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Project Title: **Strengthening Early Warning System and Climate Services** in **Eswatini**

Project Number: 00116208

Implementing Partner: Ministry of Tourism and Environmental Affairs

Start Date: 01-11-2019 **End Date:** 31-12-2019 **PAC Meeting date:** 28 Feb 2019

Brief Description

The Kingdom of Eswatini is the smallest state in Southern Africa, with a population of less than 1.5 million inhabitants. The country's economy is agro-based with irrigation mainly based on rainwater which however, is highly affected by meteorological phenomena (rain pattern and intensity) and critical climatic conditions (drought periods). A large proportion of the Eswatini population is highly dependent on rain-fed agriculture and natural resources thereby making the country more vulnerable to rain variability and other negative climate events.

Several climate change studies conducted in the country indicate that Eswatini is particularly vulnerable to the increasing frequency and severity of droughts, floods, severe lightning, wind / hail storms and other climate episodes. The Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) for Eswatini (SNC 2012) recognizes that the country is highly vulnerable to climate change effects. In addition, the climate change modelling studies commissioned by the Department of Water Affairs (DWA) in 2014, over the period covering 1950–2010, indicate significant increases in both mean minimum and mean maximum temperatures, with a possible contraction of the rainy season. Consequently, these have had severe negative impacts on sectors such as agriculture, water, tourism, health and infrastructure among others resulting in increasingly adverse effects on the country's economy.

The National Meteorological Services of Eswatini (MET) was established in 1992 as a department under the Ministry of Public Works and Transport, and later transferred to the Ministry of Tourism and Environmental Affairs in order to monitor weather and climate and to issue advisories for safety of life and property; a major objective was to strongly lead Eswatini to a low carbon emission path in its sustainable socio-economic development, taking into account regional and international initiative and standards. Despite the establishment of the Early Warning System (EWS) within the MET a few years ago, the EWS is currently not effective enough to generate knowledge on climate change risks, vulnerabilities and hazards thereby inhibiting the country from conducting effective planning, monitoring, mitigating and adapting to climate change risks. Therefore, in order to improve the country's capacity to mitigate and adapt to climate-related hazards, high quality weather and climate related services are critical whereby climate monitoring, analysis and dissemination would be strengthened. In this respect, the strengthening and improvement of early warning systems and climate services will assist Eswatini to address the current EWS related gaps that include: a limited understanding of current and future climate risks; limited monitoring and forecasting of climate-related hazards; inappropriate communication and packaging of warnings; restricted adaptive responses to impending disasters; and constrained planning for slow-onset hazards.
This project is born out of an existing MOU between the Governments of the Kingdom of Eswatini and the Republic of Italy. The two states are represented by the Ministry for the Environment, Land and Sea of the Republic of Italy (IMELS) and the Ministry of Tourism and Environmental Affairs of the Kingdom of Eswatini (MTEA). UNDP, and the Italian Minister of the Environment, Land and Sea

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(IMELS), signed an agreement for EUR 7 million in support of Italian G7 Presidency commitments and UNDP Reform objectives. This project is part of a package that was agreed with the government of Eswatini in May 2017.

Strengthening Eswatini's Early Warning System and Climate Services in the selected sites, will be accomplished through the following results:
Result 1: Meteorological and Hydrological Observational network strengthened for early warning.
Result 2: Numerical weather prediction system improved
Result 3: National alert systems and protocols for information dissemination developed and operationalized.
Result 4: Improved weather and climate modelling and predictions through adoption of high-performance computing climate and forecasting technologies.

GRANT SUMMARY:

Contributing Outcome (UNDAF/CPD, RPD or GPD):

a) **UNDAF Outcome 1.2:** National institutions and communities have improved their management of natural resources by 2020.

Indicative Output(s) with gender marker[2]:

Output 1: Meteorological and Hydrological Observational network strengthened for early warning.

Output 2: Numerical weather prediction system improved

Output 3: National alert systems and protocols for information dissemination developed and operationalized.

Output 4: Improved weather and climate modelling and predictions through adoption of high-performance computing climate and forecasting technologies.

Total resources required:		**€1,066,880**
Total resources allocated:		
	UNDP TRAC:	€
	Donor (IMELS):	**€ 970,880.00**
	Government (in-kind):	€ 96 000.00
	In-Kind:	€ TBC
Unfunded:		€130,597

Agreed by (signatures)[1]:

UNDP	Government (Implementing Partner)
Print Name: Ms. Rose Ssebatindira	Print Name: Mr Emmanuel Dlamini

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Development Challenge

Climate change studies conducted in the country indicate that: The probability of severe drought and floods affecting most of the country's river basins is imminent; Mean annual surface temperatures have warmed by about 1 to 1.5□C since 1950. Ngwavuma and Mbuluzi have warmed by about 1°C. Future climate change projections suggest a warmer country, whereby by the 2050s warming of 1.5 to 3.2□C is projected assuming an A2 emissions scenario. Implicit in these simulations is a possible contraction in the rainy season. A decrease in the annual runoff suggests that there will be less water in the country's catchments given climate change. Therefore, there is a need to implement climate change adaptation strategies in the country. Nonetheless, several barriers and gaps exist that hinder the country from responding effectively to the above mentioned climate change impacts. These include: weak collection and processing of hydro□climate information and data; Low levels of capacity and human resources; Ineffective communication of climate information and early warning messages to various end user types and as well as the inability by the various sector users to integrate climate information into development planning. Detailed development challenges facing the country in relation to climate are described below.

Weather Forecasts

In Eswatini there exists an observational network for meteorological and hydrological monitoring. In particular, there are 38 river flow measurement gauges managed by the Water Sector and 83 weather stations (mainly measuring rainfall), some from the Meteorological Service, some from Ministry of Agriculture and other from private sector. Among them, 18 are Automatic Weather Stations, managed by the Meteorological Service and only few of them are included in the Global Telecommunication System GTS). However, no radiosonde launches are operated.

Currently the Meteorology Department does not run a daily numerical weather forecasting system. Daily meteorological bulletins are issued by forecasters with the help of maps provided by global numerical models from major international centres. In particular, maps from ARPEGE (Meteo France, 12km resolution), IFS (ECMWF - European Centre for Medium-range Weather Forecasts, 9km resolution) and from the Unified Model (UK Met Office, 4km resolution) are used. In addition, synoptic observations from the Eswatini observational Network, meteorological radar from South Africa and EUMETSAT satellite imagery are considered. The MET owns an equipped room hosting a server to manage the acquisition of satellite data and GTS data from meteorological stations network, together with a dedicated database.

Weather phenomena of major concern in Eswatini are windstorms, lightning, hail, flash floods and river floods. Many of these are linked to fast developing convective systems that are characterized by small spatial and temporal time scales. Establishing an operational numerical weather prediction system at high horizontal resolution and temporal over Eswatini can be helpful to the forecasters in emitting more accurate weather bulletins and also useful to prevent damages and/or casualties by means of a strengthened alerting system.

Concerning weather forecast, this project will support the Department of Meteorology in the following activities:

- Acquisition and installation of High-Performance Computing (HPC) resources, to be located at the Meteorological Service, suitable to perform numerical weather predictions;
- Installation of an operational numerical weather prediction model at the Meteorological Service and training on its use and maintenance.

Climate modelling

The Ministry of Tourism and Environment Affairs (MTEA) aims at strengthening the national early warning and climate services system by improving the current methods for climate forecasting. It is expected that climate services will be enhanced using numerical models for the production of seasonal forecasts and establishing the access and use of seasonal scale projections useful for the agro-meteorological sector.

Recent research initiatives, focused on climate variability and change in Africa (e.g. EU FP7 projects IMPACT2C, EUPORIAS, SPECS, CLIMAFRICA), have demonstrated that the knowledge produced by research activities during the last decades is not fully exploited for development of tools to predict climate variability, assess its impact on ecosystems and population, and improve adaptation strategies and decision-making processes. In particular, the joint research programs SPECS and EUPORIAS have focused on the

possibility of improving the quality of climate predictions at the seasonal time-scale and on the possibility of using the available climate data to produce actionable information.

To this aim, one fundamental pillar is the availability of the Copernicus Climate Data Store (CCDS). The CCDS will contain the geophysical information needed to analyze the climate change indicators in a consistent and harmonized way. This will combine the functions of a distributed data centre with a set of services and facilities for users and content developers.

The store will provide consistent estimates of Essential Climate Variables - ECVs, climate indicators and other relevant information about the past, present and future evolution of the coupled climate system, on global, continental, and regional scales. The CCDS will include, among other, reprocessed climate data records from satellites, output from global and regional re-analyses, seasonal forecasts and outputs from climate models including projections. Therefore, the CCDS will support users with state-of-the-art data for developing near-real time climate monitoring products and for providing access to seasonal forecast products.

Concerning climate modelling, this project will assess the performance of seasonal predictions as a basis for developing tools and information relevant to decision makers. These tools and techniques will aim to enhance the capacity of the Department of Meteorology to provide state of art climate predictions at the regional and local scales.

A key component of the proposed activity is the implementation and calibration of a regional climate modelling system (RegCM4). RegCM4 is developed and maintained at the Earth System Physics (ESP) section of the International Centre for Theoretical Physics (ICTP) in Trieste.
In particular, this project will:

- Assess the performance of publicly available seasonal forecasts products over Swaziland.
- Calibrate the regional climate model RegCM4 for the downscaling of seasonal forecasts and climate projections over Eswatini and southern Africa.
- Train technical staff at the Department of Meteorology of Eswatini in the evaluation of seasonal forecast products and in the use of a regional climate model for the downscaling of seasonal forecasts and climate scenarios.

II. STRATEGY

1. Theory of change

The Kingdom of Eswatini currently does not have an effective EWS to generate knowledge on climate change risks, vulnerabilities and hazards which thus inhibits the country from effective planning, monitoring, mitigating and adapting to climate change risks. This project therefore aims to address the current EWS□related gaps / barriers which include: weak collection and processing of hydro□climate information and data; low levels of capacity and human resources; ineffective communication of climate information and early warning messages to various end user types as well as the inability by the various sector users to integrate climate information into development planning. To ensure sustainability and ownership, the project will employ policy conformity, communication and advocacy, capacity building and as well as stakeholder participation and gender equality inclusion strategies as discussed below.

The project theory of change is based on the premise that expanding weather monitoring infrastructure will improve accuracy and reliability of the national weather prediction and forecasting capacity to provide accurate early warning alerts for risk informed decision making and reduce risk of severe weather impacts. By harmonising national alert systems and protocols for information dissemination among the practitioners, vulnerable communities will increase the effectiveness and cost efficiency of delivering climate advisories to affected communities in time to stimulate on ground action. The project will therefore seek to improve the existing national observation stations, both meteorological and hydrological, by installing new stations and rehabilitating those that are not functional. A national weather prediction system will be improved through adoption and use of new models and high- performance computing climate and forecasting technologies. Generally, the national weather and climate modelling and predictions is poor and there is a need to improve the performance computing system. The project will also build the capacity of technical staff both males and females within the government to be able to operate the new weather prediction systems. The project will address gender considerations by ensuring equal participation of men and women technicians are provided with adequate support and are part of the proposed trainings. This approach will lead to change in the manner of operation within the Meteorology Department. The technical team will be capacitated to issue timely warning for the benefit of other sectors in the country. The harmonised/common protocol and alert system will improve communication between stakeholders for effective management of climate related risks. Through the contribution of this project, collectively all the project outputs will contribute to the attainment of the national UNDAF outcome of improved management of natural resources by 2020.

The key assumption to the sustainability of the project investments that government will provide funds for recurrent operation and maintenance costs of observation networks for both meteorological and hydrological in the national budget. This will lead to a more sustainable management of the systems post project implementation. It is further assumed that stakeholders will be actively involved in the implementation of the project to guide the outputs. It is also assumed that the improvement of the weather and climate prediction systems will draw other sectors interest in the use of data and information generate by the project to build a resilient country against climate change.

2. Policy conformity

This project conforms to broader national government policies, goals and commitments. The country's Vision 2022 states that "By the year 2022, the Kingdom of Eswatini will be in the top 10% of the medium human development group of countries founded on sustainable economic development, social justice and political stability." The Kingdom of Eswatini recognizes that climate change can severely impact on the achievement of this ultimate vision and as such, climate change is considered a priority development concern. The country has developed a number of notable climate actions which include (amongst others) the establishment of a multi-stakeholder National Climate Change Steering Committee which spearheaded the development of Swaziland's 2014 Climate Change Strategy and Action Plan as well as the 2015 National Climate Change Policy. Another notable stride was that the country revised the National Development Strategy (NDS) with a view of emphasizing linkages between the national development agenda, the SDGs and AU2063. To this extent, the draft revised NDS prioritizes seven (7) thematic areas as a means to achieve sustainable economic development in Swaziland.

6. Knowledge Exchange and Management (South-South Triangulation):

Documentation of best practices and lessons over the implementation of the project activities with the view of enabling national integration, will be of focus. This will be through the water resources mapping and baseline assessments reports, quarterly and annual reporting, and project publications. Partnerships with be established with the local media (print media articles and radio pronouncements and programme participation), and through MET, DWA and UN Newsletters. The Terminal Evaluation will be conducted to highlight on lessons and achievements made by the project intervention.

III. RESULTS AND PARTNERSHIPS

The project is expected to contribute to the National Priority on: Environmental management and sustainability; the National Development Strategy (NDS): Objective 8: To ensure environmental sustainability by fully integrating environmental management and development planning and it further contributes to the objective of information gathering, monitoring and assessment; and the National Determined Contribution: - Strengthening the capacity of early warning centres for improved emergency preparedness, disaster risks and response capacities and action on integrated river basin management.

The project will also contribute to realisation the UNDAF 2016 – 2020 Outcome 1.2: National institutions and communities improved their management of natural resources by 2020; Output 1.2.1: Institutions' utilization of climate smart techniques (CST) and disaster risk reduction and preparedness strengthened (Indicator: # of regions and local councils with Disaster Preparedness, Management and Risk Plans in place and operational).

In addition, the project will contribute to UNDP Country Programme Document (CPD) and Resource Framework outcome on growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded; and Output 1.2.3. Multi-sectoral climate and risk preparedness and management measures being implemented at national and regional levels disaggregated by urban and rural areas and with gender considerations (Indicator 1.2.3.1. No. of plans, strategies, policies for low emissions and climate resilient development and Indicator 1.2.3.2. No. of regional administrations affected by climate change using national standard operational procedures).

The project has been assigned by the Ministry of Tourism and Environmental Affairs to the National Meteorological Service for implementation. The project will recruit its dedicated project management unit composed of a project coordinator and a finance and admin officer to effectively implement the project within 24 months.

capacities for improved readiness and preparedness through strengthening early warning systems (EWS) and climate services in Eswatini through an intervention aimed at strengthening early warning systems and climate services capacities. The project amounting to US Dollars 1.1Million will be implemented by the Ministry of Tourism and Environmental Affairs (MTEA), National Meteorological Services (MET), and facilitated by the UNDP Eswatini Country Office (CO). The project will be implemented by the Ministry of Tourism and Environmental Affairs through the National Meteorological Service for a period of 24 months. During this period the Government of Eswatini will contribute in-kind toward the project implementation. The Government will provide furnished office space to accommodate the PMU and further contribute with other administration requires such as telephones, transportation for PMU. UNDP country office will ensure that resources are managed as per the donor expectations and ensure adequate control and use of project resources ensuring value for money.

c) Partnerships

Early warning systems management in Eswatini is currently fragmented across different institutions. The National Meteorological Service Department has primary responsibility of producing and providing weather alerts while other institutions such as the National Disaster Management Agency (NDMA) is responsible for the coordination of overall national disasters and emergencies. To effectively implement their mandate, data provided by the NMS is essential. The Department of Water Affairs under the Ministry of Natural Resources and Energy is responsible for the management of the main river across the country and any flooding alerts or warnings are issued through it. Alerts on heavy rainfall, flooding or drought is issued by MET and used by DWA for preparedness and for alerting downstream users and riparian states. The Ministry of Agriculture is responsible for issuing warning information to especially farmers after being processed by the Meteorological Service. The Prime Minister's office is mandated to declare disasters in the country hence it becomes a beneficiary to information processed by the MTEA- NMS. Similarly, a number of NGOs and civil society organizations becomes beneficiaries of any early warning information. The successful implementation of the project will require effective collaboration among all these institutions. A proper stakeholder mapping will be essential at the initial stages of implementation of the project.

d) Risks and assumptions

Identified Risk	Mitigation plan	Expected result
1. Inadequate funding from the government to maintain newly installed software licences and communication costs.	Engage with MTEA and MNRE leadership to establish a maintenance budget line within MET for communication and maintenance of equipment and infrastructure installed through the project	Budget line for software licence renewal, infrastructure maintenance and communication established within MET and DWA
2. Poor stakeholder participation among key institutions.	Establish a dedicated technical team for the project provided with responsibility through effective TORs. Continuous briefing key institutions on the project progress to keep them motivated	Informed and active stakeholder participation in the project
3. Loss of trained/capacitated government technicians due to better offers from neighbouring countries.	Identify and provide incentives to key staff and ensure that training is provided to a wide range of technical staff.	Wider based of skilled and motivated technical staff
4. Damage of electronic equipment used in the project due to high incidences of lightning	Ensure that all equipment is installed accordingly with adequate earthing and lightning arrestors. Avoiding lightning prone areas	Reduced risks of damage of electronic equipment
5. Theft and loss of technical equipment especially Automated Weather Stations (AWS) due to remote locations	Identify safe locations especially with full time guarded premises for installing Automated Weather Stations	Secured locations and premises for all AWS.

- The project will identify through the Coordination Assembly for Non-Governmental Organizations (CANGO) all members that utilise weather information and responds on alerts. Organizations such as Red Cross will be engaged. It will be essential to understand how such CSO's uses the weather information and alerts to inform decision making processes.

iv) Regional Bodies

- Other regional bodies such as SADC will be essential to be engaged. Early warning information is coordinated regionally and it is essential to link the Eswatini systems with existing regional platforms to ensure a coordinated effort. Other advanced weather services such as the South Africa Weather Service will be engaged for benchmarking, harmonising models and share technical information.

f) South-South and Triangular Cooperation (SSC/TrC)

Learning, information dissemination and knowledge sharing across boarders will be facilitated through the South-South and Triangular Cooperation (SSC/TrC). Apart from the sharing of information through websites, the project will host one SSC/TrC knowledge sharing workshop especially with technicians from South Africa and Mozambique. Platforms such as the River and Environment Management Cooperation (REMCO) will be targeted for project information sharing and dissemination.

g) Knowledge Generation and Management

Result 5 of the project is focusing on knowledge management and information dissemination. The project proposes to use web-based platforms as medium for disseminating information and sharing of products developed by the project. The NMS website will be upgraded and loaded with information on project performance from time to time. An on-line newsletter sharing information about the status of project activities will be developed periodically. Information broachers and leaflets about the project will be shared with stakeholder in meetings and also be present in the PMU offices.

h) Sustainability and Scaling-Up

The implementing government ministry (MTEA) will ensure that the project outputs are sustained post implementation. This will be achieved through several strategies that will be contained in an exit strategy document to be developed by the project. The sustainability of the software will be ensured through building the software renewal costs into government annual budget. The Ministry will also ensure that funds for maintenance and replacement of sensors of the automated weather stations are earmarked within the Ministry's annual budgeting. The project will provide the necessary capacity widely among the government technicians to ensure that a larger pool of staff has the capacity to operate or use the new forecasting models. The government will develop a training and capacity building programme for technicians to build their skills on continuous basis. The sustainability of the project rests on government ability to absorb all the operational costs of the projects moving forward.

IV. PROJECT MANAGEMENT

Cost Efficiency and Effectiveness

To improve on cost efficiency and effectiveness, the project will be implemented through expertise within government agencies responsible for EWS, climate change adaptation, disaster risk management and multi□sectorial task teams. The project would ensure that financial and human resources are used most cost□effectively, efficiently and give the greatest value.

Alternative approaches considered included different technological options and in conjunction with human capital and skills building whereby, human skills and capabilities match the equipment being purchased so that investments are not underused. The development of 10 sites to assess the effectiveness of early warning dissemination at the local level is considered cost□effective in the long run in that sensitization on early

V. RESULTS FRAMEWORK[2]

EXPECTED OUTPUTS	OUTPUT INDICATORS[3]	DATA SOURCE	BASELINE		TARGETS (by frequency of data collection)		DATA COLLECTION METHODS & RISKS
			Value	Year	Year1	Year2	
Output 1 Meteorological and Hydrological observational network for early warning strengthened.	***1.1*** Number of new Automatic Weather Stations (AWS) installed and operationalized.	Project reports	18	2019	5	5	
	1.2 Number of AWS sensors upgraded.				*0*	*10*	
	1.3 Number of rehabilitated river flow gauging stations		38	*2019*	*4*	*4*	
	1.4 Number of trainings conducted for local operators on new hydrological monitoring networks	Training report	0	2019	0	1	
	1.5 Number of men and women trained on new hydrological meteorological monitoring networks		0	0	*4*	4	
Output 2: Numerical weather prediction system improved	2.1 Upgraded computer room	Project reports	0	2019	1	0	
	2.2 An operational HPC facility	Project reports	0	2019	0	1	
	2.3 An operational Numerical Weather Prediction (NWP)	Project reports	0	2019	1	0	
	2.4 Configured HPC and NWP facilities	Project reports	0	2019	1	0	

[2] UNDP publishes its project information (indicators, baselines, targets and results) to meet the International Aid Transparency Initiative (IATI) standards. Make sure that indicators are S.M.A.R.T. (Specific, Measurable, Attainable, Relevant and Time-bound), provide accurate baselines and targets underpinned by reliable evidence and data, and avoid acronyms so that external audience clearly understand the results of the project.

[3] It is recommended that projects use output indicators from the Strategic Plan IRRF, as relevant, in addition to project-specific results indicators. Indicators should be disaggregated by sex or for other targeted groups where relevant.

VI. MONITORING AND EVALUATION

In accordance with UNDP's programming policies and procedures, the project will be monitored through the following monitoring and evaluation plans: The project entails an effective and resourced M&E framework that will enable ongoing adaptive management of the project ensuring that lessons are learnt, management decisions are taken into consideration based on relevant and up□to□date information that the appropriate feedback channels are used to integrate new information, and that regular progress reports are available for concerned parties. The Project Results Framework includes SMART indicators for each expected outcome as well as mid□term and end□of□project targets. These indicators along with the key deliverables and benchmarks are to be developed in some more detail and fine-tuned during the inception phase of the project and will be the main tools for assessing project implementation progress and whether project results are being achieved.

The M&E plan will be reviewed and revised as necessary during the project inception workshop to ensure project stakeholders understand their roles and responsibilities vis□à□vis project monitoring and evaluation. Day□to□day project monitoring is the responsibility of the project management unit but other project partners will have responsibilities to collect specific information to track the indicators. It is the responsibility of the Project Manager to inform the Project Steering Committee of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion. The Project Steering Committee will receive periodic reports on progress and will make recommendations concerning the need to revise any aspects of the Results Framework or the M&E plan. Project oversight is the responsibility of the UNDP Task Managers who will review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

A Project Inception Workshop will be held within the first 3 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other key stakeholders. An inception report shall be provided at the end of 3 months by the Project Manager thereafter quarterly briefs will be provided, which will inform the annual reports to be submitted to UNDP.

In accordance with the programming policies and procedures outlined in the UNDP User Guide, the project will be monitored through the following:

Within the annual cycle

- **Project Implementation Reports (PIR):** The PIR includes the UNDP reporting requirements. The PIR includes, but is not limited to, reporting on the following: - Progress made toward project objective and project outcomes □each with indicators, baseline data and end□of□project targets (cumulative) - Project outputs delivered per project outcome (annual). Lesson learned/good practice. Annual Work Plans (AWP) and other expenditure reports. -
- **Quarterly Progress Reports**-On a quarterly basis, a quality assessment shall record progress towards the completion of key results, based on quality criteria and methods captured in the Quality Management table below – see Annex 1.

- **A Risk / Issue Log** shall be activated in Atlas and updated by the UNDP Project Coordinator to facilitate tracking and resolution of potential problems or requests for change. Based on the initial risk analysis submitted (see Annex 1), a risk log shall be activated in Atlas and regularly `updated by reviewing the external environment that may affect the project implementation.

- **A Project Lesson-learned log** shall be activated and regularly updated to ensure on-going learning and adaptation within the organization, and to facilitate the preparation of the Lessons-learned Report at the end of the project.
- **A Monitoring Schedule Plan** shall be activated in Atlas and updated to track key management actions/events for management by the UNDP Project Coordinator.

Annually

Monitoring Activity	Purpose	Frequency	Expected Action	Partners (if joint)	Cost (if any)
			make course corrections.		
Project Report	A progress report will be presented to the Project Board and key stakeholders, consisting of progress data showing the results achieved against pre-defined annual targets at the output level, the annual project quality rating summary, an updated risk long with mitigation measures, and any evaluation or review reports prepared over the period.	Annually, and at the end of the project (final report)	The Project Manager will produce quarterly and annual report for submission to the MET, PJC, UNDP.	PMU	0
Project Review (Project Board)	The project's governance mechanism (i.e., project board) will hold regular project reviews to assess the performance of the project and review the Multi-Year Work Plan (Annex 5) to ensure realistic budgeting over the life of the project (Annex 6). In the project's final year, the PSC shall hold an end-of project review to capture lessons learned and discuss opportunities for scaling up and to socialize project results and lessons learned with relevant audiences.	Specify frequency (i.e., at least annually)	Any quality concerns or slower than expected progress will be discussed by the PSC and management actions agreed to address the issues identified.	MTEA	0

Audit and Evaluation Plan[4]

- **NIM Audit:** The project will be subjected to a project financial audit (UNDP National Implementation Modality Audit), at least once in its lifetime. The audit will be conducted by the office of the Eswatini Government Auditor General, in line with all Government projects audit procedures which will form part of the larger regional audit plan.

- **Terminal Evaluation:** An independent Final Evaluation will take place three months prior to the final Project Committee meeting and will be undertaken in accordance with UNDP guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid□term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by UNDP. The Terminal Evaluation will also provide recommendations for follow□up activities and requires a management response.

[4] Optional, if needed

VII. MULTI-YEAR WORK PLAN [67]

All anticipated programmatic and operational costs to support the project, including development effectiveness and implementation support arrangements, need to be identified, estimated and fully costed in the project budget under the relevant output(s). This includes activities that directly support the project, such as communication, human resources, procurement, finance, audit, policy advisory, quality assurance, reporting, management, etc. All services which are directly related to the project need to be disclosed transparently in the project document.

EXPECTED OUTPUTS	PLANNED ACTIVITIES	Planned Budget by Year		RESPONSIBLE PARTY		PLANNED BUDGET					
		Y1	Y2			Funding Source		Budget Description	Amount	Budget notes	
		(2,019)	(2,020)						(€)		
Output 1: Meteorological and Hydrological observational network for early warning strengthened.											
1.1 Shop drawings developed and meteorological and hydrometric stations with all components installed		167,000	-	MET		IMELS		72200– Equipment	167,000	1	Procurement of 10 Meteorological stations
		8,000	-	MET		IMELS		71300 -Local consultant	8,000	2	Survey and project design
		10,000	-	MET		IMELS		71600 – Transport service	10,000	3	International Transport
		3,000	-	MET		IMELS		71600 – Transport service	3,000	4	Local Transport
		7,000	-	PMU		IMELS		73216 – Commercial construction	7,000	5	Civil Works for installation of weather stations
		8,000				IMELS		71205 – International Consultant technical	8,000	7	Installation, start up, calibration technical support from ENEA
Subtotal for meteorological stations		**203,000**	-	**0**	**0**	**0**	**0**	**0**	**203,000**		
		74,640	-	DWA		IMELS		722005 – Equipment	64,640	9	Procurement of 8 Hydrometric station

[6] Cost definitions and classifications for programme and development effectiveness costs to be charged to the project are defined in the Executive Board decision DP/2010/32

[7] Changes to a project budget affecting the scope (outputs), completion date, or total estimated project costs require a formal budget revision that must be signed by the project board. In other cases, the UNDP programme manager alone may sign the revision provided the other signatories have no objection. This procedure may be applied for example when the purpose of the revision is only to re-phase activities among years.

EXPECTED OUTPUTS	PLANNED ACTIVITIES	Planned Budget by Year		RESPONSIBLE PARTY		PLANNED BUDGET					
		Y1	Y2			Funding Source		Budget Description	Amount	Budget notes	
		(2,019)	(2,020)						(€)		
		2,000	-	MET/DWA		IMELS		71205 – International Consultant technical	2,000	20	Onsite installation and commissioning by ENEA
		10,000	-	MET/DWA		IMELS		72105 – Transport service	10,000	21	International transport for delivering hydrometric and meteorological stations
Subtotal Data automation and integration		**79,500**	-	**0**	**0**	**IMELS**	**0**	**0**	**79,500**		0
1.3 Training on the operation and maintenance of installed equipment conducted.		4,000	4,000	MET/DWA		IMELS	IMELS	75700 - Training, workshops and conferences	8,000	22	Training for AWS and hydrometric station and general equipment maintenance
		4,000	4,000	MET/DWA		IMELS	IMELS	75700 - Training, workshops and conferences	8,000	23	Licensed software training at local premises
Sub-Total for Training		**8,000**	**8,000**	**0**	**0**	**IMELS**	**0**	**0**	**16,000**		
Subtotal for output 1		**402,440**							**402,440**		
Output 2: Numerical weather prediction system improved									-		
2.1 Computer room upgraded to cater for installation of equipment		-	74,900	MET		IMELS		71205–International Consultant technical	74,900	24	External service provider including HPC experts
		-	8,000	MET		IMELS		71600 – Travel	8,000	25	Travel
2.2 High Performance Computing (HPC) storage facility installed in the Department of Meteorology. The HPC will be utilized for performing numerical weather predictions.		-	65,000	MET		IMELS		74965 – Computer equipment	65,000	26	Racks sever (at least 192 cores)

EXPECTED OUTPUTS	PLANNED ACTIVITIES	Planned Budget by Year		RESPONSIBLE PARTY		PLANNED BUDGET					
		Y1	Y2			Funding Source		Budget Description	Amount	Budget notes	
		(2,019)	(2,020)						(€)		
3.3 Implementation of a gender responsive country CAP-profile for Eswatini accomplished.		4,000	-	PMU/MET		IMELS		71600 – Travel	4,000	33	Travel (local staff to external service provider premises)
3.4 Installation and set-up of the CAP platform completed		4,000				IMELS		75700 - Training, workshops and conferences	4,000	34	
3.5 Simulations, testing and awareness conducted through case studies and conducting simulations		10,000				IMELS		75700 - Training, workshops and conferences	10,000	35	
3.6 Knowledge management packaged (CAP broachers) and result disseminated and updated in the MET website		4,000				IMELS		74200-Audio Visual and Print Prod Costs	4,000	36	
Sub-Total for Output 3		93,000	10,000	0	0	IMELS	0	0	103,000.00 -		0
Output 4 Improved weather and climate modelling and predictions through adoption of high-performance computing climate and forecasting technologies.											
4.1 National Staff from the Department of Meteorology trained on proper calibration of RegCM4 for downscaling of long-term climate projection and seasonal predictions.		71,540	-	MET		IMELS		71205–International Consultant -technical	71,540	37	Personnel (external service provider)
		15,000	-	MET		IMELS		75700 - Training, workshops and conferences	15,000	38	Personnel (local staff) travel costs including DSA
		8,000	-	MET		IMELS		71600 – Travel	8,000	39	Travel (external service provider); 4 missions to Eswatini
		5000	5000	MET		IMELS		71400-Contractual Services	10,000		MET Project Manager

EXPECTED OUTPUTS	PLANNED ACTIVITIES	Planned Budget by Year		RESPONSIBLE PARTY		PLANNED BUDGET				
		Y1	Y2			Funding Source	Budget Description	Amount	Budget notes	
		(2,019)	(2,020)					(€)		
		3000	4,287	UNDP		IMELS	75700 - Training, workshops and conferences	7,287	50	Board and steering committee meetings
5.4 UNDP Direct Project Cost		15,450	5,598	UNDP		IMELS	74598-Direct Project Cost	21,047	51	Cost of UNDP Country office support to project implementation
Sub-Total: Project Management		37,830	45,385	0		IMELS	0	83,214		
UNDP Administration fees (GMS)		53,995	23,676			IMELS	74559-Cost cost recovery	77,670		8% of the total grant as per cost sharing agreement with Italian government
TOTAL		**717,984**	**296,319**	**0**	**0**	**0**	**0**	**1,002,764**		

Note: All costs are in Euros (€)

IX. LEGAL CONTEXT

Option a. Where the country has signed the Standard Basic Assistance Agreement (SBAA)

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of Kingdom of Eswatini and UNDP, signed in 1977. All references in the SBAA to "Executing Agency" shall be deemed to refer to "Implementing Partner."

This project will be implemented by Ministry of Tourism and Environmental Affairs in accordance with its financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of an Implementing Partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, the financial governance of UNDP shall apply.

The Government of the Kingdom of Eswatini and the Republic of Italy signed a Memorandum of Understanding (MOU) to cooperate and enhance climate and weather monitoring capacities for improved readiness and preparedness through strengthening early warning systems (EWS) and climate services in Eswatini through an intervention aimed at strengthening early warning systems and climate services capacities. The project amounting to US Dollars 1.1Million will be implemented by the Ministry of Tourism and Environmental Affairs (MTEA), National Meteorological Services (MET), and facilitated by the UNDP Eswatini Country Office (CO).

X. RISK MANAGEMENT

Option a. Government Entity (NIM)

1. Consistent with the Article III of the SBAA *[or the Supplemental Provisions to the Project Document]*, the responsibility for the safety and security of the Implementing Partner and its personnel and property, and of UNDP's property in the Implementing Partner's custody, rests with the Implementing Partner. To this end, the Implementing Partner shall:
   a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
   b) assume all risks and liabilities related to the Implementing Partner's security, and the full implementation of the security plan.

2. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of the Implementing Partner's obligations under this Project Document.

3. The Implementing Partner agrees to undertake all reasonable efforts to ensure that no UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml.

4. Social and environmental sustainability will be enhanced through application of the UNDP Social and Environmental Standards (http://www.undp.org/ses) and related Accountability Mechanism (http://www.undp.org/secu-srm).

5. The Implementing Partner shall: (a) conduct project and programme-related activities in a manner consistent with the UNDP Social and Environmental Standards, (b) implement any management or mitigation plan prepared for the project or programme to comply with such standards, and (c) engage in a constructive and timely manner to address any concerns and complaints raised through the Accountability Mechanism. UNDP will seek to ensure that communities and other project stakeholders are informed of and have access to the Accountability Mechanism.

6. All signatories to the Project Document shall cooperate in good faith with any exercise to evaluate any programme or project-related commitments or compliance with the UNDP Social and Environmental Standards. This includes providing access to project sites, relevant personnel, information, and documentation.

XI. ANNEXES

1. **Project Quality Assurance Report**

2. **Social and Environmental Screening Template** [English][French][Spanish], including additional Social and Environmental Assessments or Management Plans as relevant. *(NOTE: The SES Screening is not required for projects in which UNDP is Administrative Agent only and/or projects comprised solely of reports, coordination of events, trainings, workshops, meetings, conferences, preparation of communication materials, strengthening capacities of partners to participate in international negotiations and conferences, partnership coordination and management of networks, or global/regional projects with no country level activities).*

3. **Risk Analysis**. Use the standard Risk Log template. Please refer to the Deliverable Description of the Risk Log for instructions

4. **Capacity Assessment:** Results of capacity assessments of Implementing Partner (including HACT Micro Assessment)

5. **Project Board Terms of Reference and TORs of key management positions**

5.1. Terms of Reference for Joint Committee/Project Board

The **Project Board** (also called the **Joint Commitee**) will be responsible for making management decisions of the project, and will guide the Project Manager (PM). The PB plays a critical role in monitoring progress of implementation and ensuring that recommendations from annual and mid-term evaluations are adopted for performance improvement, ensuring accountability and adoption of lessons learnt. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the PM. Based on the approved Annual Work Plan, the PB can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

1. In order to ensure UNDP's ultimate accountability for the project results, PB decisions will be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In cases where consensus cannot be reached within the PB, the final decision shall rest with UNDP in its role as the Senior Supplier.
2. Potential members of the PB are reviewed and recommended for approval during the PAC meeting. Representatives of other stakeholders can be included in the PB as appropriate. The PB contains three distinct roles, including:
   - **An Executive** representing the project ownership to chair the group. The Executive for the project will be an individual from the **Ministry of Tourism and Environmental Affairs (MTEA)**
   - **Senior Supplier** representing the interests of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project. The Senior Supplier of the project is UNDP and IMELS.
   - **Senior Beneficiary/ies** representing the interests of those who will ultimately benefit from the project, i.e. sector and communities vulnerable to the impacts of climate change. The Senior Beneficiary's primary function within the Board is to ensure the realization of project

5.3. Terms of Reference for Project Manager

A full-time **Project Manager** shall be contracted for day-to-day management of the EWS project. The management role of the PM will be to ensure that the project is managed in a transparent and effective manner, and that it is in line with all budget and work plans in accordance with guidelines from UNDP. The PM will provide technical and implementation support to the Implementing Partner (MTEA) and respponsible party focal points (Technical committee) including *inter alia* Department of Meteorology (DoM), Department of Water Affairs and Eswatini Disaster Management Authority.

Responsibilities

The PM will be evaluated in accordance with the successful implementation of project activities.

The responsibilities of the PM will include:

i. Oversee and manage project implementation, monitor work progress, and ensure timely delivery of outputs.
ii. Report to members of the Project Board (PB), including UNDP, MTEA, MNRE, IMELS regarding project progress.
iii. Develop and facilitate implementation of a comprehensive monitoring and reporting system.
iv. Ensure timely preparation of detailed annual work plans and budgets for by PB.
v. Assist in the identification, selection and recruitment of staff, consultants and other experts as required.
vi. Supervise, coordinate and facilitate the work of the Administrative and Financial Officer (FAA) and contracted consultants.
vii. Control expenditures and assure adequate management of resources.
viii. Establish linkages and networks with on-going activities by other government and non-government agencies.
ix. Establish and maintain linkages with regional initiatives and institutions such as ICPAC, SADC, ACMAD, GFDRR etc. in order to realise cost-effective and efficient opportunities for training, information sharing and procurement.
x. Provide input to management and technical reports and other documents as described in the M&E plan for the overall project. Reports should contain assessments of progress in implementing activities, including reasons for delays, if any, and recommendations on necessary improvements.
xi. Inform the PB, immediately, of any issue or risk which might jeopardise the success of the project.
xii. Liaise and coordinate with the UNDP on a regular basis and inform UNDP of any delays or difficulties faced during implementation.
xiii. Act as secretary to the project board

Qualifications

i. Master's degree in a relevant field such as natural resource management, agricultural development, climatology, meteorology, hydrology, water resources management, environmental sciences and disaster management.
ii. A minimum of 10 years relevant work experience in climate change adaptation and natural resource management; disaster management and/or operational early warning systems, including implementation at national and decentralized levels.
iii. Demonstrated knowledge and experience in climate change adaptation, early warning systems, and the monitoring and forecasting of climate and weather.
iv. Experience in the public participation development process associated with the hydro-meteorology, climate change, disaster risk management and natural resources sectors is an asset.
v. Experience in working and collaborating with governments is an asset.
vi. Excellent knowledge of English, including writing and communication skills, with analytic capacity and ability to synthesise project outputs and relevant findings for the preparation of quality project reports.

meteorological monitoring and forecasting system and EWSs. Fluency in spoken and written English and excellent report-writing skills are important criteria for all consultants.

The hiring procedures to be followed for both international and national consultants must include a transparent and competitive process based on standard UNDP policies and procedures.