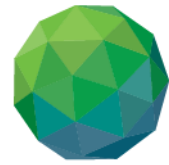


READINESS & PREPARATORY SUPPORT PROPOSAL TEMPLATE



GREEN
CLIMATE
FUND

Proposal title:	Scaling up the Use of Earth Observations and Unmanned Aerial Vehicles (UAVs) to Improve Agricultural Monitoring and Climate Resilience in the Kingdom of Eswatini
Country:	Kingdom of Eswatini
National designated authority:	Department of Meteorological Services
Implementing Institution:	The National Disaster Management Agency (NDMA)
Date of first submission:	Click or tap to enter a date.
Date of current submission / version number	Click or tap to enter a date.

Before completing this proposal template, please read the guidebook and learn how to access funding under the GCF Readiness & Preparatory Support Programme.

Download the guidebook:
https://www.g.cf/readiness_guidebook



How to complete this document?

This document should be completed by National Designated Authorities (NDA) or focal points with support from their Delivery Partners where relevant. Once completed, this document should be submitted to the GCF by the NDA or focal point via the **online submission system**, accessible through the Country Portal of the GCF website.

Please be concise. If you need to include any additional information, please attach it to the proposal.

If the Delivery Partner implementing the Readiness support is not a GCF Accredited Entity for project Funding Proposals, please complete the Financial Management Capacity Assessment (FMCA) questionnaire and submit it prior to or with this Readiness proposal. The FMCA is available for download at the [Library](#) page of the GCF website.

Where to get support?

If you are not sure how to complete this document, or require support, please send an e-mail to countries@gcfund.org.

You can also complete as much of this document as you can and then send it to countries@gcfund.org, copying both the Readiness Delivery Partner and the relevant GCF Regional Desks. Please refer to the [Country Profiles](#) page of the GCF website to identify the relevant GCF Country Dialogue Specialist and Regional Advisor.

We will get back to you within five (5) working days to acknowledge receipt of your submission and discuss the way forward.

Note: Environmental and Social Safeguards and Gender

Throughout this document, when answering questions and providing details, please make sure to pay special attention to environmental, social and gender issues, particularly to the situation of vulnerable populations, including women and men. Please be specific about proposed actions to address these issues. Consult Annex IV of the Readiness Guidebook for more information.

Please visit the Country Portal on the GCF website to submit this proposal via the online system.

When submitting the proposal, please name the file:
 GCF Readiness -[Country]-[yyymmdd]

1. SUMMARY

1.1 Country submitting the proposal	Country name:	Kingdom of Eswatini	
	Name of institution representing NDA or Focal Point:	National Disaster Management Agency	
	Name of contact person:	Mr. Eric Seyama	
	Contact person's position:	Director of Research	
	Telephone number:	+268 7603 4505	
	Email:	eric@ndma.org.sz	
	Full office address:	Rhus Office Park, Lot 195, Karl Grant Street, Mbabane H100, Eswatini	
	Additional email addresses that need to be copied on correspondences:	bafanasim@gmail.com	
1.2 Date of initial submission	Click or tap to enter a date.		
1.3 Last date of resubmission	Click or tap to enter a date. (Please update for each resubmission.)	Version number	V.##
1.4 Which institution will implement the Readiness and Preparatory Support project?	<input checked="" type="checkbox"/> National designated authority <input type="checkbox"/> Accredited entity <input type="checkbox"/> Delivery partner		
	Please provide contact information if the implementing partner is not the NDA/focal point		
	Name of institution:	Type here	
	Name of official:	Type here	
	Position:	Type here	
	Telephone number:	Type here	
	Email:	Type here	
	Full office address:	Type here	

	Additional email addresses that need to be copied on correspondences:	Type here
1.5 Title of the Readiness support proposal	Scaling up the Use of Earth Observations and Unmanned Aerial Vehicles (UAVs) to Improve Agricultural Monitoring and Climate Resilience in the Kingdom of Eswatini	
1.6 Type of Readiness support sought	<p>Please select the relevant GCF Readiness objective(s) below (click on the box – please refer to Annex I and II in the Guidebook):</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> I. Capacity building <input checked="" type="checkbox"/> II. Strategic frameworks <input checked="" type="checkbox"/> III. Adaptation planning <input checked="" type="checkbox"/> IV. Pipeline development <input checked="" type="checkbox"/> V. Knowledge sharing and learning 	
1.7 Brief summary of the request	<p>Agriculture is the most important sector for the majority of Eswatini's population, as well as national food security and economic development contributing about 9.5% of the country's GDP. Smallholder agriculture is the primary source of rural livelihoods, with over 70% of the country's total population relying on subsistence farming and women accounting for 60% of that group. Crop production among smallholder farmers is mainly rain-fed and it is thus the most vulnerable to climate change. Climate change impacts have negatively affected the most climate-vulnerable communities particularly smallholder farmers, increasing poverty levels and food insecurity, as well as limiting access to basic services. The vulnerability profile in the country indicates that 60% of the population experiences medium to high vulnerability to climate-driven hazards exacerbated by underlying socio-economic conditions, including poverty. The country's agricultural vulnerability assessment information relies on pre-planting and post-harvest assessments, and oftentimes the annual National Agricultural Survey which aims to provide information on cropped areas through questionnaires and field surveys not consistently conducted due to resource and technology constraints. As a result, the country lacks continuous crop growth monitoring and assessment tools and technologies for quick and early detection of undesirable threats and occurrence of risks and hazards to food security. With Unmanned Aerial Vehicles (UAV) technology and satellite earth observations, it is expected that such assessments can be done with minimal human resources and during any phase of crop growth in order to deliver timely interventions.</p> <p>The proposed project under this Readiness Proposal intends to build on the successes of the pilot study and the need to support the implementation of the NAP by further enhancing the capacity of national stakeholders on the application of UAV technology and remote sensing technologies for agricultural monitoring and provision of timely early warning data to local stakeholders</p>	

	<p>including farmers. In this context, the proposed project will have four expected outcomes:</p> <ol style="list-style-type: none"> 1. Strengthened institutional and technical capacity to utilize earth observations and UAV technologies for agricultural monitoring and climate resilience; 2. Improved delivery of accurate and timely climate information to national policymakers, technical officers and local communities; 3. Improved gender considerations in the implementation of technologies for agricultural monitoring and climate resilience; 4. Improved knowledge management frameworks for the collection and maintenance of national knowledge in agricultural monitoring, vulnerability assessments and climate change adaptation practices <p>This Readiness proposal will build the necessary capacity to implement an operational program that will provide important information for adaptation planning as part of the national adaptation and resilience programming.</p>	
<p>1.8 Total requested amount and currency</p>	<p>USD 1,965,147</p>	<p>1.9 Implementation period 36 months</p>
<p>1.10 Is this request a multiple-year strategic Readiness implementation request?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>For more information on how a country may be eligible to access Readiness support through this modality, please refer to Annex IV of the Readiness Guidebook.</p>	
<p>1.11 Complementarity and coherence of existing readiness support</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Has the country received or is expecting to receive other Readiness and Preparatory Support funding allocations (including adaptation planning) from GCF or other donors? If yes, please briefly describe the scope of support provided or expected to be provided by the GCF and/or other institutions including other climate funds (GEF, AF) UN agencies, multilateral development banks and/or bilateral agencies. Please also provide the implementation status of each approved readiness intervention.</p>	

2. SITUATION ANALYSIS

Please elaborate on the country's current situation in the context of climate change, specifically with regards to capacities, technical gaps, and governance for climate finance. Please describe the specific Readiness needs in the form of a problem statement that the proposal aims to address.

Provide clear linkages to existing capacities, enabling environments, and programming processes that the proposal will build on and how they relate to the key barriers and/or gaps will be addressed through the proposed activities.

Please also describe past and ongoing efforts undertaken by public and/or private sectors, and other complementary GCF Readiness grants or funding proposals.

Please define the objective clearly and the anticipated deliverables that would contribute to filling the existing gaps.

Please refer to the Guidebook (Part III, Section 2) for more specific information on completing this section.

Eswatini is landlocked with a total population of 1.2 million shares borders with South Africa and Mozambique. Although the country is classified as lower middle income, 58% of people in rural areas live below the national poverty line, and 25% are extremely poor. Agriculture is the most important sector for the majority of Eswatini's population, as well as national food security and economic development contributing about 9.5% of the country's GDP. Smallholder agriculture is the primary source of rural livelihoods, with over 70% of the country's total population relying on subsistence farming and women accounting for 60% of that group. Crop production among smallholder farmers is mainly rain-fed and it is thus the most vulnerable to climate change. For example, in 2015/16 the country declared a national state of emergency due to drought, and experienced losses amounting to approximately 7% of GDP, and about 18% of the government's expenditure. Staple crops, especially maize, beans and sorghum have declined by more than 30% since 2014 as a result of the more frequent droughts which has also seen shrinkage of cultivated areas. Climate projections foresee a decrease of 4.19% in maize productivity and of 17.84% in managed grass productivity by 2050 assuming 1995 as year of reference. Decline in staple food production indicates a likely negative impact on the country's food security leaving smallholder farmers highly vulnerable to food insecurity.

Significant climate changes have been observed in Eswatini over the last 30 years. These changes include increased frequency of hydro-climatological disasters (droughts and storms), changes in rainfall regimes, including heavy rainfall events and extreme weather conditions. Eswatini's Third National Communication to the United Nations Framework Convention on Climate Change highlighted several impacts of climate change the country has already experienced, noting that the intensity and frequency of extreme weather events such as droughts and heat waves have increased over the past few years. These impacts have negatively affected the most climate-vulnerable communities particularly smallholder farmers, increasing poverty levels and food insecurity, as well as limiting access to basic services. The vulnerability profile in the country indicates that 60% of the population experiences medium to high vulnerability to climate-driven hazards exacerbated by underlying socio-economic conditions, including poverty.

According to the World Bank Group's Climate Change Knowledge Portal (CCKP) the mean monthly temperature of the country has ranged between 15°C and 23.4°C from 1991 – 2020. The most substantial warming on record occurred between 2000 and 2010 and climate projections for the country predict temperature increases of 1.5 – 2.5°C by the 2046–2065 period. During the same time period (1991 – 2020), the mean monthly precipitation of the country varied from 11.9 mm in June to 143.3 mm in January, which resulted in an annual total average rainfall of 810.8 mm. Precipitation varies considerably from year to year, which either may lead to periods of flash flooding or drought. Drought is an inherent feature because rain seasons have become shorter while the frequency, intensity and duration of dry spells keeps increasing. While no significant change in mean annual rainfall is predicted, the frequency and intensity of extreme rainfall events and droughts are projected to continue to increase by 13–20% by 2050. Coupled with an increase in pests and diseases, and exacerbated by unemployment and increasing food commodity prices, major constraints have been placed on food security. Significant rainfall deficits or cessation at critical stages of crop growth have frequently led to a serious shortfall in crop production, especially maize, the staple crop in Eswatini impacting about 75% of the population in rural subsistence farming families.

The country's agricultural vulnerability assessment information relies on pre-planting and post-harvest assessments, and oftentimes the annual National Agricultural Survey which aims to provide information on cropped areas through questionnaires and field surveys not consistently conducted due to resource and technology constraints. As a result, the country lacks continuous crop growth monitoring and assessment tools and technologies for quick and early detection of undesirable threats and occurrence of risks and hazards to food security. With Unmanned Aerial Vehicles (UAV) technology and satellite earth observations, it is expected that such assessments can be done with minimal human resources and during any phase of crop growth in order to deliver timely interventions.

In response to the country's drought risk, the National Disaster Management Agency (NDMA) and the National Designated Entity (NDE) of Eswatini; the Eswatini Meteorological Service and the Regional Centre for Mapping of Resources for Development (RCMRD) requested support for technical assistance from the Climate Technology Centre and Network (CTCN) with the overall objective to strengthen Eswatini's climate resilience, disaster risk reduction and vulnerability assessments in the agricultural sector using a case study approach. Under the pilot study, a guiding framework was developed to enhance the capacity of national agencies in Eswatini to monitor agricultural conditions through the use of UAVs and satellite remote sensing technologies. This framework was complemented by training on drone usage, climate data improvements and analysis, and generation of yield forecasts from remote sensing data from satellites and the UAVs, and field survey data. These activities were further augmented by a gender analysis with a focus on finding gaps and opportunities for improving gendered outcomes through technology implementation in the agricultural sector. At the end of the pilot study, further needs were identified to scale up these pilot interventions across the country. The NDMA has already purchased high capacity fixed-wing drones in readiness for a scale up program and as part of the recommendations made from the pilot study.

The country received a Readiness grant from the GCF to implement a capacity building project to advance the National Adaptation Plan process. This project was implemented between 2018-06-28 to 2021-06-27. The NAP process was expected to be completed in 2022 and the initial adaptation communication to the UNFCCC identified “international funding and support to build the adaptive capacity and climate resilience of the Kingdom’s vulnerable populations and communities. Meeting the country’s adaptation goals is conditional upon receiving external support, including finance, technology development and transfer, and capacity building.”

The proposed project under this Readiness Proposal intends to build on the successes of the pilot study and the need to support the implementation of the NAP by further enhancing the capacity of national stakeholders on the application of UAV technology and remote sensing technologies for agricultural monitoring and provision of timely early warning data to local stakeholders including farmers. In this context, the proposed project will have four expected outcomes:

1. Strengthened institutional and technical capacity to utilize earth observations and UAV technologies for agricultural monitoring and climate resilience;
2. Improved delivery of accurate and timely climate information to national policymakers, technical officers and local communities;
3. Improved gender considerations in the implementation of technologies for agricultural monitoring and climate resilience;
4. Improved knowledge management frameworks for the collection and maintenance of national knowledge in agricultural monitoring, vulnerability assessments and climate change adaptation practices

This Readiness proposal, if funded, will build the necessary capacity to implement an operational program that will provide important information for adaptation planning as part of the national adaptation and resilience programming.

3. LOGICAL FRAMEWORK

Outcomes	Baseline ¹	Targets	Outputs	Activities (brief description)	Deliverables ²
Outcome 1: Strengthened institutional and technical capacity to utilize earth observations and UAV technologies for agricultural monitoring and climate resilience	The NDA and NDE are established but lacks sufficient capacity to implement an operational agricultural monitoring program that utilizes earth observations and UAVs. The country's UAV policies are also evolving but require	The NDA and NDE are capacitated to provide earth observation and UAV-based services to national stakeholders involved in agricultural value chains	Output 1.1: Establishment of frameworks and guidelines for climate, environmental and agricultural monitoring systems that utilize earth observations and UAV technologies	Activity 1.1.1a: Implement a national-wide program for the application of UAV and remote sensing technology for vulnerability assessments and response planning to enhance national food security and climate resilience	Deliverable 1.1.1a: Finalized coordination guidelines for a national earth observation based agricultural monitoring program
				Activity 1.1.1b: Apply and refine the "Framework for the use of Unmanned Aerial Vehicles and Satellite Data for Agricultural Monitoring in the Kingdom of Eswatini" developed during the piloting phase of the Technical Assistance funded by CTCN	Deliverable 1.1.1b: Revised framework and specifications for the use of UAVs and earth observations for agricultural monitoring

¹ Please briefly elaborate on current baselines on which the proposed activities can be built on, processes that are in place that the current Readiness proposal can strengthen, or any gaps that the proposed activities would fill in. If more space is needed, please elaborate this in Section 4.

² Please include tangible and specific deliverables for each activity proposed, Please note that during implementation all deliverables should be included within the implementation reports for GCF consideration.

Outcomes	Baseline ¹	Targets	Outputs	Activities (brief description)	Deliverables ²			
	strengthening to take full advantage of these technologies to speed up climate resilience		Output 1.2: Training provided for government agencies, non-governmental organizations, research institutions and the private sector to utilize earth observation data and geospatial tools for climate resilience	Activity 1.2.1a: Train national stakeholders in the climate and agricultural sectors on the use of earth observation data and geospatial tools for climate monitoring, vulnerability assessments and crop condition monitoring	Deliverable 1.2.1a: Training workshop reports Deliverable 1.2.1b: Climate data analysis tools (GeoCLIM and R Scripts) Deliverable 1.2.1c: Vulnerability mapping training manual Deliverable 1.2.1d: Crop condition monitoring tools (R scripts, QGIS and satellite data)			
				Activity 1.2.1b: Train national stakeholders on the use of drones for crop condition monitoring, and environmental management	Deliverable 1.2.1b: Drone mapping guidelines, training manual and data for land cover mapping, training workshop reports			
				Output 1.3: Earth Observation based agricultural monitoring program established to provide timely early warning information to national stakeholders and local communities	Activity 1.3.1a: Establish a GEOGLAM-based national crop monitoring program	Deliverable 1.3.1a: National Crop Monitor		
				Activity 1.3.1b: Set up a national crop monitoring group comprised of key stakeholders	Deliverable 1.3.1b: Consultation workshop reports			
			Outcome 2:	The NDA relies on the	The NDA and NDE are	Output 2.1:	Activity 2.1.1a:	Deliverable 2.1.1a:

Outcomes	Baseline ¹	Targets	Outputs	Activities (brief description)	Deliverables ²
Improved capacity of the meteorological services department to provide timely climate information to national stakeholders including the Eswatini Vulnerability Assessment Committee (EVAC)	NDE for climate related data, mostly derived from in-situ observations that are inadequate for monitoring and forecasting	capacitated to improve climate data availability using satellite-based sources, and to provide timely early warning information to stakeholders	Access to improved, consistent and reliable satellite-based climate data and tools to guide climate information generation is enabled	Develop, establish and strengthen tools that enable access to analysis-ready gridded climate data	Climate data analysis tools (GeoCLIM and R Scripts)
				<p>Activity 2.1.1b: Establish tools for integrating satellite and ground station data to improve accuracy and reliability</p>	<p>Deliverable 2.1.1b: In-situ and satellite climate data integration tool</p>
				<p>Activity 2.1.1c: Train the meteorological services department and agrometeorology stakeholders on climate data analysis</p>	<p>Deliverable 2.1.1c: Training reports</p>
			<p>Output 2.2: Reliable and accurate climate data and information is delivered to national stakeholders and local communities to guide</p>	<p>Activity 2.1.1d: Climate data integration from rain gauges and gridded satellite-based climate data</p>	<p>Deliverable 2.2.1: Improved gridded climate data</p>

Outcomes	Baseline ¹	Targets	Outputs	Activities (brief description)	Deliverables ²
			both operational and long-term strategic planning		
<p>Outcome 3: Improved gender considerations in the implementation of technologies for agricultural monitoring and climate resilience</p>	<p>Women make up the largest proportion of Eswatini's small-scale farmers and are the most affected by climate change impacts on agricultural production. Additionally, gender-disaggregated data remain sparse, which hinders problem identification and trends analysis with respect to women's</p>	<p>Gender considerations are mainstreamed in the implementation of agricultural technologies</p>	<p>Output 3.1: Integrated gender equality and social inclusion in the implementation of agricultural technologies to minimize gender-related risks from climate impacts</p>	<p>Activity 3.1.1a: Collect and generate gender-disaggregated data on the impacts of implementing proposed agricultural monitoring and climate resilience technologies on female and male farmers</p> <p>Activity 3.2.1a: Carry out a comprehensive gender analysis during project implementation with a particular focus on women's climate vulnerabilities and their role as active agents and farmers in strengthening climate resilience through their contribution to disaster risk reduction, vulnerability assessments and crop monitoring</p>	<p>Deliverable 3.1.1: Gender disaggregated data on the impacts of the proposed project</p> <p>Deliverable 3.2.1: Comprehensive gender analysis report</p>

Outcomes	Baseline ¹	Targets	Outputs	Activities (brief description)	Deliverables ²
	empowerment in agriculture				
<p>Outcome 4: Improved knowledge management frameworks for the collection and maintenance of national knowledge in agricultural monitoring, vulnerability assessments and climate change adaptation practices</p>	<p>Knowledge management systems exist in the country but require strengthening, especially in regard to agricultural technologies</p>	<p>Knowledge management practices and systems are improved—from data collection to information delivery to decision and policymakers</p>	<p>Output 4.1: A forum established to promote the collaboration of research initiatives in the country, with a focus on utilization of earth observations and UAV technologies for adaptation to climate change</p>	<p>Activity 4.1.1a: Hold workshops with researchers and technical experts to plan interdisciplinary research projects on climate change adaptation through the use of remote sensing and UAV technologies</p>	<p>Deliverable 4.1.1a: Stakeholder consultation workshop reports</p>
			<p>Output 4.2: Awareness-raising program to share lessons learned with stakeholders, ranging from policy- and decision-</p>	<p>Activity 4.1.1b: Establish a forum of researchers and technical experts working on climate change adaptation using remote sensing and UAV technologies to coordinate climate change research initiatives in the country</p>	<p>Deliverable 4.1.1b: Technical-policy forum establishment report</p>
				<p>Activity 4.2.1: Develop a detailed communications strategy – building on the communication and outreach strategy to share lessons learned from the project with relevant national and local</p>	<p>Deliverable 4.2.1: Comprehensive communication and outreach strategy</p>

Outcomes	Baseline ¹	Targets	Outputs	Activities (brief description)	Deliverables ²
			makers to vulnerable communities in the country	community stakeholders through appropriate media	

4. THEORY OF CHANGE

Please explain how the activities proposed in the Logical Framework will help deliver on the country's readiness needs and build on institutions, processes or existing work already underway in the country

Please provide an explanation of how the proposal will advance national climate priorities, especially those identified in nationally determined contributions (NDCs), national adaptation plans (NAPs), and other relevant national climate change strategies. Please describe how the various Outcomes, Outputs, activities and deliverables from the Logical Framework in Section 3 address the core Readiness challenges identified in the Situation Analysis in Section 2.

Please include a theory of change (ToC) diagram, which helps articulate, understand and track the multiple pathways and linkages between outcomes, outputs, and activities by identifying the desired long-term goals with preconditions and/or interventions that are necessary for change to occur in achieving the desired goal.

Please see Part III, Section 4 in the Readiness Guidebook for further instructions on how to complete this section depending on the type of Readiness support being requested.

The proposed project will result in increased resilience to climate change impacts in the Kingdom of Eswatini. Specifically, this project will involve the use of remote sensing, geospatial technologies and unmanned aerial vehicles (drones) to improve environmental monitoring, agricultural condition monitoring and disaster risk reduction. This goal will be achieved by attaining the outcomes below:

Outcome 1: Strengthened institutional and technical capacity to utilize earth observations and UAV technologies for agricultural monitoring and climate resilience

There is limited use of earth observations and UAVs in Eswatini for agricultural and environmental monitoring to enhance climate resilience. This limitation is primarily driven by lack of institutional capacities including facilitative and regulatory mechanisms for the use of drones, and limited technical capacity for mandated agencies to use these technologies to drive climate resilience related services for decision making. The proposed project will address these gaps by scaling up interventions from the pilot study that was implemented in 2021-2022 funded by the UNFCCC Climate Technology Center Network (CTCN). By implementing activities proposed under this outcome, it is expected that the capacity of key stakeholder agencies identified during the pilot study will be strengthened resulting in increased use of the technologies across the country. This outcome will be attained through the following outputs:

1. Establishment of frameworks and guidelines for climate, environmental and agricultural monitoring systems that utilize earth observations and UAV technologies
2. Training provided for government agencies, non-governmental organizations, research institutions and the private sector to utilize earth observation data and geospatial tools for climate resilience
3. Agricultural monitoring systems established to provide timely early warning information to national stakeholders and local communities

The outputs will be achieved by implementing the following activities:

1. Implement a national-wide program for the application of UAV and remote sensing technology for vulnerability assessments and response planning to enhance national food security and climate resilience
2. Apply and refine the “Framework for the use of Unmanned Aerial Vehicles and Satellite Data for Agricultural Monitoring in the Kingdom of Eswatini” developed during the piloting phase of the Technical Assistance funded by CTCN
3. Develop additional frameworks and guidelines to support the scale up of climate and agricultural technologies and interventions across the country
4. Train national stakeholders in the climate and agricultural sectors on the use of earth observation data and geospatial tools for climate monitoring, vulnerability assessments and crop condition monitoring
5. Train national stakeholders on the use of drones for agricultural monitoring, disaster risk reduction and environmental management
6. Identify, collect datasets, and develop agricultural monitoring systems (crop mapping, crop condition monitoring, crop yield forecasting)

Outcome 2: Improved delivery of accurate and timely climate information to national policymakers, technical officers and local communities

This outcome is closely related with Outcome 1. During the pilot phase, it was noted that the availability of accurate and reliable climate information is hindered by an inadequate in-situ climate monitoring network and oftentimes, persistent inconsistencies in data collected by the existing networks. As such, resultant products from data collected by these networks have had glaring discrepancies that have had an implication on understanding historical climate trends and providing sufficiently accurate climate information to users in the country. The proposed project intends to address this challenge by implementing activities that improve the availability, access and technical capacity of the meteorological services to collect and improve ground-based climate data with satellite-based climate data.

Outcome 2 will result in the following outputs:

1. Access to improved, consistent and reliable satellite-based climate data and tools to guide climate risk assessments
2. Reliable and accurate climate data and information is delivered to national stakeholders and local communities to guide both operational and long-term strategic planning

These outputs will in turn be attained by implementing the following activities:

1. Develop, establish and strengthen tools that enable access to analysis-ready climate data from satellite sources
2. Establish tools for integrating satellite and ground station data to improve accuracy and reliability
3. Train the meteorological services department and agrometeorology stakeholders on climate data analysis
4. Provide technical training meteorological services department to provide timely climate information to national stakeholders including the Eswatini Vulnerability Assessment Committee (EVAC)

Outcome 3: Improved gender considerations in the implementation of technologies for agricultural monitoring and climate resilience

The government of the Kingdom of Eswatini recognizes gender inequality as an impediment to sustainable national development and has backed its constitutional guarantees of equality with a number of statutes, policies, and strategies. These include its 2004 ratification of the United Nations Convention on the Elimination of All Forms of

Discrimination against Women (CEDAW), its National Gender Policy (2010), and its 2018 Sexual Offences and Domestic Violence Bill. These enabling mechanisms have provided an opportunity to make progress toward gender equality in Eswatini. However, gender disparities in the agricultural sector continue to be an obstacle to improving women's agricultural outcomes. These disparities include access to land, and technologies that can spur agricultural productivity and market access. Regionally, as it applies in Eswatini, there is evidence that women benefit less than men, in terms of increased agricultural productivity from extension advice that their households receive, suggesting that current agricultural extension programs may be better attuned to the needs of male farmers. These crucial new findings will empower governments and development organizations to better tailor policies and programs to those issues and constraints that are most critical to the livelihoods of women farmers in their countries.

The implementation of earth observations and UAV technologies to improve agricultural productivity could have varying gender outcomes and as such, it is important to assess the impact of these technologies on different genders. This outcome will attain this objective through the following output:

1. Integrated gender equality and social inclusion in the implementation of agricultural technologies to minimize gender-related risks from climate impacts

In turn, this output will be achieved by implementing the following activities:

1. Collect and generate gender-disaggregated data on the impacts of implementing proposed agricultural monitoring and climate resilience technologies on female and male farmers
2. Carry out a gender analysis during project implementation with a particular focus on women's climate vulnerabilities and their role as active agents and farmers in strengthening climate resilience through their contribution to disaster risk reduction, vulnerability assessments and crop monitoring

Outcome 4: Improved knowledge management frameworks for the collection and maintenance of national knowledge in agricultural monitoring, vulnerability assessments and climate change adaptation practices

To promote the coordination between researchers, technical experts and policy- and decision-makers, a knowledge management forum with a focus on earth observation technologies, UAVs and climate change adaptation will be established. This forum will be established in collaboration with national institutions, including national networks implementing agricultural monitoring programs like the EVAC, women agricultural groups, and research institutions. By supporting collaborative research efforts and a knowledge management practice based on collaboration, the proposed project's interventions can increase the evidence base to leverage funds to address climate change adaptation and agricultural productivity. To attain this, the following outputs and activities will be realized:

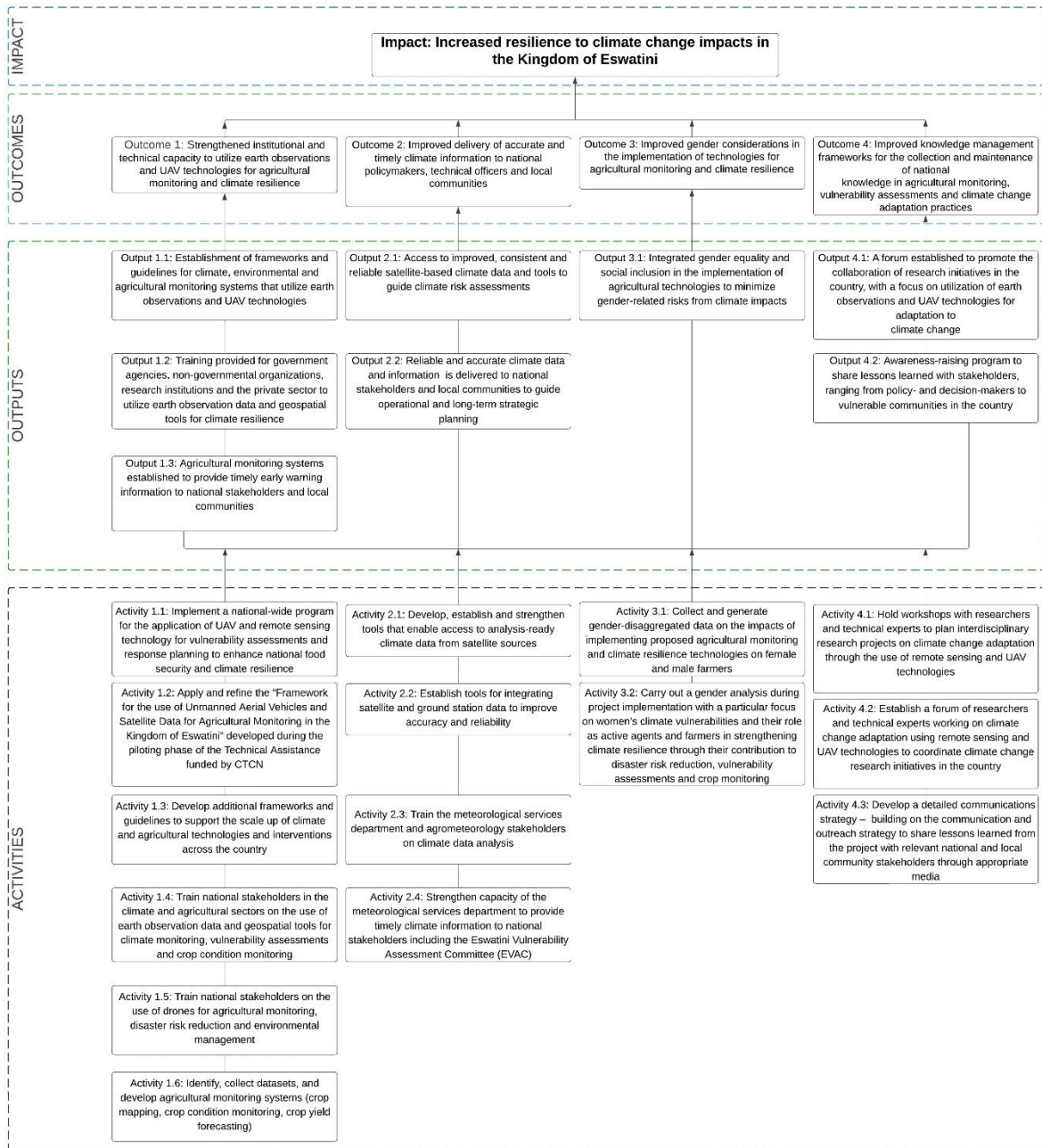
Outputs:

1. A forum established to promote the collaboration of research initiatives in the country, with a focus on utilization of earth observations and UAV technologies for adaptation to climate change
2. Awareness-raising program to share lessons learned with stakeholders, ranging from policy- and decision-makers to vulnerable communities in the country

Activities:

1. Hold workshops with researchers and technical experts to plan interdisciplinary research projects on climate change adaptation through the use of remote sensing and UAV technologies
2. Establish a forum of researchers and technical experts working on climate change adaptation using remote sensing and UAV technologies to coordinate climate change research initiatives in the country
3. Develop a detailed communications strategy – building on the communication and outreach strategy to share lessons learned from the project with relevant national and local community stakeholders through appropriate media

The TOC is illustrated below:



5. BUDGET, PROCUREMENT, IMPLEMENTATION AND DISBURSEMENT PLAN

5.1 Budget plan

Please complete the Budget Plan in Excel using the template available in the [Library](#) page of the GCF website.

(Included in attachment of this Readiness Proposal)

5.2 Procurement plan

Please complete the Procurement Plan in Excel using the template available in the [Library](#) page of the GCF website. For goods, services, and consultancies to be procured, please list the items, descriptions in relation to the activities in section 2, estimated cost, procurement method, relevant threshold, and the estimated dates. Please include the procurement plan for at least the first tranche of disbursement requested below and provide a full procurement plan for the entire duration of the implementation period if available at this stage.

(Included in attachment of this Readiness Proposal)

5.3 Implementation Plan

Please complete the Implementation Plan in Excel using the template available in the [Library](#) page of the GCF website.

(Included in attachment of this Readiness Proposal)

5.4 Disbursement schedule

Please specify the proposed schedule for requesting disbursements from the GCF. For periodicity, specify whether it's quarterly, bi-annually or annually only.

The disbursement schedule will be annually, allowing three (3) disbursements during the period of the project implementation to be implemented as follows:

- First disbursement at the beginning of project implementation
- Second disbursement at the beginning of the second year
- Third disbursement at the beginning of the third year

Please choose one option among the two below and delete the one that does not apply to you. Please fill in information under brackets:

Readiness Proposal that requires a bilateral Grant Agreement

- Please include an indicative disbursement table showing the expected amounts to be requested and keep to multiples of USD 5,000.
- The first disbursement *amounting* USD 595,000 will be transferred upon approval of the readiness request and effectiveness of the Grant Agreement;
- The second disbursement *amounting* USD 975,000 will be transferred upon submission of an interim progress report [and audited financial report]³, in form and substance acceptable to the Fund, [including an audited expenditure statement]; and
- The third disbursement *amounting* USD 395,147 will be made upon submission of a completion report and financial report, in form and substance acceptable to the Fund, including an audited expenditure statement.

6. IMPLEMENTATION ARRANGEMENTS AND OTHER INFORMATION

6.1 Implementation arrangements

Please describe how implementation arrangements will be made and how funds will be managed by the NDA and/or the Delivery Partner.

Describe which organization will be the central entity and how the stakeholders will be coordinated to enable implementation of the grant. The responsible party who will oversee day to day activities as well as own the deliverables and the role of other stakeholders need to be clarified.

Please describe the differing responsibilities of the NDA and their Delivery Partner for the management of the grant, procurement, implementation of activities, project oversight, monitoring, and reporting. If applicable, please also describe any delegation of responsibility from the Delivery Partner to another Executing Entity.

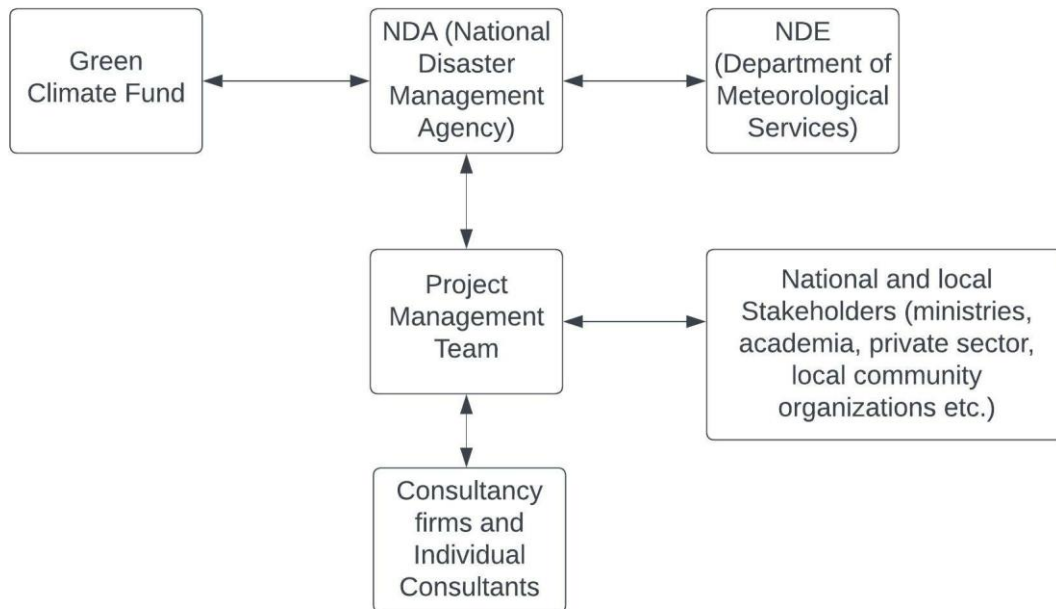
A clear schematic diagram should be presented to illustrate the implementation arrangements.

Please see **Part III Section 6.1 of the Readiness Guidebook** for further information on how to complete this section.

The NDA will provide overall leadership and implementation of the proposed project, in consultation with the NDE. It will be the sole responsibility of the NDA to engage with the GCF and the project implementation team, consultants and other entities. The Project

³ For second disbursement, audited financial report and audited expenditure statement are only required for readiness and preparatory support proposals expected to last over 12 months.

implementation team will have direct engagement with the NDA and will report directly to NDA. This team will also provide support to other implementing partners/entities as needed and will coordinate and engage with the consultancy firms and individual consultants. The Consultants will report directly to the Project Manager.



6.2 Implementation and execution roles and responsibilities

Please briefly describe how the activities will be implemented and outputs delivered by project staff and consultants.

Please describe the roles and responsibilities for identified project staff and consultants, such as international and/or local technical experts, project manager/coordinator, project assistant, procurement personnel, and finance and administrative personnel. Please include this information for Delivery Partner staff/consultants and for those of the Executing Entity(ies), if any. Please see **Part III Section 6.2 of the Readiness Guidebook** for further information on how to complete this section.

The proposed Project Manager will take overall coordination of the implementation of activities specified in this proposal. The PM will also supervise the project implementation team and provide direct link between the consultant teams and the NDA.

The Technical Expert will provide technical leadership in the implementation of all activities that require technical services including data collection, analysis and reporting.

The Project Assistant will provide assistance to the Project Manager to ensure successful implementation of the project.

The Finance Assistant will provide financial services and manage contractual agreements between the NDA and other partners.

Two consultancy firms are envisaged: 1) the first will provide leadership and overall implementation of Outcomes 1 and 2 whereas 2), the second firm will provide gender strategy development leadership. Both firms will be reporting directly to the Project Manager and will work closely with the project implementation team and other stakeholders as needed.

Local consultants will be hired on a needs basis to support the implementation of Outcomes 1-4. An international consultant (climate scientist) will be recruited to provide technical assistance to the NDE and other stakeholders in development of climate data analysis tools and capacity building for national stakeholders. Both consultants will report directly to the Project Manager.

6.3 Risks and mitigation measures

Please include a set of identified risks and mitigation actions for each. Please utilize the risk table below that identifies the probability of a given risk occurring and the entity that will manage the risk. Please refer to Part III Section 6.3 of the Readiness Guidebook for further information on how to complete this section.

Risk category	Specific risk(s) / Risk(s) description	Probability of occurrence (low, medium, high)	Impact level (low, medium, high)	Mitigation action(s)	Entity(ies) responsible to manage the risk(s)
Stakeholder engagement	Working with different stakeholders with varying priorities and activities	low	low	Project steering committee will support the mobilization and coordination of relevant stakeholders	NDA
Political	Risk that potential political changes or instability in the country may affect the successful implementation of the Readiness	low	high	In case of high political instability affecting the ability of the team to implement proposed activities, the activities will be suspended and resumed when more favorable	NDA

Risk category	Specific risk(s) / Risk(s) description	Probability of occurrence (low, medium, high)	Impact level (low, medium, high)	Mitigation action(s)	Entity(ies) responsible to manage the risk(s)
				conditions are met.	
Recruitment	Recruitment of staff, individual consultant and consulting firms	low	low	ToRs developed in time and recruitment process completed prior to official kick-off of projects	NDA
Project Implementation	Disagreement amongst stakeholders with regards to implementation on sites.	low	low	There will be a participatory approach to the proposed project, particularly with regard to selection of implementation on sites.	NDA and NDE
Implementation delays	Loss of government support may result in lack of prioritization of proposed project activities.	low	low	Regular stakeholder consultation and involvement will be undertaken to ensure that the government maintains its commitment and considers the proposed project as a support to its forestry and agriculture programmes.	NDA

Risk category	Specific risk(s) / Risk(s) description	Probability of occurrence (low, medium, high)	Impact level (low, medium, high)	Mitigation action(s)	Entity(ies) responsible to manage the risk(s)
Institutional capacity	Institutional capacities and relationships are not sufficient to provide effective solutions to climate problems that are complex and multi-sectoral.	low	medium	Proposed Project Design Includes the Development Of Institutional capacity. This will ultimately lead to the development of an appropriate institutional framework for analyzing climate change impacts on food supply, altering policy and implementing interventions.	NDA and NDE
Gender consideration	Project implementation does not consider gender equity.	low	medium	Therefore, the proposed project is designed to promote gender equity.	NDA
Financial	Money laundering, terrorist financing, or prohibited practices	low	low	The delivery partner has a decentralized financial management system, which would enable additional oversight and risk mitigation measures	NDA

6.4 Monitoring

Please describe the monitoring plan. Please refer to **Part III Section 6.4 of the Readiness Guidebook** for further information on how to complete this section.

Outputs and Activities as described in the Response Plan	Indicator	Expected Results	Method and Frequency for data collection	Comments
Output 1.1: Establishment of frameworks and guidelines for climate, environmental and agricultural monitoring systems that utilize earth observations and UAV technologies	Number of organizations utilizing UAV and remote sensing technology for vulnerability assessments and response planning to enhance national food security and climate resilience. Number of organizations using the “Framework for the use of Unmanned Aerial Vehicles and Satellite Data for Agricultural Monitoring in the Kingdom of Eswatini”	Guidelines for a national earth observation based agricultural monitoring program. A refined framework and specifications for the use of UAVs and earth observations for agricultural monitoring	Technical report Meeting minutes	Clear stipulation of the guidelines Full cooperation and support from the key stakeholders

Activities:

Activity 1:1: Implement a national-wide program for the application of UAV and remote sensing technology for vulnerability assessments and response planning to enhance national food security and climate resilience.

Activity 1:2: Apply and refine the “Framework for the use of Unmanned Aerial Vehicles and Satellite Data for Agricultural Monitoring in the Kingdom of Eswatini” developed during the piloting phase of the Technical Assistance funded by CTCN.

Activity 1:3: Develop additional frameworks and guidelines to support the scale up of

climate and agricultural technologies and interventions across the country.				
Output 1.2: Training provided for government agencies, non-governmental organizations, research institutions and the private sector to utilize earth observation data and geospatial tools for climate resilience	Number of participants identified	Training on the use of remote sensing and UAVs technology for agricultural monitoring.	Training reports and materials.	Government agencies, non-governmental organizations, research institutions and the private sector will apply remote sensing and UAVs technology for agricultural monitoring.
	Number of people trained on use of earth observation data and geospatial tools for climate resilience Anticipated number of beneficiaries who have benefited directly or indirectly as a result of the training on remote sensing and UAVs technology	Climate datasets and analysis tools (GeoCLIM and R scripts) Vulnerability maps Crop condition assessment maps List of beneficiaries (All genders and the vulnerable groups). Drone mapping guidelines, training manual and data for land cover mapping, training workshop reports	Training manuals	
Activities: Activity 1.4: Train national stakeholders in the climate and agricultural sectors on the use of earth observation data and geospatial tools for climate monitoring, vulnerability assessments and crop condition monitoring. Activity 1.5: Train national stakeholders on the use of drones for crop condition monitoring, and environmental management.				
Output 1.3:	Number of participants	National crop monitor for the	Training reports and materials.	Crop monitors will be

Earth Observation based agricultural monitoring program established to provide timely early warning information to national stakeholders and local communities	identified Number of people trained on use of Earth Observation based agricultural monitoring.	country Training on how to establish and manage a national crop monitor. Crop monitor bulletins	Training manuals Consultation report Meeting minutes	established The need for crop monitors will be identified
Activities: Activity 1.6: Identify, collect datasets and develop agricultural monitoring systems(Crop mapping, crop condition monitoring and crop yield forecasting)				
Output 2.1: Access to improved, consistent and reliable satellite-based climate data and tools to guide climate information generation is enabled	Number of stakeholders/participants retrieving climate datasets Anticipated number of beneficiaries who have benefited directly or indirectly as a result of access of timely early warning information	Climate data analysis tools(GeoCLIM, R scripts and EWX) List of beneficiaries (All genders and the vulnerable groups).	Early warning bulletins Policy briefs Reports	Coordination with Met Services
Activities: Activity 2.1: Develop, establish and strengthen tools that enable access to analysis-ready climate data from satellite sources				
Output 2.2 Reliable and accurate climate data and information is delivered to	Number of people trained on climate data analysis Number of	Enhanced integrated rainfall data products. Training on	Training Reports and manuals Meetings minutes	Coordination with Met Services and agro-met stakeholders

national stakeholders and local communities to guide operational and long-term strategic planning	people benefiting from the application of climate data information for early warning	climate data integration of station and satellite data for generation of enhanced products. EO and ground insitu blending methodologies		
<p>Activities: Activity 2.2: Establish tools for integrating satellite and ground station data to improve accuracy and reliability. Activity 2.3: Train the meteorological services department and agro-meteorological stakeholder so climate data analysis. Activity 2.4: Strengthen capacity of the meteorological services department to provide timely climate information to national stakeholders including the Eswatini Vulnerability Assessment committee (EVAC)</p>				
Output 3.1 Integrated gender equality and social inclusion in the implementation of agricultural technologies to minimize gender-related risks from climate impacts	Number of direct and indirect beneficiaries the implementation of EO and UAVs technology to reduce gendered-impacts of climate change	Sex-dissaggregated datasets Gender analysis List of beneficiaries dis-aggregated into sex for adaptation and mitigation	Training reports Gender analysis report	Collaboration and integration of gender inclusion with key stakeholders
<p>Activities: Activity 3.1: Collect and generate gender-disaggregated data on the impacts of implementing proposed agricultural monitoring and climate resilience technologies on female and male farmers. Activity 3.2: Carry out a comprehensive gender analysis during project implementation with a particular focus on women's climate vulnerabilities and their role as active agents and farmers in strengthening climate resilience through their contribution to disaster risk reduction, vulnerability assessments and crop monitoring.</p>				
Output 4.1 A forum established to promote the collaboration of	Number of participants attending the workshops	Stakeholders in the workshop Consultative meetings	Consultation report	Full participation and cooperation of stakeholders

research initiatives in the country, with a focus on utilization of earth observations and UAV technologies for adaptation to climate change	Number of organizations using earth observations and UAV technologies for adaptation to climate change	conducted Stakeholder consultation report Technical policy report/brief Working forum		
<p>Activities: Activity 4.1: Hold workshops with researchers and technical experts to plan interdisciplinary research projects on climate change adaptation through the use of remote sensing and UAV technologies. Activity 4.2: Establish a forum of researchers and technical experts working on climate change adaptation using remote sensing and UAV technologies to coordinate climate change research initiatives in the country.</p>				
Output 4.2 Awareness-raising program to share lessons learned with stakeholders, ranging from policy- and decision-makers to vulnerable communities in the country	Number of individuals/organizations reached	Comprehensive communication and outreach strategy. Communication plan. Newsletters	Meetings Reports	Effective communication plan
<p>Activities: Activity 4.3: Develop a detailed communications strategy – building on the communication and outreach strategy to share lessons learned from the project with relevant national and local community stakeholders through appropriate media.</p>				

6.5 Other Relevant Information

Please provide supplementary information regarding the sustainability of the proposed activities. Please explain how the impact of the project will be ensured in the long-term, after the expiration of the support from GCF. Please describe efforts to be made with respect to capturing lessons learned, best practices, and ensuring appropriate knowledge management. Similarly, please ensure that any information regarding capacity building and skills transfer to the NDA is captured here.

Please refer to **Part III Section 6.5 of the Readiness Guidebook** for further information on how to complete this section.

Cooperation between the delivery partner with the NDA/Focal point

The National Disaster Management Agency (NDMA) and the Eswatini Meteorological Service which is the National Designated Entity (NDE) of Eswatini

“To avoid any possible conflicts of interest deriving from the delivery partner’s role as an accredited entity, the prioritization of investments and projects in the context of this readiness grant, will be made through a broad consultation process with relevant stakeholders, including other potential implementing entities. The final validation of these priorities will be carried out through the countries’ own relevant coordination mechanism and institutional arrangements, with the participation of other government agencies, as well as representatives from civil society and private sector as the NDA deems relevant, to ensure chosen priorities are fully aligned with national plans and strategies and adequately includes inputs from consulted stakeholders.”

Capacity building

The project activities will strengthen the capacities of participating national staff from NDMA, meteorology agency, ministry of agriculture, and enrich the country’s climate change and adaptation program. By developing capacities of targeted key beneficiaries such as technical institutions in charge of climate change issues and value chain actors, local authorities as well as other technical institutions and stakeholders, the project will enable sustainability of project activities and outcomes and provide services and support to climate change adaptation and mitigation in the country on the mid and long-term.

Exit Strategy

The project outputs will significantly prepare the country to access climate finance namely Green Climate Fund, Global Environment Facility and Adaptation Fund. In this respect, the readiness is structured to complement GCF proposals planned by the Government of Eswatini in its country program. The country is in the process of conceptualizing GCF program concepts which are set to clearly benefit from the readiness program. The Government through the NDA with the support of UN agencies is coming up with a strategy for accessing the Global Environment Facility and Adaptation fund. All the project outputs contribute to preparing the coordination systems, institutional capacities and technical requirements for accessing these three funds. The outputs of the Readiness will therefore be shared with all stakeholders who are involved in assisting the country to access these funds.

Gender equality

With reference to mainstreaming gender equality, the project will support an equal active participation of women and men in all project activities. Project will set up a mechanism to ensure gender parity during the inception workshop of project activities, training on various tools, studies conducted in the sites as well as meetings with local communities to integrate their different needs and specificities according to the GCF policy on Gender.

