



Strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in Guinea Bissau

Part I: Project Information

GEF ID

10105

Project Type

FSP

Type of Trust Fund

LDCF

CBIT/NGI

☐ CBIT

☐ NGI

Project Title

Strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in Guinea Bissau

Countries

Guinea-Bissau

Agency(ies)

UNDP

Other Executing Partner(s):

National Institute of Meteorology (INM-GB)

Executing Partner Type

Government

GEF Focal Area

Climate Change

Taxonomy

Focal Areas, Climate Change Adaptation, Climate Change, Small Island Developing States, Least Developed Countries, Climate finance, Influencing models, Strengthen institutional capacity and decision-making, Gender Equality, Gender Mainstreaming, Gender-sensitive indicators, Beneficiaries, Women groups, Sex-disaggregated indicators, Gender results areas, Awareness Raising, Knowledge Generation and Exchange, Participation and leadership, Capacity Development, Capacity, Knowledge and Research, Knowledge Generation, Knowledge Exchange, Learning

Rio Markers**Climate Change Mitigation**

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 2

Submission Date

10/5/2018

Expected Implementation Start

7/1/2021

Expected Completion Date

6/30/2027

Duration

48In Months

Agency Fee(\$)

570,000.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
CCA-1	Reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation	LDCF	3,509,026.00	14,200,000.00
CCA-2	Mainstream climate change adaptation and resilience for systemic impact	LDCF	1,378,281.00	10,200,000.00
CCA-3	Foster enabling conditions for effective and integrated climate change adaptation	LDCF	1,112,693.00	8,200,000.00
Total Project Cost(\$)			6,000,000.00	32,600,000.00

B. Project description summary

Project Objective

To strengthen the climate monitoring capabilities, early warning systems and information for responding to climate shocks and planning adaptation to climate change in Guinea Bissau

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
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Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Transfer of technologies for climate monitoring infrastructure	Investment	Enhanced capacity of national hydro-meteorological (NHMS) and environmental institutions to monitor extreme weather and climate change	<p>1.1. Installation or rehabilitation (as appropriate) of 15 Automatic Acoustic Limnigraphic stations (with data logger and telemetry)</p> <p>1.2. Installation or rehabilitation (as appropriate) of 3 Automatic Acoustic Tidal Gauge Stations (with data logger and telemetry)</p> <p>1.3. Installation or rehabilitation (as appropriate) of 10 Automatic Rain gauge Stations (with data logger and telemetry)</p> <p>1.4. Installation of 10 Automatic Weather Stations (with data logger and telemetry)</p> <p>1.5. Procurement and installation of 3 maritime weather stations (AWS430), maritime observation console (MCC401), MetCast observation console (MCC301) in the 6 ports of Guinea-Bissau</p>	LDC F	3,341,582.00	18,000,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Climate information integrated into priority development plans and early warning systems to support the NAP process	Technical Assistance	Efficient and effective use of hydro-meteorological and environmental information for decision-making early warnings and mainstreaming CC in the long-term development plans	<p>2.1. Institutional strengthening of the institutional framework for collection of climate data, for the production and dissemination of climate information products and decision making for early warning of the national hydrology and meteorology services</p> <p>2.2. Development of National Framework for Climate Services to strengthen the integration of climate information into planning, including the Integration of climate risks into the GB 2025 development strategy and related operational programs in coordination with the NAP process</p> <p>2.3. Development of a sustainable financing mechanism for the climate information production and dissemination system</p> <p>2.4. Development of new tailored climate information products for the users in the priority vulnerable sectors and locations (Protected Areas.</p>	LDC F	1,979,110.00	13,000,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Monitoring, evaluation and knowledge management	Technical Assistance	Lessons learned by the project through participatory M&E, with special attention to gender mainstreaming, are made available to support the financial sustainability of the strategy	<p>3.1. Project activities and impacts on global, national and local adaptation benefits of climate information and EWS are assessed and monitored.</p> <p>3.2. Project lessons and knowledge codified and disseminated nationally and internationally</p> <p>3.3. Wider public awareness of climate services available and the benefits of their use achieved through comprehensive multimedia outreach and education campaigns</p>	LDCF	393,624.00	1,000,000.00
Sub Total (\$)					5,714,316.00	32,000,000.00
Project Management Cost (PMC)						
				LDCF	285,684.00	600,000.00

Project Management Cost (PMC)

Sub Total(\$)	285,684.00	600,000.00
Total Project Cost(\$)	6,000,000.00	32,600,000.00

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Recipient Country Government	Ministerio de Agricultura e Desenvolvimento Rural	Grant	Recurrent expenditures	14,000,000.00
Recipient Country Government	Secretaria de Estado do Ambiente e Biodiversidade	Grant	Recurrent expenditures	8,000,000.00
Recipient Country Government	Ministerio dos Recursos Naturais e Ambiente	Grant	Recurrent expenditures	10,000,000.00
GEF Agency	UNDP	Grant	Recurrent expenditures	600,000.00
			Total Co-Financing(\$)	32,600,000.00

Describe how any "Investment Mobilized" was identified

UNDP TRAC Resources

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
UNDP	LDCF	Guinea-Bissau	Climate Change	NA	6,000,000	570,000
Total Grant Resources(\$)					6,000,000.00	570,000.00

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required
☐

PPG Amount (\$)
150,000

PPG Agency Fee (\$)
14,250

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
UNDP	LDCF	Guinea-Bissau	Climate Change	NA	150,000	14,250
Total Project Costs(\$)					150,000.00	14,250.00

Part II. Project Justification

1a. Project Description

1a. Project Description. Elaborate on: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description); 2) the baseline scenario and any associated baseline projects; 3) the proposed alternative scenario with a brief description of expected outcomes and components of the project; 4) alignment with GEF focal area and/or Impact Program strategies; 5) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing; 6) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and 7) innovativeness, sustainability and potential for scaling up.

Informed by stakeholder consultations and project development related assessments (ie a review of priority sites and ongoing capacity assessments), the allocation of funds across Components has been adjusted, as has the project duration. This is to ensure that the investment component is complemented with greater capacity for greater impact. The additional time is to allow a slower roll out of equipment, with regular monitoring to ensure adequate O&M and sustainability of the investment. Additionally, a greater focus has been placed in the project on climate and health, and related advisories. This is due to the significant risks of climate on human health in Guinea Bissau (e.g. water and vector borne diseases), as well as the emphasis COVID-19 has placed on the importance of early warning and preparedness to enable people and health systems to prepare for health-related shocks.

As a least developed country (LDC) and small island developing state (SIDS), Guinea-Bissau is particularly vulnerable to climate change and is continually listed among the countries most vulnerable to climate change impacts. In 2014, the Maplecroft Climate Change Vulnerability Index ranked the country as the second most vulnerable in the world, only behind Bangladesh. The primary drivers of Guinea-Bissau's climate vulnerability are its physical exposure and dependence on agriculture and fishing.

Located in West Africa, the country is bordered by Senegal to the north, Guinea to the south and east, and the Atlantic Ocean to the west. Guinea-Bissau's territory is divided between continent and islands, which include the Bijagós archipelago, made up of 88 islands and islets, recognized by UNESCO as a Biosphere Reserve due to its important biodiversity. Low-elevation coastal zones stand out as Guinea-Bissau's indicator of physical vulnerability. The country has approximately 270km of coastal line, in which almost 80% of the population and economic activities are concentrated. Two thirds of Guinea-Bissau's land area are less than 50m above sea level, with the highest point at 298 m, the Colinas do Boé . Rising sea temperatures, changes in circulation, acidification and loss of nursery areas, are predicted to reduce fish populations. Given the country's low altitude, there is a clear risk of land loss, including mangrove coasts and islands due to the sea level rise. For Guinea Bissau, the loss of coral reefs and mangroves destroys fish spawning grounds, decreasing the availability of fish, limiting the livelihoods of fishermen, and challenging food security. Fisheries also contribute significantly to Guinea-Bissau's government, with fees for fishing licenses providing 35% of government revenue .

The country's natural resources are the basis for the population's livelihood, biodiversity and public revenue streams. The economic wealth of Guinea-Bissau is based on its natural capital. According to World Bank, the total of the country's natural wealth, including minerals as bauxite and phosphate, fishing, wood, fertile lands and rich ecosystems, can reach USD 3,874 per capita. The renewable natural resources, such as agricultural lands (for cultivation and pastures), fishing (traditional, of collection of mollusks, workmanship, industrial and sport), forests (firewood and wood, Non-woody Forest Products, capture of carbon), habitats and protected ecosystems represent more than 90% of Guinea Bissau wealth.

The agricultural sector corresponds to 69% of the country's GDP, 90% of its export's earnings and 85% of direct and indirect jobs in Guinea-Bissau. However, agricultural practices are still undeveloped, largely based on rudimentary technology and dominated by low value-added goods production. About 90% of Guinea-Bissau's exports are from cashew nuts, and this represents the main income source for more than two-thirds of households in the country. According to the World Food Programme, 80% of those living outside the city of Bissau currently make their living from cashew nuts, which they use to trade for rice and other staple products. While rice is another strategic crop for Guinea-Bissau – per FAO (2016) the country's average annual consumption is estimated at 200,000 tons - its domestic production covers only 55% of it. Domestic production is continuously challenged, as coastal farmers who can no longer grow rice due to saltwater intrusion are shifting to cashew production. This increasing dependency on a single crop, leaves livelihoods highly exposed to both climate and market shocks. For both crops, domestic production will experience the impacts of climate change hazards, such as droughts, changes in rainfall patterns and the rising sea level.

With climate change putting pressure on agriculture and fisheries, existing health issues will be further challenged. Undernutrition is already a public health challenge in Guinea-Bissau, and is due mainly to food insecurity, inadequate health services, poor water and sanitation, poor infant and young child feeding practices, and high illiteracy rates among women. According to the Multi Indicator Cluster Survey (MICS 5), countrywide the chronic malnutrition rate is over 25%. Children are particularly vulnerable. Malnutrition weakens the immune system and can lead to a heightened risk of illness and disease, including diminished cognitive and physical development if malnutrition happens at a very young age. Guinea Bissau's population is young, with a population of 1.87 million people and approx. 43% under 15.

The main climate change driver on the health sector is the rainfall variability. The rainy season corresponds to greater proliferation of mosquitoes, flies and other insects, which contributes to the appearance of malaria, as well as other infectious diseases. Malaria accounts for about 50% of cases of hospitalization in all health facilities, a number which increases substantially during the rainy season and varies with each age group. Children are usually the most affected, with about 65% of cases in the paediatric wards.

Further, the greater the rainfall amount the greater the occurrence of diarrhea and other water-borne illnesses. Increasing temperatures simultaneously with changes in rainfall availability also acts as climate change driver by altering the locations that are sensitive to vector-borne diseases such as malaria, dengue fever and schistosomiasis, also known as bilharzia, through affecting the habitat range for the vector (Chaves, 201060). The government and international partners are currently pursuing the implementation of a national plan towards the improvement of the quality of public health by, among others, promoting health education, providing minimum sanitation conditions, increase the number of latrines, improve the quality of drinking water, and increase the number of sanitation centers particularly in the capital.

Guinea-Bissau is also subject to climate related disasters risk, such as floods, storms, droughts grasshoppers' attacks, diseases epidemics (cholera, meningitis, and malaria), sea accidents due to increasing sea surges, such as shipwrecks of fishermen canoes that cause significant material damages and loss of lives.

These damages further hinder economic development, which is already challenged by limited infrastructure. The government seeks to address this infrastructure challenge by building a national network of modern and competitive infrastructures, as per its Guinea-Bissau 2025 – Terra Ranka. Given the high upfront costs of this ambition, it is critical that plans are climate-informed, to minimize risk of loss and damage related to the impacts of climate change. As the pace of infrastructure development quickens, further development of sectors such as transport and mining must consider climate impacts to ensure that supporting ecosystems and related critical ecosystem services are protected. Climate variability and change thus constitute serious challenges for Guinea-Bissau's economic growth and development that must be addressed for the country to pursue a sustainable and resilient development pathway.

2) The climate change-induced problem

The climatic trends and their impacts observed during these last decades in the country will likely be exacerbated, according to climate projections. The General circulation model (GCM) projects an increase in mean annual temperature between 1.1°C to 3.0°C by 2060. The Fifth Assessment Report (AR5) from the Intergovernmental Panel on Climate Change (IPCC) indicates that under a range of scenarios, the Sahel and West Africa are projected to be hotspots of climate change and unprecedented changes in climate will occur earliest in these regions. In addition, the AR5 projections point out that many global models indicate a wetter main rainy season with a small delay in the onset of the rainy season by the end of the 21st century. Regional modelling also suggests an increase in more intense and more frequent extreme rainfall events over the Guinea Highlands and Cameroon Mountains.

Like many of its West African neighbors, Guinea-Bissau faces rainy seasons and long dry seasons, with abrupt transitions. The West African monsoon that characterizes the region's climate is less stable than its eastern counterpart, and long droughts such as those that affected the area during the 1970s and 1980s are possible. Northern Guinea-Bissau borders the Sahel region. Anecdotal evidence suggests that the long droughts that characterize the Sahel may be spreading to this region. Guinea-Bissau is also subject to climate related disasters risk, such as floods, storms, droughts grasshoppers' attacks, diseases epidemics (cholera, meningitis, and malaria), sea accidents due to increasing sea surges, such as shipwrecks of fishermen canoes that cause significant material damages and loss of lives. In recent years, the following loss data of past decades indicates that Guinea Bissau has experienced an increase both in frequency and in intensity of climate related disasters.

The observation of recent climate extreme events and the meteorological records, from both Guinea-Bissau and the region, provide evidence that climate change is happening in the country. Further, these changes are already being felt by communities. The changes witnessed and described by communities consulted during the process of developing Guinea-Bissau's National Program of Action of Adaptation to Climate Changes include:

- Late onset of the rainy season (mid-June) compared to the usual (early May)

- Less regular distribution of rainfall than in the past
- Shortening of the mild temperatures period, often called the "cold season" (Guinea-Bissau's "winter"), which used to last for three months (December to February), to only two months (December to January) nowadays
- Warmer and drier environment
- Frequent dust clouds
- More frequent occurrence of high tides of greater magnitudes impacting on dikes and rice fields
- Decrease in water quality due to saline water intrusion and water point infestation by aquatic plants
- Reduction of the wetland areas and resettlement due to frequent drought episodes

According to the AR5, the near surface temperature in West Africa and the Sahel has increased over the last 50 years. Temperatures in the African continent are projected to rise faster than the global average, and in the tropical West Africa, changes in temperature are projected to occur 1 to 2 decades earlier than global average. The temperature projections for the region range between 3 and 6°C above the late 20th century baseline. Also, regional modelling suggests an increase in more intense and more frequent extreme rainfall events over the Guinea Highlands and Cameroon Mountains. According to the NAPA (2006), INC (2005) and SNC (2011), projections of rainfall suggest an increase in the proportion falling during heavy events, particularly in the late summer and autumn season.

The data presented in Guinea-Bissau's Third National Communication (TNC) to the UNFCCC demonstrate that the temperature behavior in the country reflects the regional pattern mentioned above. Figure 1 and Figure 2 confirm the temperature evolution in the country over the last years. Although these predictions are based on different emissions scenarios, climate variability will clearly remain a dominant aspect of climate in Guinea-Bissau.

Figure 1. Evolution of temperature of (a) maximum temperature (red), (b) minimum temperature (green) and (c) mean temperature (blue) time series (1958-2018) for the center of Bissau

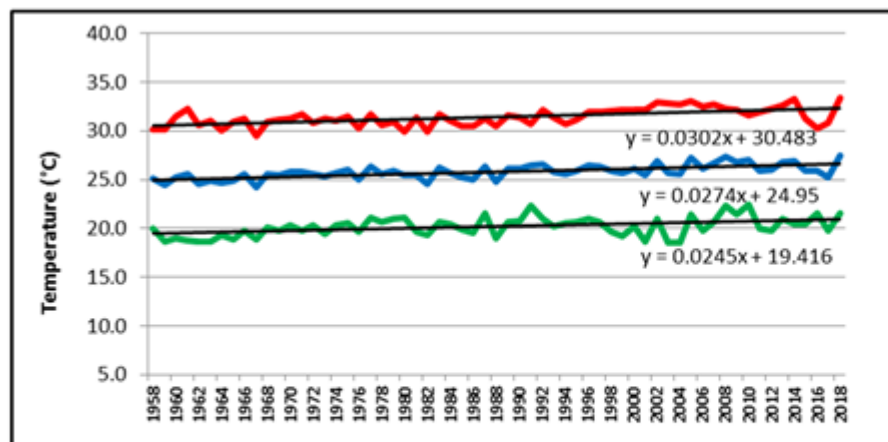
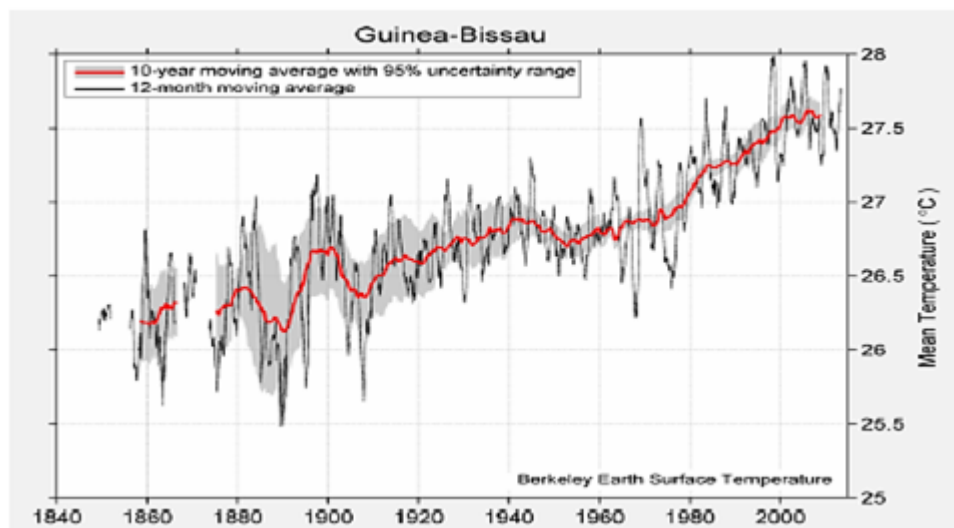
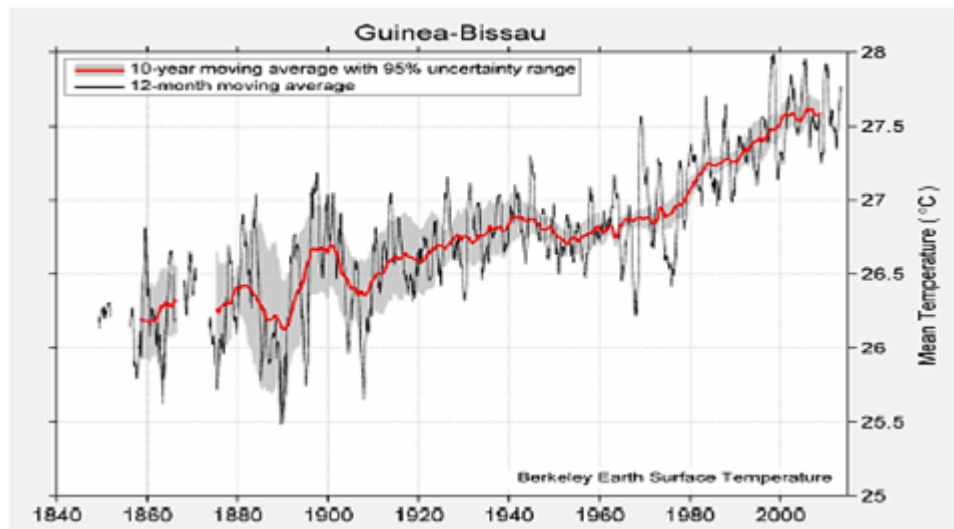


Figure 2. Month moving average and 10-year moving average mean temperature evolution for Guinea-Bissau region¹⁵



Guinea-Bissau’s already mentioned climatic vulnerability will be exacerbated by the projected increase in temperature, more extreme droughts and floods, more volatile precipitation and a higher frequency of extreme climatic events. The level of vulnerability can vary considerably between regions and sectors in the country, but climate change impacts may seriously affect economic growth, harm the development efforts implemented over the last years and aggravate poverty in the country. The potential negative impacts of climate change per sector are listed in Table 1.

Table 1. Climate change impacts per sector in Guinea-Bissau

Sector	Impact
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Sector	Impact
Agriculture	<p><u>According to different agro-ecological zones and agricultural practices:</u></p> <p>-</p> <p><u>Mangroves, including mangrove-rice systems (paddy or “bolanhas”) along the coast:</u></p> <ul style="list-style-type: none"> · Low soil productivity and lower agricultural yields, mainly cereals, the food base of the population · Sea erosion phenomena with siltation of the “<i>bolanhas</i>” · Food insecurity and episodes of hunger, which contributes to rural exodus, malnutrition, diseases · Constant acidity of the mangrove soils making farming difficult in these “<i>bolanhas</i>”. <p><u>Floodplains (freshwater):</u></p> <ul style="list-style-type: none"> · Salinization / acidification phenomena in transitional floodplains in the coastal area (“bolanhas”), but to a lesser extent in relation to mangrove soils · Low soil productivity and lower agricultural yields, mainly cereals, the food base of the population <p><u>Plateau:</u></p> <ul style="list-style-type: none"> · Sudden onset and rapid propagation of wildfires, given the existence of a dry biomass substrate · Soil erosion phenomena in naked soils under intense rainfall · Landslides events and destruction of arable topsoil horizon. · This ecosystem is probably the most vulnerable given the impossibility of reconstruction of arable land and soil organic matter content. · Lack of water, with crop water deficit developing and negatively impacting productivity. <p><u>Horticulture:</u></p> <ul style="list-style-type: none"> · The increase in temperature stimulates the appearance of pests that are harmful to crops. · Increased precipitation induces seed rot during the germination phase. · In this situation, wherever this occurs, invariably leads to a food deficit in the horticulture agro-ecosystem.

Sector	Impact
Health	<ul style="list-style-type: none"> · Rainfall variability. The rainy season corresponds to greater proliferation of mosquitoes, flies and other insects, which contributes to the appearance, as well as malaria, of other infectious diseases · The greater the rainfall amount the greater is the occurrence of diarrhea and other water borne illnesses · Increasing temperatures simultaneously with changes in rainfall availability also acts as climate change driver by altering the locations that are sensitive to vector-borne diseases such as malaria, dengue fever and schistosomiasis, also known as bilharzia, through affecting the habitat range for the vector.
Biodiversity	<ul style="list-style-type: none"> · Decreased agricultural production and food shortages · Unproductiveness of the “bolanhas“ leading to food scarcity · Loss of natural habitat, species migration, loss of biodiversity and economic yield decline. · Escape of animals and disappearance of plants intolerant to droughts
Forests	<ul style="list-style-type: none"> · Decreased forest resources and ecosystem services · Decreased organic matter and soil impoverishment. · Loss of biodiversity, natural resources and essential nutrients for the forest · Decrease of evapotranspiration, increase of vectors of epidemics
Energy	<ul style="list-style-type: none"> · Poor reproductive capacity of some fauna and floristic species. · Loss of biodiversity · Soil degradation caused by drought, pollution and erosion
Source: Adapted from Guinea-Bissau's Third National Communication to the UNFCCC, 2018.	

The lack of adequate hydro-climatic information also represents a hindrance for the development of various economic sectors: transportation (air, land and water), agriculture, fisheries, infrastructure, education, health, water supply & sanitation (WATSAN), biodiversity conservation & ecosystem services. Monitoring climate change with hydro-meteorological services is key for the development of adequate adaptation measures within these sectors.

The impacts of climate change could be better mitigated through climate resilient planning and timely disaster preparedness measures. However, inadequate or non-existing climate and weather information, forecasts and analyses create severe limitations for developing informed and climate-responsive decision-making and put the population under high-risk conditions related to climate induced hazards and extreme weather events.

Long-term solution and Barriers to achieving it

To allow Guinea-Bissau's to better manage climate related challenges undermining economic growth and development, it is essential to address a number of pressing challenges. These include the needs to:

- enhance capacity of hydro-meteorological services and networks for predicting climatic events and associated risks.
- develop a more effective, efficient and targeted delivery of climate information including early warnings to both planners as well as communities living on the fringes of climate induced pressures.
- Support improved and timely preparedness and rehabilitated response to forecast climate-related risks and vulnerabilities.

A rehabilitated and modernized weather and climate monitoring system can provide Guinea-Bissau with the capacity necessary to develop, for example, in the future: (i) an early warning system for severe weather; (ii) real-time weather and hydrological monitoring; (iii) weather forecasting capabilities (Numerical Weather Prediction); (iv) agro-meteorological information and services (including for climate smart agriculture, integrated crop and pest management and other related applications where CI &EWS contribute to food security); (v) health advisories (vi) applications related to building and management of infrastructure; (vi) tailored products for mining planning and management; (vii) risk informed land, air and maritime transport management; (viii) integrated water resources management; (ix) adaptive coastal zone and land management; and (x) adaptation planning and policy making processes.

Barriers

However, there are significant policy, institutional, individual, financial, technological and informational barriers that prevent the desired situation from emerging. These barriers include:

Significant gaps in weather and climate monitoring infrastructure:

Data and observation capacity with respect to climate change is limited in Guinea-Bissau. The meteorological network in the country only counted seven (7) synoptic stations, seven (7) agro-climatic stations that are not functioning and forty-five rainfall stations before the politico- military conflict 1998 – 1999. Most of these facilities have been destroyed by the politico- military conflict between 1998-1999. Today there are only four Meteorological stations (Bissau Airport, Bissau Centre, Bolama-Bijagós, Bafatá e Gabú) operational but unfortunately working with very limited capacity. Therefore, there is a critical need for modernizing and expanding the meteorological network to collect more accurate and reliable data, in real- or near-real-time. More information about the current baseline situation of hydro-meteorological stations in Guinea-Bissau are available in the next section, and on Annex 19: Complete Baseline Assessments (In Portuguese).

Limited knowledge and capacity to effectively predict climatic events and assess their sector/area/community specific potential impacts:

The scientific and technical capabilities required to effectively identify climate induced hazards such as storms, flooding, droughts, sea surges and climate induced pest and disease outbreaks and forecast their potential impacts on all Guinea-Bissau's vulnerable communities such as coastal communities, the farmers and fishermen and others are often weak. This is due to a lack of infrastructure, hardware and software, human capacity/skills to program and run the models code, or not effectively using forecasts that are available from regional and international centers. Running and interpretation of forecast models requires specialized education and training that is often lacking. Even when climate information is available (monitoring and forecasts), it is usually not translated into specific hazards experienced by different sectors and users e.g. heat units for agriculture or wave heights for managing coastal shipping. Without translation into information that can be easily understood by users, the information is difficult to use for particular operational decisions.

Inconsistent use of different information sources across and within country borders:

There is currently no clear legal mandate for the issuance of warnings. As a result, with multiple sources of information, messages may be confusing and not acted upon. It is therefore necessary to have an official process for generating warnings that include communication with sectoral ministries and communities where disasters are experienced. Meanwhile, calculating risks for known vulnerabilities requires a comprehensive archive of information related to vulnerable communities, infrastructure, roads, shipping, access to markets, flood prone areas, cropping patterns etc. This information is currently held in disconnected databases or computers spread across different government departments and ministries. All the information required to assess vulnerability and calculate risks needs to be accessible, either through a central database/repository, or through distributed network.

No systematic forecasting of climate hazards, analysis of risks and timely dissemination of warnings and climate risk information:

Communication and data processing facilities for hydro-meteorological data and derived products are currently not available due to a lack of observing stations, computers and telecommunications equipment. Furthermore, weather and climate forecasts are not regularly produced within Guinea-Bissau nor do they take conditions specific to Guinea-Bissau into consideration (e.g. combining localized climate hazard information with information on localized vulnerability or environmental factors). Besides a lack of climate risk forecasts, there are no formal or official channels for the dissemination of these forecasts, associated warnings or response strategies that may be employed to mitigate any impacts.

Lack of environmental databases for assessing the risks posed by climate variability and change:

The absence of a national environmental database reduces the potential to use weather and climate information for decision-making in different sectors that make up the Bissau Guinean economy. These include planning and investment decisions related to urban and rural development, infrastructure, health, transport, agriculture, and mining and water resources.

Effective efforts to improve early warning systems Guinea-Bissau must address all of the above barriers, while taking in account the adaptive capacity of the country's most vulnerable.

Baseline and Related Projects

After three decades of poverty and violence, Guinea-Bissau embarked on a long-term process of economic development and social transformation, aiming to achieve political stability through inclusive development, good governance and preservation of biodiversity. This is reflected in the adoption of the strategic and operational development plan “Guinea-Bissau 2025 – Terra Ranka” which aims at supporting the country to achieve by 2025 a green and sustainable economic and social transformation. To achieve this goal, the plan is organized around the following 5 pillars: i) improve the democratic governance; ii) ensure a sustainable management of natural capital and conservation of the biodiversity; iii) build a national network of modern and competitive infrastructures; iv) strengthen the human capital and improve citizen quality of life; v) build a strong private sector and a diversified economy. In the framework of this new development vision, the government with support of various donors and financial institutions has mobilized \$63M for the next 10 years.

The natural capital is one of the key assets for the Guinea-Bissau economic development. The natural capital currently represents 47% of the wealth per capita in the country and the government is aiming to increase this number. For this reason, the sustainable management of the natural resources (forests, lands and waters) is among the government’s top priorities. If the natural capital is one of the key assets on which Guinea-Bissau relies for alleviating poverty and promoting economic and social transformation, the poverty, associated with a poor and inefficient agrarian system, is also one of the key drivers of the natural resources depletion in the country. In order to address this driver, the government has also identified as key priority the development of the agricultural sector. As part of the Guinea-Bissau 2025 – Terra Ranka, a number of investments and projects support infrastructure developments and the agricultural sector in support of the pillars listed above. Without the LDCF intervention the long-term sustainability of these investments can be undermined unless climate risk information is provided, early warning system delivered, and relevant preparedness and adaptation capacities embedded into the relevant institutions responsible.

However, as the meteorological network Guinea-Bissau is old, outdated, degraded and made up of diversified brands, it makes it difficult to ensure network connection and equipment maintenance. Today, there are only four Meteorological stations (Bissau Airport, Bissau Centre, Bolama-Bijagós, Bafatá e Gabú) that are partially functional with very limited operational capacity. Indeed, because of budget constraints, the hydro-meteorological stations are no longer functioning properly. Given the current economic difficulties facing the country, the National Meteorological Service has only very limited means of operation and a virtual absence of investment resources. More information about the current baseline of the hydro and meteorological stations are provided in the related Annex of the UNDP ProDoc.

Rural communities and their agro-pastoral practices remain highly vulnerable while agro-meteorological information and support to farmers is currently non-existent or ineffective. Previously, Guinea-Bissau benefitted from another LDCF project (*“Strengthening adaptive capacity and resilience to Climate Change in the Agrarian and Water Resources Sectors in Guinea-Bissau”*), but the project had limited geographical scope and it came to an end in 2019.

Additionally, the local and decentralized institutions in charge of supporting the meteorological stations in the collection and analysis of climate change information do not have the necessary capacity and are not properly coordinated to formulate and disseminate relevant agro-meteorological information and advisories.

In 2013, Guinea-Bissau adopted a national disaster risks management strategy. The objectives of this strategy are: i) increase political commitment to the reduction of disaster risks; ii) improve the identification and assessment of disaster risks; iii) strengthen the knowledge management related to DRR; iv) increased awareness of disasters risks within the population; v) enhance the governance of institutions involved in DRR, and vi) mainstreaming DRM in the development strategies and plans. Although this strategy was an important step for DRM in Guinea-Bissau, it is necessary to integrate the strategy with climate change management in the country. This strategy has not yet been implemented until recently because of lack of financial resources. The required policy, institutional and regulatory frameworks to enable risk informed decisions is currently absent partly due to described limitations in required infrastructure and capacities.

In 2019, a new LDCF project with focus on climate change adaptation in the Coastal Zone was approved (“*Strengthen the adaptive capacity and climate resilience of Guinea-Bissau vulnerable coastal communities to climate risks*”). Although the project will help Guinea-Bissau advance with its adaptation planning and implementation, it will not necessarily address the issue of climatic observation inherent, to the current hydro-meteorological network or the important capacity that affect national institutions responsible for water and meteorology.

The state of meteorological stations in Guinea-Bissau

The surface weather observation network system in Guinea-Bissau is currently inadequate for the assessment, quantification and reliable prediction of climate and its impacts, and consequently for the prevention of natural disasters and the management of weather and climate risks. This diminishes the ability of the country to participate effectively, efficiently and fully in shaping climate change scenarios and in developing climate-based early warning system.

The National Institute of Meteorology (INM) is the institution responsible for managing and maintaining these stations. Currently, the Institute has 6 technicians in charge for the maintenance of the synoptic and Pluviometric stations that are still functioning in the country. The INM of Guinea-Bissau currently operates with support from the national budget of the Government through the Ministry of Social Equipment. The national allocation budget only covers the salaries of officers and technical staff members. Despite past support from West Africa Agricultural Meteorology Project (METAGRI) and the Post and Natural Disasters Countries (EMERMET) funded by Spain, the technical and institutional capacity and the equipment procured were not sufficient to reach the capacity levels required to generate climate information and early warning products necessary for addressing communities livelihoods vulnerability and the efficient addressing of climate challenges for economic growth and sustainable development in Guinea-Bissau.

Currently the baseline network of surface weather observations in Guinea-Bissau is composed of:

- 07 synoptic stations; of which 03 partially operational (Bissau, Bolama and Bafatá). These stations do not measure wind and 01 (Bolama) does not have a barometer for measuring atmospheric pressure.
- 04 main weather stations (Bissau, Bolama, Bafatá and Gabú), also partially operational.
- 12 auxiliary climatological stations, inoperative.
- 07 inoperative agrometeorological stations; and
- 45 rainfall stations, of which 22 are operational.

Both in the main whether stations and in the rainfall ones, local observers face major difficulties with data transmission to INM in Bissau. They either rely on State maintained landline telephony – for which the network is now being rapidly decommissioned -- or on cellular phones, but often needing to use their own means to purchase credit for sending the data/information to HQ.^[1]

The causes for the shortcomings of the limited surface weather observation network system in Guinea-Bissau and the very low level operational and maintenance level, as well as the low level of technology uptake, are:

- The 1998/1999 political-military conflict, which basically destroyed the then existing network.
- Lack of adequate education and training facilities in the country – careers within meteorology and other related fields need to be pursued abroad.
- The INM lacks financial means that are minimally needed for the purchase of technical equipment, for the maintenance of buildings, furniture, supplies, utility bills, security services, etc.

The efficient functioning of the surface weather observation network system is important for the achievement of the World Climate Observation System (SMOC) objective of improving systematic climate observations leading to:

- Better monitoring of the climate system, better detection of climate change and better assessment of climate change impacts.
- Reliable data for a quick alert system.

The following tables list the meteorological stations and their operating states. Refer to the related UNDP ProDoc Annex for additional detailed information.

Table 2. Synoptic^[2] stations and their operating status

Localities	Type	Year of creation	Code OMM	Lat. (N)	Long. (W)	Alt. (m)	Operating status
Bolama	Synop	1905	61769	11°36'	15°29'	20	To rehabilitate
Bafatá	Synop	1950	61781	12°10'	14°40'	43	To rehabilitate
Bissau/Aero	Synop	1941	61766	11°52'	15°56'	29	OK
Bissorã	Synop	1950	61777	12°14'	15°27'	10	To reinstall
Cufar	Synop	1950	61778	11°19'	15°23'	19	To reinstall
Farim	Synop	1950	61775	12°29'	15°30'	3	To reinstall
Gabu	Synop	1941	61790	12°17'	14°14'	83	To rehabilitate

Table 3. Agrometeorological[3]³ and climatological[4]⁴ stations and their operating status

Localities	Type[5] ⁵	Year of creation	Code AGRHIMET	Lat. (N)	Long (W)	Alt. (m)	Operating status
Bissau/Obs	CLI	1916	190021	11°51'	15°36'	20	To rehabilitate
Buba	CLI	1940	190024	11°36'	15°05'	10	To reinstall
Bubaque	AGR	1940	190026	11°04'	16°02'	30	To reinstall
Bula	AGR	1950	190007	12°03'	15°44'	30	To reinstall
Cabuxanque	AGR	1992	190054	11°17'	15°07'		To reinstall
Cacine	CLI	1950	190028	11°08'	15°01'	6	To reinstall
Caió de Fora	CLI	1950	190018	11°50'	16°19'	39,5	To reinstall
Catio	CLI	1946	190027	11°17'	15°16'	18	To reinstall
Contuboel	AGR	1989	190041	12°22'	14°35'	8	To reinstall
Formosa	CLI	1995	190050	11°33'	15°50'		To reinstall
Gabu	CLI	1941	190013	12°17'	14°14'	83	To rehabilitate
M. Boé/Beli	AGR	1950	190030	11°45'	14°13'	75	To reinstall
Orango	CLI	1995	190048	11°04'	16°09'		To reinstall
Pirada	CLI	1950	190011	12°40'	14°10'	55	To reinstall
Quêbo Coli	CLI	1996	190057	11°32'	14°47'		To reinstall
Quinhamel	AGR	1985	190020	11°53'	15°52'		To reinstall
Sonaco	CLI	1950	190012	12°24'	14°29'	25	To reinstall
Varela	CLI	1950	190004	12°17'	16°36'	13	To reinstall

Table 4. Pluviometric[6]⁶ stations and their operating status

Localities	Type	Year of creation	Code AGRHIMET	Lat. (N)	Long (W)	Alt. (m)	Operating status
Bachil	PLU	1985	190063	12°13'	16°64'		To reinstall
Bambadinca	PLU	1978	190015	12°02'	14°52'		To reinstall

Localities	Type	Year of creation	Code AGRHIMET	Lat. (N)	Long (W)	Alt. (m)	Operating status
Bedanda	PLU	1955	190051	11°27'	15°06'	14	To reinstall
Bigene	PLU	1985	190034	12°25'	15°33'	50	OK
Binar	PLU	1985	190060	12°07'	16°24'		To reinstall
Bissassema	PLU	1987	190049	11°45'	15°28'		To reinstall
Bruntuma	PLU	1950	190016	12°28'	13°40'	100	To reinstall
Cacheu	PLU	1950	190005	12°06'	16°10'	14	To reinstall
Cade	PLU	1985	190044	12°14'	13°54'	50	To reinstall
Calequisse	PLU	1985	190033	12°04'	16°14'	50	OK
Canchungo	PLU	1950	190006	12°04'	14°02'	15	To reinstall
Canquelifa	PLU	1985	190043	12°35'	13°52'		To reinstall
Caravela	PLU	1962	190046	11°33'	16°20'	15	To reinstall
Cuntima	PLU	1985	190038	12°39'	15°02'		To reinstall
Djolmete	PLU	1985	190036	12°13'	15°52'	30	To reinstall
Empada	PLU	1968	190025	11°33'	15°14'		OK
Fa	PLU	-	190014	12°06'	14°49'		To reinstall
Fajonquito	PLU	1995	190040	12°32'	15°14'		To reinstall
Foia	PLU	1987	-	11°48'	16°36'		To reinstall
Fulacunda	PLU	1950	190023	11°47'	15°11'	34	To reinstall
Galomaro	PLU	1985	190029	11°56'	14°37'		To reinstall
Ganadu	PLU	1985	190042	12°16'	14°43'		To reinstall
Guiledje	PLU	1987	-	11°20'	15°07'		To reinstall
I. Galinha	PLU	1993	-	11°28'	16°18'		To reinstall
Ingoré	PLU	1985	190035	12°24'	15°48'	30	To reinstall
Mansaba	PLU	1950	190010	12°18'	15°10'	43	OK
Mansoa	PLU	1950	190010	12°04'	15°19'	8	To reinstall
Nhacra	PLU	1985	190062	11°27'	16°28'		To reinstall
Nhala	PLU	1987	-	11°53'	15°28'		To reinstall
Picixe	PLU	1950	190045	11°50'	16°08'		To reinstall
Pitche	PLU	1985	190017	12°19'	13°58'		OK
Potugole	PLU	1950	190019	11°58'	15°08'	10	To reinstall
Quebo	PLU	1950	190057	11°33'	14°49'		To reinstall
S. Domingos	PLU	1958	190032	12°24'	16°12'	22	To reinstall

Localities	Type	Year of creation	Code AGRIMET	Lat. (N)	Long (W)	Alt. (m)	Operating status
Saltinho	PLU	1950	-	11°38'	14°40'		To reinstall
Sare Bacar	PLU	1985	190039	12°51'	14°27'		To reinstall
Tche-Tche	PLU	1956	190055	12°17'	14°12'		To reinstall
Tite	PLU	1980	190022	11°47'	15°24'		OK
Uno	PLU	1995	190047	11°13'	16°10'		To reinstall
Xitole	PLU	1950	190031	11°44'	14°49'	30	OK

The information presented in the tables above is based on the records of the National Institute of Meteorology (INM) of Guinea-Bissau and was collected by the national consultants during the PPG phase.

As there is a limited budget to develop the project's activities, not all these stations will be reinstalled/rehabilitated. Therefore, a list of stations to be part of the project's sites, based on the priorities settled by the National Meteorological Institute is presented in the section 2) Project sites.

The state of hydrological stations in Guinea-Bissau

The General Direction of Water Resources (DGRH) is the focal institution for the water resources in Guinea-Bissau and it maintains the country's hydrological observation network comprises seventeen (17) hydrometric stations, most of which are equipped with limnigraphic devices (see Table 5). However, all hydrometric stations are currently inoperative. One of the main causes of the non-operational status of the network is linked to the lack of security of the installed equipment theft of the station components, such as limnigraph devices, cables, etc, and the vandalism of the stations.

All hydrometric stations were installed in the watersheds of the two (02) major transboundary and most important freshwater rivers in Guinea-Bissau, which were the subject of various measurements, and are shared with Guinea-Conakry: the river Corubal (with hydroelectric vocation), and with Senegal - Geba (mainly used for agriculture purposes). It should be noted that river basin management is carried out in a coordinated and concerted manner within the framework of the Gambia River Basin Development Organization (OMVG).

Figure 3. Guinea - Bissau National Hydrological Observation Network, including projection of projected gauge stations

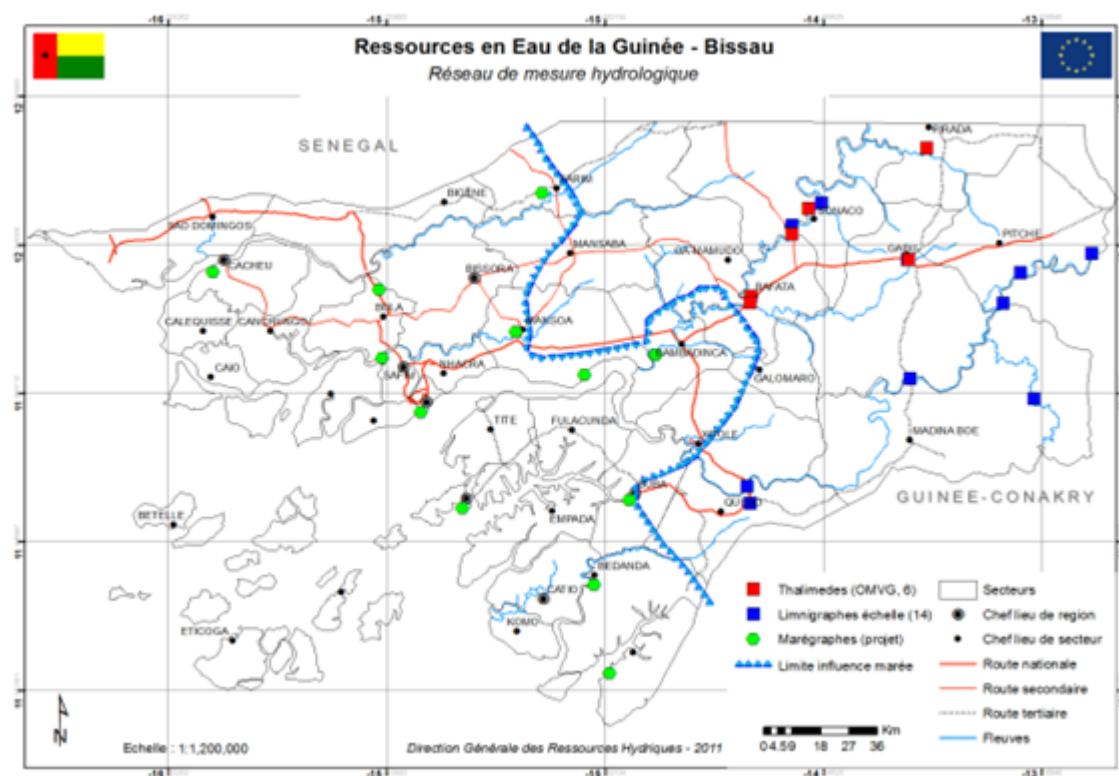


Table 5. Hydrometric stations in Guinea-Bissau

Station Code	Name of the Station	River/Affluent	Latitude	Longitude	Altitude (m)	Installation date	Initial equipment
1193401020	Bafatá/Ponte Novo	Geba	+12° 10' 00''	-14° 40' 00''	0	1979	1 E.L. 00 à 07m 1 A.L. – A OTT
1193401030	Contuboel	Geba	+ 12° 20' 56''	-13° 33' 10''	3	April 1989	E.L. 00 à 04m
1193401031	Sonaco/ à Jusante	Geba	+ 12° 42' 50''	-14° 50' 28''	4	1956	1 E.L. 00 à 04m, e ; 1 E.L. 00 à 9.30m
1193401032	Sonaco/à montante	Geba	+ 12° 25' 30''	-14° 30' 10''	4	1956	1 E.L. 00 à 06m
1193401035	Carantaba	Geba	+ 12° 26' 31''	-14° 28' 00''	12	1989	1 E.L. 00 à 03 m

Station Code	Name of the Station	River/Affluent	Latitude	Longitude	Altitude (m)	Installation date	Initial equipment
1193402010	Saltinho à jusante/Sintchã Sambel	Corubal	+ 11° 36' 32''	-14° 40' 39''	25	April 1989	1 E.L. 00 à 04m
1193402011	Saltinho à montante/Sintchã Canta	Corubal	+ 11° 33' 40''	-14° 40' 10''	26	1957	1 E.L. 00 à 06m
1193402020	TCHE-TCHE	Corubal	+ 11° 55' 30''	-14° 12' 51''	35	1977	1 E.L. 00 à 12m
1193402025	Cabuca	Corubal	+ 12° 08' 48''	-13° 56' 58''	40	1983	1 E.L. 00 à 12m
1193402030	Cadé	Corubal	+ 12° 14' 12''	-13° 54' 00''	40	1980	1 E.L. 00 à 10m
1193402035	Bucure	Koliba/Geba	+ 12° 17' 35''	-13° 41' 46''	45	1983	1 E.L. 00 à 10m
1193410001	Bafatá Portagem	Geba/Campossa	+ 12° 16' 29''	-14° 40' 00''	3	1980	1 E.L. 00 à 06m 1 A.L. A OTT
1193410020	Gabu/Ponte	Geba/Campossa	+ 12° 16' 29''	-14° 13' 18''	45	1983	1 E.L. 00 à 05m 1 A.L. – A OTT
1193416005	Pirada/Ponte	River Geba/Bidigor	+ 12° 36' 01''	-14° 10' 08''	15	1991	1 E.L. 00 à 07m 1 A.L. – A OTT
1193425001	Udumduma	Geba/Udumduma					1 E.L. N.O.
1193430005	Beli	Corrubal/Rio Fefine	+ 11° 52' 00''	-13° 51' 40''	54	1978	1 E.L. 00 à 10m
1193440301	Gambiel	Geba	Unknown	Unknown	Unknown	Station over Geba River Point, Old Gambiel Lane - Bafatá	1 E.L. 00 à 04m 1 A.L. – A OTT

OMVG (after its name in French, *Organisation de la mise en valeur du fleuve Gambie*) is also important partner with respect to the monitoring of water resources in Guinea-Bissau. The OMVG is a subregional organization created in 1978, to which the country joined in 1983, as a result of a long process of cooperation and harmonization of efforts to enhance the resources of the Gambia River basin. This process extended the Organization's competences on the Kayanga / Geba river basins (covering 14 900 km² of which 10 00 km² in Guinea-Bissau, 4 400 km² in Senegal and 500 km² in Guinea-Conacry and length 335 km) and Koliba / Corubal (with an area of 26 000 km² of which 8 800 km² in Guinea-Bissau, 17 200 km² in Guinea-Conacry) and 384 000 km in length.

It was in this context that in 2010, OMVG financed the rehabilitation of six (06) stations of the national hydrological observation network, already obsolete at the time. All stations were installed on the Geba river, namely: Gabú - Ponte; Sonaco; Bafatá – Ponte Nova; Bafatá - Portagem; Contuboe - Ponte and; Pirada - Ponta. Despite the rehabilitation works in the stations in 2011, the stations are currently inoperative. During the relatively short period of operation, with OMVG support, regular field missions were organized involving technicians from this subregional basin organization, and technicians from the General Direction of Water Resources (DGRH) hydrology service, where data was first recorded for several uses.

The first hydrological monitoring stations in Guinea-Bissau were set up in the early part of the second half of the 1950s, with support from Portugal, as part of the operative hydrology program, funded by the Portuguese government. These are the stations of Bafatá / Ponte Nova - over Geba river, and Saltinho (localities of Sintchã Canta / upstream and Sintchã Sambel / downstream) and Corubal River.

In terms of equipment, the vast majority of stations were equipped with limnimetric scales ranging from 00 to 10 m and A. OTT limnographic devices. Currently, in only a few locations are still visible traces of scales by the rivers, and metal enclosures to protect limnigraphic devices, but the presence of such devices is not registered at the site.

Concerning the tidal gauge stations, their facilities were designed in the 1990s (Table 6), in the tidal basins of the country's secondary rivers, influenced by the tide, namely the rivers: Buba (localities of Buba and São João); Cacheu (Cacheu, São Vicente and Farim, localities); Cacine (locality of Cacine); Cumbidjã (Bedanda and Gadamael localities); Geba (towns of Bissau / confluencia Geba and Corubal, Porto Gole and Banbadinca) and Mansôa (João Landim and Mansôa).

In 2012, a project financed by the European Union planned to install 12 tide gauge stations in Guinea-Bissau (see Table 6 and Figure 3). However, as the funding was suspended in April 2012, the installation of these stations was never completed and there is no indication of resuming the project's activities.

Table 6. Tidal Gauge stations projected

#	Code ORSTOM	River	Gauge station/place of installation
01	1193001005	Buba	Porto de Buba/Ponte
02	1193002002	Buba	Porto de São João
03	1193101005	Cacheu	Porto de Cacheu/Ponte
04	1193101010	Cacheu	Ponte de São Vicente
05	1193101015	Cacheu	Porto de Farim
06	1193201005	Cacine	Porto de Cacine
07	1193401005	Geba	Porto de Bissau
08	1193401010	Geba	Portogole
09	1193401015	Geba	Porto de Bambadinca
10	1193401020	Geba	Porto de Bafatá
11	1193402006	Geba	Porto de Cusselinta
12	1193501002	Mansôa	Ponte João Landim
13	1193501005	Mansôa	Ponte de Mansôa

The installation and operation of the hydrological observation network in Guinea-Bissau was almost entirely ensured by the partners, who funded all hydrology projects to date. The country's cooperation with partners in this area began in the 1950s, still in the colonial period through Portugal. Other bi- and multilateral, sub-regional organizations include also contributed to the development of hydrological services in Guinea-Bissau: the Portuguese Governments (Environment Institute); French Government (French Cooperation Agency / AFD); United Nations Development Program (UNDP), World Meteorological Organization (WMO); AGRHYMET / CILSS Regional Center, OMVG. They have contributed with technical assistance and by financing projects aimed at the physical installation and maintenance of hydrological monitoring equipment, training and capacity building of technicians within national institutions, ensuring at times the salaries of hydrological observers and service technicians, in light of the chronic difficulties faced by the State in Guinea-Bissau in providing adequate services to the population.

Among these services, and within the various segments that can be classified under the chapeau of ‘**water services**’, the monitoring of the hydrological observation network is an important one that generates public goods and global benefits, as well as adaptation benefits. Together with meteorological services, the observation and monitoring of the hydrological network is essential for the consolidation of climatic services in the Guinea-Bissau.

In terms of staff, the public institutions responsible for the water sector, whether the DGRH more generally, or the hydrology services more specifically, face the problem of being grossly understaffed. There is a lack of qualified professionals with high level education and specialized in areas such as climate change and forecasting. Currently, the water resources sector has 31 technicians (23 effective and 8 hired). Of this total, 07 are female (22.3%), with 06 (19.3%) in retirement conditions but still providing services. Regarding academic training, 11 technicians (35.5%) have higher education in the fields of: (i) Hydrology; (ii) Hydrogeology; (iii) Geology; (iv) Sociology; (v) Economics, 14 technicians (45.1%) with medium training, 6 technicians (19.4%) with technical - professional training.

The hydrology services have 08 technicians, corresponding to 25.8% of the total technicians assigned to the water resources sector in Guinea - Bissau. Of this number, 3 have a higher education level in hydrology, 3 have a medium level in the same topic, and 2 have a medium level in hydrological instruments. Of the eight technicians assigned to the hydrology services, 2 are female.

Capacity challenges are more pronounced in the Regional Directorates of Water Resources. In almost all the administrative regions of the country there are physical facilities, but without the human resources and material means necessary to fulfill their duties at the decentralized level, except for the regions of Bafata, Gabú (Eastern regions where all hydrometric stations are installed) , Quínara and Tombali (South Zone), which have only the Regional Director / Delegate as the only human resource, but without minimum operating conditions.

Thus, the process of operationalizing and relaunching hydrological services in the country cannot be limited solely and exclusively to the reconstitution of the national hydrological observation network in order to contribute to the creation and development climate information services, but rather to be accompanied by training (e.g. new staff by recruiting candidates in secondary schools in the country) / capacity building of the institution's human resources.

The use of specialized training and research institutions should be explored, such as CRA - Niamey / Niger, 2IE - Ouagadougou / Burkina Faso, ACMAD, University of Lomé / Togo, Sheick Anta Diop University of Dakar / Senegal, may serve as a resource to bridge the shortfall human resources needed for the relaunch of hydrology services in Guinea – Bissau, or establish partnerships with other international hydromet centers or research institutions for support.

It should be noted that the hydrological information available in the DGRH HYDROM vs 3.1 database relates solely to the shared transboundary freshwater Geba and Corubal rivers where the hydrometric stations were installed.

For climate informed planning going forward, both physical (hydrological) equipment and technical capacity strengthening are needed to improve the state of qualitative and quantitative knowledge of hydromet data and water resources of Guinea-Bissau's surface, so that the supervising institution has the capacity to be able to produce information as accurately as possible, thus contributing to the ongoing development and operationalization of, for example, a National Early Warning System, within the scope of Disaster Risk Reduction (DRR), and or Disaster Risk Management (DRM).

Component 1) Transfer of technologies for climate monitoring infrastructure

Outcome 1) Enhanced capacity of national hydro- meteorological (NHMS) and environmental institutions to monitor extreme weather and climate change

Under this component of the project, the Government of Guinea-Bissau will be able to use LDCF resources to procure and install critical climate information infrastructure required to rehabilitate and/or modernize the country's observation network. In all equipment purchases, an assessment of existing equipment will be made, noting the manufacturer, status and critical gaps in density.[1]

The basic criteria for selection of locations of stations to rehabilitate or establish has been mentioned in Section II-2 of the UNDP ProDoc. The actual selection of locations when implementing the project will need to be weighed against the costs of potentially cheaper solutions and the added costs of training personnel to service different products.

This component will build on the legacy of past interventions undertaken through the METAGRI, EMERMET. Those interventions served to minimally capacitate the INM prior to the approval of the present project. While important, those interventions did not include the provision of modern equipment.

The GEF projects will also be considered. As for example, the legacy project GoGB/UNDP/LDCF "*Strengthening adaptive capacity and resilience to Climate Change in the Agrarian and Water Resources Sectors in Guinea-Bissau*" had provided some equipment to Gabú station, although without any necessary provisions for its maintenance. Important lessons on the need for creating ideal conditions for sustainably managing equipment were learned duly and incorporated into the design of this project.

This project will also build upon the baseline of interventions that constitute the financial baseline for this project and as well as other relevant partners' interventions, in particular those related to the baseline and which have a focus on technology and/or know-how transfer, as well as infrastructure.

Without LDCF Finance: the baseline situation for climate monitoring infrastructure

The baseline finance associated with Component 1 of the project includes the following initiatives:

#	Programs, Projects or Initiative relevant for Component 1 (C1)	C1 FINANCE (\$M)	BASELINE
1	AfDB/Ministry of Agriculture, Développement des Chaines de Valeur Riz	\$1.0	
2	IFAD - PADES	\$0.9	
3	IFAD - REDE	\$30.0	
4	WB Rural Transport Project (RTP)	\$1.0	
5	Government of China, Alto do Bandim Fishing Port Project	\$10.0	
6	CPLP Secretariat Water Res Mgt & Monit. in member Countries	\$0.33	
7	OMVG Salinho Hydroelectric Project	\$4.0	
8	Adaptation Fund / West African Development Bank (BOAD)	\$4.0	
9	Green Climate Fund/ West African Development Bank (BOAD)	\$3.7	

#	Programs, Projects or Initiative relevant for Component 1 (C1)	C1 FINANCE (\$M)	BASELINE
10	Project AGIR AfDB / EU / Ministry of Agriculture	-	
	TOTAL	\$54.9	

Without LDCF, it would be difficult for agricultural, infrastructural, transport, energy or fisheries projects to reach their full potential. Sectoral stakeholder will be unable to accurately assess climate risk, and shocks. Therefore, key decision-making processes within those sectors, including and in particular those that require EWS, would totally lack essential data on weather, water and climate.

In the context of climate change and variability, access to and understanding of agro- and hydro-meteorological information is a prerequisite for disaster risk reduction, agriculture productivity and adaptive agro-sylvo-pastoral activities.

Although well supplied with funds, those baseline projects listed further up have not prioritized investments in the development of climate monitoring infrastructure. Such investments would simply otherwise not be made in the near foreseeable future in the baseline scenario.

With LDCF Finance: The adaptation alternative for climate monitoring infrastructure

With LDCF funds, the basic conditions for the systematic production of climate data and information in Guinea-Bissau would be created. Project funds and UNDP co-financing will be used to procure and install appropriate infrastructure, to enable a minimum network density for improved observation, generation of climate information and a functioning EWS. Targeted capacity building and technology transfer actions are also envisaged.

The hydro-meteorological monitoring network in Guinea-Bissau comprising automatic weather stations (AWS), tidal gauging stations (FGS), and hydrological gauging stations (HGS) are upgraded. The weather and climate monitoring network in Guinea-Bissau including tidal gauge stations, automatic weather stations and hydrological stations has been upgraded. The development or procurement of reasonably robust and nationally owned weather forecasts services will be accomplished within the project's lifetime.

The equipment to be purchased and the capacity to be built with the resources channeled through the project under Component 1 will help to develop services such early warning of severe weather, agro and hydro-meteorological information and advisories. The identification of the required services will be demand-driven and is included as an output in Component 2.

Suited activities under this component will address risks identified in the baseline survey, in particular the risks related to maintenance of the equipment. The procurement and installation of equipment will be done gradually over the 3 phases in the project. This will allow for learning and adjusting the approach throughout the duration of the project.

The selection of instruments, density of the network and locations of the monitoring sites will be based on a plan which will be regularly updated (at least one update in every phase of the project). The design of this plan will take into account 1) suitability of the instruments for the particular environment, 2) required human capacity to maintain and operate the instruments, 3) required (financial) resources to operation the instruments, 4) information services required. Cost considerations are made and included in Table 11 (in view of budgeting).

The equipment to be purchased is meant to support the National Institute of Meteorology (INM) and the General Directorate of Water Resources (DGRH) to generate timely and quality hydro-meteorological information and services. The project team will ensure that the equipment purchased, and the services delivered will be connected complementing any coastal (terrestrial and maritime), weather measuring and forecasting equipment that may exist or be acquired by other partners or projects.

Where needed, the INM and DGRH will work with key project partners for the placement of equipment in secure location, e.g. with Guinea-Bissau Port Authority or the Institute for Biodiversity and Protected Areas (IBAP), which have delegates present on the Islands.

The participation of communities, in particular of women, in the operation and maintenance of the observation network equipment will be fostered, along with related activities concerning the development of climate services. The project will therefore ensure that a capacity building program to that effect is rolled out.

The EWS response capacities of community leaders, including women, will also be strengthened under this Component, so that they too can become protagonists in a wider national response to climate related risks.

As a result, targeted stakeholders in Guinea-Bissau will have the required capacity to operate and maintain equipment – as well as systems -- within a reasonably robust and adequate hydro-meteorological observation network, to be gradually and sustainably installed in strategic locations across the country, along with the necessary technology transfer, and in view of producing useful climate information and feeding early warning systems with accurate data – advancing thereby the CI & EWS agenda envisaged by Guinea-Bissau in its NAPA and similar documents.

The adaptive scenario: Essential climate information is generated

Adaptation and other benefits expected to be generated: The key Outcome under Component 1 of this LDCF project is focused on enhancing the capacity of national hydro-meteorological services in Guinea-Bissau. As service providers operating on mostly on a demand-driven basis, these institutions will be equipped and capacitated to better face climatic challenges. Various groups, who are ‘consumers’ or ‘users’ of CI & EWS, including farmers, herders, fishermen, sailors, health workers, along with stakeholders from the construction, transport and mining industries, will be able to make climate-informed decisions and averting climate risk – among them, several women, whose plight for equality will be prioritized, safeguarding as well the needs of vulnerable groups, so that ‘no one is left behind’.

Core outputs under Outcome 1

Outputs list (long text)
Output 1.1) Installation or rehabilitation (as appropriate) of 15 Automatic Acoustic Limnigraphic stations (with data logger and telemetry)
Output 1.2) Installation or rehabilitation (as appropriate) of 3 Automatic Acoustic Tidal Gauge Stations (with data logger and telemetry)
Output 1.3) Installation or rehabilitation (as appropriate) of 10 Automatic Rain gauge Stations (with data logger and telemetry)
Output 1.4) Installation of 10 Automatic Weather Stations (with data logger and telemetry)
Output 1.5) Procurement and installation of 3 maritime weather stations (AWS430), maritime observation console (MCC401), MetCast observation console (MCC301) in the 6 ports of Guinea-Bissau
Output 1.6) Design and installation of data processing facilities, open climate data portal (OCDP), and forecasting system

Outputs list (long text)
Output 1.7) Development or procurement of weather forecasts services
Output 1.8) Development and implementation of a capacity building program to provide the Guinea-Bissau with the required capacity to operate and maintain the observation network and develop climate information services
Output 1.9) Development of participative community driven monitoring of Climate Information Services as well as EWS response capacities at local/site level"

Cost considerations relevant for **Outputs 1.1 through 1.5** are included in the table below, and they were included in the TBW in bulk, to be procured in lots according to the implementation phases of the project.

Table 7. Equipment price and service costs' estimates: AWS, FGS, HGS, plus maritime (Outputs 1.1 through 1.5)

<i>The hydro-meteorological monitoring network in Guinea Bissau comprising automatic weather stations (AWS), tidal gauging stations (FGS), and hydrological gauging stations (HGS) are upgraded. The weather and climate monitoring network in Guinea Bissau including tidal gauge stations, automatic weather stations and hydrological stations has been upgraded</i>				
Linkages to:	<i>Activities under Outputs 1.1 to 1.6 as below</i>	Unit price \$K	Quantity (approx.)	Total \$K
Std activity under Outputs 1.1 to 1.5	1.X.1) Design and optimization of the.... ... <i>[equipment as mentioned in the title of the output]</i>	Bulk	1	75
Std activity under Outputs 1.1 to 1.5	1.X.2) Site selection and community sensitization.	Bulk	1	287
Std activity under Outputs 1.1 to 1.5	1.X.3) Site implementation and maintenance plan.	Bulk	1	78
Std activity under Outputs 1.1 to 1.5	1.X.4) Procurement and installation of ... <i>[equipment as mentioned in the title of the output]</i>	<i>[as below]</i>	<i>[as below]</i>	<i>[as below]</i>
Output: 1.1)	<i>Automatic Acoustic limnigraph</i>	5	15	75
Output: 1.2)	<i>Automatic Acoustic Tidal Gauge</i>	5	3	15
Output: 1.3)	<i>Automatic Rain gauge station</i>	3	10	30

The hydro-meteorological monitoring network in Guinea Bissau comprising automatic weather stations (AWS), tidal gauging stations (FGS), and hydrological gauging stations (HGS) are upgraded. The weather and climate monitoring network in Guinea Bissau including tidal gauge stations, automatic weather stations and hydrological stations has been upgraded

Linkages to:	Activities under Outputs 1.1 to 1.6 as below	Unit price \$K	Quantity (approx.)	Total \$K
Output: 1.4)	Automatic Weather station	24	10	240
Output: 1.5)	Automatic Maritime Weather station	3	25	75
Std activity under Outputs 1.1 to 1.5	1.X.5) Rehabilitation of infrastructure	Bulk	1	108
Std activity under Outputs 1.1 to 1.5	1.X.5) Commissioning and transfer	Bulk	1	41
	Total			1,024

/A description of activities that are common to the above listed outputs follows below: /

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Under Outputs 1.1 through 1.5 of the proposed project, LDCF resources will be used for the procurement and installation or rehabilitation (as appropriate) of equipment and protective infrastructure relevant to the hydro-meteorological monitoring network in Guinea Bissau.

<i>Equipment to be purchased, as per Table 11 and Table 12</i>	<i>Quantity*</i>
<i>Automatic Acoustic Limnigraph</i>	10-15
<i>Automatic Acoustic Tidal Gauge</i>	3
<i>Automatic Rain gauge station</i>	10
<i>Automatic Weather station</i>	10
<i>Automatic Maritime Weather station</i>	25

* Quantities are indicative, as prices may vary.

Stations will be fully automatic and will be equipped with data loggers and telemetry for transmitting of data.

For the limnigraphic and tidal gauge stations (Outputs 1.1 and 1.2), this will enable to monitor river and lake levels and to early identify dangerous floods before they occur, issue warnings for dam/transport managers downstream and alert communities at risk, but also manage water allocation e.g. for irrigation practices. The rain gauge and weather stations (Outputs 1.3 and 1.4) are for climatic parameters. The maritime weather stations (Output 1.5) will have multiple functions.

Stations and equipment will be installed during phase I, II and III, according to the indicative workplan following priorities identified during the PPG stage. The remaining sites will be selected based on a more comprehensive **master plan** to be developed during phase 1. The masterplan will take into account physical, social and economic parameters and will be updated in each phase to integrate the results of cost analysis and funding models, information needs assessments and demand of services.

Table 8. Standard Activities for Outputs 1.1 through 1.5.

#	Activities (1.1.1 through 1.5.6)	Description
1	Activity 1.X.1) Design of master plan for the optimization of <i>[equipment as mentioned in the title of output and according to Table 11]</i>	Technical expertise will be provided to support government counterparts in the development of a masterplan plan for rolling out the modernized monitoring network. Network design criteria will be defined as well as site selection criteria, taking into account the priority list defined by the national institutions involved in the project. These will include both physical, social and economic parameters. The activity includes procurement of network optimization studies and will furthermore be tied to the funding strategy to balance the number of stations in function of O&M costs vs. resource mobilization capacity and will take into account the results of the demand for information products.
2	Activity 1.X.2) Site selection and community sensitization.	The exact locations for the installation of stations will be determined within this activity, taking into account the priority list defined by the national institutions involved in the project. Selection criteria will include a costed O&M plan with roles and responsibilities defined. Adoption by the community is a highly important factor, especially when instruments cannot be installed in a secured compound. This activity is strongly related to the community approach model and protocol developed, which allows identifying and implementing a strategy to engage with local stakeholders and sensitize the communities on the benefits of weather and climate data. This will be repeated for each phase to prepare for installation of stations.
3	Activity 1.X.3) Site implementation and maintenance plan.	The consultant will outline a site implementation and maintenance plan based on the selection of sites within the monitoring plan, community approach strategy and chosen instruments. The outline will comprise a detailed technical design taking into account the limitations and opportunities of each site. The feasibility will be evaluated, energy sources will be identified, as well as data-logging requirements and solutions for data transmission. For each site an implementation plan report will be prepared describing the technical requirements of the instruments, instructions regarding the installation of the equipment and requirements for maintenance. Also, the cost for operating the observation stations will be estimated at this stage, including costs for periodic maintenance and replacement parts. The activity will be repeated in each phase.

#	Activities (1.1.1 through 1.5.6)	Description
4	Activity 1.X.4) Procurement and installation of stations	<p>The acquisition and installation of instruments will be procured following standard protocols. The consultant will prepare the technical part of the procurement documents. The documents will include a detailed formulation of delivery, testing and training (with regard to O&M).</p> <p>Instruments will be purchased from awarded suppliers and installed in according to specifications developed in activities 1.X.1 to 1.X.3.</p> <p>Refer to Table 11 and Table 12 for information.</p>
5	Activity 1.X.5) Rehabilitation of infrastructure	Where needed existing infrastructure will be rehabilitated or - in case of new sites - new structures will be built in order to secure the instruments and assure sustainable operation. This may include fencing, small buildings (sheds), basic furnitures.
6	Activity 1.X.6) Commissioning and transfer	<p>The supplier will install the instruments on site. Subsequently the correct installation and functioning will be demonstrated completing successfully the delivery tests. The commissioning of a site will involve the process of assuring that all systems and components of the monitoring site are designed, installed, tested, operated, and maintained according to the operational requirements stated in the technical specifications of the procurement.</p> <p>Special attention will be given to train local operators and developers in the management and use of the systems. Therefore this activity will be related and carried out in coordination to activity 1.8.5.</p> <p>A memorandum will be signed between the institutions and the hosting community on the regular observation or monitoring of the equipment, with protocols in place for reporting needs for parts or repairs. Caretakers will be elected who will be maintaining the site.</p>

Output 1.6) Design and installation of data processing facilities, open climate data portal (OCDP), and forecasting system

Under **Output 1.6** of the proposed project, LDCF resources will be used for developing a robust and reliable data management infrastructure (DMI) for gauging, transmitting, storing and processing hydro-meteorological data. The DMI comprises of hardware and software solutions, operating protocols and overarching responsibilities. The DMI will guarantee the autonomous acquisition of gauged data, the reliable transmission into a customized data hub where data will be stored, validated and made available for subsequent production through an open climate data portal (OCDP).

The data management infrastructure will assure that reliable and high-quality data can be made available to partners in an efficient and robust manner for them to develop weather and climate services in component II.

The core activities to achieve Output 1.6 are:

#	Activities	Description
1	Activity 1.6.1) Preliminary design of the data management infrastructure (DMI)	<p>A consultant will be chosen to carry out an in depth functional analysis and subsequent technical design of the data management infrastructure (DMI). The design will comprise hardware and software solutions, operating protocols and overarching responsibilities. It should be emphasized that relying on cloud solutions would enhance the robustness of the DMI.</p> <p>The DMI also comprises non-technical features related to the interaction between different institutions within the country. Therefore, this activity will be closely related to the Outputs 1.8 and 2.1 when it comes to formulating operating protocols and overarching interinstitutional responsibilities to allow a smooth operation of the DMI.</p> <p>The DMI will take into account that historic data currently available in analog format will be digitized and incorporated in the system; data already existing in digital format will be imported into the system. Validation of both data sets will be part of the development of the DMI.</p> <p>The consultant will formulate a set of alternative technical solutions with corresponding cost estimation. A multi criteria analysis should reveal what the most adequate solution will be.</p>
2	Activity 1.6.2) Detailed design and procurement documents.	<p>A consultant will develop a detailed design and costing for the preferred alternative. The design will foresee a phased implementation plan consistent with the findings of output 2.1 and a capacity building plan consistent with Output 2.3.</p> <p>These products will be used to develop procurement documents for the selection of an external supplier.</p>
3	Activity 1.6.3) Procurement and installation of the DMI	<p>The procurement and installation of the DMI will be procured following standard protocol. The consultant will prepare the technical part of the procurement documents based on the outputs of activity 1.6.1 and 1.6.2. The documents will include a detailed formulation of delivery tests.</p> <p>The components of the DMI system will be purchased from awarded suppliers and installed according to specifications developed in activities 1.6.1 and 1.6.2.</p>

#	Activities	Description
4	Activity 1.6.4) Commisionning, transfer and training.	<p>The supplier will install the system according to the technical especifications in 1.6.3. Subsequently, the correct instalation and functioning of the system will be demonstrated by succesfully completing the delivery tests. The commissioning of the system will involve the process of assuring that all components of the DMI are designed, installed, tested, operated, and maintained according to the operational requirements stated in the technical specifications of the procurement.</p> <p>Especial attention will be given to train local operators and developers in the management and use of the system. Support will be provided during the duration of the project.</p> <p>The ownership of the DMI will pass to selected institution according to MoU signed (see Output 2.1) after succesfull tests during oficial inauguration.</p>
5	Activity 1.6.5) Design the open climate data portal (OCDP)	<p>Design of an open climate data portal comprising a reliable platform for browsing visualising and sharing data.</p> <p>Design a demand driven service roll-out to allow third parties accessing data sets in real time (fast and eficent) following trustable standards and protocols.</p> <p>Cloud solutions will be given priority to guarantee prompt troubleshooting and regular maintenance.</p> <p>OCDP supports the developpement of simplified visualisation platforms as low treshold aimed at local communities (see output 1.9) detailed on the market analysis (see Output 2.3)</p> <p>The design of the portal includdes the development of an efficient and sustainable mechanism for sharing climate products and early warning information.</p>
6	Activity 1.6.6) Procurement and installation of the OCDP	A procurement plan will be made for the procurement and installation of the system comprising hardware and software, instuments and services to create the OCDP. Procurement documents will be prepared based on the output of activity 1.6.5.
7	Activity 1.6.7) Testing, commisionning and transfer of OCDP	<p>The installed systems will be extensively tested before commisioning following a prestablished testing protocol. Special attention will be given to train local operators and developers in the management and use of the system.</p> <p>Technical support will be provided during the duration of the project.</p>

Output 1.7) Development or procurement of weather forecasts services

This output has a single activity. The PMU, working with UNDP Procurement Services, to explore options and provide cost estimates for the engagement an international service provider to deliver weather forecast services. This is to complement national capacity, as capacity is strengthened. The scope of the procurement will comprise:

- Deliver weather forecast services
- Integrate and update regularly data from the hydro meteorological network as soon as it becomes available
- TOR will be produced in accordance to design of activities 1.6, 2.4 and 2.5

#	Activities	Comments
1	Activity 1.7.1) Development of forecasts as a service	<p>Development of forecasts as a service comprises in depth knowledge on the physical processes regarding meteorology, hydrology, hydraulics and marine processes. As the local staff will not be sufficiently trained within the first 2 years of the project yet this activity will be developed by a consultant (see Activity 2.5.1).</p> <p>Forecasted products will be developed according to the strategy and priorities established in business plan in Activity 2.3.5.</p>

Output 1.8) Development and implementation of a capacity building program to provide the Guinea-Bissau with the required capacity to operate and maintain the observation network and develop climate information services

Under **Output 1.8** of the proposed project, LDCF resources will be used for training of hydrologists, meteorologists and maintenance staff in compliance with WMO standards (as documented in series WMO-No. 258 on capacity building and training). Maintenance plans and protocols will be developed to assure the reliability of the network and sustainability of the investment.

INM and the DGRH technical staff will be trained to develop climate information services. The capacity to make and use seasonal climate forecasts will be developed. This will link to ongoing joint activities at the INM and the DGRH and will ensure the capacity to run numerical weather prediction models and nowcasting or be able to usefully generate and use data from these models run elsewhere within the region or at international centers.

Given the lack of hydrologists and meteorologists with training to develop numerical models (hydrology, hydrodynamics) and weather prediction models, the project will select and support up to 10 candidates to follow master courses outside the country (e.g. Niamey, Ouagadougou, possibly Brazil, among other places).

#	Activities	Description
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#	Activities	Description
1	Activity 1.8.1) Identify staffing needs and capacity requirements.	<p>For every monitoring site, the consultant will assess the staff and financial requirements to assure the continued operation and maintenance of the instruments. The assessment will be based on the requirements identified and documented (under output 2.3).</p> <p>Job descriptions will be produced for each required profile; at the end of this stage will become evident which capacities are needed; main focus will be given to local observers and local maintenance staff will follow the implementation plan, with oversight by regional/central offices of INM and DGRH. The needs will need to be updated during phases 2 and 3 to match the actual implemented monitoring sites.</p> <p>The staffing requirements and skills needed to develop and operate climate information services will be identified by a consultant based on assessments carried out under previous activities, the outlined business plan and complemented with stakeholder consultations and experiences from O&M staff.</p> <p>A capacity development plan will be defined, taking into account existing capacities in the country, and the capacity needs identified along previous activities. This plan will include the identification of partner institutions within the region and abroad which can offer master courses for the sector of interest and establishing a framework agreement for delivering training.</p> <p>Relevant disciplines at this stage are: IT, data management, surface water hydrology, meteorology, oceanography, climate change, etc.</p> <p>An initial scan in Guinea-Bissau showed that there are no academic institutions within the country with the capacity of providing these courses; therefore partnerships with academic institutions in the region will be consolidated. A relation with activity 2.3.4 will assure that after the project is finished the opportunities for further training are still available and at reach of young potentials.</p>

#	Activities	Description
2	Activity 1.8.2) Recruitment, capacity needs assessment of staff and capacity building plan.	<p>Required staff will be filled with staff currently employed by the partner institutions, new recruits or community members. This part of the activity will be carried out by the corresponding partner institution/community following the agreements of a MoU with a suitable center of excellence / KM service provider.</p> <p>A consultant will be appointed to develop a training plan to upgrade the skills of observers and maintenance staff up to the required level taking into account current capacity and capacity requirements. The preparation of the training will take place in close collaboration with the selected suppliers and will focus on short term training needs and long-term capacity building.</p> <p>This activity is strongly related to the community approach model and protocol developed under activity 1.X.2 which allow identifying and implementing a strategy to engage with local stakeholders and sensitise the communities on the benefits of weather and climate data.</p>
3	Activity 1.8.3) Training of trainers	<p>Training sessions will be provided by an external consultant following the plan outlined under activity 1.8.2; the training will be organised for the staff in charge of operations and maintenance of the monitoring facilities. These training will be compliant with the WMO standards, and will be adapted to the local context. Given the importance of community ownership, specific attention will also be given to community participation.</p>
4	Activity 1.8.4) Creating operational procedures, manuals, etc.	<p>This activity aims to capitalize on the organized trainings, past experience and international best practices. The objective is a consultant developing a set of manuals, instructions, and standard operation protocols in view of supporting and monitoring staff and long-term capacity building.</p> <p>The first version of this set (in the form of a wiki for instance) will be available at the end of phase 1. The set will be enhanced and adapted by local and international staff during further implementation of the project.</p>
5	Activity 1.8.5) Summer school & selection of candidates	<p>Summer school sessions or short training courses will be organised for staff of the national institutions and students (with minimum bachelor's degree). The summer course will cover a number of topics related to the disciplines necessary for creating climate information services.</p> <p>The aim is twofold: Firstly, this opportunity will allow to update participants on innovations in hydrology, meteorology, data processing etc. and teaching them on the climate information services. Secondly, the training period will allow identifying promising profiles which could be offered the opportunity to be sent abroad for master courses (See activity 1.8.6).</p>

#	Activities	Description
3	Activity 1.8.6) Master courses	Up to 10 candidates will be selected to follow master's programmes abroad as identified in the capacity development strategy. Two important conditions for granting these scholarships are: a) the willingness of the candidate to come back to Guinea-Bissau and join the staff dedicated to the project. b) engagement of the national authorities to create a position for the returning experts. Selection criteria and conditions will be developed in close consultation with the Ministry of Education
4	Activity 1.8.7) Customized applied Research	The master students will be followed and coached by the project staff and external experts in the selection and conduction of master's thesis. The thesis subjects will be chosen to help building knowledge and capacity within the national institutions and respond to the local need for upporting the early development of climate information services.

Output 1.9) Strengthen community demand and develop participative community driven monitoring of Climate Information Services as well as EWS response capacities at local/site level

Under **Output 1.9** a community approach model and protocol are developed and implemented. Past experience has shown that monitoring (gauging) stations have often been vandalized. Local communities are among the end users of weather and climate information services, and work with communities is needed to make them aware of the benefits of observation and climate information. Creating this awareness and involving communities or selected groups in observation at certain sites is critical to assure the protection of the stations. Rolling out an early warning system will further build on this community engagement strategy.

Furthermore, community actions will be developed to assess the demand for climate information services, involve communities in the design and testing of information products, strengthen reaction capacity in existing or future Community based DRR schemes. Activities:

#	Activities	Description
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#	Activities	Description
1	Activity 1.9.1) Stakeholder mapping and design of community engagement process	<p>For each site where monitoring equipment is planned to be implemented, a stakeholder mapping will be done by an external consultant, with the support of the project team, specially the Technical advisor specialized in community engagement and gender. The aim of the stakeholder mapping is to explore possibilities for involving the communities in the project, and in the monitoring of climate data on the long run. The mapping may also reveal threats to the project, which may be a consequence of existing conflicts within the community, and/or between neighbouring communities; attitudes in the community towards governmental institutions or state interventions.</p> <p>In case such threats were identified, they will need special attention in the remainder of the project.</p> <p>The results of the mapping will be a crucial building block in developing the stakeholder engagement strategy. It will further provide guidance to efficiently tackle critical community components of the project such as awareness creation, community participation in monitoring climate data, identification of demand for climate information services, community-based early warning and disaster risk management planning.</p>
2	Activity 1.9.2) Community engagement: Sense of ownership and awareness.	<p>Specific communities will be approached by an external consultant to develop strong engagement to maintain and protect the gauging infrastructure. To achieve this, the following components will need to be developed:</p> <ul style="list-style-type: none"> - Community engagement strategy - Approaches for developing sense of ownership - Identify means for creating awareness for climate data and the benefits arising from information services at community level - Focus on Social inclusiveness, <p>By the end of phase 1, this activity will come up with a customized and proven strategy for community sensitization and commitment towards the project and its sustainability.</p>
3	Activity 1.9.3) Brokering agreements between local stakeholders and government.	<p>This activity will become an essential input from the consultant towards formulating an MoU identifying roles and responsibilities within in the community for the protection and maintenance of instruments (where appropriate).</p> <p>This will be a bridging activity in which community members and government officials are brought into dialogue.</p> <p>Given the nature of the activity, a local NGO (trusted by communities) is the most appropriate partner to take the connecting role and should be carried out in several steps with full community praxis (local customs) and according to cultural habits.</p> <p>This activity will have a key milestone by the time the monitoring stations are implemented and ready for transfer. Communities are delegated the ownership of the station as responsible caretakes, through the approval of by-laws to enforce this responsibility.</p>

#	Activities	Description
4	Activity 1.9.4) Train the trainers	<p>Local staff in charge of approaching the communities will need specific support before, during and after the first communities are approached. These community facilitators will receive specific training (train the trainer) to enhance their impact and spread the correct message.</p> <p>The support will be provided by a consultant which will also follow up the functioning of the facilitators gathering their feedback to improve the training.</p>
5	Activity 1.9.5) Identify the role of the community	<p>An important task of the facilitators comprises identifying potential roles and responsibilities that the community is willing to take for the surveillance, protection and maintenance of instruments (where appropriate).</p> <p>The task will identify community individuals, expected rewards, motivation strategies, etc.</p>
6	Activity 1.9.6) Organised inauguration of monitoring stations	<p>The facilitators will also take care of organising and directing the inauguration of monitoring stations following traditional habits, agreed MoU.</p>
7	Activity 1.9.7) The Generic community approach model and protocol CAMP	<p>Previous activities will start during phase 1 for a limited number of communities; before starting phase 2, the consultant will gather all the feedback from previous activities towards outlining a generic community approach model and protocol (CAMP); the generic CAMP will become an essential and critical instrument for guaranteeing communities attention and engagement in subsequent activities along the project.</p> <p>The key outcome of this activity (the generic CAMP) becomes the golden key towards opening communities and engaging them to support and cooperate along the project and after. This commitment is an essential element for ensuring the project's sustainability and therefore is critical that the approach model is successfully tested and is reliable.</p> <p>The success of the subsequent phases of the project and its sustainability relies strongly on a robust CAMP.</p>
8	Activity 1.9.8) Assessing the current community demand	<p>The key features of this action comprise assessing the current community demand for climate information services by a local NGO. The activity is closely related to the market analysis carried out in 2.3 and follows the approach protocol defined under 1.9.7. It comprises investigating traditional practices related to climate observation, decision making and current obstacles and limitations induced by climate change.</p> <p>This needs analysis should convey towards the identification of alternative products/solutions taking in account existing technical advantages and limitations.</p> <p>The evident success and widespread on mobile communication should be taken in account when identifying climate products and services.</p> <p>A consultant will train the NGO in the objectives and expected results of the assessment and together with the NGO an approach strategy will be defined and tested following findings of 1.9.7; results of the test will be used to enrich the protocol from 1.9.7 and will be documented for subsequent use.</p>

#	Activities	Description
9	Activity 1.9.9) Participative design and testing	<p>Climate information services and products need to match communities habits and traditions to guarantee success. Sessions of participative functional design will be organized for each envisaged development.</p> <p>In subsequent stages, as the developments progress, they will be tested (see also activity 2.4.7) following a community approach protocol derived under 1.9.7 by a local NGO preferably.</p> <p>A consultant will train the NGO in the objectives and expected results of the participative design and testing; together with the NGO an approach strategy will be defined and tested following findings of 1.9.7; results of the test will be used to enrich the protocol from 1.9.7 and will be documented for subsequent use.</p>
10	Activity 1.9.10) Strengthen response capacity	<p>Climate information (observed or forecasted) is essential for enhancing the response capacity of exposed communities. The success of the enhancement depends on the extent in which the additional information is incorporated within a communication and reaction protocol of a well established early warning system. (see also Output 2.5). A local NGO with experience in DRR and community based EWS will be involved in the process to customize the warning and reaction components. In a next step, drills will be organized by the NGO and assessed in cooperation with the consultant. The results of the assessment will be used to improve the communication and reaction protocol so that it can be rolled out in subsequent stages.</p>

Component 2) Climate information integrated into priority development plans and EWS to support the NAP process

Outcome 2) Efficient and effective use of hydro- meteorological and environmental information for decision-making early warnings and mainstreaming CC in the long-term development plans

Integrating climate information and early warning in the decision-making process at all levels from the individuals to the policy makers has become a necessity of informed decisions in the face of climate change. In order to increase the effectiveness of warnings in the context of Guinea-Bissau, it is necessary to improve the observation systems, forecasts at various timescales, the quality of climate information products and the ways they are delivered to the diverse users and disseminated for a broad access.

Whereas component 1 was focuses on collection of climate information in Guinea-Bissau by means of strengthening the climate observation network, this component aims to build the necessary capacity to use the collected data and design a range of new climate information services or improvement of existing services.

In order to assure sustainability of the integration, the design and exploitation of climate information systems needs to rely on a demand driven strategy and be framed within a solid business plan. Both features involve a stepwise integration with explicit involvement of the private sector. Well-chosen climate information services will generate additional economic value (e.g. better planning of economic activities) and play a vital role in the design and implementation of climate change adaptation measures (early warning, design of protection schemes, design of water retention measures, etc.).

The present project will seek coordinate with another newly launched Project GoGB/UNDP/LDCF “*Strengthening the resilience of vulnerable coastal areas and communities to climate change in Guinea-Bissau*”. The Coastal Zone LDCF project will engage coastal communities in adaptation and resilience activities in various coastal locations. The projects will seek efficiencies by coordinating community engagement activities in the future within their respective themes where relevant.

Without LDCF Finance: The baseline situation for climate change mainstreaming into development

The baseline finance associated with Component 2 of the project includes the following initiatives, from which the baseline finance that is associated with Component 2 is derived:

#	Programs, Projects or Initiative relevant for Component 2 (C2)	C2 BASELINE (\$M)
1	AfDB/Ministry of Agriculture, Développement des Chaines de Valeur Riz	\$1.0
2	IFAD - PADES	\$1.0
3	IFAD REDE	\$33.7
4	WB Rural Transport Project (RTP)	\$8.0
5	Government of China, Alto do Bandim Fishing Port Project	\$10.0
6	CPLP Secretariat	
7	OMVG Salinho Hydroelectric Project	\$4.0
8	Adaptation Fund / West African Development Bank (BOAD)	\$4.0
9	Green Climate Fund/ West African Development Bank (BOAD)	\$3.7
10	AfDB/EU	\$0.2
	TOTAL	\$65.6

Without LDCF, a suite of development process linked to planning, strategizing and mobilizing finance to build people’s resilience, as well as the country will have significant gaps. The financial, institutional, human capacity and State building baseline in Guinea-Bissau has many weaknesses.

With climate change, these weaknesses, the inherent fragility and vulnerability and will be amplified. Without LDCF, it will not be possible for the hydro-meteorological services to reach a higher level in the hierarchy of national climate services – e.g. Category 2 which corresponds to “the ability to deliver a basic range of climate services and products, as well as, to provide climate predictions.” (refer to Figure 5.

Category 2 organizations are those that also “participate in climate forums, interact with end-users from different sectors, and gather feedback on the information that end-users provide.” While this is not an unachievable goal for Guinea-Bissau, the fact that hydro-meteorological services are yet to reach this level is a sign of significant weaknesses in the baseline scenario.

There are significant investments in the baseline that relates to Component 2, which more than \$60M in sectoral investments. However, more is needed for these sectors to integrate climate risk in planning and to have a solid basis from which towards climate resilient and cost-effective investments. Not all of the baseline projects listed further up as the financial baseline for Component 2 effectively include climate change as an important factor in their planning and implementation.

Under the project's first component, access to agro- and hydro-meteorological information will be facilitated. Still, to reach an understanding of its implications and opportunities will require a differentiated approach.

Also, without LDCF, there will be little to no innovation in the hydro-meteorological sector in Guinea-Bissau and knowledge exchanges instances for a selected few. The few services that are rendered will continue to be supply-driven, with little regard for what clients, need, expect and at times demand.

With LDCF Finance: The adaptation alternative for climate change mainstreaming

With LDCF funds, it will be possible to secure the much needed strengthening of the institutional framework for climate services. This includes the collection of climate data, for the production and dissemination of climate information products, for risk-informed decision making within sectors and for early warning linked to climatic hazards.

The pathway to capacity building and systemic change takes time. The project favored a phased approach over 6 years.

In Phase I of the project, priority will be given to strengthening of institutions, building capacity, creating awareness for climate information services, mapping demand and developing business cases for climate information services in Guinea-Bissau. This will include development of strategies for integrating climate information, developing adequate funding mechanisms and addressing policy gaps or introducing innovative policies.

In Phase II, the focus will be on improving existing weather and climate information products such as daily weather bulletins, agro-met bulletins, and the design of new services will be initiated.

In Phase III, the last phase of the project will be focusing on delivery of new services, and gradual transfer of tasks from the project team and consultants to the local staff.

As a result of the implementation of these phases, systemic capacity to render hydro-climatic services on a demand-driven basis (for the most) would have been created. Through working with partners, by project end, a few climate services may have been developed commercially and explored by through innovation and technical expertise. In addition, service provision will have more quality, diversity and more client satisfaction. The project will explore applications of climate information systems and information for commercial or private sector use, which would generate revenue for met services the generation of tailored climate products. Provisions have been made in the project budget however to ensure strengthened capacity and continued operations and maintenance of related systems. Still, *with LDCF*, the institutions responsible for rendering those services would have taken some steps towards a more financially balanced stance with financial sustainability as an inspirational goal to be pursued.

Regardless, it is important that early warning messages on climate-driven catastrophes can be effectively delivered free charge and reach vulnerable groups and most remote communities when they are at risk.

The adaptive scenario: Functional Climate Services for adaptation planning and EWS

Adaptation and other benefits expected to be generated: The key Outcome under Component 2 of this LDCF project is the strengthening of key planning process within the country's sectors by fully taking climate change into account. This will put Guinea-Bissau in a better position to face its climatic challenges. By Project end, and if the project can minimally achieve its goals, Guinea-Bissau should be able to develop and explore at least some of the applications listed in Table 13.

Table 9. Specific Applications of weather and climate information systems and information

<i>Count</i>	<i>Specific Applications of weather and climate information systems and information</i>
(i)	an early warning system for severe weather;
(ii)	real-time weather and hydrological monitoring
(iii)	weather forecasting capabilities (Numerical Weather Prediction)
(iv)	agro-meteorological information and services (including integrated crop and pest management);
(v)	applications related to building and management of infrastructure
(vi)	tailored products for the mining planning and management
(vii)	risk informed land, air and maritime transport management
(viii)	integrated water resources management
(ix)	adaptive coastal zone and land management
(x)	adaptation planning and policy making processes

Core outputs under Outcome 2

Outputs
Output 2.1) Institutional strengthening of the institutional framework for collection of climate data, for the production and dissemination of climate information products and decision making for early warning of the national hydrology and meteorology services

Outputs
Output 2.2) Development of National Framework for Climate Services to strengthen the integration of climate information into planning, including the Integration of climate risks into the GB 2025 development strategy and related operational programs in coordination with the NAP process
Output 2.3) Development of a sustainable financing mechanism for the climate information production and dissemination system
Output 2.4) Development of new tailored climate information products for the users in the priority vulnerable sectors and locations (Protected Areas, world importance biodiversity spots, agriculture, fisheries and natural capital, etc) identified in coordination with the NAP process
Output 2.5) Development of an efficient and sustainable mechanism for sharing climate products and early warning information

Output 2.1) Institutional strengthening the institutional framework for collection of climate data, for the production and dissemination of climate information products and decision making for early warning of the national hydrology and meteorology services

Under **Output 2.1** the project will focus on the institutional framework required for upgrading the national hydrology and meteorology services in Guinea-Bissau.

Strengthening the institutional framework, the project will work towards closing the gaps in the policy framework and modernizing the policies related to environmental/climate data collection and use. The responsibility and ownership over environmental data (including hydrology and meteorology) in many countries is scattered over several institutions, as is the case in Guinea-Bissau. Regulations for accessing (thus using) these data are developed within the respective institutions and very often it is difficult to gain access to data. By regulating and allowing access for both public and private stakeholders, more benefits can be created. Public stakeholders will be able to make better informed decisions and private stakeholders can create added value to the local economy either by developing information products or as end-user of information services.

Specialized climate information services furthermore require the collaboration between various institutions. Particularly with regard to early warning systems, strong collaboration between meteorology and hydrology is necessary (to produce reliable forecasts) and between other institutions such as civil protection for warning and response coordination. A review of the policy framework and its operationalization will be conducted. Clarifications will be made where relevant, as well as recommendations for improvements. Strengthening the institutional framework for collection climate data, for the production and dissemination of **climate information products and decision-making for early warning**.

This will include assessments with regard to the institutional structure of the respective institutions, their mandates, their current and desired level of autonomy (also taking into account potential funding models analyzed under output 2.3), required staffing levels, etc. It furthermore will assess the possibilities or need for decentralization of concentration of services, the legal framework for monitoring of environmental (climate) data and the dissemination of use of this data. This is the framework which needs to allow the creation of an open climate data portal (OCDP) under output 1.6, and which needs to support the development of a wide range of tailored climate information services under output 2.4. A last important aspect is the establishment of far reaching collaboration agreements between the hydrology service and meteorology service to facilitate the creation of an operational coastal and inland flood forecasting system in the future.

#	Activities	Comments
1	Activity 2.1.1) Institutional landscaping and Gap Analysis	<p>A consultancy will be procured to guide the project team in conducting an institutional analysis. The analysis shall assess the current situation, i.e. the existing policy frameworks and the level of implementation. Subsequently, opportunities for improvement of climate integration will be identified. This will take into account the desired further situation, or which changes are needed to develop modern climate information services.</p> <p>Since the project is also aiming to propose innovative funding models, the institutional analysis also needs to assess to what extent the current policy framework creates an enabling environment for these services and funding mechanism, or how these can be created. This also includes adequate budgeting for monitoring of climate data (hydrology, meteorology). The assessment of current funding instruments is part of Output 2.3.</p> <p>Coordination, collaboration, decision making and communication are important factors to consider in the institutional arrangements. Therefore the activity should reveal the institutional expectations towards these factors and draw a realistic scenario.</p>
2	Activity 2.1.2) Open data frameworks and policies	<p>A consultancy will be procured to set up a proposal for creating or adapting inter institutional frameworks and policies to create incentives for open data use and sharing.</p> <p>Brokering agreements between involved institutions in collaboration, sharing of infrastructure, and access to information at institutional level. Internal and external procedures will be designed to regulate and sustain monitoring activities.</p> <p>These elements will become essential inputs for outlining an inter-institutional MoU. The non-technical features of the DMI (Output 1.6) related to the interaction between different institutions within the country will be tackled in more detail under this activity.</p> <p>The consultant will formulate a set of inter-institutional recommendations to guarantee the operation of the DMI. Formal arrangements between the implementing partners on a range of institutional topics are needed to establish a governance and implementation framework.</p> <p>To ensure the fast implementation, the governance and implementation framework should be formalized in a memorandum of understanding (MoU), signed by the participating institutions identified above at the start of Phase 1. Among other topics, the MoU should describe the roles and responsibilities of each organization and the available budget and its sources.</p> <p>Ideally, the MoU should cover the implementation period of all three phases and focus on the sustainability of the project at technical, financial and logistical levels.</p>

#	Activities	Comments
33	Activity 2.1.3) Institutional development towards a client centred approach	The results of the institutional analysis carried out under activity 2.1.1 should also be used to pursue change in the institutional culture towards a more client centred approach, where the role as service provider is integrated in the institutional strategy and organization. Moreover, the result of activities 1.6 will be used to update the roadmap for development and implementation of climate information services from 2.1. Activities under this output can be lumped under a single multi-disciplinary consultancy with focus on the medium to long-term capacity development.
44	Activity 2.1.4) Strengthening institutional coordination and cooperation	Strengthening institutional coordination and cooperation is essential for outputs 1.6, 1.8, 1.9, 2.1 and 2.3. Existing institutional mandates and financing protocols regulated by national laws will be reviewed and support to amendments, which would support cross sectoral collaboration will be provided. A technical expert will work with government counterparts to provide an outline alternative mechanisms for strengthening institutional coordination and cooperation, including the establishment of an intersectoral advisory group. The advisory group may be formalized through a MoU
55	Activity 2.1.5) Strengthening regional integration for sharing climate information	Data sharing with regional NHMSs will be encouraged as this helps develop forecast products nationally from weather systems inbound from other countries, and vice versa. A consultant will assist participating organizations in outlining a national data sharing protocol (to be included as part of the MoU), taking in account international open data principles. Additional effort will be spent on emphasizing the proven benefits of an open data culture with examples of successful cases abroad.

Output 2.2) Development of the National Framework for Climate Services to strengthen the integration of climate information into planning, including the Integration of climate risks into the GB 2025 development strategy and related operational programs in coordination with the NAP process

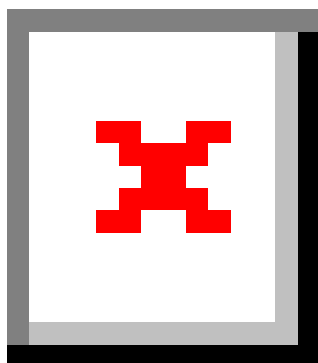
Output 2.2 focuses overall on strengthening the use of climate information in the broadest sense, and specifically on the identification and development of the explicit links between the developed climate information products and services, and the integration of adaptation into overall development planning. To achieve this a National Framework for Climate Services will be established in accordance to the guidelines published by the Global Framework for Climate Services.

The aim of the framework is to support climate-smart decision making by making sure to:

- (a) know the user and understand what is needed: Understand the climatic elements that are relevant to the user; how the user wishes to receive information; how the user is likely to interpret the information; for what purpose the information will be used; the decision process of the user; and how the information might improve the decision-making processes.*
- (b) Make the information service simple, accessible and timely: Provide products that can be understood and readily applied by the user, along with easy access to follow-up professional advice.*

(c) Ensure quality: Provide products that have been developed with skill and with an understanding of possible applications and analytical techniques, complete with proper documentation and backed by thorough knowledge of up-to-date data availability and characteristics.

Figure 4. Five steps for establishing a National Framework for Climate Services (Source: (WMO-No. 1206)



The proposed activities or steps for the establishment of the NFCS are based on Step-by-step Guidelines for Establishing a National Framework for Climate Services (WMO-No. 1206) as shown in Figure 8.

Sustainable funding of climate services which is being addressed through output 2.3 will need to support the action planning developed under this output.

Tailored climate information products and services developed under output 2.4 will be fundamental for the integration of climate into development planning.

#	Activities	Comments
	Activity 2.2.1) Assessing the baseline on climate services and needs	<p>The aim of this activity is to formally start the process of establishing the National Framework for Climate Services (NFCS).</p> <p>The project will organize a technical workshop for the establishment of the NFCS presented under this output should/will be combined with other activities listed in the prodoc.</p> <p>Stakeholders will be brought together to present the purpose, a blue print and roadmap for the establishment of the NFCS (as documented in the <u>WMO guide No. 1206: Step-by-step Guidelines for Establishing a National Framework for Climate Services</u>).</p> <p><i>(Step 1)</i> Building on the assessments conducted during the PPG phase and documented in the Prodoc, a stakeholder mapping will be conducted (including all stakeholder in the climate services value chain, from production, co-development through to users at the local level) and an assessment of existing capacities and baseline will be made. The assessment will identify the capacities, the country's state of readiness to implement an NFCS, the actors who make up the national chain for climate services, what climate services are currently being provided? What are the needs? And what gaps exist in climate service delivery?</p>
	Activity 2.2.2) Organizing a national stakeholder consultation workshop on climate services	<i>(Step 2)</i> A national stakeholder consultation workshop on climate services will bring together all identified key stakeholders to draw consensus on the urgent need for improved climate services in the country and to identify the gaps and key elements for developing a national strategic plan and costed action plan for implementation of the NFCS, focusing on areas for joint action.
	Activity 2.2.3) Developing a national strategic plan and action plan for the National Framework for Climate Services	<i>(Step 3)</i> A national strategic plan will be developed with an annexed action plan detailing costs and timelines for delivering an NFCS and improving climate services delivery. The actions presented in the Prodoc will be integrated in the national strategic action plan together with the relevant actions funded by government and development partners.
	Activity 2.2.4) Endorsing the national strategic plan and action plan for the National Framework for Climate Services	<i>(Step 4)</i> A high-level meeting with all national stakeholders (governments, United Nations agencies, development partners, donors, etc.) will be convened to endorse the national strategic action plan developed. This activity will integrate various results of activities presented in the prodoc, to seek support and validation (e.g. with regard to identified options for sustainable funding mechanisms).
	Activity 2.2.5) Launching a National Framework for Climate Services	<i>(Step 5)</i> Once the national strategic action plan has been endorsed it will be formally launched during a public event.

#	Activities	Comments
	Activity 2.2.6) Integrating of climate risks and adaptation strategies into the Guinea-Bissau 2025 development strategy	<p>Using new insights on climate change impact of Guinea-Bissau documented in climate information services, the activity will provide support to the revision of the Guinea-Bissau 2025 development strategy and operational programs taking full account of climate risk and adaptation strategies.</p> <p>This will include at least four of the following:</p> <ul style="list-style-type: none"> § the national development plan (whichever form it may take); § The Environmental Management (bound to be updated soon) § The NBSAP (in the process of being finalized) § The Agricultural strategy/plan (likely to be updated soon) § The Water resources plan (idem) § Coastal zone planning (slated to be updated with the help from the Coastal Zone Project). <p>Other sectoral development plans and strategies may also be considered, along with local development plans. The above list is indicative and it should be kept dynamically, meant only to show the importance of climate change mainstreaming in planning frameworks.</p> <p>Within the NFCS, a process will be established for future updating of climate information and adjustments of the national development strategy.</p>

Output 2.3) Development of a sustainable financing mechanism for the climate information production and dissemination system

Activities under **Output 2.3** aim to identify sustainable mechanisms for funding of climate information services. This may include various sources including the national budgeting framework, dedicated fund supported by development partners and private funding mobilized through public-private partnerships. This needs to be based on a thorough economic assessment in the form of a Social and Economic Benefits (SEB) Study. The proposed activities for the SEB study are drawn from the guidelines *Valuing Weather and Climate: Economic Assessment of Meteorological and Hydrological Services* (WMO-No. 1153).

This study herein proposed, inspired by the SEB, has a dual purpose: (i) it should provide evidence of the benefits of the services and provide arguments for the allocation of public funds to the national hydrology and meteorology services; and (ii) it should provide insights in possible commercialization of specialized services.

A comprehensive needs assessment for climate services will be carried out (how needs are currently met, opportunities for private partnerships and gaps in the current services), as well as the willingness and ability to pay for such services across a range of stakeholders, both public and private including the mining sectors and the Bissau port users and the identification of the market barriers (unleashing of the market forces and development of the demand from the communities and the private sector) and solution to remove those barriers.

This output will furthermore support the NHMSs to evolve towards a demand-driven and client-oriented approach, which will need to be taken into account with respect to advances and results from Outputs 2.1 and 2.2.

#	Activities	Comments
1	Activity 2.3.1) Conduct of comprehensive needs assessment for climate services	<p>A consultancy will be procured to carry out a market analysis aimed to identify the demand for climate information products and/or services. A broad stakeholder consultation process will be organised to assess the demand, the willingness to pay, and the high level design criteria for development and consumption of information products (e.g. how is the information best presented, delivery method, etc).</p> <p>The analysis needs to focus also at community level because communities are expected to become key consumers and end users of several of the services and products that will developed. Therefore the analysis will have strong relation with activities 1.9.7 and 1.9.8 and should be carried out in a coordinated manner.</p> <p>Stakeholders can be further consulted about the willingness for the development of services in a co-creation process. The stakeholder consultations must be inclusive, i.e. special attention will be given to vulnerable groups in society, and have a gender-responsive approach.</p> <p>This activity builds further on the achievements of Output 1.9 and relies on the community approach model and protocol to attract community's attention and engagement.</p>

#	Activities	Comments
2	Activity 2.3.2) Sector analysis	<p>A consultancy will be procured to carry out a sector analysis to identify potential industrial actors (national and international, public and private) that can play a role as consumer, developer or provider of (climate) services and potential (climate) derived products.</p> <p>An initial inventory will be followed by detailed interviews to map clearly the potential interest within industrial parties for cooperating during and after the project.</p> <p>The analysis will compile existing instruments (administrative, legal, financial, etc.) at national scale that are already in place and can be relevant for developing business and partnerships.</p> <p>Special attention will be given to identifying the existence and performance of instruments like tax incentives, advisory and development services, business incubation support, PPP's, funding mechanisms, support platforms, etc. The activity will end up with a detailed description of the key features on the instrument, targeted firms and points of contact.</p> <p>The analysis will also provide a detailed view on potential opportunities and existing barriers within the technological, economic, financial and administrative sectors.</p> <p>Essential within the analysis is identifying the necessary means to create a favorable climate for industrial participation and co-creation.</p> <p>The consultancy will furthermore carry out a competitive analysis focusing on identifying potential competitors active in the development and commercialization of climate related products and services; moreover, the activity will include the collection and analysis of all the available information about the competitors, their business models, used technologies, etc.</p> <p>The analysis will establish in which extent competitors can become a threat for the sustainability after the project finalization. The gathered information will be used to identify particular areas of improvement to enrich and adjust the business plan for the future sustainability of the project.</p>

#	Activities	Comments
3	Activity 2.3.3) Conducting a social and economic benefits study and identification of changes in NMHSs.	<p>This activity will be integrating results from the previous activities (needs assessment, market analysis, institutional analysis, etc). Information will be combined into a social and economic benefits study which will deliver key information for the National Framework for Climate Services and the development and business plan for the hydrology and meteorology services.</p> <p>Step 1 formulates the baseline for the study i.e. the current situation, and provides a point of reference for changes in the met/hydro services to be evaluated.</p> <p>These changes are further outlined in step 2, and can involve the introduction of new services or products, expanded geographic coverage of existing services, improvements in services, and etc. This will be tied to the needs assessment and the proposals for the design of new tailored information products under output 2.4.</p> <p>Step 3 focuses on enumerating benefits to user communities and costs incurred under scenario's with varying levels of services. Steps 4 to 6 is the analysis of actual costs and benefits, and is critical in sizing the study and selecting estimation methods.</p> <p>Step 7 involves the comparison of benefits and costs using economic criteria to determine if the change in services results in benefits that are greater than costs.</p> <p>Step 8 is important in helping the NMHSs and funding authorities to understand the constraints due to data limitations, lack of funding, and uncertainties inherent in assumptions and future values, and step 9 (sensitivity analysis) involves methods for presenting benefit and cost results for a range of assumptions on uncertain variables.</p> <p>Step 10 is the presentation of results and recommendations. The communication strategy will guide the development of messages and mechanisms for delivering results to audiences.</p>
4	Activity 2.3.4) Assessment of funding instruments (national and external)	<p>A consultant will be appointed to compile existing instruments (administrative, legal, financial, etc.s) at national scale that are already in place and can be relevant for developing business and partnerships.</p> <p>The second part of the consultancy will be to compile existing external instruments for supporting entrepreneurs and businesses startups.</p> <p>The activity will map the vast amount of programmes facilitating access to finance via international/regional financial institutions. Special attention will be devoted to screening programmes and projects focusing on technology transfer, climate information services, adaptation, DRR, etc.</p>

#	Activities	Comments
	Activity 2.3.5) Business plan	<p>The outcomes of previous activities will be processed and synthesized by a consultant to derive a Business plan which will become the blue print for developing climate services as a sustainable business with direct involvement of the public and private sectors being critical for the sustainable implementation of climate services. The activity will take place in Phase I and it will be repeated in Phase III.</p> <p>The first step will define the business model comprising at least: value proposition, customer segments and relationships, channels, key activities, resources, partners, cost structures and revenue streams.</p> <p>The business model will be the framework to derive the business plan comprising a prioritized action plan that at the end of phase III should achieve a solid business environment to allow start ups taking action at different scales.</p> <p>The plan will bring more clarity about staff, equipment and infrastructure, financial aspects and most important, the future vision focusing on sustainability.</p> <p>An important outcome of this activity will be defining a small set of business cases (public and possible private) that could be started halfway or by the end of phase II.</p>

#	Activities	Comments
2	Activity 2.3.6) Setup a support platform	<p>Results of the previous activities will be consolidated towards creating a national support platform providing business development services to start ups.</p> <p>Ideally this activity will build upon an existing national office for this purpose but, if Output 2.3.2 identifies that such a service does not exist yet, this activity will focus on creating such a platform in close dialogue and cooperation with national authorities.</p> <p>A consultant will define the blue print for creating or enhancing such platform based on solid local consultations. The inter institutional arrangements for this may need to be settled through a MoU.</p> <p>The key objectives of this support platform will be:</p> <ul style="list-style-type: none"> · Proactively look for opportunities for companies/institutions · Deliver support on demand · Set up tailor-made matchmaking activities, press releases and information sessions · Contact members with calls and financing options for innovation ideas · Support members preparing proposals <p>One of the success factors of the platform is attracting a vast set of members coming from public and private institutions. This activity will build upon the results of activity 2.3.1, where a thorough needs assessment for climate services will be carried out.</p> <p>Stakeholders can be further consulted about the willingness for the development of services in a co-creation process. The stakeholder consultations must be inclusive, specially regarding the gender aspect.</p> <p>This activity builds further on the of Output 1.9 and relies on the community approach model and protocol to attract community's attention and engagement.</p>

Output 2.4) Development of new tailored climate information products for the users in the priority vulnerable sectors and locations (Protected Areas, world importance biodiversity spots, agriculture, fisheries and natural capital, etc) identified in coordination with the NAP process

Output 2.4 Activities: Technical Prototyping and product testing. Building on the needs assessment and strategies developed under the previous outputs, this output will focus on delivery of selected climate information products and services. The first batch of activities will focus on enhancing climate vulnerability and risk maps which will be used to strengthen the ongoing development and adaptation planning processes within the context of the new National Framework for Climate Services. Other services to be developed will be defined in greater detail based on the needs assessment and business plan (output 2.3). Priority will be given on improving existing products and priority sectors (public safety, agriculture and fisheries in particular).

Locations will be including the coastal zones, the drought and the flood prone areas, and key development strategies through consultation with the intended users of the information and appropriate research organizations. A strong emphasis will be given to the required climate information products for the key food and cash crops as well as the early warnings of climate risks for fishermen. This output 2.4 focuses on the development of the products, the final output 2.5 will focus on communication and dissemination of information.

Furthermore, a particular attention will, also be given to the production of the climate products necessary to address the climate related threats for the management and expansions of the protected areas of the mangroves forests of the Rio Cacheu, Orango islands of the Bijagos archipelago, Cufada lagoons, the forest of Cantanhes and Dulombi, the coastal areas.

Also, under **Output 2.4 Technical Prototyping**, a small subset of business cases will be developed, and their implementation will be supported; this will be set up as two efforts: implementation of a selectin of business cases identified in Output 2.3 and cases emerging from a national competition. Particular attention will be given to support the cases under development with considerable support and guide in matters like market analysis business planning, technical development, marketing, etc. Activities follow:

#	Activities	Comments
1	Activity 2.4.1) Develop localized methodologies for climate hazard mapping	<p>This activity will comprise a desktop study to identify the most relevant climate related hazards affecting the country. Subsequently, the study will also identify state of the art methods for deriving hazard maps taking into account local context and constraints, particularly with regard to data availability and quality of data. The main output at this stage will be a set of hazard maps (flood, drought, severe weather), a methodology and manual to train local staff in creating or updating hazard maps with new data.</p> <p>Moreover, at design stages during adaptation planning several design parameters become necessary. Within this activity an inventory of existing design manuals will be made; subsequently design manuals will be enhanced or developed using information made available during this project.</p> <p>Mapping as such will require modelling capabilities not yet available in the country. The consultant will carry out a limited number of mapping exercises for illustrative purposes. Ideally master's thesis will be chosen to cope with these limitations, and help develop maps while building capacity.</p>

#	Activities	Comments
2	Activity 2.4.2) Investigate local practices on adaptive capacity and hazard reduction	<p>A good vulnerability and risk assessment will take into account the adaptive capacity in the communities. Vulnerability of crops or livestock will to a large extent depend on the physical crop or livestock characteristics but will be significantly influenced by management practices. A consultant with the assistance of a local NGO will be appointed for investigating local practices on adaptive capacity and hazard reduction.</p> <p>The fundamental idea is inventoring hazard reduction practices that were proven successful in the past from different sources: traditional knowledge within the country as first layer followed by practices within the near region to finally be completed with well established practices world-wide like nature based solutions. The end result of this activity will be a catalog of potential measures and corresponding assessment framework in function of hydroclimatic features.</p>
3	Activity 2.4.3) Develop localized methodologies for climate vulnerability and risk mapping	<p>Climate risk maps are the result of hazard, exposure and vulnerability maps. Using the hazard maps produced in activity 2.4.1. exposure maps for various sectors will be created and vulnerability for these sectors will be assessed. The result will be combined in climate risk maps, a series of maps will provide information on climate risk in various sectors (agriculture, fisheries, livestock, public health and safety) for droughts, floods and extreme weather.</p> <p>As in the previous activity this will be based on an inventory of best practices and using a methodology which will be customised to the local context and constraints. Ideally this will be co-developed with master students.</p>
4	Activity 2.4.4) Agenda for the future	<p>The development of methodologies and the catalog of practices and maps will provide new information which will be used by the National Framework for Climate Services to guide the mainstreaming of climate information in development and adaptation planning. It will also reveal knowledge and capacity gaps.</p> <p>Within this activity the consultant will interpret the findings and recommend a road map for improving climate information products and services with the formulation of adaptation plans but also recommend the way to go for adaptation planning from a hydroclimate perspective.</p> <p>This agenda for the future will be one of the documents that will contribute to the sustainability of the project after finalisation.</p>
5	2.4.5) Setup of a multidisciplinary mentoring platform for market driven development of weather and climate information products.	<p>This activity will setup a multidisciplinary mentoring platform to support and guide the implementation of services by private operators. The results of this activity can be seen as one of the services to be provided by the new support platform (2.3.6) but at this stage it will be developed with support of external consultants.</p> <p>The service is a practical implementation of the outcomes of the business plan (2.3.5) but customized for very specific business opportunities detected by innovators and entrepreneurs from public and private organizations.</p> <p>The mentoring process will include business analysis, prototyping, testing and roll out.</p>

#	Activities	Comments
6	Activity 2.4.6) National call for the guided development	<p>This activity will envisage motivating private innovators and entrepreneurs to participate in a mentoring process to become the first generation of climate service providers in the country.</p> <p>A consultant will organize and steer the National call for the guided development of climate services; a limited number of potential candidates will be selected from the call and be part of the mentoring.</p> <p>Participation and selection criteria will be defined in consistency with the business plan.</p>
7	Activity 2.4.7) Development of prototypes	<p>A technical consultant will be appointed to assist the development of prototypes and assess the progress and agreed mock ups.</p> <p>For didactic reasons the consultant will also develop a couple of prototypes that will become a reference for further developments.</p>

Output 2.5) Development of an efficient and sustainable mechanism for sharing climate products and early warning information

Under **Output 2.5**, Early Warning: communication and diffusion, a set of key activities for integrating climate information in early warning by means of customized communication and diffusion are developed. This output focuses the decision-making process at all levels from the individuals at remote communities to the policymakers. Indicative activities follow:

#	Activities	Comments
1	Activity 2.5.1) Assessment of existing EWS systems and protocols	<p>A consultant in EWS will assess existing national and regional warning protocols based on consultations with relevant national authorities and exposed communities.</p> <p>Recommendations for improving the protocols will be made based on the observed missing gaps, the new climate services and forecast.</p>
2	Activity 2.5.2) Develop and implement forecasting components	<p>A consultant will develop and implement forecasting components that can be built on top of the climate information products. This will be carried out in 3 phases:</p> <p>Phase 1 will comprise two components: firstly identifying forecasting staff needs and starting their formation abroad (see activity 1.8.6). Secondly, following the early implementation of the first monitoring stations a pragmatic forecasting system (Arima, AI, etc) will be developed. Depending on the availability, external weather forecasts will be incorporated to the system. The objective of this first step will be to test technology and community response.</p> <p>During phase 2, with more monitoring stations on the field, and local capacities more developed, local weather and hydrologic forecasting will start.</p> <p>During phase 3 coastal and riverine flood will be developed.</p>

#	Activities	Comments
3	Activity 2.5.3) Develop communication and diffusion	<p>A consultant will develop and implement communication and diffusion into the EWS. This development will be carried out considering the outputs from Activity 2.5.1 and the in close interaction with activity 1.9.10 .</p> <p>Within this activity, additional effort will need to be carried out for consulting other exposed sectors (industry, transport, agriculture, media, etc) .</p> <p>A local consultant with experience in EWS will be involved in the process to customize the communication and diffusion components.</p> <p>In a next step, drills will be organized and assessed. The results of the assesement will be used to improve the comunication and diffusion protocol such that it can be rolled out in subsequent stages.</p>
4	Activity 2.5.4) Future development plan	<p>Future development plan</p> <p>By the end of phase 3, the implemented EWS system will cover several climate induced hazards and it should have been tested under different situations already.</p> <p>The consultant will carry out an assesment of the achieved implementation, trained staff and tests. The conclusions of the assessment should allow detailing a future development plan for the EWS covering a vision on technical improvements and evolutions, improvements to the staff capacitation plan, and to the EWS operation protocols and overall institutional capacity.</p> <p>The recomendations will focus on pursuing a sustainable EWS for the life after the project finalization.</p>

Component 3) Monitoring, evaluation and Knowledge management

Outcome 3) Lessons learned by the project through participatory M&E, with special attention to gender mainstreaming, are made available to support the financial sustainability of the strategy

The adaptive scenario: The Project reaches its goals and this is adequately documented

The present outcome is 100% additional (or full cost), to the extent that it would not make sense ‘without LDCF’. The same applies to the project management costs (PMC). Nevertheless, a few baseline initiatives are well aligned with it and provide some co-financing, as follows:

Under Component 3, the project will develop, implement and oversee a monitoring and evaluation (M&E) strategy to ensure that the climate resilient benefits (global, local and national) are monitored and assessed using appropriate tools and systems. This will provide the project with the opportunity to record and disseminate lessons learned for scaling-up to other similar development projects, both in Guinea-Bissau and abroad. A long-term monitoring and evaluation program will take place during the duration of the program and will ensure that the project’s objectives are being met during the different phases of implementation. In the case the specific project goals and indicators of each phase are not being met, the activities and strategy to achieve it can be modified and adapted during project implementation.

Monitoring activities will also ensure that there is gender-balanced participation in the design and implementation of the project's activities and that gender equality is achieved within each outcome. Gender data will be surveyed in selected sites and gender mainstreaming strategy and complementary site level stakeholder engagement plan will be reviewed in order to provide advice to the Project Board with regards to the incorporation of gender indicators into project implementation.

Core outputs under Outcome 3

Outputs full text
Output 3.1) Project activities and impacts on global, national and local adaptation benefits of climate information and EWS are assessed and monitored.
Output 3.2) Project lessons and knowledge codified and disseminated nationally and internationally
Output 3.3) Wider public awareness of climate services available and the benefits of their use achieved through comprehensive multimedia outreach and education campaigns

Output 3.1 will set up the initial framework for starting the project, as well as an efficient monitoring and evaluation system, connected with the government national M&E system, and will include a wide-ranging set of activities and outputs to ensure that all project activities on the ground are appropriately monitored and assessed and the progress duly reported. A special attention will be given to the monitoring of the implementation of the project gender strategy. This will include participatory methods involving local farmers (including livestock farmers), fishermen and communities, women as well inter-agency collaboration with the relevant ministerial departments. Training will be provided to a range of stakeholders involved in the project including government officials at the municipal level who are directly involved on a day-to-day basis in decision-making on coastal, agriculture and marine development and activities. The progress reporting will include quarterly progress reports, the annual Project Implementation Report, mid-term review and the terminal evaluation.

#	Activities	Comments
1	Activity 3.1.1) Setting up the project unit	This activity will comprise all efforts to set up the project unit, including the procurement process to hire the project manager, the national technical assistants and project assistant, as well as settling and establishing the infrastructure needed for the unit to kick-start the project.
2	Activity 3.1.2) Design of project monitoring system and review of monitoring indicators and team detailed planning and team building	Once the project unit is in place, the members will implement activities to engage and kickstart the project. They will be responsible for adjusting the project planning to incorporate any changes to the initial plan included in the ProDoc that may be needed. A detailed project monitoring system and indicators will be defined by the project team, based on the monitoring and evaluation plan included in the ProDoc.

#	Activities	Comments
3	Activity 3.1.3) Review of gender mainstreaming strategy, stakeholder engagement approach and plan and the logical framework with indicators (+ development of specific TORs, review budget allocations, detailed workplanning, etc.)	All the plans, strategies, dates and budget included in the ProDoc will be updated by the project unit and validated by the project steering committee in order to reflect any changes that might have occurred until the project implementation phase.
5	Activity 3.1.4) Midterm review to assess the implementation and impacts of project activities	An independent consultant will be selected to carry out the project midterm review. The goal will be to assess the impacts, validate the implemented strategy and describe the lessons learned and best practices, as well as points to be improved during the last phase to achieve the project goal.
6	Activity 3.1.5) Global final project evaluation	An independent consultant will be selected to carry out the final project evaluation with the goal of assessing the overall project implementation.

Output 3.2 will focus on setting up a knowledge sharing mechanism designed to ensure that the project benefits from lessons of past projects and shares its results and lessons learnt with others. Guinea-Bissau will benefit from the CIRDA countries projects. UNDP and the GEF LDCF supported a set of NIM Climate Information and Early Warning System projects (12 in total) and a coordinating regional component (CIRDA) which has the objectives to enhance coordination among the 12 NIM projects, increase cost effectiveness and, most importantly, provide the 12 country projects with a regional network of technologies, a cohort of technical advisors and efficient knowledge management mechanism for experience and lessons exchange. Activities under output 3.2 will benefit from the lessons learned and best practices generated from those projects (including market studies and assessments), and from the knowledge generated.

#	Activities	Comments
1	Activity 3.2.1) National Inception workshop	A national inception workshop will be organized to mark the start of the project. All key stakeholders, including government institutions, local communities representatives and co-financing institutions will be invited to participate and know more about the project's activities, goals and timeline.
2	Activity 3.2.2) Preparation of a knowledge sharing mechanisms including an accessible report on "best-practices" and "lessons-learned" linked with the CIRDA	A procurement process will be opened to hire an external consultant, with specialization in knowledge sharing and management, that will be responsible for creating a mechanism to share the lessons learned and best practices implemented by the project. Products will be tailored to different stakeholders, ie policy decision makers, technical staff, subnational stakeholders.
3	Activity 3.2.3) Circulation of report on "best-practices" and "lessons-learned"	The outcomes of activity 3.2.2 will be distributed locally and internationally to key stakeholders, partners and institutions engaged with climate monitoring and related topics. The goal will be to raise awareness of project's outcomes and help the development of similar projects.

#	Activities	Comments
4	Activity 3.2.4) Closure workshop with all involved stakeholders for discussing "lessons-learned", follow-up initiatives and the project's sustainability strategy.	A closure workshop will be organized at the end of the project to give a wide panorama of what was achieved, the benefits and best practices of the project. It will be a moment to reflect on the good points and what can be improved in future projects related to climate monitoring and climate information services.
5	Activity 3.2.5) Administrative closure	All tasks related to the administrative closure of the project after the end of all project's activities after year 6 will be managed by the project unit team.

Output 3.3 will support the implementation of a wider public awareness of the benefits of the access of end-users to climate services. This public awareness will give a special focus to decision makers in order to convince them to consider climate information services as development priority and on the necessity for the government to dedicate national resources to the support the sustainable financing of the climate information and early warning system after the end of the project. The raising awareness will also target the communities, the private sector, the national development institutions and the civil society organizations to inform them on the available climate services and the benefits of using them.

#	Activities	Comments
1	Activity 3.3.1) Build and maintain a web presence and community outreach through electronic means	A procurement process will be opened to hire an expert in community engagement with strong command of communication and web tools in order to build a web presence strategy for the project. The project team will be trained to be able to maintain the website or other web tool developed by the expert.
2	Activity 3.3.2) Create and implement a national awareness campaign about EWS and climate information services created by the project, with focus on decision makers, local communities, private sector, national institutions and CSO	The expert in community engagement will also be responsible for setting up a national awareness campaign about the climate information services developed by the project activities. The plan will be implemented by the project team during the last phase of the project.

The project is aligned to three GEF/LDCF adaptation programming directions:

- CCA-1 Reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation
- CCA-2 Mainstream climate change adaptation and resilience for systemic impact
- CCA-3 Foster enabling conditions for effective and integrated climate change adaptation

The project will support the upfront costs of monitoring equipment, while strengthening means and building capacity to collect, analyze and interpret that data for use by various sectors – ensuring integration of climate impacts into planning during a pivotal time in Guinea Bissau’s development planning.

It is important to leverage greater results and promote new technologies, approaches and concepts that will help the deployment of solutions to many development’s most pressing needs. Given IT related challenges in the country, the use of the mobile telecommunications network for observation network implementation will be prioritized since that infrastructure will, over time, provide the most robust power, communications, and security setup for the network hardware. Cloud-based services will also be used for computing systems to minimize this risk at the local, computer room level.

The project’s activities will help the local institutions to implement a demand-driven approach to the development of climate information services. This is a new perspective for the institutions in Guinea-Bissau and will promote a shift on the current strategy for developing products in the country. With this approach, the future climate information services and products produced by the national institutions will be based on the needs of the potential clients, making it tailored and facilitating the commercialization.

Regarding its sustainability, this will be ensured by investing in capacity building at all levels, with a special emphasis on gender matters, participation and replication of successful models and interventions, improving and strengthening knowledge and understanding of medium to long-term climate-related disaster risks to local communities. The project will then bring knowledge and experience to the climate change observation network and climate information services in Guinea-Bissau, helping to ensure its potential for scaling up through a strong community engagement. Further, the implementation strategy is divided in 3 phases, with two mid-term reviews and a close monitoring plan. This approach will contribute to reducing the risks related to long term O&M of investments that can challenge the project implementation and outcome achievement. The knowledge management component will document the evidence base to support further upscaling and replication, including for instance climate information for additional public and private sectors actors.

[1] ‘Density’ here refers to the distance between stations so as to ensure adequate coverage for the measurements. The optimal spatial distribution of stations in any given geography can be initially determined through modelling software on a map. What is optimal for Guinea-Bissau needs though to considers other parameters, such as funds’ availability and security.

[1] As reported by institutional stakeholder during the Validation Workshop.

[2] A station at which meteorological observations are made for the purposes of synoptic analysis. The observations are made at the main synoptic times of 0000, 0600, 1200, 1800 UTC and normally at the intermediate synoptic hours of 0300, 0900, 1500, 2100 UTC and are entered into a coded format for dissemination. (American Meteorology Society. Glossary of Meteorology, 2012.)

[3] An agricultural weather station is an automatic device for specific monitoring of the agricultural environment. (ZATA Weather Station Dept. Available at: <<https://www.weatherstation1.com/agricultural-weather-station/>>)

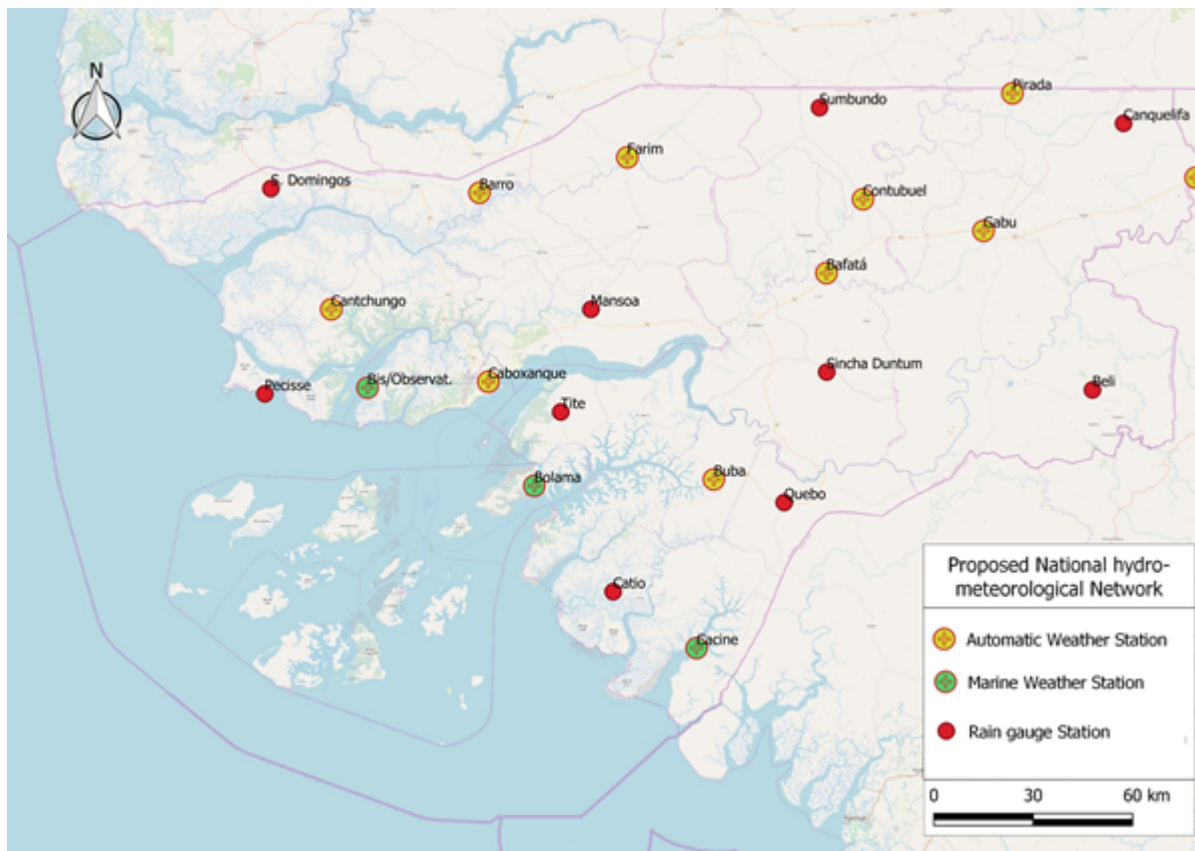
[4] An observing station from which climatological reports are submitted. (Oxford Reference. Available at: <https://www.oxfordreference.com/view/10.1093/oi/authority.20110803095618323>)

[5] AGRO = Agro météorologique | CLI. = Climatologique Auxiliaire

[6] Station that measures rainfall.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.



1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities

Private Sector Entities

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

please refer to Prodoc

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement.

The project preparation phase will be coordinated by the National Institute of Meteorology (INM-GB), which is expected to be the main implementing partner for the project. The identification and assessment of the climate information needs will be co-implemented with key CSOs (NGOs, CBOs) that have a long experience in supporting rural development, climate risks assessment and climate change management. This will also include research organizations such as INEP, IBAP and the other key potential users of the climate information namely the vulnerable communities, the private sector (mining companies and Bissau port users) and the related government institutions: Ministry of Natural resources and Energy / General Directorate of Water Resources; Secretary of State of Environment /Directorate General of Environment ; Ministry of Agriculture /Secretary of State for Food Security; Ministry of Interior / National Civil Protection Service ; Ministry of Health /Directorate General of Health; further the Ministries of Infrastructure and Tourism.

For the implementation phase, prior consultations with the Government of Guinea-Bissau have revealed that the National Institute of Meteorology (INM-GB) will ensure the overall coordination of the project as the national main implementing partner (IP), and in close collaboration with the General Directorate of Environment, Directorate General of Hydrology, the National Directorate of Fishing, the National directorate of the disaster risks management, the Directorates of Infrastructures and land management. The project implementation phase will also involve the Universities of Guinea-Bissau (Jean Piaget, Lusófona, Amilcar Cabral).

The INM-GB which is the main implementing partner for Guinea-Bissau of the EU- UNDP supported project AMESD, METAGRI and EMERMET will ensure the coordination of these aforementioned projects with this LDCF proposal. In the same perspective, the INM-GB will coordinate with the SNPC (National Civil Protection Service) to ensure a better coordination between DRM and climate change management in Guinea-Bissau.

The INM-GB will also coordinate with the Ministry of Agriculture which is the main IP for the “Guinea-Bissau agriculture development and food security project” to ensure the coordination of the proposals with the aforementioned project.

In the same perspective, the INM-GB will ensure a close collaboration of the IBAP, as main IP of the 2 projects “strengthening the capacity for the management of the environment and the forests” and “sustainable management of natural resources”, to ensure that the project implementation are in line with the 2 afore-mentioned projects. The INM-GB will also ensure the full collaboration of the Directorate of Infrastructures in the project implementation which is the main IP for the investment program for the rehabilitation and constructions of road.

Select what role civil society will play in the project:

Consulted only;

Member of Advisory Body; Contractor; Yes

Co-financier;

Member of project steering committee or equivalent decision-making body;

Executor or co-executor;

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

The impacts of climate change on human health and livelihoods life in Guinea-Bissau are quite serious and therefore it has become urgent to focus on people-oriented climate change solutions. The gender dimension of resilience and adaptation strategies to climate change, including how women are impacted by extreme weather events, what type of early warning messages and disaster management responses are needed, must be given particular attention.

As women play an essential role in Guinea-Bissau's society and make up a large number of the poor communities that depend on natural resources for their livelihood, they face higher risks and burdens from climate change impacts, such as hazards and extreme weather conditions. Gender inequalities may be exacerbated by climate change and women will have a higher time, stress and work burden than men. Therefore, any measure to foster climate resilient development needs to be gender-responsive and include women's active involvement in planning, implementation and monitoring to achieve more efficient and sustainable results.

During the project preparation phase, gender related vulnerability assessments have been conducted in urban and rural communities in four (4) project areas (Cacheu, Bafata, Gabu and Oio regions) in order to identify specific climate information needs, risk knowledge and disaster preparedness of communities as well as engendered power relations in Guinea-Bissau's society. The assessments highlight the need to ensure that early warning and adaptation planning take into account the particular needs of women in responding to climate change, and that messages and guidance are provided in a manner which is accessible and facilitates decision-making and action (e.g. considering livelihoods and taking into account literacy levels of women in different areas).

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources;

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women Yes

Does the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

Given the project's multi sector scope for climate information, there is potential to explore roles for industrial actors (national and international, public and private) that can play a role as consumer, developer or provider of (climate) services and potential (climate) derived products. Under Outcome 2, an assessment and initial inventory will be followed by detailed interviews to map clearly the potential interest within industrial parties for cooperating during and after the project. The analysis will compile existing instruments (administrative, legal, financial, etc.) at national scale that are already in place and can be relevant for developing business and partnerships. Special attention will be given to identifying the existence and performance of instruments like tax incentives, advisory and development services, business incubation support, PPP's, funding mechanisms, support platforms, etc.

The analysis will also provide a detailed view on potential opportunities and existing barriers within the technological, economic, financial and administrative sectors. Essential within the analysis is identifying the necessary means to create a favorable climate for industrial participation and co-creation.

These activities will provide the important groundwork for further engagement and partnership with the private sector on climate information services. Ultimately, the result will be a detailed description of the key features on the instrument, targeted firms and points of contact, which can then be further explored through consultation.

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

#	Description	Risk Category	Likelihood & Impact and Level	Risk Mitigation Measures
1	Unavailability of requisite human resources and data	Technical	Likelihood - 3 Impact – 3 Level - Moderate	The issue of the unavailability of requisite human resources will be mitigated by recruitment of international consultants who will work closely with in-country counterparts and by targeted capacity building activities. Where possible, the acquisition of services, rather than complicated systems requiring high levels of IT capacity will be prioritized. Training activities of local personnel will also be part of all aspects of the work and the relevant institutions will be encouraged to expand the staff base if it is weak in particular areas, this includes support for learning and scholarship programmes to help build the cadre of trained technical expertise.

#	Description	Risk Category	Likelihood & Impact and Level	Risk Mitigation Measures
2	Local IT, telecommunications and technical infrastructure are weak e.g. international bandwidth and local mobile telecommunications networks	Technical	Likelihood - 3 Impact – 3 Level - Moderate	The use of the mobile telecommunications network for observation network implementation will be prioritized since that infrastructure will, over time, provide the most robust power, communications, and security setup for the network hardware. Cloud-based services will also be used for computing systems to minimize this risk at the local, computer room level.

#	Description	Risk Category	Likelihood & Impact Level	Risk Mitigation Measures
3	Insufficient institutional support and political commitments can affect the implementation through ineffective collaborative for climate services and EWS	Political	Likelihood - 2 Impact – 3 Level - Moderate	<p>The proposed project is strongly supported by Governments and other key stakeholders and development partners. The project, in conjunction with UNDP, will therefore take advantage of this opportunity to seek substantial support from the Governments and forge strong partnership with other development partners. Direct linkages to existing and planned baseline development activities implemented by government, securing of the necessary co-financing, as well as local buy-in will also minimize this risk. It will also be important to establish buy-in from all government departments early as the project will utilize data and information from a wide range of departments.</p> <p>During the PPG process, a strong effort was made in order to engage and raise awareness of key stakeholders and national institutions that could benefit with the project. The response was very positive, and the representatives of these institutions were very open about their willingness to cooperate and contribute to the project implementation. The inputs gathered during the interviews and both workshops were included in the project design, so their views could be reflected, contributing to create a more consolidated institutional framework.</p>
4	Work progresses in a compartmentalized fashion and there is little integration e.g. government departments refuse to share data and information	Political	Likelihood - 2 Impact – 3 Level - Moderate	By ensuring that sensitization on the impact of climate change on sectors and related capacity building across a range of sectors, as well as through the development of tailored climate products (e.g developing products based on internationally available data), these issues can be mitigated. Project activities focused on creating institutional integration and a collaborative framework have been defined and will be implemented by the project as to mitigate this risk.

#	Description	Risk Category	Likelihood & Impact Level	Risk Mitigation Measures
5	Non-compliance by primary proponents for the successful implementation of this project	Political	Likelihood - 2 Impact – 3 Level - Moderate	<p>Ensuring that the project is designed and implemented in a participatory and inclusive manner, following established UNDP procedures, will mitigate the risk. Since the activities correspond to the urgent needs as expressed by the primary proponents the risk of non-compliance should be reduced.</p> <p>The Project Board is a means to approve of and apply adaptive management measures related to management arrangements in the case there are critical challenges.</p>
6	Climate or other (ie COVID) shocks occurring during the implementation phase of the Project	Environmental/Social	Likelihood - 2 Impact – 3 Level - Moderate	<p>Government priorities may have to temporarily adjust to respond to shocks. And as a result there may be some delays as more urgent priorities need to be addressed by stakeholders (e.g. disaster risk management services, government preparedness/response measures to the COVID-19 pandemic)</p> <p>Related to extreme weather events, timing of equipment installation will be informed by seasons - minimizing impact. Regarding COVID-19, uncertainties persist particularly on the African continent and Guinea Bissau has a concerning number of cases relative to its population. UNDP will fully adhere to Government guidelines to contain the spread of the virus, in planning its activities. To the extent possible, the project will employ virtual means for consultations with government and capacity building.</p>

#	Description	Risk Category	Likelihood & Impact Level	Risk Mitigation Measures
7	Sustainability of investment due to inadequate security and O&M	Technical	Likelihood - 3 Impact – 4 Level - Substantial	This risk will be mitigated through the proposed phased approach related to equipment and installation under Component 1, as well as specific activities aimed at creating awareness and a sense of ownership within the communities where the equipment will be located. The project will have a step-by-step development of protocols for successfully engaging local communities and awareness raising about the importance of caretaking and maintaining the equipment. With a robust stakeholder and local community's engagement plan implemented with the project, the risk will be mitigated. Importantly, site selection will be contingent on a costed O&M plan with roles and responsibilities clearly defined.
8	In the selection of pilot intervention areas, the project might unintentionally cause inequitable or discriminatory adverse impacts on affected populations.	Social and Environmental	Likelihood - 3 Impact – 3 Level - Moderate	The issue of the unavailability of requisite human resources will be mitigated by recruitment of international consultants who will work closely with in-country counterparts and by targeted capacity building activities; this has been built into the project's design. Where possible, the acquisition of services, rather than complicated systems requiring high levels of IT capacity will be prioritized. The project was also designed such that training activities of local personnel will be part of all aspects of the work and the relevant institutions will be encouraged to expand the staff base if it is weak in particular areas, this includes support for learning and scholarship programmes to help build the cadre of trained technical expertise.

#	Description	Risk Category	Likelihood & Impact Level	Risk Mitigation Measures
9	The particular challenges faced by women might not be effectively incorporated into the EWS or adaptation planning.	Social and Environmental	Likelihood - 2 Impact - 3 Level - Moderate	<p>This risk will be managed through the Stakeholder Engagement Plan developed during the PPG (ProDoc Annex 4). Site-level Stakeholder Engagement Plans will be prepared during project implementation, as noted in the ProDoc.</p> <p>EWS communication strategies and comprehensive local disaster management will be developed hand in hand with the stakeholders to avoid that no one is left behind. The project will highlight showcases and pilot the proper installation of EWS communication and local DRR. However, its scope is limited, and it is recommended that a dedicated DRR project is designed as soon as funding is available and building on the early results of this one.</p>
10	Construction at sites, once selected, might have localized negative impacts (social and/or environmental), e.g. debris resulting from installation of equipment, and/or OHS risks.	Social and Environmental	Likelihood - 2 Impact - 3 Level - Moderate	<p>Specific study on gender needs and gender differentiated conditions in climate events and EWS was carried out during the PPG, and a Gender Mainstream Action Plan designed and included in this project for risk mitigation. The project design includes strong awareness raising components which will enable both, men and women, to better understand the impact of extreme weather on their livelihood and security and gender specific needs. It was also designed to enhance women participation in all stages of EWS to overcome the limited victim role towards active community engagement and decision making by and for women (including quotes).</p>

#	Description	Risk Category	Likelihood & Impact Level	Risk Mitigation Measures
11	The adaptation planning supported by the project (including the national development plans under output 2.2) might unintentionally lead to downstream impacts on people or the environment.	Social and Environmental	<p>Likelihood - 1</p> <p>Impact - 4</p> <p>Level - Moderate</p>	<p>The site selection process will include SES considerations (e.g. with exclusionary criteria), and procedures for screening site-specific potential social/environmental impacts will be conducted for each site after its selection.</p> <p>These measures will be integrated into the ProDoc (in forthcoming revisions).</p> <p>A project-wide ESMF was determined to be unnecessary, though site-specific (targeted) management plans might be necessary for SES compliance, based on the findings of the screening that are carried out during implementation.</p>
12	Climate or other (ie COVID) shocks occurring during the implementation phase of the Project	Social and Environmental	<p>Likelihood - 1</p> <p>Impact - 4</p> <p>Level - Moderate</p>	<p>The process for selecting the plans/policies will include SES considerations (e.g. with exclusionary criteria), and procedures for screening the potential asocial/environmental impacts will be conducted for each selected plan/policy.</p> <p>These measures will be integrated into the ProDoc (in forthcoming revisions).</p> <p>The need for targeted/scoped SESA will be confirmed during the screening of each plan/policy supported by the project.</p>

#	Description	Risk Category	Likelihood & Impact Level	Risk Mitigation Measures
13	In the selection of pilot intervention areas, the project might unintentionally cause inequitable or discriminatory adverse impacts on affected populations.	Social and Environmental	Likelihood - 2 Impact - 3 Level - Moderate	Related to extreme weather events, timing of equipment installation will be informed by seasons - minimizing impact. Regarding COVID-19, uncertainties persist particularly on the African continent and Guinea Bissau has a concerning number of cases relative to its population. UNDP will fully adhere to Government guidelines to contain the spread of the virus, in planning its activities. To the extent possible, the project will employ virtual means for consultations with government and capacity building.

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

The project will be implemented following UNDP's national implementation modality, according to the Standard Basic Assistance Agreement between UNDP and the Government of Guinea-Bissau, and the Country Program.

The [National] Implementing Partner for this project will be the National Institute of Meteorology. Note: a HACT assessment is ongoing for this partner.

The Implementing Partner will work closely with the General Directorate for Water Resources, as responsible parties, tasked with implementing specific activities to them assigned and ensuring the government's contribution to the project and working with the project management team and Project Board to achieve the intended results.

The Implementing Partner is responsible and accountable for managing the project, including the M&E of project interventions, achieving project outcomes, and for the effective use of UNDP resources. The Implementing Partner is responsible for:

- Approving and signing the multiyear workplan;
- Approving and signing the combined delivery report at the end of the year; and
- Signing the financial report or the funding authorization and certificate of expenditures.

In this context, the Implementing Partner will be responsible for processing the requests for disbursements of government funding and production of financial reports, in compliance with the rules and procedures of UNDP.

Technical and financial oversight will be provided by UNDP, via the CO and the UNDP-GEF team based in Addis Ababa and will actively monitor implementation of the project according to UNDP and GEF regulations and procedures. The Implementing Partner will also be responsible for promoting and supporting the effective coordination of the project with other national partner agencies, initiatives and baseline projects and for ensuring that lessons learned from the project are incorporated into new initiatives, to support sustainability and replicability of project outcomes.

The project organization structure is set out in the Figure 11, further down.

Project Board: The Project Board (also called Project Steering Committee) is responsible for making by consensus, management decisions when guidance is required by the Project Manager, including recommendations for UNDP/Implementing Partner approval of project plans and revisions, and addressing any project level grievances. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP Programme Manager.

Specific responsibilities of the Project Board include:

- Provide overall guidance and direction to the project, ensuring it remains within any specified constraints
- Address project issues as raised by the project manager
- Provide guidance on new project risks, and agree on possible mitigation and management actions to address specific risks
- Agree on project manager's tolerances as required, within the parameters set by UNDP-GEF, and provide direction and advice for exceptional situations when the project manager's tolerances are exceeded
- Advise on major and minor amendments to the project within the parameters set by UNDP-GEF
- Ensure coordination between various donor and government-funded projects and programmes
- Ensure coordination with various government agencies and their participation in project activities
- Track and monitor co-financing for this project
- Review the project progress, assess performance, and appraise the Annual Work Plan for the following year
- Appraise the annual project implementation report, including the quality assessment rating report
- Ensure commitment of human resources to support project implementation, arbitrating any issues within the project
- Review combined delivery reports prior to certification by the implementing partner

- Provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans
- Address project-level grievances
- Approve the project Inception Report, Mid-term Review and Terminal Evaluation reports and corresponding management responses
- Review the final project report package during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.

The composition of the Project Board will be:

Project Executive: Is an individual who represents ownership of the project and chairs the Project Board. The Executive is normally the national counterpart for nationally implemented projects. The Project Executive is the National Institute of Meteorology

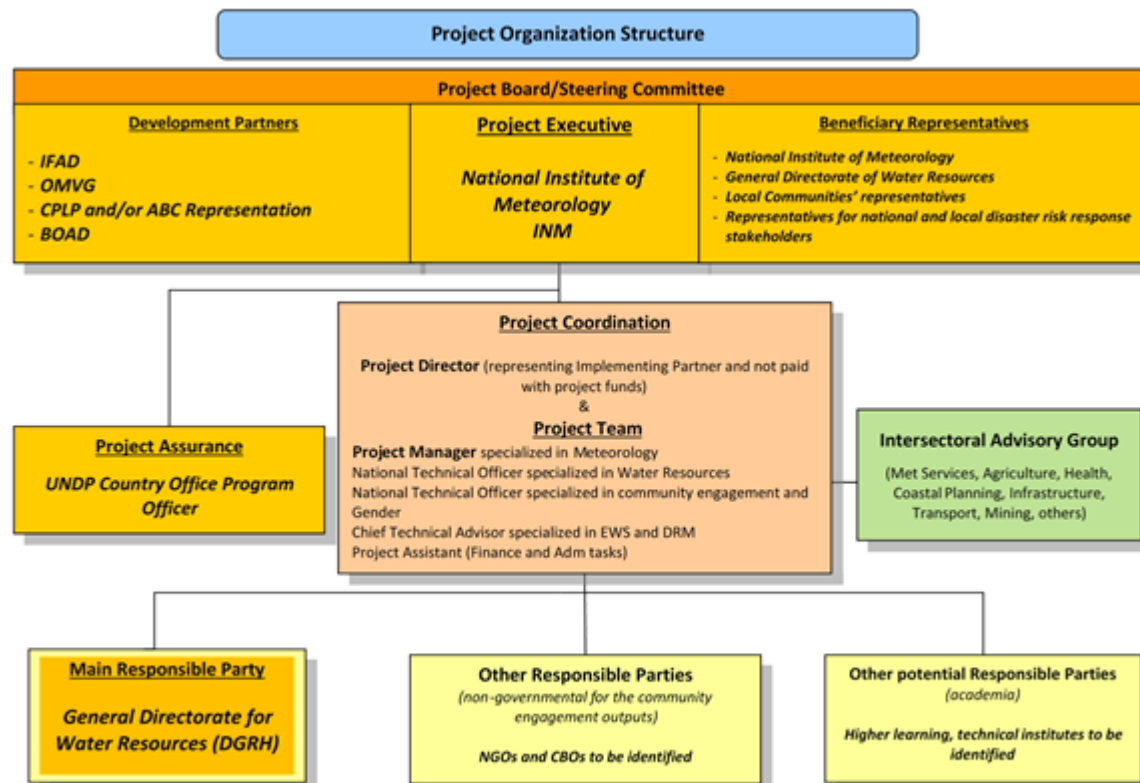
Beneficiary Representative(s): Individuals or groups representing the interests of those who will ultimately benefit from the project. Their primary function within the board is to ensure the realization of project results from the perspective of project beneficiaries. Often civil society representative(s) can fulfil this role. The Beneficiary representative (s) are: the National Institute of Meteorology, the General Directorate for Water Resources

Development Partner(s): Individuals or groups representing the interests of the parties concerned that provide funding and/or technical expertise to the project. The Development Partner(s) are: ECOWAS, EU, AfDB and IFAD through PADES project, World Bank, Adaptation Fund / BOAD, IUCN.

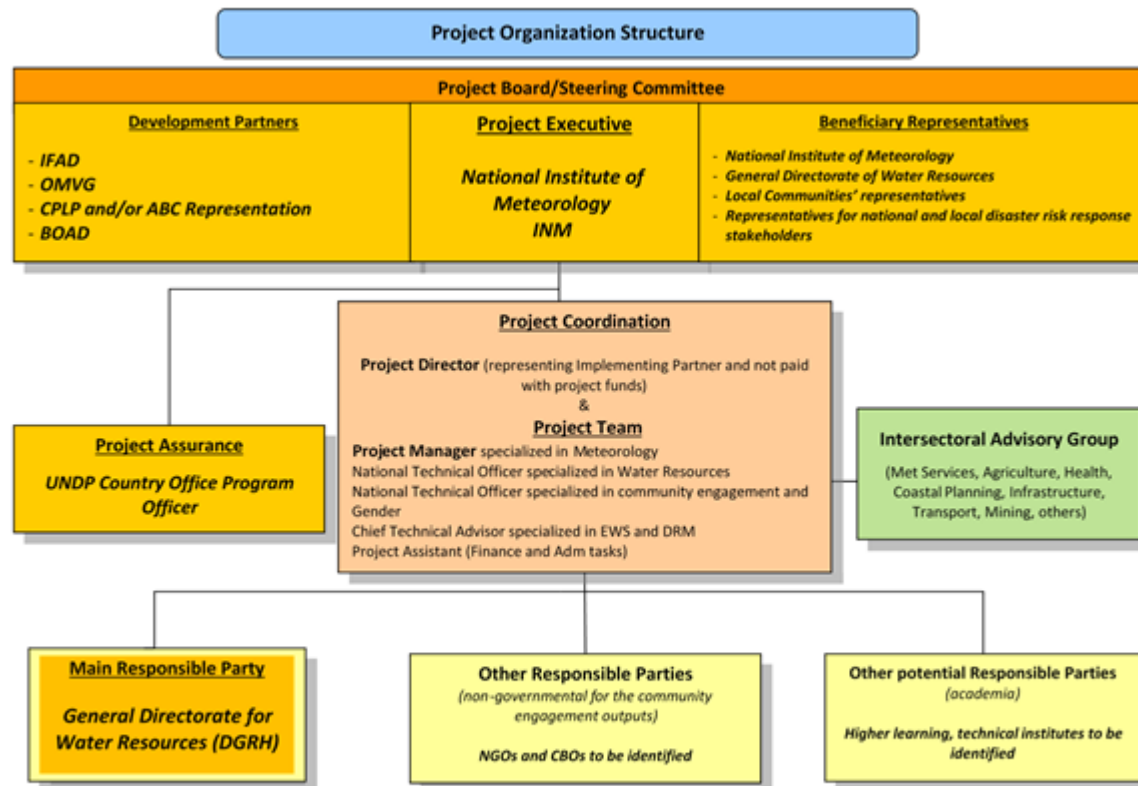
Project Assurance: UNDP performs the quality assurance role and supports the Project Board and Project Management Unit by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. The Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. UNDP provides a three – tier oversight services involving the UNDP Country Offices and UNDP at regional and headquarters levels. Project assurance is totally independent of the Project Management function.

Project Manager: The Project Manager has the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Project Board. The Project Manager will be specialized in meteorology and must have experience with implementing similar projects.

The Project Manager's primary responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. The Project Manager will inform the Project Board and the Project Assurance roles of any delays or difficulties as they arise during implementation so that appropriate support and corrective measures can be adopted. The Project Manager will remain on contract until the Terminal Evaluation report and the corresponding management response have been finalized and the required tasks for operational closure and transfer of assets are fully completed.



For additional information, please see Section VII of the UNDP ProDoc.



For additional information, please see Section VII of the UNDP ProDoc.

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

- National Action Plan for Adaptation (NAPA) under LDCF/UNFCCC

- National Action Program (NAP) under UNCCD
- ASGM NAP (Artisanal and Small-scale Gold Mining) under Mercury
- Minamata Initial Assessment (MIA) under Minamata Convention
- National Biodiversity Strategies and Action Plan (NBSAP) under UNCBD
- National Communications (NC) under UNFCCC
- Technology Needs Assessment (TNA) under UNFCCC
- National Capacity Self-Assessment (NCSA) under UNCBD, UNFCCC, UNCCD
- National Implementation Plan (NIP) under POPs
- Poverty Reduction Strategy Paper (PRSP)
- National Portfolio Formulation Exercise (NPFE) under GEFSEC
- Biennial Update Report (BUR) under UNFCCC
- Others

The proposed intervention builds on—and is closely aligned with—the recommendations of the first (2005), second (2011) and third (2018) National Communications to the UNFCCC and the NAPA (2006), which identified and ranked **six priority sectors** for Guinea-Bissau. The link between this project’s strategy and the **NAPA** is centered on the common goal of informing climate resilient development planning and sector management through improved national systems that generate relevant climate information.

This project contributes directly to the climate information needs for four priority sectors identified through the NAPA:

- Early warning and disaster management, particularly by strengthening drought and flood forecasting and early warning systems through human and technical capacity building
- Food security

- Water resources, and
- Coastal/marine ecosystems.

The development of a functioning climate monitoring system and climate information services is a priority and is expected to be beneficial to multiple sectors, such as agriculture, water, health and energy, for improving pre-disaster preparedness of rural fishing and farming communities. Additionally, this project will set solid foundations for the successful implementation of some NDC priorities of Guinea-Bissau (**Nationally Determined Contributions**, 2015):

- Draw up a profile of Vulnerability & Resilience to climate change in the country
- Preparation of contingency plans for the management of climate risks and natural disasters
- Increase of the adaptation capacity of national ecosystems through soil protection against water and wind erosion: protecting the coast against rising sea levels and other types of erosion
- Introduction of farming techniques resilient to the effects of climate change.

By signing and ratifying the **Hyogo Framework for Action**, Guinea-Bissau has committed to the adoption and implementation of policies and measures to manage existing climate risks, including enhancing preparedness and response capability to likely disasters. The country drafted its **Disaster Risk Reduction Strategy** (Government, UEMOA) in 2013 to provide strategic direction to disaster risk management for Guinea-Bissau, focusing on people centered DRR and emphasizing the strong links between poverty and vulnerability and subsequently between DRR and development policy. The objectives of this strategy are:

- I. Increase political commitment to the reduction of disaster risks
- II. Improve the identification and assessment of disaster risks
- III. Strengthen the knowledge management related to DRR
- IV. Increased awareness of disasters risks within the population
- V. Enhance the governance of institutions involved in DRR,

VI. Mainstreaming DRM in the development strategies and plans.

This strategy was an important step for Disaster Risk Management (DRM) in Guinea-Bissau, and it is necessary to integrate the strategy with climate change management in Guinea-Bissau. This strategy has not yet been implemented due to lack of financial resources.

This LDCF project is aligned with the strategic objectives of Guinea-Bissau's DRRS, namely the development of institutional mechanisms for DRR, ii) long-term capacity building at national, regional and community level, iii) strengthening comprehensive information systems, iv) developing sustainable financial mechanisms, v) global reduction of risks and vulnerabilities vi) and regional and international cooperation.

Moreover, the options chosen in this project to strengthening the climate monitoring network and climate information services for climate resilient development provide synergy with the **Guinea-Bissau National Poverty Reduction Strategy Document 2** (DENARP II) and other development strategies and plans. They are also in line with the new orientations emanating from the **2015-2025 Terra Ranka Program**, Guinea-Bissau's Master Development Plan, which was presented by the Government at the Donor Roundtable in March 2015, setting out the broad guidelines for the development of the country - although *Terra Ranka* did not start to be implemented (officially) due to severe governance crisis over the last four years.

In the *Terra Ranka* Program, environment and climate change issues are an important concern: Programs 13-18: deal with the institutional development of the environment sector, sustainable management of the ecosystems, management of the Protected Areas, Elaboration and Implementation of a National Climate Plan with Climate Change Adaptation Projects, resilient development of communities etc.; and also Program 59: Ecotourism at UNESCO World Heritage Site Bijagos Islands.

In addition, this GEF LDCF project is linked and well-aligned to national priorities and measures identified for implementation in the current United Nations Development Assistance Framework and the Country Program, especially UNDAF outcome area 4 "Promotion of the sustainable management of the environment and natural resources, risk management, and disaster prevention by public institutions, Civil Society Organizations, and the private sector".

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

Knowledge management is seen as an important part of sustainability. To that end, knowledge sharing mechanisms including an accessible documentation on best-practices and lessons-learned will be supported. Products will be tailored to different stakeholders, ie met services, policy decision makers, technical staff, subnational stakeholders.

Guinea-Bissau will benefit from the CIRDA countries projects. UNDP and the GEF LDCF supported a set of NIM Climate Information and Early Warning System projects (12 in total) and a coordinating regional component (CIRDA) which has the objectives to enhance coordination among the 12 NIM projects, increase cost effectiveness and, most importantly, provide the 12 country projects with a regional network of technologies, a cohort of technical advisors and efficient knowledge management mechanism for experience and lessons exchange. Activities under output 3.2 will benefit from the lessons learned and best practices generated from those projects (including market studies and assessments), and from the knowledge generated.

A budget of approximately 3% has been allocated for knowledge management under the project, with data collection and documentation planned throughout the project duration, particularly informed by the two reviews planned for monitoring of station condition and functionality, as well as the MTRs and other M&E activities. Please see Budget Notes in the UNDP ProDoc for further information.

9. Monitoring and Evaluation

Describe the budgeted M and E plan

Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the [UNDP POPP](#) and [UNDP Evaluation Policy](#). While these UNDP requirements are not outlined in this project document, the UNDP Country Office will work with the relevant project stakeholders to ensure UNDP M&E requirements are met in a timely fashion and to high quality standards. Additional mandatory GEF-specific M&E requirements (as outlined below) will be undertaken in accordance with the [GEF M&E policy](#) and other relevant GEF policies.

In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed during the Project Inception Workshop and will be detailed in the Inception Report. This will include the exact role of project target groups and other stakeholders in project M&E activities including the GEF Operational Focal Point and national/regional institutes assigned to undertake project monitoring. The GEF Operational Focal Point will strive to ensure consistency in the approach taken to the GEF-specific M&E requirements (notably the GEF Tracking Tools) across all GEF-financed projects in the country. This could be achieved for example by using one national institute to complete the GEF Tracking Tools for all GEF-financed projects in the country, including projects supported by other GEF Agencies.

The M&E plan and budget are presented below:

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget ^[1] (US\$)	Time frame	
		GEF grant	Co-financing (UNDP)	

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget ^[1] (US\$)	Time frame	
		GEF grant	Co-financing (UNDP)	
Inception Workshop	UNDP Country Office	USD 10,000	Needs to be assessed in due course	Within two months of project document signature
Inception Report	Project Manager. Project M&E Officer, funded from UNDP TRAC	None	None	Within two weeks of inception workshop
Standard UNDP monitoring and reporting requirements as outlined in the UNDP POPP	UNDP Country Office, Project M&E Officer, funded from UNDP TRAC	None	Pro-rata contribution of the M&E Officer	Quarterly, annually
Risk management	Project Manager Country Office	None	None	Quarterly, annually
Monitoring of indicators in project results framework (in collaboration with the National Institute of Meteorology and the General Directorate of Water Resources)	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC	Per year: USD 5,000	Pro-rata contribution of the M&E Officer	Annually before PIR

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget ^[1] (US\$)	Time frame	
		GEF grant	Co-financing (UNDP)	
GEF Project Implementation Report (PIR)	Project Manager, Project M&E Officer, funded from UNDP TRAC, CTA and UNDP Country Office and UNDP-GEF team	None	Pro-rata contribution of the M&E Officer	Annually
NIM Audit as per UNDP audit policies	UNDP Country Office	USD 5,000/year	Pro-rata contribution of the M&E Officer	Annually or other frequency as per UNDP Audit policies
Lessons learned and knowledge generation	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC	None	Pro-rata contribution of the M&E Officer	Annually
Monitoring of environmental and social risks, and corresponding management plans as relevant	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC UNDP Country Office	None	Pro-rata contribution of the M&E Officer	On-going
Gender Action Plan	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC UNDP Country Office	Part of Output 1.9 and others funded under those.	Pro-rata contribution of the M&E Officer	On-going

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget ^[1] (US\$)	Time frame	
		GEF grant	Co-financing (UNDP)	
Addressing environmental and social grievances	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC UNDP Country Office	Not needed at this stage.	None at this stage	On-going
Project Board meetings	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC UNDP Country Office	Part of M&E budget under C3	Pro-rata contribution of the M&E Officer	At minimum annually
Supervision missions	UNDP Country Office	None ^[2]	Travel costs funded by UNDP	Annually
Oversight missions	UNDP-GEF team	None	Pro-rata contribution of the M&E Officer + Travel funded by UNDP	Troubleshooting as needed
GEF Secretariat learning missions/site visits	UNDP Country Office and Project Manager and UNDP-GEF team	None foreseen	None foreseen	To be determined.

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget ^[1] (US\$)	Time frame	
		GEF grant	Co-financing (UNDP)	
Mid-term GEF Tracking Tool	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC	Included below	Pro-rata contribution of the M&E Officer	Before mid-term review mission takes place.
Mid-term Review (MTR) and management response	UNDP Country Office and Project team and UNDP-GEF team	USD 40,000	NA	Between 2nd and 3rd PIR and 4th and 5th PIR.
Two assessments during project to view condition and functionality of equipment	UNDP Country Office and Project team and UNDP-GEF team	USD 20,000 each	N/A	Between 2nd and 3rd PIR and 4th and 5th PIR.
Terminal GEF Tracking Tool	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC	Included below	Pro-rata contribution of the M&E Officer	Before terminal evaluation mission takes place
Independent Terminal Evaluation (TE) included in UNDP evaluation plan, and management response	Project Manager, CTA, Project M&E Officer, funded from UNDP TRAC	USD 40,000	NA	At least three months before operational closure
Translation of MTR and TE reports into English	UNDP Country Office	USD 2,500 see above	Only if needed	As required. GEF will only accept reports in English.
TOTAL indicative COST		Approximately USD 192,500.	Approximately \$ 160k	
Excluding project team staff time, and UNDP staff and travel expenses				

[1] Excluding project team staff time and UNDP staff time and travel expenses.

[2] The costs of UNDP Country Office and UNDP-GEF Unit's participation and time are charged to the GEF Agency Fee.

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

A rehabilitated and modernized weather and climate monitoring system can provide Guinea-Bissau with the capacity necessary to develop, for example, in the future: (i) an early warning system for severe weather; (ii) real-time weather and hydrological monitoring; (iii) weather forecasting capabilities (Numerical Weather Prediction); (iv) agro-meteorological information and services (including for climate smart agriculture, integrated crop and pest management and other related applications where CI &EWS contribute to food security); (v) health advisories (vi) applications related to building and management of infrastructure; (vi) tailored products for mining planning and management; (vii) risk informed land, air and maritime transport management; (viii) integrated water resources management; (ix) adaptive coastal zone and land management; and (x) adaptation planning and policy making processes.

The project will support climate informed planning in various sectors. Through tailored products and cross sectoral collaboration, It is expected that at least 4 subnational/sectoral plans will benefit from climate information, resulting in greater resilience and efficiency of investments. Though climate informed planning in various sectors, 1.6 million people area expected to benefit. Improved climate information will also reach communities through early warning. At least 100,000 people will benefit from advisories, which can allow time and preparation related to the impacts of climate-induced events on agriculture and health.

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF

CEO Endorsement/Approval

MTR

TE

Medium/Moderate

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

Supporting Documents

Upload available ESS supporting documents.

Title

Module

Submitted

**PIMS 5443 Guinea-Bissau_SESP_ProDoc Annex
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CEO Endorsement ESS

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Please see Section V of the UNDP ProDoc.

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

N/A

ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: 150,000			
<i>Project Preparation Activities Implemented</i>	<i>GETF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Technical assistance (design technical elements as well as all the required financial and administrative components of the project), Conducting missions to the project sites, Stakeholder consultation and validation workshop	150,000	149,934	66

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/CBIT Trust Funds or to your Agency (and/or revolving fund that will be set up)

N/A

ANNEX E: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

See 1b.

ANNEX F: Project Budget Table

Please attach a project budget table.

N/A