



PROJECT IDENTIFICATION FORM (PIF).

PROJECT TYPE: FULL-SIZE PROJECT

TYPE OF TRUST FUND: LEAST DEVELOPED COUNTRIES FUND

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PART I: PROJECT INFORMATION

Project Title:	Strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in Guinea		
Country(ies):	Guinea	GEF Project ID: ¹	8023
GEF Agency(ies):	UNDP (select) (select)	GEF Agency Project ID:	5552
Other Executing Partner(s):	Direction Nationale de la Météorologie-Ministère des Transports	Submission Date:	Jan 16, 2015
GEF Focal Area(s):	Climate Change	Re-submission Date:	Mar 3, 2015
		Project Duration (Months)	36
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>	Corporate Program: SGP <input type="checkbox"/>	
Name of parent program:	[if applicable]	Agency Fee (\$)	475,000

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²:

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
CCA-2 (select) (select)	LDCF	3,948,093	23,850,000
CCA-3(select) (select)	LDCF	1,051,907	6,664,330
(select) (select) (select)	(select)		
Total Project Cost		5,000,000	30,514,330

B. INDICATIVE 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					
Project Component	Financing Type ³	Project Outcomes	Trust Fund	(in \$)	
				GEF Project Financing	Co-financing
1. Transfer of technologies for climate and environmental monitoring infrastructure	INV	1. Enhanced capacity of national hydro-meteorological (NHMS) and environmental institutions to monitor extreme weather and climate change	LDCF	3,963,093	20,650,000
2. Climate information integrated into development plans and early warning systems	TA	2. Efficient and effective use of hydro-meteorological and environmental information for making early warnings and mainstreaming CC in the long-term development plans	LDCF	801,907	8,344,330
Subtotal				4,765,000	28,994,330
Project Management Cost (PMC) ⁴			(select)	235,000	1,520,000
Total Project Cost				5,000,000	30,514,330

¹ Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

² When completing Table A, refer to the GEF Website, [Focal Area Results Framework](#) which is an Excerpt from [GEF-6 Programming Directions](#).

³ Financing type can be either investment or technical assistance.

⁴ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

If Multi-Trust Fund project: PMC in this table should be the total and enter trust fund PMC breakdown here ()

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Please include confirmed co-financing letters for the project with this form.

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
Government	Ministry of Agriculture	Grant	30,000,000
Government	National Directorate of Meteorology	Grant	157,330
Government	National Directorate of Meteorology	In-kind	357,000
Total Co-financing			30,514,330

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS ^{a)}

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) ^{b)}	Total (c)=a+b
UNDP	LDCF	Guinea <input type="checkbox"/>	Climate Change	(select as applicable)	5,000,000	475,000	5,475,000
Total GEF Resources					5,000,000	475,000	5,475,000

a) No need to fill this table if it is a single Agency, single Trust Fund, single focal area and single country project.

b) Refer to the [Fee Policy for GEF Partner Agencies](#).

E. PROJECT PREPARATION GRANT (PPG)⁵

Is Project Preparation Grant requested? Yes No If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee ⁶ (b)	Total c = a + b
UNDP	LDCF	Guinea <input checked="" type="checkbox"/>	Climate Change	(select as applicable)	150,000	14,250	164,250
Total PPG Amount					150,000	14,250	164,250

PART II: PROJECT JUSTIFICATION

PROJECT OVERVIEW

A.1. Project Description.

Guinea’s medium-term economic guidelines defined in the 2011-2015 Five-Year Socio-Economic Development Plan and the long-term guidelines defined in the “Guinea 2035” Vision have clearly identified the agricultural and mining sectors as main pillars of long-term economic development.

⁵ PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF upto \$1 mil; \$100k for PF up to \$3 mil; \$150k for PF up to \$6 mil; \$200k for PF up to \$10 mil; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁶ PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

Indeed, Guinea is richly endowed with soil potential (fertility, watercourse and abundant rainfall) and minerals (two-thirds of the world's bauxite reserves, large iron ore, diamond and gold reserves, etc.). Currently, around 22% of the GDP comes from the agricultural sector⁷, and bauxite mining and alumina production provides about 80% of Guinea's foreign exchange. The government of Guinea aims to take advantage of these natural endowments to boost growth and economic performance, as stated in the PRSP III, the 2011-2015 plan and the Guinea Vision 2035⁸. However, the performance of these 2 sectors is highly vulnerable to climate change, which could impede the achievement of the objectives and outcomes of the Guinea development strategies. Indeed, the agriculture sector is highly weather dependent given high dependency on rain-fed agriculture. As a result of both spatial and temporal disturbances, and in particular decrease in rainfall during critical times of the year (NAPA, 2006), adverse impacts on the productivity of the sector have already begun to be realized. As the agriculture sector provides livelihoods for 80% of the population⁹, large numbers of people are exposed to chronic food insecurity and malnutrition as climate conditions become less favorable. According to the WFP's latest detailed survey of food security and vulnerability, about 600,000 people located mostly in Kindia, Labe and N'Zerekore regions suffer from severe food insecurity, while an additional 1.7 million are considered at-risk¹⁰. Furthermore, the watercourses that could support irrigated agriculture have shown a high vulnerability to climate change and variability. Indeed, the droughts episodes Guinea has experienced between 1961 and 1990 have severely affected the hydrology regime (INC, 2002). For example, several waterways that were perennial in the past in Haute and Moyenne Guinee now dry up in the dry season (INC, 2002).

Similarly, the mining sector, being a water-intensive industry is affected by the reduction of water resources in Guinea. As mining operations expand (into more water-stressed areas such as the northern region hosting the bigger alumina reserves), the mining companies are likely to invest on water management infrastructures to be able to access to the quantity of water necessary for their operation.¹¹ This will lead to water access competition with the communities living in those regions, threatening livelihoods and potentially triggering social conflicts. Change in the frequency and intensity of storm events also has the potential to impact mining operations, for example affecting some of the physical structures used in the mining process such as dams, and sediment and erosion controls (measures that keep the dirt removed from the mine from getting into waterways).

Climatic trends and their impacts observed during these last years will more likely be exacerbated, according to climate forecasts. The INC (2002) and the NAPA (2006) predict; (i) a temperature rise of 1,5°C; 2,5°C and 4,5°C respectively by 2025, 2050 and 2100; (ii) a decrease of the rainfall regime (by 36,4% in 2050 and 40,4% in 2100) and change in its spatial and temporal distribution in the country; and (iii) the frequency and intensity of severe weather related disasters such as drought, flood, storms will increase, will have important impacts on the surface and ground water resource stocks, and through a variety of channels, undermine development including ongoing poverty alleviation initiatives. Climate variability and change thus constitute serious challenges for Guinea's economic growth and development that must be addressed in order for the country to pursue a sustainable development pathway.

Long term solutions and barriers

To allow Guinea 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:

⁷ http://www.indexmundi.com/guinea/gdp_composition_by_sector.html

⁸ For example, the consortium [Alcan](#) and [Alcoa](#), partner with the Guinean government in the CBG mining in north western Guinea, have announced the feasibility study for the construction of a 1 million TPa [alumina](#) smelter. This comes with a similar project from Canadian start-up Global Alumina trying to come with a 2 billion dollar alumina plant in the same region

⁹ Idem.

¹⁰ Guinea Food security Brief (FAO, 2011)

¹¹ For example, Global Water Intelligence estimates that mining companies will spend \$11.9 billion on water infrastructure in 2013, up from \$3.4 billion in 2009 http://www.climatechangebusiness.com/Climate_Change_and_the_Mining_Industry

- 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 response to forecast climate-related risks and vulnerabilities.

These objectives require developing in-country robust weather and climate observation capability, including now-casting and forecasting infrastructure which can be rapidly deployed, is relatively easy to maintain, and simple to use. Such a weather and climate monitoring system can provide Guinea with the capacity necessary to develop: (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) land, air and maritime transport management; (viii) integrated water resources management; (ix) coastal zone and land management; and (x) planning and policy making processes.

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

Lack of weather and climate monitoring infrastructure: The Guinea meteorological network is made up of 74 meteorological stations (12 synoptic, 27 agro climatic, 1 maritime, 1 atmospheric radiosonde and 33 rainfall). This is deemed inadequate to forecast and monitor the key hydro meteorological and climatic parameters throughout the country. Furthermore, none of this equipment is suitable for developing the information and services required to support climate and weather disasters resilient development and there are no current data for areas other than the airport. Also, currently available weather warnings message processing system is only usable for aviation and need to be expanded to better cover the needs of the communities and decision making processes in the context of national and sector level planning and budgeting to manage climate change risks along with other development challenges.

Limited knowledge and capacity to effectively predict climate change events and assess potential impacts: The scientific and technical capabilities required to effectively identify hazards and forecast their potential impacts on vulnerable communities in Guinea is currently weak. At the Division of Meteorology, the scientific and technical capabilities required to effectively identify hazards and forecast their potential impacts on vulnerable communities are foundational, at best. This is due to a lack of infrastructure (i.e. computational equipment), software (model code and associated routines) and human capacity/skills to program and run the models. Running forecast models is a highly skilled task and requires many years of education and training. Forecasters, with highly sought skills, are often lured into more lucrative work. Also, when climate information is available (monitoring and forecasts), it is not translated into identifying specific hazards that are of importance to specific and 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 raw information is hardly used.

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 between sectoral ministries and with 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 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, nor do they take conditions specific to Guinea 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 Guinean economy. These include planning and investment decisions related to urban and rural development, infrastructure, health, transport, agriculture, and mining and water resources.

The baseline scenario and any associated baseline projects

The Government of Guinea, with the support of its development partners, is implementing initiatives which aim at strengthening the access of vulnerable communities and key economic sectors to climate information necessary to manage the climate challenges for food security and the economic growth and sustainable development. These projects are the following:

The National Programme to Support Agricultural Value Chain Actors–Lower Guinea and Faranah expansion /PNAFA–LGF expansion (US\$ 30 Million)

The long-term objective of this 5 years project (2014-2019) led by the Ministry of Agriculture with financing from IFAD is to improve food security for rural people living in the administrative regions of Boké, Kindia and Faranah. To achieve this objective, this initiative, financed at US\$ 40.1 Million, aims to strengthen the access of rural people living in the administrative regions of Boké, Kindia and Faranah to agriculture support services required to improve production and productivity in rice and market gardening value chains in order to improve food security. For this purpose, the PNAFA-LGF will enter into framework agreements with the public services concerned, including the National Directorate of Meteorology (DNM), Agriculture, Hydrology and Environment at the national, regional and prefectural levels to improve access of LGF rice and market gardening value chain actors to relevant climate information products.

The Rural Development Project of Kakossa /PDR-K) The objective of this project funded by the Islamic Development Bank (2009-2014) has considerably contributed to the food security and food self-sufficiency of the country and improved living conditions of the population in Kakossa, through the rehabilitation of more than 2,000 ha of rice fields, the support to the exploitation of 384 ha through the provision of good quality inputs, performing agricultural technologies, the diversification of income generating activities and construction and equipment of supporting infrastructures. While this project is not considered as co-financing, the PDR-K has made important achievements that contribute to strengthen Kakossa communities' resilience to climate change. The PDR-K has contributed to increase Kakossa's communities farming knowledge and livelihoods. But these achievements remain fragile and vulnerable to climate risks. Indeed, the climate risks remain one of the key threats to the sustainability of these achievements, but the project didn't provide the beneficiaries communities and the extension institutions supporting them, the climate change management capacity that will allow them to cope with the climate risks. . And if communities are not well prepared to cope with the climate risks, they might structurally regress back to food insecurity and poverty. In reality, the PDR-

K is one of the flagship project for the Guinea National Agriculture Investments Program (PNIA)¹² in the Kakossa region. In this new development cycle, the Government of Guinea aims at accelerating the PNIA implementation to achieve food self-sufficiency in 2017.

The Early Warning System Demonstration Project 2014 - The objective of this Public-Private Partnership (PPP) between the National Directorate of Meteorology (DNM), Cellcom Guinee, and Earth Networks was to demonstrate a new approach to weather and climate monitoring utilizing the cellular telecommunications network and an innovative lightning detection technology to establish that a robust weather observing, severe weather nowcasting, and medium range weather forecasting system can be cost-effectively, and rapidly deployed. Data output from the system enabled the DNM to monitor and alert public officials to the onset of severe weather and flooding conditions nationwide during the pilot period. While the Demonstration Project was successful in demonstrating the efficacy of the technology and the PPP during the pilot, its scope was limited to providing warnings to public officials for a one-year period, and could also be enhanced to extend those warnings to the public as well as the aviation, energy, agricultural and mining sectors. While being an interesting baseline, this project cannot for the moment be considered as co-financing because it was a demonstration project and the equipment deployed have to be purchased by the Guinea government or to be dismantled and sent back to the Earth Network. The government of Guinea has satisfactorily appreciated this demonstration project and is ready to purchase these equipment and expand the lightening detection technology network beyond the demonstration area.

Other baselines initiatives and investments led by the National Directorate of Meteorology (DNM) (US\$ 157,300)

It is worth mentioning that, during the last 5 years, Guinea has benefitted from some specifically targeted initiatives which have helped to strengthen the meteorology capacity: i) the African Monitoring of the Environment for Sustainable Development (AMESD) which has supported the installation of EUMETSAT's satellite receiver (16,000 Euros) in 2012, to have access to data and products from EUMETSAT's latest satellites; ii) the "Weather for all" initiative to improve weather station coverage through the installation and operation of a PUMA station (16,000 Euros) in 2013 ; and iii) the project "Conakry Airport Safety" which has installed in 2012 a system for data diffusion via satellite and an integrated system for aerodromes meteorology observations that have helped to improve the monitoring of the aviation weather parameters (US\$ 50,000) . The "West Africa Agricultural Meteorology Project / METAGRI" and the "Post Conflict and Natural Disasters Countries project / EMERMET" (62,200 Euros) implemented in 2013, supported by the Spanish Meteorological Agency (AEMET), have also contributed to raise farmers' awareness of the climatic risk for agriculture and strengthen the country's capacity to collect rainfall data for decision making purposes. While these initiatives have contributed to strengthen Guinea's capacity to produce climate information services, their limited scope have not addressed the unreliable nature and weak capacity of Guinea's meteorological stations network to provide necessary quality and quantity of climate information services that can support informed decision making for a climate resilient economic growth and development.

However, the current levels of human and equipment capacity does not allow the DNM to provide the relevant climate information services necessary to prevent and manage the impacts of severe weather disasters and medium- to long-term climate related risks for development of the rice and market gardening value chains. The climate information services provided by the DNM are currently limited to short-term meteorology information such as agricultural calendars and the daily, decade and monthly meteorological bulletins for the monitoring of the agricultural season and the monitoring of

¹² The PNIA has five programmes are: i) the programme for the sustainable development of the rice growing; ii) the diversification programme for the food security; iii) the programme for the promotion of the agricultural exports and the agribusiness; iv) the programme for the integrated management of natural resources.

the meteorological conditions favorable to bushfire. Indeed, the baseline scenario consists of low capacities and means for collecting climate data and undertaking analytical work on climate change and variability. The network of meteorological stations is currently incomplete. Means and capacities to produce and disseminate appropriate seasonal and other long-term climate change information including variability to rural farmers and decision makers are weak.

The proposed alternative scenario, with a brief description of expected outcomes and components of the project

Component 1: Transfer of technologies for climate and environmental monitoring infrastructure

Baseline Situation including Projects

The Guinea meteorological network is old, degraded and made up of diversified brands, which makes it difficult to ensure network connection and equipment maintenance. In addition, because of budget constraints, the hydro-meteorological stations are no longer functioning properly. Most of them are under-equipped and understaffed. As a consequence, climate data necessary to produce early warnings and other relevant climate information products are no longer collected. In March 2011, the West Africa Agricultural Meteorology Project / METAGRI and the Post Conflict and Natural Disasters Countries project/ EMERMET installed a radiosonde system and electrolytic cell for use in the Guinean national meteorological system. In 2014, the Early Warning System Demonstration Project installed 12 stations on mobile telephone towers in the population centers of disaster prone areas.

Additional cost reasoning

Under this component of the project the Government of Guinea will be able to use LDCF resources to procure, install and/or rehabilitate critical infrastructure required to build and/or strengthen the climate-related observational network. In all equipment purchases an assessment of existing equipment will be made, noting the manufacturer, whether it is still working and whether the NHMS has an interest in continuing with particular makes/models. This 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 work undertaken through the UNDP and METAGRI support to the Guinea Meteorology department and the Early Warning System Demonstration Project as detailed in the baseline projects listed previously.

Building upon the baseline projects mentioned above and the equipment they have installed, the LDCF funds will be used to scale-up, procure and install appropriate infrastructure, to improve access to climate and environmental information for a functioning EWS. In the context of climate change and variability, access to and understanding of agro-meteorological information is a prerequisite for productive and efficient management and decision-making concerning the agro-sylvo-pastoral activities. These equipment are meant to complement the EUMETSAT Satellite receiver, the PUMA station and the Conakry Airport system for monitoring of the aviation weather parameters installed by the baseline projects mentioned above, to support the Guinean National Directorate of Meteorology (DNM) to provide populations (including farmers) and decision makers with quality hydro-meteorological information and services to allow them to anticipate climate variability and change-induced disasters, and to take appropriate measures to face to the impacts of these climate risks. These include:

- Early warning of severe storms, flood events and drought periods in Guinea: this responds to a concern raised by rural stakeholders and aims to satisfy certain specific applications in agriculture, livestock and forestry, DRR like the agro climatic zoning, the elaboration of crop calendars, the monitoring of fodder resources for livestock, identification of favorable periods for early bushfires; early identification of heavy rains, storms and floods, and monitoring of the water courses.
- Seasonal forecasts: the national meteorology system has currently two (2) forecast models. Two homogeneous zones (zone 1 and zone 2) have been identified from the indices of SST de NINO 3

and EOF3 which seem to give the strongest signals concerning rain in Guinea.

- Production and diffusion of agro-meteorological information and advice: these allow farmers to integrate the influence of atmospheric parameters on ecosystems. This is necessary for the improvement of agriculture and the sustainable management of natural resources. Furthermore, national and regional forecast bulletins need to be produced by the DNM and diffused by the rural radios in local languages.

Details of this procurement will be clarified during the project preparation phase depending on the required types of EWS (e.g. for floods, drought, severe weather etc.), existing infrastructures and telecommunications, capacity to utilize the equipment and associated data and the necessity to collect the data according to GCOS standards and to share with the Regional and World Climatic Data Centers the data collected. Additionally, during the PPG phase potential climate change hotspots (where both vulnerabilities and hazards are expected to be high) will be considered when deciding where to place infrastructure e.g. meteorological stations in vulnerable regions etc.

Under **Output 1.1** of the proposed project, LDCF resources will be used for the procurement and installation or rehabilitation (as appropriate) of approximately 10+ hydrological monitoring stations with telemetry, archiving and data processing facilities, which will enable the NHMS to monitor river and lake levels. In turn this allows the NHMS to identify dangerous floods before they occur, issue warnings for dam/transport managers downstream and alert communities at risk. All stations will be fitted with appropriate means for relaying data to central servers, regional and world climatic data centers (e.g. via GPRS or satellite telemetry). Under **Output 1.2**, LDCF resources will be used for the procurement and installation or rehabilitation of approximately 40 meteorological monitoring stations, also with telemetry, archiving and data processing facilities. During the PPG phase, existing information on network coverage and vulnerabilities to climate change will be used to identify underserved locations where data from additional stations will be most useful. Also, the PPG phase will clarify how flood and drought early warning and monitoring will be improved. As early warning and up to date monitoring is a priority, Automatic Weather Stations (AWS) using GPRS mobile telecommunications will be prioritized and where this is not available the feasibility of using more costly satellite communications will be assessed (including implications for budgets and future running costs). In cases where the station has been neglected but the site (fences, towers etc.) is still functional, LDCF resources will be used to replace existing sensors and data loggers, as historical observations from the site can be used with newly acquired data to create longer time series for detecting climate changes. Under **Output 1.3**, LDCF resources will be used to procure equipment for monitoring severe weather. LDCF resources will be used to procure equipment and services for monitoring severe weather. However, radar equipment, which is typically used for doing this in developed countries, is costly (purchasing and maintaining the equipment, as well as training and paying personnel to operate it) and budgets will not allow for the purchase and maintenance of such items. Therefore, based on the successful outcome of the Baseline Early Warning System Demonstration Project, a lower cost alternative technology using lightning data as a proxy for radar will be procured and installed. The PPG phase will clarify how data from this system will be used to provide real-time warnings of severe weather conditions and heavy rainfall warnings to public officials and the public to warn of potentially dangerous weather or flooding conditions. The system will allow for full coverage of the country, rather than rely on radar's limited range of detection. . Through **Output 1.4** LDCF resources will be used for the procurement of a site specific weather forecasting system that will provide 10 day weather forecasts for all major towns and villages throughout the entire country. This weather forecasting system will take local Guinean climatic conditions into consideration and output hourly data for at least the first three days of the forecast. To mitigate the risk of insufficient local IT resources and capacity to establish a sophisticated system like this, the use of cloud-based technologies will be explored during the PPG phase and the subsequent procurement. (**Output 1.5**). This output will build on the AMESD and recently launched SERVIR¹³

¹³http://www.servir.net/africa/index.php?option=com_frontpage&Itemid=1

programmes at the regional level, as well as Guinea's current installation of satellite reception equipment. The potential uses of satellite data and imagery for planning and management purposes in the context of food security, and water management will be established based on country specific contexts, users of information, needs (in the short-term disaster management, medium-long term planning) etc. If online data is not available in time to support required decisions, then satellite receiving equipment will be purchased and systems established to provide the required information. Under **Output 1.6**, LDCF resources will be used to develop the human technical capacity required to maintain and use the equipment made available through the LDCF. Specifically, the project will support the development of required capacity to develop and run hydrologic models in order to provide improved forecasts to big water users such as the mining companies, the agriculture projects, and the national and regional authorities responsible for hydrological resources management to allow them to improve water management and mitigation of flood losses. Personnel responsible for the running of the equipment and receiving/archiving the data that it produces (including manually operated stations where necessary) will be trained, along with back up personnel and replacements. This includes ensuring that there is an incentive mechanism in place to sustain the system that is set up with the LDCF resources. The training will stress that cost-effective technologies are utilized, which are able to interface with existing systems and which minimize dependence on external suppliers of hard and software.

In summary, government needs that are relevant to Component 1 (to be developed in detail during the PPG phase) are:

- Severe Weather and Flood Warning System based on a lightning detection network (purchasing, installation, training);
- Automatic Weather Stations (purchasing, installation, training);
- Coastal monitoring equipment (purchasing installation, training);
- River gauging equipment (purchasing installation, training)
- Weather forecasting system (purchasing, installation, training);

Component 2: Climate information integrated into development plans and early warning systems

Improving the forecasts/monitoring information, communications or the decision-making process, can increase the effectiveness of warnings. This component is primarily concerned with improving these aspects of the EWS and mainstreaming climate information in the current Guinea key development policies document. Specific details on the exact type of EWS information and risk management tools (for flood warnings, agricultural extension advisories, weather index insurance, transport planning, etc) will be determined during the PPG phase and additional actions designed to meet those priority needs.

Baseline scenario

The PNAFA-LGF expansion (2014-2019) aims to improve and integrate access to agro-meteorological information and assistance to improve food security for rural people living in the administrative regions of Boké, Kindia and Faranah. The programme has therefore established an

agreed framework for cooperation with the National Directorate of Meteo (DNM). The Rural Development Project of Kakossa (PDR-K) aims to improve Guinea's food security situation by rehabilitating 2,400 ha of rice growing plains in Kakossa and supporting the development of rice growing in 384 ha. The Lower-Guinea Rice Project (Riz-BG) aims to: (i) develop 2,500 ha of rice-growing plains in Lower Guinea; (ii) support rice field water management activities; (iii) fund research activities (management of soil fertility and socio-economic follow-up). The success of these 2 projects will also depend on the access to relevant information concerning the climate risks for the agriculture and the management of those risks. In general terms, the National Agriculture Investment Program (PNIA) which is the key Agriculture strategy and is supposed to institutionalize and systematize climate informed decision making processes and identify the required investments to address the climate risks for the agriculture development initiatives, including the PNAFA-LGF and PDR-K, do not integrate such provisions. This is the case for the Poverty Reduction Strategy Document (DSRP-III) which doesn't include the required provisions for mainstreaming climate change in the national development process. Furthermore, the Government of Guinea has developed a new Policy Letter for the development of the energy sector. This policy letter aims at enhancing the Guinea electricity production capacity at the level required by his economic growth and development ambitions, by exploiting his huge hydroelectricity potential. Even if concrete investment have not been done yet, the progress of the negotiations of the government with certain of these development partners and the private sector confirm the imminence of the hydroelectricity components of this energy sector development strategy. One of the key element of the successful implementation of the energy sector policy and strategies will be the development and the integration of relevant climate information in the investments decision making processes and the management of the hydroelectricity potential. In addition, the mining sector is currently operating without any monitoring and medium to long term forecasting of the water resources potential. The Guinea mining industry is also expanding its operation into more water-stressed areas such as the northern region hosting the bigger alumina reserves. As mining is a water-intensive industry, the mining companies need to integrate in their operation relevant information on the current and forecasted potential of water resources and take appropriate actions to ensure the long-term availability of water resources which are necessary for their operations and at the same time prevent competition for water access with communities and avoid any potential social conflicts. In this context, the national hydrological resources managers need access to this information so that they can provide the decision makers with relevant information to include in the negotiation of the mining agreements (mining rent, environmental and social safeguard measures). Similarly, changes in the frequency and intensity of storm events has the potential to impact mining operations, for example affecting some of the physical structures used in the mining process such as dams, and sediment and erosion controls (measures that keep the dirt removed from the mine from getting into waterways). However, the baseline scenario consists of low capacities and means for undertaking analytical work on climate change and variability. The system of meteorological data collection and diffusion is currently not appropriate (incomplete data collection, weak analysis and diffuse human and operational capacity). Means and capacities to produce and disseminate appropriate early warning and seasonal and long-term climate change information including variability to populations and decision makers are weak. Rural communities and their agro-pastoral practices remain highly vulnerable while agro-meteorological support to farmers is currently non-existent or ineffective. 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 advice and information.

Additional cost reasoning

The capacity to make and use daily to seasonal climate forecasts will be developed through **Output 2.1**. This will link to ongoing activities at the NHMS 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 with the region or at international centers. The data from these models should be linked to tailored products developed in output 2.4 and the decision processes in output 2.5. The

gaps between existing forecasting and nowcasting systems and those required for climate resilient planning purposes will be evaluated during the PPG phase, including use of indigenous knowledge when useful. 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. **Output 2.2** will develop National capacity for assimilating forecasts and monitoring into existing development planning, PRSPs and disaster management systems, including coordination with systems and warnings developed by other initiatives. **Output 2.3** will assess the sustainability of the EWS, taking account of the current funding mechanisms and allocated budgets. It will assess where funding shortfalls are most acute and where budgets are likely to be reduced in the future. 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 Conakry port users. Where suitable legal arrangements exist and where national and local governments are willing, private companies will be approached to test their willingness to engage in a public-private partnership with the NHMS or associated entity. Similar activities within the country or region will be studied to learn from their experiences (e.g. the Weather Information for Development (WIND) initiative in Kenya). Through the **Output 2.4**, new tailored products will be produced to serve the information requirements of users in different sectors and locations. These products will be developed through consultations with the intended users of the information and appropriate research organizations. A special attention will be given to the climate information needed to prevent and address the climate challenges for the success of the PNAFA-LGF and the safeguard of the PDR-K achievements against the project climate risks for Guinea. For this purpose, the PPG will help to identify the key climate vulnerabilities of the targeted areas and beneficiaries of these 2 projects and in consultation with the beneficiaries identify the required climate information and early warning products that will help a climate informed decision in the PNAFA-LGF and PDR-K targeted areas. In the same objective, this outcome will also target to develop the climate information and EW products necessary for the mainstreaming of climate risks in the 4 programs of the National Agriculture Investment Program (PNIA)¹⁴ which plans and implement the required investment for increasing the agriculture productivity, improving food security and contributing to improve the balance of trade by boosting the exports of agricultural products, the Poverty Reduction Strategy Document (DSRP-III) and the Energy Sector Development Policy Letter. These policies and strategies do not integrate at the required level the climate risks. So this output in coordination with the NAP process in Guinea will, as first implementation activities, review these strategies and policies and identify the required information to integrate climate information in their implementation. Information and data from the monitoring infrastructure (weather and hydrological stations, radar, and satellite monitoring) will be combined to produce new user-relevant information. As an example, satellite and weather station observations can be combined to derive a spatially continuous dataset and estimate rainfall for locations without meteorological stations. Using these data, the water balance of crops can be estimated for wider regions and these can be used as part of agricultural advisories. Improved availability of data to generate these products will also be implemented e.g. where important climate records reside in paper format, they will be digitized and used to better describe local microclimates, hence improving the baseline hazard mapping. It is not clear which projects are currently undertaking this work and this will be determined during the PPG phase. Building on the Output 2.4, and in coordination with the NAP process, the **Output 2.5** will support the revision and the mainstreaming of climate risks and adaptation strategies in the PNIA, the Energy Sector Development Policy Letter, and the DSRP-III. The **Output 2.6** will establish communication strategies and processes targeted to each identified sector and user and vulnerable areas. The aim is to effectively communicate early warnings, and advisory packages developed through Output 2.4, in the most useful way for different users/audiences. These strategies will vary as communications technologies,

¹⁴ The five programmes of the PNIA are: i) the programme for the sustainable development of the rice growing; ii) the diversification programme for the food security; iii) the programme for the promotion of the agricultural exports and the agribusiness; iv) the programme for the integrated management of natural resources.

language and cultural norms vary and according the targeted areas and beneficiaries. Using software and technology in innovative ways will be explored e.g. Google Earth for presenting forecasts and identified risks. Lessons and experiences in other parts of Africa will be assessed for their potential to upscale e.g. using innovative techniques to communicate agrometeorological advisories¹⁵. This will build on the work undertaken by GFDRR and UNDP.

In summary, government needs relevant to Component 2 which will be developed further during the PPG phase are:

- Access to satellite imagery and integration into development of EWS messages;
- Integration of lightning data into severe weather warning messages and flood warnings;
- Modelling and monitoring capacity built (weather, hydrology, and coasts);
- Simple and user-friendly messages are developed for distribution over mobile telephone networks and other channels;
- Coastal, severe weather, and flooding forecasts.
- Integration of climate information in the PNIA, ESDPL and the DSRP-III

The expected benefits of the proposal is to make available relevant climate information and EWS products necessary for the design and implementation of the immediate adaptation needs and mainstream climate information in the medium to long term development policies in order to advance a climate resilient economic growth and development.

This project will be part of the GEF/LDCF financed Regional Program on Climate Information and EWS already underway in 11 countries in Africa. The purpose of this regional program is to facilitate coordination, exchange experience and lessons, and provide regional technical support to the country projects on CI-EWS developed through UNDP-GEF support in Africa. As Guinea will benefit from the technical support that is in place, as well as from the lessons learned emerging from other programme countries, this project will contribute to the operational cost of the regional component. Enhanced regional coordination will facilitate sharing of experiences, access to best practices in the region and sharing of resources in cases where hydro meteorological training can be provided jointly.

Innovativeness, sustainability and potential for scaling up

One of the innovative aspects of this project is that it aims at putting in place a strategy for the sustainable financing of the operation, maintenance and upgrading of the climate information system it will contribute towards developing in Guinea. The LDCF proposal will work to support and pilot the feasibility of the emergence of a market for climate services in Guinea that will help the DNM to generate consequent revenues able to support the sustainability of the improved climate information and early warning system. For this purpose, the PPG will identify the key actions to implement for removing the technical barriers (such as strengthening the quality of the service supply), market barriers (unleashing of the market forces and development of the demand from the communities and the private sector) and policy barriers as well as identifying other conditions for the long-term feasibility for leveraging private sector support for climate information services.

A.2. *Stakeholders*. Will project design include the participation of relevant stakeholders from civil society and indigenous people? (yes /no) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation:

The project preparation phase will be coordinated by the National Directorate of Meteorology (DNM), which will likely also be the main implementing partner for the project implementation phase. Also, the identification and assessment of the climate information needs will be co-implemented with key CSOs, NGOs, and 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 IRAG and the other key potential users of the climate information, namely the vulnerable communities, the private

¹⁵ <http://www.rockefellerfoundation.org/what-we-do/current-work/developing-climate-change-resilience/grants-grantees/african-agriculture-climate-change>

sector (mining companies and Conakry port users), and the ministries in charge of agriculture, tourism, fishing, hydrology, and forestry. For the implementation phase prior consultations with the Government of Guinea have revealed that the DNM will probably be the main implementing partner and will implement the project in close collaboration with IRAG, the Environment Safeguard Fund, the Agricultural Directorate, the Hydrology Directorate and the Forestry Directorate. The project implementation phase will also involve the University of Conakry. Stakeholders participation in the project implementation phase will be further determined during the project preparation phase and outlined in the documents submitted for CEO endorsement.

A.3. *Gender Considerations.* Are gender considerations taken into account? (yes /no).

During the project preparation phase, gender-based vulnerability assessments will be made in the different targeted villages and regions in order to point out the specific climate information needed to address gender related vulnerabilities. In the same line, the climate information needs assessment will give a special emphasis to identify the needs for vulnerable women and develop specific tools to allow their easy access to the information they need to strengthen their resilience to climate change. The results of this assessment will inform the identification and development of gender-sensitive adaptation measures and strategies to be supported by this LDCF in order to address the identified gender-related climate risks and vulnerabilities. These adaptation strategies will be technically specified (including the required specific capacity building and financial support) and their cost-effectiveness vis-a-vis alternatives approaches clearly demonstrated. The design phase of the project will include consideration of gender specific indicators as well as allocation of budget resources to ensure that gender concerns are comprehensively dealt with.

A.4 *Risk.* Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable):

Risk	Level	Mitigation
Unavailability of requisite human resources and data	High	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.
Local IT and telecommunications infrastructure weak e.g. international bandwidth and local mobile telecommunications networks	Medium	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.
Insufficient institutional support and political commitments	Medium	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.
Work progresses in a compartmentalized fashion and there is little integration e.g. government departments refuse to share data and information	Medium	This risk is always present in a project such as this. By ensuring that capacity is built across a range of departments and implementing ‘quick win’ measures early (developing products based on internationally available data), these issues can be mitigated.
Non-compliance by primary proponents for the successful implementation of this project	Medium	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
Climate shock occurring during the design and implementation phase of the project	Low to medium	There may be some delays as more urgent priorities may need to be addressed by some of the stakeholders (e.g. NHMS or disaster management) but it is unlikely that this will derail the project.

A.5. Coordination. Outline the coordination with other relevant GEF-financed and other initiatives:

There are two LDCF/UNDP financed projects that are currently ongoing which are relevant to the proposed initiative. The GOG/UNDP/LDCF project, “Increasing Resilience and Adaptation to Adverse Impacts of Climate Change in Guinea’s Vulnerable Coastal Zones” focuses on initiating an Early Warning System (EWS) to support coastal zone management. In this perspective the project has supported the installation of 5 AWS in the capital city Conakry and the coastal Municipalities of Boké, Boffa, Dubreka and Forécariah. The GOG/UNDP/LDCF project, “Strengthening Farmers Communities’ Livelihoods Resilience against Climate Changes in the Guinean Municipalities of Gaoual, Koundara and Mali” will also support the development of a climate change information system to guide climate resilient agroforestry practices. For this purpose, the project will support the installation of 3 AWS in these 3 municipalities. The EWS to be installed through this LDCF proposal will be connected with the AWS installed by these ongoing projects to form one integrated network. In the same vein, the CI-EWS products and the capacity building activities of this LDCF proposal will also support the needs identified under the ongoing LDCF projects.

The coordination and the management arrangements will be defined in detail during the preparation phase of the project. Based on initial discussions with the Government of Guinea, the National Directorate of Meteorology (DNM) 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 DNM which is the main implementing partner for Guinea 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 DNM will coordinate with the Ministry of Agriculture which is the main IP for the IFAD supported PANAAFA-LGF and IDB supported PDR-K projects to ensure the coordination of the proposals with the aforementioned projects. Also the LDCF IP will coordinate with the Ministry of agriculture to ensure that the LDCF proposal activities are in line with the 2 ongoing GOG/UNDP/LDCF projects, “Increasing Resilience and Adaptation to Adverse Impacts of Climate Change in Guinea’s Vulnerable Coastal Zones” and “Strengthening Farmers Communities’ Livelihoods Resilience Against Climate Changes in the Guinean Municipalities of Gaoual, Koundara and Mali”

DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

B.1 Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes /no). If yes, which ones and how: NAPAs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.:

The link between this project strategy and the NAPA is centered on a common goal of informing climate resilient development planning and sector management through improved national systems that generate relevant climate information. Guinea’s number 8 NAPA priorities is the project, “Implementation of a system of early warning climate forecasts to protect agricultural production” This project aims to equip Guinea with a functioning EWS system and a seasonal climatic forecast model in order to take appropriate actions to ensure climate resilient development. Its proposed outputs are the installation of a functioning EWS model and the provision of appropriate climate information and necessary human resources to run the EWS.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. Record of Endorsement¹⁶ of GEF Operational Focal Point (S) on Behalf of the Government(s):
(Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [SGP OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Ahmadou Sebory Toure	General Director of the Fonds de Sauvegarde de l’Environnement	MINISTRY OF ENVIRONMENT	DEC, 23 RD 2014

B. GEF Agency(ies) Certification

This request has been prepared in accordance with GEF policies¹⁷ and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Adriana Dinu, Executive Coordinator, UNDP/GEF		03/13/2015	Henry Rene Diouf	+251929016785	henry.rene.diouf@undp.org

C. Additional GEF Project Agency Certification (*Applicable Only to newly accredited GEF Project Agencies*)

For newly accredited GEF Project Agencies, please download and fill up the required **GEF Project Agency Certification of Ceiling Information Template** to be attached as an annex to the PIF.

¹⁶ For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

¹⁷ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF