United NationsDevelopment Programme

Country: SÃO TOMÉ and PRINCIPE

PROJECT DOCUMENT[1]

Project Title: Strengthening climate information and early warning systems in São Tomé and Principe for climate resilient development and adaptation to climate change.

UNDAF Outcome(s): By 2016, the Governmentand districts, as well as people adopt techniques and behaviour conducive to a sustainable environment and improving the prevention and management of risks and natural disasters.

Expected CP Outcome(s):
By 2016, the national and local institutions incorporate and adopt aspects of Climate Change and DRR in the planning instruments, and are demonstrating behaviours and practices that favour the preservation of environmental heritage.

Expected CPAP Output (s)

- Government, private sector, communities and regional CSOs develop and implement participatory projects that guaranty and provide environmental protection, adaptation to climate change and the preservation of environmental heritage.
- The Government and local authorities adopt and implement a master plan for land use that protects the environment and assure rural development.
- Integrate sustainable management of the environment, climate change and disaster risk management into development strategies and national development plans anddevelopment interventions.
- The Government and local authorities adopt and implement a master plan for land use that protects the environment and assure rural development.
- Local governments and communities are familiar and use efficiently tools for disaster risks Management and climate change adaptation.
- Strengthen responses to disasters and risk management.

Executing Entity/Implementing Partner:
The Ministry of Public Works, Infrastructure, Natural Resources and Environment

Implementing Entity/Responsible Partners:
The Ministry of Public Works, Infrastructure, Natural Resources and Environment
The Ministry of Agriculture, Fisheries and Rural Development
The Ministry of Defence

[1]For UNDP supported GEF funded projects as this includes GEF-specific requirements

Brief Description

The small archipelago state of São Tomé and Príncipe (STP) is particularly vulnerable to climate-related hazards such as floods, coastal/river mouths flash floods and storms. The increasing frequency and severity of such flash floods, severe storms (hail, thunder, lightning and violent winds) and drought episodes, and their impacts on sectors such as agriculture, fisheries, as well as infrastructures mostly located in the coastal zone are having increasingly adverse effects on the country and future climate change is likely to further exacerbate the situation.Of particular concern are the coastal communities and sectors such as agriculture and fisheries which are an important component of the economy and forms the basis of rural livelihoods in STP. São Tomé and Príncipe's capacity to adapt to climate-related hazards should therefore be developed to limit the negative impacts of climate change and address the country's socio-economic and developmental challenges effectively. One way to support effective adaptation planning – in particular for an increase in intensity and frequency of droughts, floods and severe storms – is to improve climate monitoring and early warning systems. For São Tomé and Príncipe to improve the management of these climate-related hazards it is necessary to: i) Improve the hydro-meteorological monitoring network and forecasting capacity; ii)Build skilled human resources to guarantee long-term sustainability of hydro-meteorological Services; iii) Develop an efficient and targeted delivery system of climate information as well as the preparedness and responses capacity of CONPREC and Civil Protection to Warnings; and iv) Improve ability of stakeholders to identify climate linked risks/vulnerabilities to support decision making and sector planning.Barriers that need to be overcome to establish an effective EWS in São Tomé and Príncipe include the following: i) weak weather, climate and hydrological monitoring network to support Early Warning System; ii) limited infrastructure, skills and capacity to effectively produce accurate forecasts; iii) weak capacity for warning issuing, dissemination and response; and iv) absence of environmental databases and national framework for data sharing to support sectoral development policies.This LDCF financed project, implemented by the by the Ministry of Public Works, Infrastructures, will: i) establish a functional network of meteorological and hydrological monitoring stations and associated infrastructure to better understand climatic changes; ii) develop and disseminate tailored weather and climate information (including colour-coded alerts – advisories, watches and warnings – for flood, drought, severe weather and agricultural stresses, integrated cost-benefit analyses and sector-specific risk and vulnerability maps) to decision makers in government, private sector, civil society, development partners and communities in all district of the Island including the autonomous region of Principe; and iii) integrate weather and climate information into national policies, annual workplans and local development including the National Policy for Disaster Preparedness and Management, and districtdevelopment plans in priority communities of coastline villages of Neves, Santa Catarina, Malanza and Ribeira Afonso. The project is expected to be completed by 2017.

Programme Period:	2013-2017
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Project ID:	00086865
PIMS #	5103
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End Date	September 2017
Management Arrangements	NIM
PAC Meeting Date	31st July 2013

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Total allocated resources:	US$ 43,895,000
• GEF/LDCF	US$ 3,600,000
• UNDP	US$ 795,000
• Other	US$ 39,500,000

Agreed by (Government):

Date/Month/Year

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Date/Month/Year

Agreed by (UNDP):

Date/Month/Year

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List of Acronyms

AAP	Africa Adaptation Programme
ACMAD	African Centre of Meteorological Applications for Development
AfDB	Africa Development Bank
AFR	Airport Forecasting Centre
AGRHYMET	Regional Centre for Training and Application of Agrometeorology and Operational Hydrology
AHS	Automatic Hydrometric Station
ALM	Adaptation Learning Mechanism
AMAT	Adaptation Monitoring and Assessment Tool
AMESD	African Monitoring of the Environment for Sustainable Development
AWS	Automatic Weather Station
BADEA	Arab Bank for Economic Development in Africa
CATAP	Agricultural Technology Training Centre
CBO	Community Based Organisation
CENOE	National Centre for Emergency Operation
CPTEC	Weather Forecasting and Research Centre
CIAT	Agricultural Research and Technology Centre
CIF	Community Infrastructures Fund
ClimDevAfrica	Climate for Development in Africa
CONPREC	Council for the Prevention and Response to Disasters
COP	Conference of Parties
CP	Country Programme
CPAP	Country Programme Action Plan
CSO	Civil Society Organization
CST	Saotomean Communication Company
DFID	Department for International Development
DGA	Directorate General for Environment
DGRNE	Directorate General of Natural Resources and Energy
DJF	December-January-February
DLUM	Land Use Management Department
DRR	Disaster Risks Reduction
DRSTP	Democratic Republic Of Sao Tome And Principe
EA	Environmental Assessment
EC	European Community
ECMWF	European Centre for Medium-Range Weather Forecasts
ECOWAS	Economic Community of West African States
EMAE	Water and Energy Company
ENASA	National Company for Airports and Air Safety
EWS	Early Warning System
FAO	Food and Agriclture Organisation
FENAPA	Federation of Small Farmers
FONG	Federation of NGO'S
FSP	Full Size Project
GCM	Global circulation model
GCOS	Global Climate Observing System

GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO	Group on Earth Observations
GIME	Road Maintenance Interest Group
GoSTP	Government of Sao Tome and Principe
GPRS	General Packet Radio Service
GTS	Global Telecommunication System
HAS	Hydromet Automatic Station
HAWS	Hydrology Automatic Weather Station
HMS	Hydro-Meteorological System
ICB-EWS	Integrated Community Based Early Warnng System
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IFRC	International Federation of Red Cross
IMAP	Maritime and Port Institute
INAC	National Institute of Civil Aviation
INM	National Institute Of The Meteorology
IPCC	Intergovernement Panel On Climate Change
IW	Inception Workshop
JJA	June-July-August
KSIDS	Capacity Building and Knowledge on Sustainable Responses to Climate Change in Small Island States
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LDRMC	Local Disaster Risk Management Committees
MAIT	Ministry of Interior and Territorial
MARAPPA	Sea, Environment and Craft Fishing
MDG	Millennium Development Goal
MESA	Ministry of Infrastructure and Environment
MoAFRD	Ministry of Agriculture, Fisheries and Rural Development
MoH	Ministry of Health
MoPWNREE	Ministry of Public Works, Natural Resources, Energy and Environment
NAPA	National Adaptation Programme of Action
NDE	National Directorate of Environment
NGO's	Non Governmental Organisations
NHMS	National Hydro-Meteorological Services
NEX	National Execution/National Implementation Modality
NIM	National Institute Of Meteorology
PADE	Livestock Development Project
PADE II	Livestock Development Project Phase 2
PAPAFPA	Participatory Small Holder Agriculture and Artisanal Fisheries Development Programme
PPG	Project Preparation Grant
PPP	Public Private Partnership
PRIASA	Infrastructure Rehabilitation for Food Security Support Project
PRSP IIPoverty	Reduction Strategy Paper Phase 2
PUMA	Preparation for the Use of MSG in Africa
PVW	Project Validation Workshop
QMS	Quality Management System
RAP	Autonomous Region Of Principe

RBM	Results Based Management
RNSTP	National Broadcasting Company of São Tomé & Principe
SADIS	Satellite Data Distribution
SATOCAO	Cocoa Production Company
SCW	Stakeholders Consultation Workshop
SECAB	Exploration Society Of Biological Cocoa
SICLIMAD	System for Climatic Information and Sea to Support the Sustainable Development
SIDS	Small Island Developing States
SMS	Short Message Service
SPCB	Civil Protection and Fire Brigade
SRES	Special Report on Emissions Scenarios
STP	São Tomé and Principe
TVS	National Television Company
UKMO	United Kingdom Meteorological Office
Undaf	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
ViGiRiC	Integrated System for Monitoring Risks
WB	World Bank
WFP	World Food Programme
WHYCOS	World Hydrological Cycle Observing System
WIND	Weather Information for Development
WMO	World Meteorological Organisation

1. SITUATION ANALYSIS

1.1. Climate change - induced problem

1. São Tomé and Principea an archipelago comprised of two main islands (São Tomé and Principe Island) and four islets located in the Gulf of Guinea 350 km off the west coast of Africa, is prone to climate risks due to its specific climatic, geographic and socio-economic context – the coastal and water management being particularly vulnerable.TheNAPA study has shown that there has been a significant variability over this climatic pattern in the last decades with rainfall decreasing at rate of 1,7 mm/year between 1951 and 2010.This reduction in rainfall will disturb the hydrological pattern by altering the rainfall/runoff ratio. Due to reduced recharge, groundwater supply quality will be reduced by the reduction of rainwater infiltration, thus reducing the groundwater table and the dilution effect to salt water intrusion.

2. On the other hand, recent data shows that São Tomé and Príncipe annual temperatures have risen by approximately 0.4°C between 1960 and 2006 and are expected to increase by between 0.8 and 2.4°C by 2060[2]. Hot nights and days are expected to continue to increase in frequency (there were not enough observations to calculate these changes for the historical record), whilst cold days and nights will become rarer. Statistically significant trends indicate that March to May rainfall has been decreasing whilst heavy rainfall during the September to November period has been increasing[3]. Future projections of rainfall suggest a likely increase in rainfall during the October to December period with accompanying increases in heavy precipitation.

3. Indeed, episodes of heavy rainfall are predicted to increase[4], leading to more frequent episodes of flooding, which will cause further soil erosion. Flooding also has the potential to damage infrastructure (e.g. roads, buildings, water supply infrastructure and housing), increase the spread of water-related diseases, damage or destroy crops and incite landslides and rock falls. In the case of STP where the largest increases in precipitation was found to occur in March and April, with increases of up to 2 mm day^{-1} in the 1990s and 2000s compared to the 1980s the danger of flash floods is potentiated.

4. From the above, it is seen that the main climate change-induced problem facing STP communities and to be addressed by the project is that climate change is likely to further enhance the frequency of severe weather associated with convective activity and augment sea level rise, potentiating frequent salt water intrusion, coastal erosion and the likelihood of flash floods. Government institutions of STP lack the technical capacity, management capacity, physical resources and financial resources to overcome or cope with the anticipated changes.The rural population, though they have the perception of the impact of Climate Change, as it was expressed during the NAPA activities, they lack in particular, the capacity, resources andfinancial assistance to adapt to and overcome worsening climatic conditions (NAPA, 2006).

[2]http://country-profiles.geog.ox.ac.uk/

[3]Tadross M. (2011) Sao Tome & Principe: Adaptation to Climate Change Program Technical support for climate modelling: Projected and observed changes in climate from historical data and General Circulation Models. Technical note. World Bank. Washington DC. pp 22

[4]Mark Tadross and Fiona Tummon. (2010). São Tomé and Príncipe: Adaptation to Climate Change Program. Technical support for climate modelling.Historical decadal changes in regional climate and aerosols. Climate Systems Analysis Group. University of Cape Town. 18p

5. Exacerbating these impacts is the STP' inherent vulnerabilities as a Small Island Developing States (small land area, susceptibility to natural disasters, geographical isolation, limited natural resources and sensitive ecosystems). Further compounding the situation are the existing unsustainable anthropogenic practices (such as deforestation and beach sand mining). The inherent vulnerability of the São Tomé & Principe islands is also aggravated by the low capacity of the STP people to adapt themselves to climate change impacts and also by the very low level of involvement of the governmental institutions to assist the population to cope with the impacts of weather and climate.

6. As indicated in NAPA, the country is prone to various climate and weather phenomena with various degree of incidence. Amongst these climate-related hazards some poses great danger to communities and its variability will negatively affect a range of sectors. Of particular concern are the coastal communities and sectors such as agriculture and fisheries which are an important component of the economy and forms the basis of rural livelihoods in STP. The climate-related hazards considered most risky and to which community feel highly vulnerable are floods, coastal/river mouths floods and storms (Table 1). Droughts and landslides are also considered but of medium risk/vulnerability.Furthermore, the NAPA concluded that though the current rainfall trend show a steady decrease, this variability will be significantly exacerbated by climate change in coming decades with occurrence of extreme rainfall events.

7. In addition, future climate change models run in connection with the Initial National Communication to the UNFCCC and the NAPA suggest that an increase in temperature of up to 2°C can be expected by 2100 coupled with a decrease in precipitation of about 15% in the STP sub-region. Later IPCC scenarios (SRES A1B scenario as shown in the IPCC 4th assessment report) suggest the following mean changes (across 21 GCMs) for the 2080-2099 period; rainfall is likely to increase during DJF and decrease during JJA, whereas temperatures are likely to increase by 2-2.5°C.

8. There is limited detailed data for São Tomé and Principe on the projected economic costs of climate change and the additional costs and benefits of adaptation. Assessments of Africa and other African countries facing similar challenges, however, indicate that the economic costs of climate change in Africa could equal an annual loss in GDP of ~1.5-3% by 2030 under a business-as-usual scenario. In the long-term, these costs could increase rapidly to a loss of ~10% of GDP by 2100.Accurate weather and climate information and forecasting are essential for planning and managing economic production and the provision of social services, particularly under a changing climate.

9. São Tomé and Principe rainfall variability shows a tendency for a steady decrease in rainfall amounts during the rainy season but also an increase in extreme precipitation events. This has been causing significant impacts on the frequency and intensity of drought episodes alternating with flash floods, inundations and epidemics. One way to help mitigate the impact of these climate-related shocks is to warn populations, businesses and governments in advance of an impending or likely damaging event through an Early Warning System (EWS). It is expected that as climate change unfolds, the frequency and intensity of climate related shocks will change. Therefore the establishment/improvement of EWSs is one way to adapt to a changing climate.

10. As an adaptive measure, EWS also benefit the poorer segments of society, those who do not necessarily benefit from large protective infrastructure projects[5]. Furthermore, improving the EWS also provides benefits for long term planning and helps NHMS and other institutions build capacity to service other needs e.g. for landuse and agricultural planning, coastal zone management, natural resources management, etc. To allow São Tome and Principe to better manage severe weather related disasters, food security and agricultural production and make their socioeconomic development process less vulnerable to climate-related risks it is essential to address some key issues.

1.2. The problem this project seeks to address

11. The fundamental problem that this project seeks to address is that a complete EWS, which generates knowledge of the risks (vulnerability & hazard), has capacity to monitor, analyze and forecast hazards, provides communication and dissemination of alerts and warnings, does notfunction as well as it ought to be relevant and useful for long-term planning,management and risk reduction activities. In São Tomé and Príncipe, this status unnecessarily imperilslives and assets, particularly amongst artisanal fishermen and those suffering landslides from excessiverainfall.

12. Reasons for this situation involve a lack of both hard and soft technologies and the capacity toutilise those technologies in an appropriate manner. This results in: i) a limited understanding of current and future risks; ii) limited monitoring and forecasting of climate-related hazards; iii) inappropriate communication and packaging of warnings; iv) restricted responses to impending disasters and v)constrained planning for slow-onset changes due to climate change that will require a transformationalshift in economic development and risk reduction efforts. The infrastructure and technology on which tobuild these services is lacking in São Tomé and Príncipe e.g. forecasting and monitoring of the coastalzones and weather/hydrological stations to monitor drought and floods across the two islands.

1.3. Long-term solution and barriers to achieving the solution

13. To allow São Tomé and Principe to better manage severe climate change related disasters, food security and agricultural production and dwindling water resources and make their socioeconomic development process less vulnerable to climate-inducedrisks it is essential to:

- ***Improve the hydro-meteorological monitoringnetwork and forecasting capacity***

14. The strengthening the monitoring capacity of hydro-meteorological services to adequately monitor hydrological data and information as well as weather data can be achieved by installing more hydromet and weather stations to increase the coverage of the network. This should be coupled with the establishment of a reliable data transmission system which can allow the storage of data at central server at the São Tomé Airport Forecasting Centre (ST_AFR) and also at NIM. Capacity development programme for National Institute of Meteorology (NIM) staff will allow data handling and analyzes the can enable development of flood and drought forecast in a timely manner. This can also be attained by providing ancillary equipment to NIM (e.g satellite based systems such as SADIS, SYNERGIE) to aid early identification of convective weather systems so to increase the accuracy of forecasts and warnings. Whilst this situation has been ameliorated by specifically targeted project interventions, this has often benefitted a particular aspect of the early warning system (e.g. African Monitoring of the Environment

[5]World Bank (2010). Natural hazards, Unnatural disasters: Effective prevention through an economic lens. World Bank and United Nations. 231 pp.

for Sustainable Development (AMESD)[6] to improve use of satellite data or the "Weather for all" initiative to improve weather station coverage[7]). The technical skills of hydro-meteorological personnel (e.g. hydrologists, meteorologists and forecast technicians) to handle, analyze and produce sector-specific tailored forecasts and to package information in clearer and more understandable way can be improved through a dedicated capacity development programmes.

- ***Build skilled human resources to guarantee long-term sustainability of hydro-meteorologicalServices***

15. With the advent of the massive departure of all Portuguese skilled personnelsome sub-sectors in the countryincluding National Institute of Meteorology (NIM) have been hit hard in their technical capacity to run services. Subsequently, some efforts have been carried out by the Government to train some meteorologists abroad and meteorologist technicians in-country with own resources. However, this has not resulted in a significant improvement of the services as NIM is still currently weak, underfunded and with its technical human resources reduced and unmotivated. The challenges that NIM have been through in the last ten to twenty years back have resulted in limited computational equipment, software (model code and associated routines) and human (scientific and technical) capacity to program and run the model codes, as well as effectively identify climate hazards and forecast their potential impacts on vulnerable communities. Furthermore, as a result of the fragmented nature of the sub-sector, the few remaining well-trained forecasters in the country are not able to use their skills effectively and are often lured overseas or into more lucrative work. This has also resulted in limited manpower especially technicians and IT specialists. The maintenance of monitoring equipment and the human capacity to use and repair this equipment require annual budgets that are sustainably resourced from either public or private sources. Both the NIM sub-sector and the hydrology sector led by DGRNE are vulnerable to funding uncertainties and budget cuts due to countries own financial difficulties. This results in uncertainty that a minimum level of funding will be available for annual activities, as well as ensuring the continuity and integrity of infrastructure investments. The technical skills of hydro-meteorological personnel (e.g. hydrologists, meteorologists and forecast technicians) to handle, analyze and produce sector-specific tailored forecasts and to package information in clearer and more understandable way can be improved through a dedicated capacity development programmes.

- ***Develop an efficient and targeted delivery system of climate information as well as the preparedness and responses capacity of Civil Protection to Warnings***

16. In São Tomé and Principe there is largely a weak institutional arrangements, absence of policy and legal frameworks to guide the provision of meteorological services, and limited appreciation and use of meteorological services by other sectors of the economy. The Ministry of Public Works, Infrastructure, Natural Resources, Energy and Environment (MoPWINREE) is responsible for the coordination of environmental issues, mainly through its Directorate General for Environment. Is also the Coordinating Body of several important institutions which do have a direct intervention in the project including the National Institute of Meteorology (NIM), the Directorate General of Natural Resources and Energy (DGNRE), the Directorate General for Environment (DGA), the Maritime and Port Institute (IMAP), Land Use Management Department (DLUM), among others. At present, there is a poor inter-sectoral coordination between sub-sectors within MoPWINREE. Furthermore, there is poor communication and data sharing between the NIM with both DGA and DGNRE regarding to climate monitoring and early warning information sharing and information flow, as well as the mainstreaming of climate change across governmental sectors.

[6]http://www.amesd.org/index.php?start=25
[7]http://www.un.org/apps/news/story.asp?NewsID=31193&Cr=weather&Cr1

17. Poor inter-sectoral coordination at a departmental and ministerial level results in the available climate, hydrological, agriculture and environmental data and information not being adequately combined and/or translated for key messages to be easily understood by users. Furthermore, this results in limited agreements on official processes for sharing climate information and issuing warnings. This includes between sectoral departments and ministries and with communities where climate-hazards are predicted to have significant impacts. In addition, on the disaster coordination and management sector there is also a poor inter-sectoral coordination between CONPREC and the Civil Protection and other national disaster management bodies (CENOE, Red Cross, The Marine Costal Guards).

18. A set of concerted actions should be adopted to developed to a more effective, efficient and targeted delivery of climate information including early warnings: i) improve inter-sectoral coordination between NIM, DGRNE, CONPREC, Civil Protection; ii) enhancement of the capacity of NIM and the DGRNE to store and handle climate information that would be collected by the future monitoring networks and transmitted to the forecasting centers; ii) strengthening of the capacity of NIM and DGRNE to analyze the data and generate accurate forecast to be transmitted to those entities (CONPREC, Civil Protection) with mandate to issue warnings; iii) develop a communication and institutional framework for warning dissemination to end users including vulnerable communities.

- ***Improve abilityof stakeholders to identify climate linked risks/vulnerabilities to supportdecision making and sector planning***

19. 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. Even though there are some ongoing initiatives to build risk information in some of the sectors (e.g.Observatory Centre ("Observatório do Clima") at the General National Directorate of Environment (DGA) built under the WB-LDCF project)this information is held in disconnected databases or computers spread across different government departments and ministries. There are no efforts to establish a national framework to systematically mainstream climate change into sectoral and development policies. All the information required to assess vulnerability and calculate risks needs to be accessible, either through a central database/repository, or through distributed networks. There are no appropriate advanced workstations and GIS facilities to allow systematic storage, integration and mainstreaming of climate and weather data to assist Disaster Management and other interested agencies and to facilitate inter-institutional data sharing. A large quantity of weather and climate data is still lying in damp store rooms in need of a recovery plan through digitalisation. There are no specialised technical personnel available to work with GIS facility or use statistical techniques for data handling and climate change vulnerability assessment and risks calculation. The technical capacity of the Directorate General for the Environment (DGA) should be strengthened through training, to systematically streamline digital information (e.g. using GIS platform to generate vulnerability and risk maps) to support decision making in sector planning such as mining, tourism and land planning.

Barriersto achieving the preferred solution:

20. In the light of the above-mentioned climate change-induced problem and causes, the preferredresponses (normative situation) for managing the likely consequences of climate change that havebeen identified, there are significant policy, institutional, financial, technological and informationalbarriers that prevent the desired situation from emerging. These barriers include:

Weak weather, climate and hydrological monitoring network to support Early Warning System

21. For over 30 years both the Hydrology and Meteorology departments in São Tomé and Principehave been struggling for resources to properly function. There has been a steady decline in infrastructure

dedicated to monitoring the climate, hydrology, environment and severe weather (e.g. meteorological and hydrological observing stations, satellite receivers and weather radar). Whilst this situation has been sporadically ameliorated by specifically targeted project interventions, such as the SICLIMAD (System for Climatic Information and Sea to Support the Sustainable Development of São Tomé and Príncipe) and joint co-funded project by WB/UNDP: "Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa: leadership, demonstration and capacity-building in São Tomé and Príncipe". However, this has often benefitted a particular aspect of the early warning system (e.g. African Monitoring of the Environment for Sustainable Development (AMESD)[8] to improve use of satellite data or the "Weather for all" initiative to improve weather station coverage[9]). Recently, the need for a systematic improvement of the observing network is recognized by the Global Climate Observing System (GCOS)[10] which in its reports to the UNFCCC notes that "Developing Countries have made only limited progress in filling gaps in their *in situ* observing networks, with some evidence of decline in some regions, and capacity building support remains small in relation to needs". The installation of new infrastructure also requires several practical considerations: i) safety of the equipment; ii) power sources; iii) long term durability; iv) access for maintenance and v) transmission and archiving of data.

22. Currently, the capacity of both the Hydromet sector and Meteorology Services is weaken as the monitoring network is almost inexistent for the former sector and reduced for the latter, requiring significant investments in both equipment, communication systems, infrastructure, and supporting facilities (satellite, radar or proxies) for resuming forecasting activities. Above all, the sustainability of these services is undermined due to lack of investment and human capacity for functioning and maintenance. In STP there is no flood forecast or warning being issued and even though hydrological data is scarce, no formal sharing of data and information currently exist with Meteorology Services. Likewise, there is no warning system in place for weather events in STP and weather and climate data and information is scattered amongst various stakeholders.

Limited infrastructure, skills and capacity to effectively produce accurate forecasts

23. The scientific and technical capabilities required to effectively identify hazards and forecast their potential impacts on vulnerable communities in São Toméand Principe are still weak. The country has suffered a prolonged period of resources scarcitywhich has dilapidated the infrastructure at district and National level. Buildings housing the hydromet and meteorological services are in an extremely poor state of repair at both Islands. Instrumentation is not in sufficient number to cover the desired density over the country, nor are they in good working order.

24. Staff resources are extremely limited: 2-qualified forecasters on duty; approx. 10 observing staff and Met technicians. The forecasting supporting facilities such as SADIS and PUMA_SYNERGIE are not currently available, requiring significant investment and training. Communication system for data transmitting is not reliable with data from monitoring stations being retrieved locally by hand. In addition, the reception system of data and info from international forecasting weather centres is also not efficient limiting the capacity of having raw material to carry out downscaling to support forecast and warnings.

Weak capacity for warning issuing, dissemination and response

[8] http://www.amesd.org/index.php?start=25
[9] http://www.un.org/apps/news/story.asp?NewsID=31193&Cr=weather&Cr1
[10] http://www.wmo.int/pages/prog/gcos/index.php

25. Once the weather monitoring network is in place and all meteorological information is available to produce accurate forecasts, there should be a structure set in place with a legal and clear mandate to issue warnings timely. However this information should be appropriately packaged for easy translation into information that can be easily understood by users in the various sectors with need to take preventive actions. Therefore there is a need to be an official process for generating warnings that include communication between sectoral ministries and with communities where disasters are experienced. São Tomé has since the deadly floods of 2008 established a new Council for the Prevention and Response to Disasters (CONPREC) which suppose to be the responsible the institution coordinating the issuing of warnings. However, the current situation is complex as all disaster management institutions such as the Civil Protection, Sea Coastal Guards, Fire Brigade, Police and the Army are dispersed and acting independently of each other.

26. Currently the limited amount of information generated by the National Institute of Meteorology (NIM) is delivered to restricted number of stakeholders such as the TV and main National Radio via a recorded videotape. The information is not shared with end-user in atimely manner thus preventing the necessary response actions to be put in place. The system will need to be well organized and versatile using a variety of communication media, and partners, including the media, and NGOs active at the local community level in recognition of their capacity for public sensitization and education. Representatives from different ministries should convene, assess the situation and then the warning messages are conveyed. This allows a wide range of views and evidence to be considered (including information from international and regional sources), though the process needs to be clear and act efficiently if warnings are to be issued in time. Furthermore, the warning should be quickly disseminated to reach a wider audience possible and a response capability should be in place to rapidly assist those in danger or in need of protection and help. The remote communities of fishermen and other vulnerable groups do not benefit from the weather and climate information collected by the NIM or the Hydrology Department in a timely manner.

Absence of environmental databasesand national frameworkfor data sharing to support sectoral development policies

27. An effective early warning system must combine scientific and technical capabilities for hazard identification and vulnerability mapping. 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. Even though there are some ongoing initiatives in STP to build risk information in some of the sectors such as coastal adaptation, this information is 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 networks.Most of all there areno efforts to mainstream climate change into sectoral and development policies. São Tomé and Principe has hotspots around the two main Islands which are prone to weather related hazards such as Malanza,Ribeira Afonso and others. However, there is no systematic climate risk mapping and assessmentthat is co-produced between local communities andscientists to improve the accuracy and utility of the climate risk information produced.

2. STRATEGY

28. The LDCF project will contribute to overcoming the above identified barriers by strengthening climate monitoring and early warning systems in São Tomé and Principe, largely through improving national capacities to generate and use climate information in planning for, and management of, climate hazards and long-term strategic planning. This will be achieved by transferring appropriate technology, infrastructure and skills to hydro-meteorological services (NIM and DGRNE), user-agencies (DGA, CONPREC, SPCB and CIAT) and end-users (local communities) in the country.

2.1. Project rationale and policy conformity

29. São Tomé and Principe has signed the United Nations Framework Convention on Climate Change (UNFCCC)on 26 September 1996 andratified on December 31, 2008. By signing and ratifying the UNFCCC, Uganda has committed to the adoption and implementation of policies and measures designed to adapt to climate change, e.g. *inter alia* NAPAs, NCs and NAPs.

30. São Tomé and Principe submitted its National Adaptation Plans of Action (NAPA)to the UNFCCC Secretariat in December 2006. The proposed project has been prepared fully in line with the guidance from 'Programming Paper for Funding the Implementation of NAPA's under the LDC Trust Fund' (GEF/LDCF 2006). The Government of São Tomé and Principe (GoSTP) requests the Least Developed Countries Fund (LDCF) to support a Full-Sized Project (FSP) to respond to priority adaptation needs and actions identified in **STP's NAPA**[11]. More specifically, the LDCF project activities aim to address **NAPA** prioritynumber **2** associated with "Establishing a system of climate alert in São Tomé and Principe".

31. Climate variability is affecting São Tomé and Principe by increasing the frequency of flash floods resulting from a combination of stormy rainfall events and abnormal tidal waves invading coastal rivermouth zones. Therefore, the focus of the project is the need to reduce the country's vulnerability and risk to climate change hazards characterized by the irregular and unpredictable rainfall pattern which is associated with increased floods and landslides, as well as, seasonal and prolonged droughts through the development of an Early Warning System (EWS). These hazards have adverse impacts on the country's development planning, the population's wellbeing, agricultural production and the livelihoods of the local communities.

32. Therefore, the objective of this LDCF project is to develop an Early Warning System (EWS) to enhance the resilience capacity of communities and services in STP to better manage climate through two main components:

Component 1.
"Enhancing the capacity of national hydro-meteorological (NHMS) institutions to monitor extreme weather and produce sector tailored weather forecasting", seeks to establish a functional network of climate (meteorological and hydrological) monitoring stations and associated infrastructure (severe weather monitoring) as a basis for understanding climate change and building an early warning system to increase resilience to climate-related shocks;

and

Component 2.

[11]República Democrática de S. Tomé e Príncipe. Ministério dos Recursos Naturais e Ambiente. Dezembro 2006. 77pp

"Making an efficient and effective use of hydro-meteorological information for generating early warnings and support long-term development plans", concerns itself with developing connected systems and processes to enable the data from such a network to be translated, combined, reinterpreted and communicated to intended users. It will also develop the human capacity to make such a system work.

33. The preparation of this NAPA follow-up project was guided by a comprehensive and extensive participatory process involving all stakeholders at GoSTP institutions, private sector and NGO's, including local communities organizations, a multidisciplinary approach (professionals from different sectors participated); and a complementary approach, building upon existing plans and programmes, including national action plans and national sectoral policies.

34. The project is expected to deliver benefits at both the national and local levels. The installation of weather monitoring network and other observation and computer infrastructure will benefit the NIM staff (through training and technological advancement). Other national institutions that will benefit from this endeavour will be among others the hydrology sector- Directorate General of Natural Resources and Energy (DGRNE), National Directorate of Environment (DGA), The Ministry of Agriculture, Fisheries and Rural Development (MoAFRD). This LDCF will also provide the opportunity to strengthen the capacity of institutions dealing with disaster management in STP, for example the Council for the Prevention and Response to Disasters (CONPREC), The National Centre for Emergency Operation (CENOE), Marine Coast Guards, The Civil Protection, The Army and Marine Coastal Guards, The Fire Brigade, the Ministry of Health (MoH) and the Red Cross.

35. The NAPA follow-up project significantly contributes to sustainable development in São Tomé and Principe; it was and remains country-driven in further design and final implementation, and will demonstrate sound environmental management while being as cost-effective. Whilst participatory in the coordination arrangements, simplicity of technical delivery actions on the ground is a key feature of the project. The project interventions are expected to generate in the long run, tangible poverty reduction benefits by addressing environmental sustainability aspects, food security and livelihood related issues and will also have a considerable impact on health and sanitation planning.

36. In fact, the project is well timed to strengthen and support the further roll-out of GoSTP and donor activities. Additionally, the project will assist in the realization of the goals set out in the Second Poverty Reduction Strategy Paper (PRSP II) 2012-2016[12]. This national document aims to increase economic growth by achieve GDP rate of at least 5% by 2013 and to reduce theproportion of people's povertyto athirdby 2015. Sustainable development, promotionof awareness campaigns, mainstreaming ofclimate changeissuesinnational and sectoral plans including protection of the environment, particularly coast erosion is the major focus of the strategy paper.

LDCF conformity

37. São Tomé and Principe is included in the list of Least Developed Countries (LDCs) and Small Islands DevelopingStates (SIDS). It also is a signatory to the Kyoto Protocol, thus pledging political and practical commitment in the direction of sustainable development, while creating conditions to benefit from opportunities in this framework. The country ratified the UNFCCC on 26 September 1996 and submitted its NAPAto the UNFCCC Secretariat in December 2006 in accordance with the requirements

[12]Republica Democrática de São Tomé. Segunda Estratégia Nacional de Redução da Pobreza. 2012-2016. Versão Final.Março 2012.134p

outlined in the UNFCCC COP 7, which listed 22 urgent and immediate adaptation needs out of which the second was identified as: "Establishing a system of climate alert in São Tomé and Principe". Therefore, in consistence with guidance for theLDCF (GEF/C.28/18, May 12, 2006), GEF support is requested for developing a Full-Size Project(FSP) to respond directly to the priority actions related to the development an Early Warning System identifiedduring the NAPA process.

38. The project is aligned with LDCF goals since it will aim at fundingthe additional costs associated with addressing the most immediate and urgent adaptation needs and gaps in STP through ensuring climate-resilience of vulnerable communities and Services and the development policies of vulnerable sectors. This fits with the strategic objective of the LDCF which is to promote climate change resilient development in LDCs and secure attainment of MDGs.

39. The project conforms to the LDCF's eligibility criteria, namely: i) undertaking a country driven and participatory approach; ii) implementing the NAPA priorities; iii) supporting a "learning-by-doing" approach; iv) undertaking a multidisciplinary approach; v) promoting gender equality; and vi) undertaking a complementary approach, as described below.

i) *Country drivenness and undertaking a participatory approach:*

40. The project is clearly country driven since it proceeds from a national planning and consultation exercise involving a wide range of tackle climate change threats to communities, Services and the coastal zones as a priority area of intervention. Moreover, it was designed to be consistent with, and supportive of, national development strategies, as expressed in the 1st and 2ndPoverty Reduction Strategy Paper for STPand related documents.

ii) *Implement NAPA priorities:*

41. The project addresses the urgent and immediate activities identified in the NAPA, in particular the project will address specifically NAPA adaptation priority nº 2: "Establishing a system of climate alert" and is in line with the other priority sectors identified on a global basis and in particular the nº15: "Reinforcement of Human Technical Capacity of National Civil Protection and Fire Brigade". Notably, this project focuses on urgently needed adaptive capacities in disaster risk reduction.

iii) *Supporting a "learning-by-doing" approach:*

42. The project will use the applied interventions to demonstrate how properly packaged early warning messages to help fishermen, farmers and other stakeholders living in vulnerable areas so to allow them to better prepare for and adapt to climate change events. In addition the project will use, synthesized lessons learned for replication elsewhere with the ultimate goal of improving EWS performance. It will also generate evidence on the cost effectiveness of building institutional adaptive capacity in order to develop a case for policy and budgetary adjustment to ensure greater sustainability. The project is designed to complement other ongoing and planned projects and programmes without duplicating them and to build on theexisting systems in place.

iv) *Multi-disciplinary approach:*

43. The project includes two main components and within each the project will undertake a number of activities (see Project Objective, Outcomes and Outputs/activities Section 2.3) to ensure a multi-sector approach to building capacity for adaptation while reducing disaster risk to climate change impacts.

v) *Gender equality:*

44. Project outcomes will contribute to an understanding of how adaptation responses can be designed to strengthen gender equality. To achieve this, the project will ensure that women attend workshops and are part of adaptation option interventions on community based EWS, and community management committees.

vi. *Complementary approach:*

45. In order to build upon existing plans and avoid the duplication of efforts, the project will be working in conjunction with relevant ongoing projects in São Tomé and Principe (see Section 2.3 for details).

Overall GEF Conformity

46. The Project has been designed to meet overall GEF requirements in terms of design and implementation. For example:

- Sustainability: the project has been designed to have a sustainable impact, at village and at national level. See section on sustainability below for more details;
- Monitoring and evaluation: the project is accompanied by an effective and resourced M&E framework, that will enable ongoing adaptive management of the project, ensuring that lessons are learnt, management decisions are taken based on relevant and up-to-date information, and regular progress reports are available for concerned parties;
- Replicability:The pilot approach to establishing a functional early warning system willgenerate approaches, tools and methods that can be addressed elsewhere in STP andfinally lead to the establishment of a fully functional national approach. See section onreplicability below for more details;
- Stakeholder involvement:The project was designed in a participatory manner to ensuresignificant stakeholder inputs, and will be implemented in a way to ensure their fullparticipation in all implementation aspects including monitoring and evaluation (see section 1.4 for more details).

2.2 Country ownership: country eligibility and country drivenness

47. São Tomé and Principe is a member of the Small Islands DevelopingStates (SIDS) and has ratified the UNFCCC on 26 September 1996 and submitted its National Adaptation Plans of Action (NAPA)to the UNFCCC Secretariat in December 2006. Therefore, STP is entitled to benefit from the LDC Fund for the implementation of priority measures identified in its NAPA. In implementing priority interventions identified in the NAPA, the project is consistent with the Conference of Parties (COP-9) and also satisfies criteria outlined in UNFCCC Decision 7/CP.7 and GEF/C.28/18. The project focus is aligned with the scope of expected interventions as articulated in the LDCF programming paper and decision 5/CP.9. As climate impacts fall disproportionately on the poor, the project recognizes the links between adaptation and poverty reduction (GEF/C.28/18, 1(b), 29).

48. This project fully reflects the priority measures identified by São Tomé and Principe's NAPA, and will contribute to the country's development and achievement of critical MDGs. Climate Change Adaptation is a leading priority for the Government of STP. The LDCF project, which will address all the NAPA priorities concerning Climate Change, Disaster Management and related issues (2 & 15), was designed specifically to meet the objectives of Priority Activity 2 of the NAPA ("Establishing a system of climate alert"). By addressing these urgent priorities, the project will contribute to the long-term planning solutions that the country urgently requires to prepare for the inevitable impacts of climate change in key socio-economic sectors. Furthermore, to develop a project that reflects the needs of national stakeholders and for local partners to feel ownership of the project, the LDCF project is based on information received from a range of stakeholder consultations conducted in Uganda from September 2012 to April 2013.

Legal and Policy Framework

49. São Tomé and Principe has acknowledged that future economic growth continues to rely on the sustainable use of natural resources and on the capacity to reduce the risk of disaster by enhancing the resilience capacity of communities and economical agents to adapt to climate change challenges. The Government of STP has drafted and implemented a wide-range of policies that directly or indirectly relate to climate change and community adaptation to climate change. The environmental policy and environmental assessment (EA) legislation and procedures of São Tomé and Principe which are relevant to the project, are outlined below:

- Decree-Law No. 10/2012, adopting a new Statutes for the National Meteorological Institute, considering that this institution contains elements for the organization of employees of the Ministry of Public Works and Natural Resources. The activity of the National Institute of Meteorology, guides - up to meet the main objectives, namely the protection of lives, support national economic activities in the fields of agriculture, forestry, livestock, fisheries, transport, communications industries, environmental protection, participation in water resource management, participation in water resources management and development of international relations in the field of meteorology, intensifying the relationship with other countries.

- Decree-Law No. 12/2012 establishing the Ministry of Public Works and Natural Resources, with the mission to design, implementation, coordination and evaluation of government policies in the areas of public works and natural resources. For the sector of water and sanitation the main responsible are the Directorate General for Natural Resources and Energy and the Directorate General for the Environment.

Law on Maritime Safety and Prevention

- Law No. 13/2007, of 11 September, aims to create government infrastructure and in simultaneous to adopt modern legislation, with a view to provide the maritime sector the means for the prevention and monitoring of sea pollution and create a national level, the necessary conditions for a minimum of laws and adequate infrastructure favoring implementation of a national policy on maritime safety and prevention of marine pollution. Thus, this legal instrument is underlying the creation of entities for maritime administration and port, integrating Maritime Institute - Port of Sao Tome and Principe (STP-IMAP), the Coast Guard and the National Committee for the International Maritime Organization, as well as the legal basis to allow future adoption of complementary legislation covering all areas of maritime safety and prevention of pollution.

- Law No. 10/1999 law that defines the basis of environmental policy for sustainable development of the Republic of São Tomé and Principe and sets out the principles that guide it, under the Constitution and the Declaration of Rio de Janeiro on Environment and Development.

- Decree No. 37/1999 re-evaluating the regulation on the process of environmental impact - The precautionary principle adopted at various international conventions, particularly the Convention signed in Rio de Janeiro in 1992, states that when the potential risks of an enterprise is at the outset alarming, the State should ensure that its implementation is not carried out at the expense of the quality of life of citizens, communities and the environment. The Law of the

Environment establishes the environmental licensing process based on the assessment of the impact on the environment by referring to its regulations to specific regulation.

- Decree Law No. 13/2012 - Establishment of the National Committee on Climate Change, taking into account that São Tomé and Principe ratified the United Nations Framework Convention on Climate Change (UNFCCC) on December 31, 2008, through Assembly Resolution # 9/98 and Presidential Decree No. 6/98 and the Kyoto Protocol on May 19, 2008, through Presidential Decree No. / 2008. The Committee aims to coordinate, manage, train and sensitize various actors STP in matters relating to climate change, including policies and measures that promote or result in the reduction of emissions of greenhouse gases as well as measures to reduce the variability economy and the people of São Tomé and Principe, adapting - to the adverse impacts of climate change.

- Decree-Law No. 18/92, defines the organic statute of the Ministry of Infrastructure and Environment, (MESA) as a body of the Central State Administration which aims to coordinate and implement the Government's policy in the field of public works and construction, transportation and communications housing, land use, environment, natural resources and energy. As part of its duties MESA should promote the development of geodesy and cartography national as well as measures relating to development plans and registration of territory and political preservation and improvement of the environment.

- Decree - Law No. 21/2000, which recognizes the need to restore the authority of the State, being the Ministry of Interior and Territorial (MAIT) responsible for the development of efforts to enhance the operational structure of its services. This organization integrates existing services in new areas of activity, appealing to professionals who know to respond adequately to the new challenges. For the performance of its duties the MAIT includes among others, the Civil Protection Service and Fire (SPCB), whose mission is to coordinate and supervise the activities of civil protection and other services provided by fire brigades. The SPCB is tasked to promote and assessment of risks of a collective natural or technological develop educational campaigns and informational oriented public awareness, self-protection, fostering a sense of solidarity in the face of serious accidents, disasters or calamities, and strive with the competent authorities in the search for other forms of support to victims.

- Decree-Law No. 6/76, created the National Society of the Red Cross of São Tom and Principe the national body to assist public authorities in the field of Health and Social Welfare and aid in case of emergency.

- Decree - Law No. 17/2011, creates the Council for National Preparedness and Response to Disasters (CONPREC). The creation of CONPREC arises from the need to create an entity and appointment of staff from different institutions, to its institutionalization and operation.

50. National priorities with regards to climate change events and its multiple impacts are comprehensively taken into account in the NAPA, which itself was developed in a participatory manner and featured priorities and concerns of a variety of stakeholders including rural and urban communities, non-governmental and community based organizations, the private sector, the scientific community and various components of government. Care was also taken to align the NAPA to the thrusts and priorities of a number of important national development plans such as the Government’s Second Poverty Reduction Strategy Program (2012-2016).Interalia,this Program supports the Strengthening of Social Cohesion and Promotion of Integrated Human Development. One of the important priorities under this

pillar will be the Conservation of Natural Patrimony and Strengthening of Mechanisms of Adaptation and Mitigation to Climate Change.

51. The Government of São Tomé and Principethrough this Program is trying to develop efforts to mainstream climate vulnerability and risks into major development and sectoral policies.In fact, the Second Poverty Reduction Strategy Program (PRSP II) 2012-2016 calls for a Framework for effective Management of Natural Resources but also focusing on Mainstreaming ofclimate changeinto countries' development policies. Specifically the mission in its Section 8.5 promotes:

a) The mandatory integrationofdimension"Climate Change", innationalandsectoral analyses to minimizeandrestorethe environmental costsof development policies;
b) The creationof skillsand knowledge aboutthe importanceof climate changein the process ofsustainable developmentof the country;
c) Carry out the"mainstreaming" ofclimate changeissuesinnational and sectoral plans;
d) Conductingadvocacywithdecision makersaboutthe adverse effectsof climate change;
e)Promotionof awareness campaignsto sensitize thepopulation aboutthe harmful effectsof climate change;
f) Capacity developmentoftechnicalsectorand civil societyon the basic issuesonclimate changeanditsadverse effects;
g) Development ofa Master Guide onurgent mainstreamingof climate changeissues into thedevelopment policyinstruments, as well as its implementation

52. The Project is fully consistent with the country's development, growth and sector priorities and builds on existing investments, policies and political commitments. The Major Planning Options (2008) of the national government states that financial resources will be allocated to the productive sectors (agriculture, fisheries and animal husbandry) as well as to support sustainable development of rural communities.

53. The project development process is country-driven and responds to key governmental priorities and is also aligned with STP's targets for MDG 1 ("Eradicate extreme poverty and hunger"). It will also contribute towards MDG 7 ("Ensure environmental sustainability") by reducing vulnerability to climate change through a strengthened early warning and information sharing mechanism, thus contributing for a better informed decision making by government and affected population. The program is also responsive to STP's needs and provides predictability of resources to a country whose main economic activity is threatened by the impacts of climate change. This in turn is expected to improve the agriculture production and community livelihood in the face of a changing climate.

2.2.1 Stakeholder baseline analysis

54. During the preparation of this NAPA follow-up project a comprehensive and extensive participatory process, involving local communities and a considerable number of stakeholders interested and/or linked to disaster management and impact of weather related hazards, was carried out so to foster ownership of the project. A multidisciplinary approach (professionals from different sectors participated); and a complementary approach, building upon existing plans and programmes, including national action plans and national sectoral policies was adopted. Therefore, during the consultation process from September 2012 to April 2013, approximately 150 professionals were engaged at national, sub-national, municipal and community level.

55. Key stakeholders with a major direct role in the project were identified and consulted at different stages during the Project Preparation Grant (PPG) phase to obtain their inputs and feedback for designing the project. The stakeholder consultation process that was undertaken included:

i. Stakeholders Consultation Workshops/Meetings:

- *Inception Workshop (IW) - Information and consultation session*at the UNDP Conference Room, UN Building, São Tomé. An interactive national workshop on climate information and EWS was organized and held on Wednesday 18th September 2012.

- *Stakeholders Consultation Workshop (SCW)* - at the UNDP Conference Room, UN Building, São Tomé. An interactive national workshop on climate information and EWS was organized and held on Thursday 10th January 2013.

- *Project Validation Workshop (PVW)* - at the UNDP Conference Room, UN Building, São Tomé. An interactive national workshop on climate information and EWS was organized and held on Monday 15th January 2013.

- *Community Consultations and site visits (CC-SV)*- scoring meeting were held during January 2013, with Fishing and Agriculture community Members, Community Based Organization and NGO's at selected locations of Neves, Santa Catarina and Ribeira Afonso.

ii. Bilateral consultation throughout the PPG process

56. The PPG Phase (September 2012 to April 2013) included a series of bilateral meetings between members of the PPG Team and representatives and resource persons from other projects, GoSTP agencies, NGOs and other organizations including main Universities. These bilateral meetings targeted key Sierra Leone Government Institutions, International Agencies and donor community in São Tomé and Principe, Non-Government Organizations and the private sector which are listed in Table 1.

iii. São Tomé and Principe Government Institutions

57. The two major stakeholders for the implementation of this LDCF project in establishing an Early Warning System (EWS) in São Tomé will be the National Institute of Meteorology (NIM) and The Directorate General for Natural Resources and Energy (DGRNE) both sitting at the Ministry of Public Work, Natural Resources, Energy and Environment (MoPWNREE). However, the implementation of the project will require the collaboration and partnership of various other STP institutions particularly those which can collaborate in data sharing and vulnerability and risk assessment such as the National Directorate of Environment (NDE), The Ministry of Agriculture, Fisheries and Rural Development (MoAFRD). During the PPG consultations were carried out with all these institutions to ascertain the model of collaboration, their data potential and their capacity to conduct vulnerability and risk assessment.

58. The dissemination and response strategy of the EWS was also discussed with several actors of the STP management scenery. To this end consultations were held with the Council for the Prevention and Response to Disasters (CONPREC) is responsible for the Disaster Management at GoSTP level, with the role on the dissemination and response aspects of the EWS; The National Centre for Emergency

Operation (CENOE), The Civil Protection, The Army and Marine Coastal Guards, The Fire Brigade, the Ministry of Health (MoH) and the Red Cross.

iv. International Agencies and donor community in São Tomé and Principe

59. Multilateral donors including the World Bank, EC, USAID, DFID and United Nations (UNDP, UNICEF, WFP, FAO, IFAD) agencies maintain an active presence in São Toméand Principe and play influential roles in determining national priorities and mechanisms for their implementation ofSTP fight against poverty. The issue of climate change and particularly Early Warning System is now high on the international agenda. There is intense pressure on western governments to tackle climate change by reducing the current vulnerability of the country and specifically of the communities and infrastructure, largely within the conditions set by peripheral bodies, especially those with funding that needs to be channelled into these activities. During the PPG bilateral consultations have been conducted with country representatives of these institutions to inform of the project and ascertain their anxieties concerning the design of the LDCF project in São Tomé and Principe.

v. Non-Government Organizations

60. The stakeholder process will count on the support and involvement of international NGOs, particularly those working with vulnerable communities particularly in fisheries (Sea, Environment and Craft Fishing NGO-MARAPPA) and agriculture and rural development (Participatory Small Holder Agriculture and Artisanal Fisheries Development Programme-PAPAFPA). The foreseen awareness campaigns on Climate Change risk and disaster management to be carried out in the context of the activities of this LDCF at community level will lean on the experience and capacity of various NGO's and CBO's. In addition the dissemination and response strategy to be developed will have the close cooperation of STP Red Cross Society (STP-RCS) and International Federation of Red Cross (IFRC).

vi. Private Sector

61. The establishment of the EWS in the country will also benefit all private sectors whose assets and socio-economic activities are currently vulnerable or under a threat of the risks posed by the climate change extreme weather events. As the LDCF project will strengthen the monitoring and forecasting capacity of the NIM, the transport and aviation sector will be also benefited by the capacity of Meteorological services to receive aeronautical forecast from international and regional centres and subsequent downscale to local conditions allowing for an improved safety in aerial/maritime transport. Companies in these sectors (National Institute of Civil Aviation-INAC, National CompanyforAirportsandAir Safety-ENASA, Maritime InstituteandHarborofSão Tome and Principe-IMAP) and other related have attended the consultation meetings and there have been bilateral discussions to ascertain how best NIM can satisfy their needs.

62. Tourism and Media industry are important activities for the economy of the country and represents important hard currency earners. These sectors are particularly interested in early warning against extreme rainfall events which can disrupt their normal activities. Bilateral meetings have been established with STP Telecommunication Company (Companhia Sãotomense de Telecomunicação-CST), National Broadcasting Company of São Tomé (Rádio Nacional de São Tomé e Príncipe-RNSTP), National Television Company (Televisão SãoTomense -TVS). These stakeholders require tailored warning products which this LDCF will develop to reduce the risk that heavy convective rainfall represents to them.

63. The Agriculture sector is also anxious to have the assistance of the NIM particularly in the support to small scale and commercial farming to reduce the risks of food insecurity due to climate change induced variability. Bilateral consultations have been carried out during the PPG to evaluate their specific needs and long term framework required to be put in place by the Early Warning System to assist farmers. Therefore, some stakeholders, including the Federation ofSmall Farmers (FENAPA-STP), Cocoa ProductionCompany (SATOCAO) and FONG-STP (Federation of all NGO's) were consulted to ascertain the nature of personalized seasonal forecast that EWS can produce to allow the adoption of more resilient production techniques.

Table 1. Primary and Secondary Stakeholders and their roles in the project.

Stakeholders	Interests/ role in the project
Ministry of Public Works, Infrastructure, Natural Resources, Energy and Environment (MoPWINREE)	This Ministry is responsible for the coordination of environmental issues, mainly through its Directorate General for Environment. Is the Coordinating Body of several important institutions which do have a direct intervention in the project including the National Institute of Meteorology (NIM), the Department of Natural Resources and Energy (DNRE), the Directorate General for Environment (DGA), the Maritime and Port Institute (IMAP), Land Use Management Department (DLUM), among others.
The National Institute of Meteorology (NIM)	The National Institute of Meteorology, initially designated as the Meteorological Service of STP was created in 1950 and has worked until 1979 when it became known as the National Institute of Meteorology. It is the body responsible for the Management, coordination and carries out any activities, studies and provides information on meteorology, geophysics and astronomy, or any technical weather information required for air and maritime navigation, agriculture and fisheries, the use of water resources and all scientific and economic activities.
The Directorate General for Natural Resources and Energy (DGRNE)	The Directorate General for Natural Resources and Energy is the Government institution responsible for conducting studies and research on the characteristics and conditions of the natural resources of the country, its territorial distribution and the level of utilization, ensure effective implementation of policies, laws and other policy instruments in the Natural Resources and Energy sector; ensure and integrated management of Natural Resources and Energy. The DGRNE is organized into functional directorates following: Directorate of Water, which contains the Department of Hydrology, Water Supply and Analysis Laboratory; Directorate of Geology and Mines; Department of Energy.
The Directorate General for the Environment - DGE	The Directorate General for the Environment is in charge, the coordination of the country's environmental activities, active actors in the definition and participation in the implementation of government policy on the environment. Founded in 2007 by Decree No. 2/2007, comprises three Divisions: Legal Department, Administration, Cooperation, Evaluation and Environmental Impact Studies - DJACAEIA, the Department of Conservation, Sanitation and Quality of Environment - DCSQA and Department of Statistics, Information, Environmental Education and Communication - DEIECA.
Serviço de Protecção civil e Bombeiros – SPCB	The Civil Protection and Fire Brigade (SPCB) belongs to the Ministry of Internal Affairs and Planning whose mission is to supervise the activities of civil protection and other services provided by fire department and has among others, the function of promoting assessment of natural or

Stakeholders	Interests/ role in the project
	technological risks in the community.
STP Coastal Guards - ST CG	The main objectives of STP Coastal Guards at sea is to exercise state authority within shipping safety zone, pollution prevention and fighting ¬ sea and coastal polution, assure inviolability of maritime boundary and Exclusive Economic Zone of the country.
The National Council for Preparedness and Response to Disasters - CONPREC	The National Council for Preparedness and Response to Disasters was created in 2011 by Decree-Law n º 17/2011, in response to a need to create an entity that overlooks all issues relating to different natural or manmade disasters that have been occurring currently in STP. In addition given the total absence of an organized system in the country it has also the responsibility at national and international leverage support to the country with means and conditions for the national civil protection to act. The CONPREC is overseen by the Ministry who oversees the area of decentralization and Parliamentarian issues Defense and Public Safety Affairs. Amongst other tasks, it has the duty to contribute to the reduction of the vulnerability of communities and infrastructure assets exposed to the negative effects of disasters.
The Red Cross Society of Sao Tome and Principe- STP-RCS	The Red Cross Society of São Tomé and Principe works with the Ministry of Health and Social Affairs and enjoys administrative and financial autonomy. It benefits from the advantages granted to state services including: transportation gratuity in case of disasters, calamities, accident or disruption.
Maritime InstituteandHarborofSão Tome and Principe-IMAP-STP	The IMAP-STP was created by Decree Law no. 32/2007.The main activities of the Maritime InstituteandHarborofSão Tome and Principe(IMAP-STP) are the development of the safety aspects of vessels, persons and goods shipped, the prevention of ship pollution, contribution to safety within the national maritime zone under its jurisdiction and law enforcement activities In addition he has the responsibility to implement some of the international conventions on maritime safety and in particular ensure national vessels and their crews, with the main purpose, to protect and safeguard Human life at sea.
The Ministry of Agriculture, Fisheries and Rural Development (MoAFRD)	The Ministry of Agriculture is the institution responsible for agricultural, Fisheries and Rural Development issues as well as Extension Services in the country. Through its Rural Development Strategy, it aims at (i) Increased competitiveness, productivity and rural wealth accumulation; (ii) Productive and sustainable management of natural resources; (iii) Growth in human capital, innovation and technology; (iv) Diversification in social capital, institutional efficiency and effectiveness; and, (v) Good governance and market planning.
Agricultural Research and Technology Centre (CIAT)	The Agricultural Research and Technology Centre (CIAT) is a public institution under the Ministry of Agriculture responsible for generating knowledge and technological solutions for sustainable development of agro-business and food and nutritional security. As such, this institution is responsible for implementing research activities that contribute to the development of strategies for biodiversity conservation, environmental protection and sustainable utilization of natural resources.

2.3 Design principles and strategic considerations

64. The LDCF project is focused on strengthening the capacity of national and sub-national entities to monitor climate change, generate reliable hydro-meteorological information (including forecasts) and to be able to combine this information with other environmental and socio-economic data to improve evidence-based decision-making for early warning and adaptation responses as well as planning. At present, however, there are many projects and programmes – both climate and non-climate related – being implemented in São Tomé and Principe.

65. A stocktaking exercise conducted during the PPG phase has identified relevant GEF and non-GEF interventions to the LDCF project. The LDCF project will link up with past and ongoing project interventions in São Tomé and Principe in order to avoid duplication of efforts, andto make sure that LDCF financing is used to provide additional benefits. Therefore the project builds on an existing development baseline, which, though not contributing any co-financing will provide information and experiences in relation to the use of climate information in Sierra Leone. Of particular importance are the following baseline projects upon which this LDCF will build:

66. The **World Bank** led **GEF-LDCF** project: "*Sao Tomé and Principe: São Tomé and Principe Adaptation to Climate Change"* focusing on *Coastal Adaptation for Vulnerable Communities"* (2011-2016; **$4.1million**).This project is divided into two major investment components aimed at assisting fishers and coastalcommunities in managing the impacts of the two major causes of climate change vulnerability in coastal zones, namely:

- **Component 1.**Coastal Early Warning and Safety at Sea:
  i) Establishment of an early warning system for coastal communities and near-shore fisheries (LDCF US$1.44 million, Co-financing US$0.66 million)
  ii) Improvement of safety at sea (LDCF US $0.45 million, Co-financing US $1.03 million)
- **Component 2.** Coastal Protection for Vulnerable Communities:
  i) Community Preparedness (LDCF US $0.43 million, Co-financing US $0.07 million)
  ii) Coastal Protection for Vulnerable Communities (LDCF US $1.33 million, Co-financing US $10.01million).

This project will build on some of the activities developed so far in particular the work developed by CONPREC, towards the mobilization of coastal communities into Local Disaster Risk Management Committees (LDRMC)which this LDCF will benefit from and will be part of the EWS strategy in dissemination and response flash floods and other climate related hazards.

67. The **Portuguese Cooperation.** The Cooperation Agency has a wide support program focusing on governance and public administration, education and health in São Tomé and Principe. This Cooperation has also carried out initiatives involving technical assistance for marine infrastructure rehabilitation and sanitation (**3.2 million Euros**). However, this LDCF project will benefit more from the specific support to the National Institute of Meteorology via the SICLIMAD project ("Sistema de Informação Climática e do Estado do Mar para Apoio ao Desenvolvimento Sustentável") targeting regional climate monitoring (29,000 Euros), installation of hydrological monitoring stations (52,800 Euros in 2008), and support to local NGOs and associations.

68. The **UNDP's Africa Adaptation Programme (AAP)**project *"Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa - São Tomé and Príncipe"* (financing of **$2.75 million**) seeks to create "institutional and individual capacity to address climate change risks and opportunities through a national approach to adaptation.This project assessed the

meteorological equipment needs of STP and installed a number of meteorological stations. Project focuses on strengthening: (1) adaptive long term planning capacities, including baseline meteorological and population vulnerability measurement (2) institutional and human resource capacities at all levels (3) policies and measures, with a focus on the already degraded area of northern São Tomé for pilot activities in developing community CCA strategies and improving livelihood resilience in priority sectors.

69. The **International Fund for Agricultural Development(IFAD)**is currently financing the Participatory Smallholder Agriculture and Artisanal Fisheries Development Programme **(PAPAFPA),** which started in 2002, for a period of 12 years. They have been channeling support to fishing communities to enhance their productivity and means of livelihoods through the Directorate of Fisheries in the Ministry of Agriculture. The involvement of the agency also involves supporting training and capacity building on sustainable cropping methods in Agriculture as well as fishing methods. However, more recently this support was translated in a the **US$16.6 million** support funding to Participatory Smallholder Agriculture and Artisanal Fisheries Development Programme which second phase of the programme has initiated in 2012. This project will benefit from the capacity development, awareness campaigns, community base organization developed with the Agricultural and Fishing communities.

70. The **Government of São Tomé and Príncipe** (GoSTP)has recently finalized the development of its Council for the Prevention and Response to Disasters (CONPREC), who has been given responsibility for organizing disaster preparedness activities in the country. The CONPREC, which is comprised of representatives from 15 sectors and NGOs, has developed its strategic plan and will benefit from a contingency fund (earmarked for 2011) of around **US$1.4 million**. As part of the activities to be implemented include the mobilization of coastal communities into disaster management committees which this LDCF will benefit from and will be part of the EWS strategy in dissemination and response flash floods and other climate related hazards.

71. The **Government of São Tomé and Príncipe** (GoSTP)has also been actively seeking to strengthen its hydro-meteorological system and is currently on the way of rehabilitating 6 river monitoring hydrological stations (**US$366,500**). With assistance of UNDP/Japan Adaptation Project, it also plans to install 4 weather stations (**US$202,500**).

72. The **Government of São Tomé and Príncipe** (GoSTP)through the *Community Infrastructure Fund (CIF)* of around **US$5 million** has helped to launch several agricultural and social micro-infrastructure projects. The CIF has been used by other partners (EU, Taiwanese Cooperation) for the execution of small community-based contracts, and appears to be an institutional instrument adapted to an island context.

73. In addition to the above initiatives, the **São Tomé and Príncipe Government,** following recent flooding events and through The Ministry of Public Works and Natural Resources has further allocated about **US$1,4 million** for urgent coastal erosion and flood control works on major river deltas, including completion of remedial works in Ribeira Afonso, one of the project's the pilot community village. This initiative will also benefit this LDCF project in the prevention of flash floods and protection of local communities following an Early Warning for heavy rainfall and coastal storm surge.

74. The **African Monitoring of the Environment for Sustainable Development (AMESD)** Project. The European Union funded project Preparation for the Use of MSG in Africa (PUMA) made available data and products from EUMETSAT's latest satellites, promoting African National Meteorological and Hydrological Services to provide accurate weather forecasts, monitor extreme

weather phenomena, and improve disaster management. The African Monitoring of the Environment for Sustainable Development (AMESD) initiative takes PUMA a stage further by significantly extending the use of remote sensing data to environmental and climate monitoring applications. For West Africa, ECOWAS adopted the theme of water resource management and the management of crops and pastures. The project was entrusted to the Niamey-based Regional Centre for Training and Application of Agrometeorologyand Operational Hydrology (AGRHYMET). This represents a baseline investment of approx. **$27 million**.

75. This LDCF project is not a standalone project; it is part of a wider multi-country programme that will implement similar initiatives on climate information and Early Warning Systems in at least 10 countries in Africa (including Benin, Burkina Faso, Ethiopia, Liberia, Malawi, Sierra Leone, São Tomé & Príncipe, Tanzania, Uganda and Zambia). Synergies between these projects will be used to enhance the cost-effective hiring of specialized technical staff, coordination of data and information (including inter-country sharing where feasible), training (operations & maintenance of equipment; forecasting techniques; tailored advisories and warnings), and effective use of communications and standard operating procedures.

76. In addition, this initiative being part of a GEF funded multi-country programme means there is significant scope for many activities to be coordinated at the regional level thereby enabling economies of scale, which reduce costs and increase effectiveness (especially in terms of knowledge generation and training). In particular activities under Output 1.1 and 1.2, which will procure hydrological and meteorological equipment, will benefit from the core technical staff who will help design and identify appropriate cost-effective observing networks. Activity 1.4.1 and 1.4.3 of output 1.4 (as well as activities under outputs 2.1) can also be implemented in collaboration with other countries to provide training on infrastructure operations and maintenance, weather and climate forecasts and development of tailored warnings/advisories e.g. activity 2.1.2 and 2.1.3 which focuses on training of forecasters and modellers.

77. Training and capacity building for operations and maintenance of the hydromet infrastructure and for modeling and forecasting can also be done at a regional level, bringing together participants from all countries to encourage knowledge sharing and the development of collective skills. This has several advantages, namely: i) promoting the sharing of information and learning between countries; ii) encouraging discussions of best practices i.e. what works, reasons for failure etc; and iii) increasing the effective pool of skilled resources which each country can draw upon (increasing the potential for future trainings to be conducted by experts within the region). Such activities will be closely coordinated with other regional and international partners/centres e.g. WMO/GFCS, ACMAD, AGRHYMET etc. More details on coordination and the cost-effective benefits of this programme are provided in Section 2.6.

78. This LDCF project also builds on the following programmes and projects to take advantage of synergies, minimise overlaps and leverage associated co-financing that is mostly grant co-financing reflected below and in Table 2:

79. **UNDP Pilot Project** on: "Implementing integrated water resources and wastewater management: Integrated management of the Rio Provaz hydrographic basin" with a totalfunding of **$795,000 (2011-2013)**from GEF and other multilateral agencies (Arab Bank for Economic Development in Africa (BADEA), European Union (EU) and implemented by the Ministry of Natural Resources, Energy and Environment. The project objective is to develop a technically robust river basin management plan for the Rio Provaz Basin enabling equitable water resources allocation and protection to support sustainable economic development, public health and environmental protection.

The project has four components, which are:

a) Evaluate the water resources (quantity and quality) in the basin;
b) Provide institutional support and foster decentralized development;
c) Improve environmental sanitation and solid waste collection and treatment; and
d) Raise awareness of integrated water resources management at the basin level.

This LDCF project will benefit from the experience already developed on capacity development, awareness campaigns, community base organization developed with the Agricultural and Fishing population where the Integrated Community Based EWS (ICB_EWS) will be active.

80. The **European Commission** *Road Network Rehabilitation and Maintenance Programme*, funded under the European Development Fund, with an allocation of Euro 6.5 million (**US$9.3 million**) for urgent coastal protection works in the most exposed area of the northern coast, leading directly to two of the pilot areas of this LDCF project: the town of Neves, and the village of Santa Catarina. The projectis currently supporting a major initiative to address coastal degradation due to Climate change induced erosion through rehabilitation and maintenance of road infrastructure of the northern coastal road (the one most prone to erosion). This programme has since 2005 enabled the restructuring of the transport sector and the establishment of the Road Maintenance Interest Group (GIME) in different localities of STP. The road network in São Tome, small by essence, is vital not only to the circulation of goods and persons, and especially crucial for the artisanal fisheries sector, but also in Early Warning response and rescue particularly during landslide occurrence.

81. The **World Bank** *Second Adaptable Program Lending for Central African Backbone Grant* of **US$14.9 million** for the development of telecommunications will contribute directly to this project through the enhancement of the communications infrastructure in the country. This project provides also technical assistance and capacity building for legal and regulatory reform, to develop public private partnership (PPP) arrangements and to launch a second global telecommunications operator license to provide fixed and mobile services, as well as investments to increase connectivity infrastructure. Therefore, this LDCF project will benefit directly from this initiative in using the newly installed communication infrastructure to develop rapid communication channels for weather, climate and hydrological data transmission, to establish the dissemination and response communication channels of the EWS in São Tomé and Principe.

82. The **African Development Bank Group (AfDB)** "*support project to the development of agriculture and livestock farming, phase II-**PADE II**" **(2012-2016,*** funded by the African Development Fund (FAD) of the AfDB for **$7.5 million** with the objective to improve food security and reduce rural poverty in STP, through: (i) strengthening of the capacity of the institutions in charge of the livestock farming, the breeders and private sector players of the livestock sector to improve the quality of services provided to actors of the livestock sector. The project is currently implementing the second phase of the livestock development project (PADEII) and tackles cross-sectoral capacity-building by providing training in literacy, information, and community organization, as well as specialized vocational training adapted to specific demands, particularly in the oil and tourist sectors.

83. The **African Development Bank Group (AfDB)***Project for the rehabilitation of the infrastructures supporting food security* **– *PRIASA (2011 – 2014*)** costing **$7.8 million**, will be implemented on the 2 islands of Sao Tome and Principe. The PRIASA goal is to contribute to the improvement of the food security and poverty reduction in STP. To achieve this goal, the PRIASA will improve the availability of farming and fishing products through the rehabilitation of rural, agricultural and artisanal fishing infrastructures and the strengthening of institutional and technical capacities of entities supporting these sectors. By rehabilitating or setting up a number of key infrastructures using the participatory approach, and building the capacity of stakeholders, the project will not only boost food

production but also contribute to improving the living conditions of the population, especially in terms of opening up isolated areas, nutrition, human health and social organisation.

84. A strategic partnership will be developed with the above projects in order to complement their activities. Therefore the proposed LDCF will establish pilot sites where will collaborate with above projects to test the effectiveness of Community based EWS units that will support community safety against severe and extreme weather events, prevention from health and sanitation planning, Agrometeorological and farming activity, seasonal forecasting for watershed and disaster management activities:

Table 2. Associated baseline projects and the indicative **co-financing amounts**

Funding source	**Name of Co-financier (source)**	**Institutions**	**Co-financingAmount (US$)**
Co-financing sources/Projects			
"Implementing integrated water resources and wastewater management: Integrated management of the Rio Provaz hydrographic basin"	UNDP/Multilateral Agencies (BADEA/UE)	Ministry of Public Works, Infrastructure, Natural Resources, Energy and Environment (MoPWINREE)	795,000
"The Road Network Rehabilitation and Maintenance Programme: Coastal Zone Protection on National Highway I"	European Union (EU)	Ministry of Public Works, Infrastructure, Natural Resources, Energy and Environment (MoPWINREE)	5,300,000
"The Road Network Rehabilitation and Maintenance Programme: Road Maintenance Project"	European Union (EU)	Ministry of Public Works, Infrastructure, Natural Resources, Energy and Environment (MoPWINREE)	4,000,000
"Second Adaptable Program Lending for Central African Backbone Grant: Optical Fibre Project"	The World Bank (WB)	Ministry of Planning and Finance (MPF)	14,900,000
"Second phase of the livestock development project (PADE II)"	African Development Bank Group (AfDB)	Ministry of Agriculture, Fisheries and Rural Development (MAFRD)	7,500,000
"Project for the rehabilitation of the infrastructures supporting food security – PRIASA"	African Development Bank Group (AfDB)	Ministry of Agriculture, Fisheries and Rural Development (MAFRD)	7,800,000
Least Developed Country Fund (LDCF) project grant requested	**GEF**		**3,600,000**

Total			**43,895,000**

2.3.1. National and local benefits

Benefits at National Level

85. Climate information and EWS will benefit: i) the **poorer segments of society**, which do not necessarily benefit from large protective infrastructure projects[13]; and ii) **hydro-meteorological services and other user-agencies** with regards to long-term planning and extension services.

86. The LDCF project will introduce new infrastructure – including weather stations and forecasting facilities – while building upon, and being integrated into, the existing NIM and DGRNE infrastructure and capacity. LDCF project activities will complement existing meteorological and hydrological support programmes being implemented by WB, SICLIMAD, AAP projects. This will benefit national hydro-meteorological infrastructure for the effective and efficient use of information for making early warnings and long-term development plans.

87. The LDCF project will benefit the NIM and DGRNE by providing resources that will procure and install necessary hardware and software. Additionally, the project will develop human technical capacity in order to maintain and operate meteorological and hydrological observation networks and systems. The project will train**:** 5 Meteorologists, 5 Meteorological Technicians, 4 Forecasting Superintendent Officers 10 Specialist Superintendent Officers and six hydrologists for the Meteo - NIM and Water - DGRNE sectors respectively, thus building technical capacity in weather and climate forecasting, as well as hydro-meteorological data handling. This will directly benefit these Government departments at a national level, with associated benefits filtering down to community end-users at the local level.

88. **At a national level,** all regions will benefit from the placement of AWSs and Hydromet ASs which will extend the geographical coverage of São Tomé and Principe's weather, climate and hydrological observation network. This will particularly address gaps in the observation network in the vulnerable areas of the country as well as build on activities supported by WB and UNDP in São Tomé and Principe.

89. Tailored weather and climate information will be made accessible to decision makers in government, private sector civil society, development partners and local communities. This information will be mainstreamed into national policies as well as work- and development plans. Government and non-government communication alert channels, including advisories, watches and warnings will be strengthened not only at the local level, but at national level as well.

90. The financing options brought about by the project will provide sustainable finance for the operation and maintenance of the installed hydro-meteorological observation, forecasting and early warning systems. These financing options will benefit existing governmental financing structures, by increasing financial sustainability and relieving existing financial pressure. The potentially largest economic benefits are associated with improved transport planning, especially aviation and maritime operations which can take advantage of improved local forecasts and monitoring. These sectors,

[13]World Bank. 2010. Natural hazards, Unnatural disasters: Effective prevention through an economic lens. World Bank and United Nations. 231 pp.

fisheries and commercial agriculture represent some of the largest private clients prepared to pay for early warning services and tailored forecasts.

91. This project also supports national development goals and plans to achieve Millennium Development Goals (MDGs) 1, 3, 6 and 7 in São Tomé and Principe.

- *MDG 1: Eradicate extreme poverty and hunger* –This project aims to improve EWS nationally, providing useful climate information such as seasonal forecasts to two-thirds of the population who are dependent on the agricultural value chain (NAPA, 2006). Seasonal forecasts can enable the rural population to take adaptive farming measures to ensure productivity;
- *MDG 3: Promote gender equality and empower women* – EWS will be tailored to end-user needs, in particular the needs of women who have little access to farming, particularly on fertile land. Women focused NGOs have been implicated in the project (Sea, Environment and Craft Fishing NGO-MARAPPA), Federation ofSmall Farmers -FENAPA-STP), Cocoa ProductionCompany-SATOCAO) and FONG-STPFederation of all NGO's).
- *MDG 6: Combat HIV/AIDS, malaria and other diseases* – Malaria and other vector-borne diseases are heavily linked with climate variables such as temperature. This project will provide open-access data for institutions such as the Ministry of Health to use climate/weather forecasts to be able to predict the spread of such diseases;
- *MDG 7: Ensure environmental sustainability* – The foundation of this project is to ensure environmental sustainability by integrating EWS initiative into national policies, planning and decision-making. Such endeavors can assist in the sustainable use of natural resources through good water management practices.

Benefits at local level

The STP Coastal—Angolares communities coastal artisanal fishing communities

92. São Tomé and Principe has an estimated annual fishery potential of between 23,000 and 29,000 tonnes. However the fishing communities around the coastal areas of Neves, Santa Catarina, Malanza and Ribeira Afonso and Sundy in Principe Island are highly vulnerable to extreme weather events. All the above sites share a common features: i) recurrent climate related hazard overlapping storm surges and torrential rains and; ii) a community livelihood's based on artisanal fishing and small scale agriculture. Nearly 20 percent of the nation's workforce are employed in artisanal fisheries (about 2,000 people directly and an additional 18,000 indirectly) the majority of the villagers are fishermen or related to fishing activity. The last count indicates 1,440 fishing vessels of which 70 percent are small dugout canoes (3-4 meters) using paddles, sails, and traditional gears (lines and nets). In this sector women account for over 90% of the people engaged in fish marketing, over 80% of retailers of food products and vegetables, and over 90% of operators involved in the artisanal processing of agricultural and fishery products[14].

93. As artisanal fishers navigate either by visual contact with land or by clouds at distances of 20 nautical miles from the shore and STP lacks a reliable early warning system, sudden squalls or dry fog result in increasing debilitating accidents and loss of life. The NIM relies on a reduced number of meteorological station and a regional model from Portugal and Brazil to compile 24-hour weather forecasts. The 24-hour weather forecast does not give assurances to fishermen and community members

[14]African Development Bank Group. Project: Infrastructure Rehabilitation for Food Security Support Project (PRIASA). Appraisal Report. *July 2010*

alike for protection against any impounding hazards as it does not cover with up-to-date information the critical period from dawn to mid-day while at sea. In addition, fishermen do not have means to access the weather forecast or warnings timely either because there is no dissemination mechanism or they have not means of reception.

94. These coastal fishing communities will be benefited from the future EWS primarily by reducing theirvulnerability. The project will provide means for more accurate, reliable and frequently updated weather and hydrological forecasts. In addition it will strengthen the dissemination of forecasts and warnings and will provide means for the fishing community to access information while at sea, ultimately reducing the risk of disasters and possibly casualties. In this way the project will affect nearly 10,000 rural coastal dwellers, assisting more directly to around 1,400 fishermen and 1,700 fishmongers who will benefit from improved weather forecast and warnings.

The Cocoa and coffee farming communities

95. Despite abundant average rainfall, São Tomé and Principe (STP) has been experiencing longer and longer periods of drought, which constitutes a new constraint to food production, particularly in the northern part of Sao Tome Island. The agricultural sector's contribution to GDP is about 19%, with cocoa as the leading export product. Lately the production of this crop has been hit by episodes of drought particularly in the northern cocoa region when the archipelago is under the dusty air mass of the "harmattan" blown from the Sahelian region. The Ministry of Agriculture, Fisheries and Rural Development (MoAPDR) has been lately involved in supporting the growers to overcome this situation through irrigation.

96. IFAD is currently financing the *Participatory Smallholder Agriculture and Artisanal Fisheries Development Programme* **(PAPAFPA),** which started in 2002, for a period of 12 years and The African Development Bank Group (AfDB) implementing the *Infrastructure Rehabilitation for Food Security Support Project***(PRIASA**). This project will benefit both the cocoa growers and these initiatives by providing seasonal forecast and Agromet advisory service to help planning their farming activities and carry out an improved irrigation water management. The weather and hydrological monitoring networks to be installed in the context of the future EWS will enable the development of seasonal forecasting and sector tailored advice as well as an online advisory service to be established in collaboration with CIAT (Agricultural Research and Technology Centre). To this end the project will directly benefit about 700 farms, supported through the development of the irrigated areas.

2.3.2. Brief Introduction to Project Pilot Sites

97. Both islands are crossed by numerous rivers (at least 23 in São Tomé and 8 in Príncipe), often broken by waterfalls, and feeding into small deltas and coastal swamps. The criterion for the most vulnerable communities was set based on the principles used in the NAPA document. This document established that vulnerability is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate changes, including climate variability and extremes. In the NAPA analysis the climate induced phenomena to which the communities were exposed in STP are: pluvial-fluvial floods, coastal floods and landfalls. São Tomé and Principe have been hit hard by a series of extreme weather events in the last decade with special emphasis for flash flooding resulting from overlap storms and torrential rains and these events have exacerbated the inherent vulnerability of villages built very close to the coastline (Section 2.3.1). The project has selected some of these villages as vulnerable locations

and which communities require assistance so to raise their intrinsic resilience against the climate change induced hazards (Output 1.5).

98. Historically established in the vicinities of flood-prone river deltas, the communities of Ribeira Afonso, Malanza, Santa Catarina and Sundy (in Principe Island) have been considered as the most vulnerable locations. Community consultations carried out on the frequency weather related hazards showed Flooding– both from the river and sea – to be the most common hazard faced by these villages affecting 79 percent of respondents in Ribeira Afonso, 72 percent in Malanza, and about 75 percent in Sta. Catarina.

99. The resilience of these communities has been further undermined by past unsustainable sand extraction practices and increasingly weakened by stronger and overlapping coastal storms and torrential rains. The confluence of such hazards in 2008-2010 has resulted in widespread flooding across all communities. Houses remain the most affected assets. The most common reported impacts are illnesses, temporary evacuation or abandonment of houses, and livelihood losses (due to work interruptions and losses of crops). Reported deaths are mostly of fishers perished at sea.

100. After independence in 1975 population around these main coastline villages (Neves, Santa Catarina, Malanza and Ribeira Afonso) grew and had increased access to land becoming more diversified in terms of the sources of livelihoods. Though fishing families declined and/or started diversifying their activities into agriculture, or informal commerce, their activity still represents an important source of communities' livelihood. In Riberia Afonso, for example, 10 percent of the population today is actively engaged in fishing and in Sta. Catarina, the proportion remains about 65 percent. However, these communities remain amongst the poorest and most vulnerable in São Tomé and Príncipe. Importantly, their natural vulnerability to floods is being compounded by changing climate patterns.

101. In the south and west of both islands, high volcanic mountains fall precipitously to the sea, although neither island has witnessed any volcanic activity in recent centuries. The mountains descend gradually to small plains in the northeast. São Tomé Peak, the highest point on the main island, rises to 6,640 feet (2,024 meters) above sea level, and Príncipe Peak on the smaller island reaches 3,110 feet (948 meters). These mountainous areas are deeply dissected by stream erosion, and spectacular isolated volcanic plugs stand out as landmarks. Swift and rocky streams rush down to the coast in every direction.

102. During the PPG phase, collaboration has been requested to this LDCF project to assist the fishing community and small scale farmers to strengthen resilience of local fishermen against climate change impact by delivering sector tailored forecasts. Therefore, this LDCF in partnership with NIM, São Tomé Red Cross, The Civil Protection, CONPREC, the Costal Guards and the Hydrology sector-DGRNEwill provide an integrated Community Based Early Warning System (ICB-EWS) to these communities.

The pilot sites locations:

103. **Neves** is the capital of the district of Lembá. It has anarea of 229 km^2 (88 sq mi) and a Population (2008) of 4.107. Main flooding River is the Provaz, a watercourserunningwestwardcrossing thecity ofNeves and dischargingbetween theFurnas andRosema beachsafter receivingthe waters ofits tributary the "LittleWater River". Rainfall amounts to around 7,000 mm/year upstream to 1,000

mm/year at coastal sites of Neves. The National Institute of Meteorology has an AWS located and there is a local Community Radio.

104. **Santa Catarina** (Portuguese for Saint Catherine) is a village in the southwestern part of São Tomé Island in São Tomé and Príncipe. It is named after a stream flowing nearby the village. Santa Catarina is crossed by two main flooding prone Rivers: Lembá and Cantador. The population is about 1.470 (2008) inhabitants live at seaside in wooden precarious houses. The National Institute of Meteorology has an AWS located and there is a local Community Radio.

105. **Ribeira Afonso** is nestledbetween the seaanda small mountain risein the centralsouth ofSãoTomé. The town of RibeiraAfonso is prone to flash floods and becomes alakeon daysofheavy rain. The town is increasingly exposed to the effects of climate variability, in particular strong river flooding and sea storms. When the two episodes coincide, the effects can be particularly devastating for the 1.621. Ribeira Afonso, for example, suffers from 23 flooding days per year on average.

106. **Malanza** is an inlet in the region of São Tomé, the country of Sao Tome and Principe with an average elev**a**tion of 314 meter above sea level and a population of 1,439inhabitants. The area is mildly densely populated with 163 people per km2. Though Malanza can have strong earthquakes (on average one every 50 years), with occurrences at 5-6 Richter, storm surge waves and strong river run-off leading to floods is current major hazard.

107. **Sundy** is a remote place plantation, 1000 m from the coast line 180m above sea level facing NE direction (01º 40' 11.3N, 007º 22' 58.8E) of the Principe Island. Sundy has a small community of around 413 inhabitants surrounded by tropical rainforest. With little regular paid work on the island, most people live outside the cash economy, farming and fishing to supply their families' needs. This site is frequently hit by strong squall line thunderstorms and storm surge waves.

108. This set up of five pilot sites will provide the opportunity for testing the effectiveness of the EWS on "nowcast" weather and hydrological forecasting capacity. The development of these LDCF activities will concur to strong youth employment/job creation and women empowerment initiatives under the Cash-for-Work (CfW) scheme.

Figure 1. Map of São Tomé & Principe showing the five pilot sites where the ICB_EWS will be installed.

109. It will also building on the partnership and Co-financing activities of the World Bank led LDCF project: "*São Tomé and Principe: São Tomé and Principe Adaptation to Climate Change"* focusing on *Coastal Adaptation for Vulnerable Communities"* (2011-2016; $4.1m).

110. In total, the Integrated Community Based EWS (ICB_EWS) in five pilot sites will benefit around 9,050 (Table 3) people, whose combined vulnerability to Climate Change will be significantly reduced in the long run.

Table 3: Project pilot sites communities and numbers of direct beneficiaries of the Integrated Community Based EWS (ICBEWS)

Pilot Sites	Number of Inhabitants	Number of Household	Women %	Youth % 15-24	Main Activities	Main Hazards
Neves	4.107	1.080,7	51,5	20,6	Fishing	Flooding River is the Provaz
Santa Catarina	1.470	386,8	51,5	20,6	Fishing	Two main flooding prone Rivers: Lembá and Cantador
Ribeira Afonso	1.621	426,5	49,5	20,3	Fishing	Ribeira Afonso River prone to flash floods
Malanza	1.439	417,8	48,0	19,0	Fishing	Storm surge waves and strong river run-off leading to floods
Sundy	413	108,6	51,7	21,0	Agriculture	This site is frequently hit by strong squall line thunderstorms and storm surge waves.
Total	**9.050**	**2.420,4**				

2.3.3. UNDP Comparative advantage

111. The proposed project is aligned with UNDP's comparative advantage, as articulated in the GEF Council Paper C.31.5 "*Comparative Advantages of GEF Agencies*", in the area of capacity building, providing technical and policy support as well as expertise in project design and implementation.UNDP's comparative advantage in designing and supporting this LDCF project is particularly strong because of the technical and capacity building focus that the project has. UNDP has strong mandates and capacities to develop national capacities for integrating climate change risks/opportunities into social equity, economic growth and environmental protection issues at all levels of development decision making. Integrating climate change risks into sustainable management of environment and natural resources and into Poverty Reduction Strategies, key national development frameworks and sector strategies is the key business of UNDP in São Tomé and Principe.

112. Furthermore, at the national level, UNDP's comparative advantage for the proposed project lies in its strong track record of 38 years working with GoSTPon complex projects running from environmental and disaster management projects to economic and democratic governance, sustainable development and environmental protection including the gender approach. On Climate Change, UNDP has helped STP to prepare the Initial and the 2nd National Communication to the UNFCCC and the Country's National Adaptation Programme of Action (NAPA) and managed the first joint co-funded project by WB/UNDP to address adaptation to climate changeand is overseeing the implementation of a series of other projects refered to above.

113. This project will be able to draw on detailed country expertise within the UNDP country office, and be able to move rapidly in establishing the first stages of the project as a result.

2.4. Project Objective, Outcomes and Outputs/activities

114. The aim of this proposal is: *to strengthen the EWS of São Tomé and Principe, largely through improving national capabilities to generate and use climate information in the planning for and management of climate induced hazard risks*.

115. This LDCF intervention will be articulated around two components:

Component 1: Transfer of technologies for climate and environmental monitoring infrastructure;
Component 2: Climate information integrated into development plans and early warning systems

Project duration is 4 years starting in 2013with an overall budget of US $ 3,600,000 and the project's outcomes are as follows:

OUTCOME 1. Enhanced capacity of national hydro-meteorological (NHMS) institutions to monitor extreme weather and produce sector tailored weather forecasting.

Baseline – without LDCF intervention

116. The fundamental problem in São Tomé and Príncipe is that a complete EWS, which generates knowledge of the risks (vulnerability & hazard), has capacity to monitor, analyze and forecast hazards, provides communication and dissemination of alerts and warnings does not exist. The infrastructure and technology on which to build these services is lacking in São Tomé and Príncipe e.g. forecasting and monitoring of the coastal zones and weather/hydrological stations to monitor drought and floods across the two islands. Without investing in the capacity to generate information, especially the monitoring and forecasting of climate related hazards, the EWS will never be established and function as optimally as it could.

Hydromet situation

117. The Hydrology sector is led by the Directorate General for Natural Resources and Energy (DGRNE) whichhad in 1960 a monitoring and collection network made up of 13 Manual Hydromet stations distributed over both Islands. Sadly the entire Hydromet network was vandalized and made inoperative between 1980 and 2011.

118. However,in 2012 under the Bilateral Portuguese Cooperation programme two Automatic Hydrometric Stations (AHSs) with water level & flow rate sensors were installed at Bombaim (500 m alt. at the centre of the island) and at Manuel Jorge River (27 m alt. at the coast NE). Bothof these AHS are operating with no direct data transmission facility. Data are manually collected periodically on site.

The DGRNE also carries out periodical manual water level measurements at about 70 locations around the island, lacking however adequate equipment (Water level rulers, water proof boots and special garments) for this task.This monitoring involves the assessmentof water flow and water quality of major Rivers around the country. Multiple manual flow meter measurements are obtained either weekly or monthly through manual collection in situ. Observers take manual readings twice a day and data is collected from electronic data registration cards for download on a monthly basis.

119. In addition, the DGRNE has a hydrological database which was set up with cooperation with The Institute for Water of Portugal under the Bilateral Portuguese Cooperation programme. However, no hydrological modelling is currently being carried out andno flooding or flash flooding warning as they have no direct link to National Institute of Meteorology (NIM) or any institutional data exchange.

Meteorological situation

120. The National Institute of Meteorology (NIM) in 1975 had a total of sixty seven observation stations distributed astwo Synoptic weather stations; nine Agromet stations, sixteen Climatological stations and forty rainfall measuring stations. However, in 2009 INAM has benefited from six Automatic Weather Stations (AWS) delivered by a Portuguese Cooperation SICLIMADprogramme. Of these,twowereSynoptic stations (1 at S.Tomé Island and 1 at Principe Island), two Climatological and two rainfall stations.

121. More recently in 2011, the UNDP - African Adaptation Programmefurther supported the NIMby delivering an additional four AWS of which three were located in S. Tomé Island (Porto Alegre, Bombaim and Santa Catarina) and one at Principe Island (Belo Monte). These late inputs from the SICLIMAD and the AAP-UNDP programmeshas strengthen the NIM weather monitoring network with a total often AWS of which only seven are now operating as follows:five AWS in São Tomé Island (at S.Tomé Airport, Lagoa Amélia, Bombaim, Santa Catarina, Porto Alegre) and two at Principe Island (at Santo António and Monte Santo). The other remaining three AWS are inoperative due to technical faults.

122. Three of these seven operating AWS(at S.Tomé Airport and Lagoa Amelia in S. Tomé Island; and Santo António at Principe Island) do not have direct link for data transmission, requiring periodical travelling to the stations to retrieve the data manually.Themanual stations are in need of attention and strengthening as some sensors are obsolete or missing or mal functioning with broken Stevenson screens. Therefore there is also a need of a complete rehabilitation of the manual stations network to guarantee the frequency of data recording and associated quality.The functioning of electronic and manual meteorological equipment requires a dedicated service and the capacity of NIM and DGRNE to maintain and repair meteorological equipment at the moment is minimal. No IT & Electronics Maintenance and Repair officers are available at both institutions to carry out the daily maintenance duties.

123. As seen, the Hydromet data monitoring network and data handling are of the responsibility of General Directorate of Natural Resources and Energy (DGRNE) and oversees a radial type of watershed covering 116 watersheds and 223 watercourses counting on only two Automatic Hydromet Stations. The monitoring network of the National Institute of Meteorology counts only on seven operating AWSs. The expansion of these monitoring networks or even its maintenance at acceptable level of operation has been problematic for both institutions. However, there are indications that this is changing.The Government has also shown its commitment to improved and maintain meteorological services and to invest in flood control by allocating substantial own resources (US$1.44 million) to these items, in addition to annual decentralized capital expenditures to the development of the pilot communities estimated at about US$0.14 million/year.

Human Capacity and Forecasting capability

124. The National Institute of Meteorology (NIM) trained 35 national technical staff in 2009. However, as a result of recent forced retirement programmesthis number has reduced onlyto 26 of which only 10 are Technical Personnel able to handle data monitoring and forecasting duties. Amongst these 10 there are only 5 Forecasters and two of which are unavailable. No modern forecasting facilities such upper air stations, pilot balloons stations, lightning detection equipmentorradars are currently available.

125. NIM currently generates a number of forecasting products ranging from: seasonal (3-6 months), monthly (30 days), Daily (24h), Aeronautical (30h) and a tendency forecast for the Aviation sector (every 2h). To produce these forecasts NIM counts on access to regional PRESAO 3 Forum forecast products and Internet access to forecast products from regional (Dakar) and international (UK Met Office, Meteo France and Brazil CEPETEC) Centers. The only supporting forecasting facility available is the EUMETSAT-Satellite imagery (PUMA off spring e-station) via AMESD (African Monitoring of the Environment for Sustainable Development) e-station. A second terminal of this facility seats at the Marine Guards Department for sea monitoring activities.

Communication and Early Warning System

126. Accurate prediction of weather and climate events requires country-specific, as well as regional data and information obtained from other countries through good, efficient and reliable communication system namely through regional and global producing Centers. To exchange data and information regionally and globallyNIM is currently disseminating information through the standard WMO communications System. The communication link also provides access to satellite and model data (UKMO, ECMWF, Brazilian numerical models) as well as observations, analyses and forecasts from Regional and Global meteorological Centers. However, the volume of data transmission and reception is reduced due to limitation in the transmission lines and communication capacity available for the Meteorological Services. This means that weather and climate observations from STP are not being effectively incorporated into regional and global circulation models, which decreases the accuracy of downscaling models to the STP context. In addition, there is a lack of advanced workstations and computers. There is insufficient connection speed, storage capacity and memory for basic modern meteorological tasks including satellite image and model data analysis and presentation.

127. São Tomé and Principe currently does not have an Early Warning System. This results from the noteworthy absence of an efficient Hydromet and weather monitoring networks. Thus, the capacity of the country to monitor and generate its own data and information is severely undermined compromising the capacity to detect and predict climate variability and climate change. A combination of non-operational, poorly functioning and obsolete infrastructure as well as poor spatial station coverage is currently reducing the ability of the NIM to provide detailed and accurate weather and climate information and products (including <1 day nowcasts and 1-10 weather, seasonal and climate forecasts) to support communities as well as the economic development of the country**.** Obsolete and inadequate equipment, including few modern forecaster workstations, limits the integration, display and analysis of weather and climate data and its use for forecasting purposes.

128. There is no weather or flood-specific EWS directed to assist vulnerable communities. The current constraints in effective hydrological and weather monitoring, weak communication links and poor dissemination coverage have not allowed the coastal fishing and farming communities to benefit from a tailored weather forecasting or warnings on impending hazards. Current forecast with 24h timeline released daily at 20h00 do not offer effective protection to fishermen at sea.

Associated baseline projects

129. There are several ongoing baseline development projects that are relevant for the proposed outcome:

- **UNDP Pilot Project** on: "Implementing integrated water resources and wastewater management: Integrated management of the Rio Provaz hydrographic basin" with a total funding of **$795,000 (2011-2013)** from GEF and other multilateral agencies. This LDCF project will benefit from the experience already developed on capacity development, awareness campaigns, community base organization developed with the Agricultural and Fishing population where the Integrated Community Based EWS (ICB_EWS) will be active.

- **The Development of TelecommunicationsProject** funded by the World Bank is to provide support to the Second Adaptable Program Lending for Central African Backbone Grant of US$14.9 million. This project will contribute directly to this project through the enhancement of the communications infrastructure in the country and strengthening of communication links amongst and between hydrology, climate and weather data providers (NIM, DGRNE) and the end users (CIAT, CONPREC, ICB-EWS, etc).

- **The SICLIMAD project ("Sistema de Informação Climática e do Estado do Mar para Apoio ao Desenvolvimento Sustentável)**funded by the **Portuguese Cooperation** supporting the National Institute of Meteorology targeting regional climate monitoring (29,000 Euros), providing installation of hydrological monitoring stations (52,800 Euros), and support to local NGOs and associations. The main objective of the project is the strengthening of the hydrological and weather monitoring networks with the installation of two Automatic Hydrometric Stations (AHS) with water level & flow rate sensors and two synoptic stations, two Climatological and two rainfall stations.

- **The AAP- UNDP Climate Change Adaptation project** funded by Government of Japan through the Government of São Tomé and Príncipe (GoSTP). The main objective is to strengthen the hydro-meteorological system by establishing4 weather stations (US$202,500) and 6 river monitoring hydrological stations (US$366,500).

- **The Community Infrastructure Fund (CIF)** funded by several partners (EU, Taiwanese Cooperation) is managed by the Government of São Tomé and Príncipe **(**US$5 million) and has helped to launch several community-based agricultural and social micro-infrastructure projects.

130. In addition, following recent flooding events **the Government of São Tomé and Príncipe** through The Ministry of Public Works and Natural Resources has further allocated about US$1,4 million for urgent coastal erosion and flood control works on major river deltas, including completion of remedial works in Ribeira Afonso, one of the project's pilot community village. This initiative will also benefit this LDCF project in the prevention of flash floods and protection of local communities following an Early Warning for heavy rainfall and coastal storm surge.

Adaptation alternative - with LDCF Intervention

131. Under this component of the project the Government of São Tomé and Principe will be able touse LDCF resources to procure, install and/or rehabilitate critical infrastructure required to build and/orstrengthen the climate-related observational network. This will include installing AHSs and

AWSs as well as rehabilitating existing manual and automatic stations in priority districts and catchments.

132. Capacity development will be undertaken to sustain the enhanced observation network during and beyond the implementation phase of the LDCF project. The outcome will enhance the coverage of spatial variability that exists through the establishment of Integrated Community Based EWS (ICB-EWS) network of 5 pilot sites, especially for rainfall and river flow, to ensure that hydrological, weather and climate data is collected within climate change vulnerable areas in particular at the demonstration pilot sites.

133. This will assist accurate and region-specific weather, climate and hydrological modeling as well as provide a platform for generating early warnings for drought, floods and severe storms. LDCF will finance measures to enhance collaboration between the NIM and DDGRNE for the management and operations of automatic and manual stations, data collection, data analysis, data exchange, data processing and water resource – in particular flood risk – assessment.

134. Data transmission system will be strengthened by improving SMS transmission (for existing manual stations) and GPRS connections (in the case of automatic weather stations). Communications between NIM and DGRNE will be established so to promote data and information exchange for developing accurate drought, flood risk and weather forecasting. Partnerships will be also established with major end users such as the Institutions in the Agriculture sector to share data and information for the development of an Agrometeorology Monitoring Systemto develop a standard seasonal forecasting to support agriculture and in particular cocoa farming.

135. Specifically LDCF funds will build on the above mentioned baseline projects in the following manner:

- **Output 1.1:** 12 Automatic Hydrometeorological stations complete with remote data transmission and archiving and 12 river gauges are installed in São Tomé Island and Principe Island.
- **Output 1.2:** A network of 4 synoptic and 8 climatological automatic weather stations, WMO standard, complete with remote data transmission and archiving are installed and 12 manual WMO standard are rehabilitated to support the establishment of an Early Warning System.
- **Output 1.3:**10 workstations to support, AMESD-SYNERGIE and SADIS systems are installed to strengthen the capacity of São Tomé Airport Forecasting Centre.
- **Output 1.4:** 5 Meteorologists, 5 Meteorological Technicians, 4 Forecasting Superintendent Officers 10 Specialist Superintendent Officers are trained to support EWS data handling and forecasting operations.
- **Output 1.5:** An Integrated Community Based EWS (ICB-EWS) network of 5 pilot sites is established to reduce vulnerability of local fishing and farming communities to flash flooding, stormy weather and develop resilience to drought episodes.

136. Following feasibility assessments and stakeholder consultations conducted between September 2012 and April 2013, LDCF resources will be used to achieve the following outputs:

Costs component 1	
Co-financing:	**US$ 15,695,000**
GEF allocation:	**US$ 2,310,000**

Outputs and activities

Output 1.1: *12 Automatic Hydrometeorological stations complete with remote data transmission and archiving and 12 river gauges are installed in São Tomé Island and Principe Island.*

137. Under Output 1.1 of the proposed project, LDCF resources will be used for the procurement andinstallation of approximately 12 hydrological monitoring stationswith telemetry, archiving and data processing facilities, which will enable the DGRNE to monitor major rivers in watersheds of Cantagalo, Caué, Lembá, Lobata, Água Grande and Mézóxi. All stations will be fitted withappropriate means for relaying data to central servers (e.g. via GPRS or satellite telemetry). 40 manual Hydrometeorological stations will be also rehabilitated in the main watershed. Building onthe rehabilitated hydrological gauges, this equipment would strengthen the goals of PRIASA, PADE andAAP by providing a clearer assessment of available water resources.In turn this allows DGRNE to develop operational watershed monitoring and hydrological modeling for hydromet officers and set up a National Framework for integrating hydrological monitoring network of São Tomé, Principe Islands. In addition the resources made available will allow the developing of necessary training for the setting up of a Hydrological Modeling Unit for flood forecasting to support Early Warning System. This set up will allow DGRNE to have the capacity to identify dangerous floods before they occur, issue warningsfor Local Disaster Risk Management Committees (LDRMC) to alert communities at risk. In order to share data information that can feed Meteorological forecasting modelsa national framework and communication links with National Institute of Meteorology for integration of hydrological data and development of flood and drought risks warning will be established.

Indicative activities

1.1.1 Re-assess needs for hydrological monitoring to support EWS and make complementary provision of equipment and materials (equipment housing, security, personnel);

1.1.2 Procure and Install 12 Automatic Hydrometeorological stations, and 12 river gauges are installed in São Tomé Island and Principe Island;

1.1.3 Procure and operationalise a mobile Hydromet Automatic Station (HAS) for sensor's field calibration, integrating recently installed and existing HAS and interfacing to central data collection & storage system;

1.1.4 Develop a capacity programme in operational watershed monitoring and hydrological modeling for hydromet officers;

1.1.5 Develop a plan and a National Framework for integrating hydrological monitoring network of São Tomé, Principe Islands.

1.1.6 Develop the necessary training for the setting up of an Hydrological Modeling Unit for flood forecasting to support Early Warning System;

1.1.7 Establish a national framework and communication links with National Institute of Meteorology for integration of hydrological data and development of flood and drought risks warning;

Output 1.2: *A network of 4 synoptic and 8 climatological automatic weather stations, WMO standard, complete with remote data transmission and archiving are installed and 12 manual WMO standard are rehabilitated to support the establishment of an Early Warning System (EWS).*

138. Under Output 1.2, LDCF resources will be used for the Procurement and installation or rehabilitation of 4 synopticand 8 climatological Automatic Weather Stations (AWS) all with telemetry, archiving and data processing facilities. Of these 6 will be installed at S. Tomé Island (Angolares, S. Jorge, Boa Nova, Canavial, Neves, Juliana de Sousa); 2 at Principe Island (Infante D. Henrique and Sundy);1at Ilhéu das Rolas; 2 spare AWS for S. Tomé Island; and1 spare AWS for Principe Island. The resources of the project will also be directed for: rehabilitation of 6 manual weather stations @$1000ea; procurement of AWLSs spare parts and equipment; telecommunications infrastructure including computers, computer servers and software, radiotelephones, portable telephones, GSM/GPRS modems and other equipment for internet access; upgrade 12 manual stations - including thermometers, Stevenson screens, manual wind and solar sensors with digital sensors and calibrate thermometers and barometers @$5260ea; installation and construction costs for 32 manual stations, including stabilizing power supply with solar panels, batteries and inverters and upgrading weather fences @$5000ea and replacement of barometers in 12 manual stations @$700ea.

139. This output will promote the establishment of a formal partnership with the providers of GPRS mobile telecommunications to assure the transmission of data from the AWS to São Tomé Airport Forecasting Centre (ST_AFR). LDCF resources will support a programme of rehabilitation of all still functional manned stations (fences, towers etc.) and existing sensors and data loggers are, will be replace as historical observations from the site can be used with newly acquired data to create longer time series for detecting climate changes. This output would strengthen and expand the work undertaken by AAP and by SICLIMAD programmes. Rainfall monitoring network will be rehabilitated by installing news rainfall gauges and replacing those existing but in good working conditions. Therefore, approximately 35 rainfall gauges will be procured and installed to strengthen the NIM, DGRNE and CIAT.

Indicative activities

1.2.1 Re-assess installation sites for AWS and make arrangements (equipment housing, security, personnel) for installation and testing of remote transmission system to São Tomé Airport Forecasting Centre (ST_AFR);

1.2.2 Procure, install and test 4 Synoptic and 8 Climatological AWS with display systems at Tomé Airport Forecasting Centre;

1.2.3 Procure and operationalise a mobile AWS for sensor's field calibration, integrating recently installed and existing AWS and interfacing to central data collection & storage system;

1.2.4 Establish a formal partnership with the STP Telecommunication Companies (CST and UNITEL) towards the sustainable utilization of mobile communication and internet signal for AWS data transfer;

1.2.5 Make procurements for technical services for the refurbishment of ST_AFR and district stations premises to accommodate new forecasting equipment and forecasting supporting facilities;

1.2.6 Procure, install all WMO Climatological standard equipment required to rehabilitate the provincial climatological outer stations;

1.2.7 Procure and install 35 rainfall stations and establish partnerships (schools, farms, fishing cooperatives and NGO's) for the manning of rainfall stations*;*

Output 1.3:*10 workstations to support, AMESD-SYNERGIE and SADIS systems are installed to strengthen the capacity of São Tomé Airport Forecasting Centre.*

140. Under Output 1.3, LDCF resources will be used to procure equipment for monitoring severe weather and supporting weather forecasting.Therefore the LDCF resources will be used to procure and install the hardware and software for upgrading the existing AMESD-SYNERGIE system with provision of update software and installation of a Lightning Detector module based on the forthcoming upgrade of SYNERGIE system by the International providers. As the World Bank led GEF_LDCF project still has not yet made a final decision if to acquire a Radio Detection and Ranging Device-RADAR for sea and weather monitoring, Output 1.3 will also provide the acquisition and installation of a SADIS[15] system which will work as proxy to Radar to support nowcast operations at much cheaper costs. The acquisition and operationalisation of Aviation Data International Service will strengthen forecasting capacity and also the international communication data sharing through the 2-way VSAT- SADIS System.

141. To support all these equipment for monitoring severe weather 10 workstations will be procured and installed so to integrate, display, analyze and provide output of observed and model data as well as other graphical information. These workstations will provide the means to generate calibrated weather forecasts based on inter alia numerical weather prediction model, graphical imagery, surface observations and station-based forecasts.The LDCF resources will also be used to train the human technical Resources to carry out integration of existing equipment in NIM, DGRNE and CIAT to those to be acquired. As part of the activities of this Output a partnership will be established between NIM and the CIAT (Ministry of Agriculture, Fisheries and Rural Development) for collaboration in AMESD-PUMA e-station utilization so to establish an Agrometeorology Monitoring System and online Agromet Advisory Service on a National web Portal.

Indicative activities

1.3.1 Procure and install 10 workstations and upgrade of AMESD_SYNERGIE system to support tailored forecasting;

1.3.2 Procure and install Aviation Data International Service (a 2-way VSAT- SADIS System) to strengthen forecasting capacity;

1.3.3 Re-assess the need for acquisition and installation of LIGHTNING DETECTOR system based on the upgrade of SYNERGY system;

1.3.4 Train 6 IT & ElectronicsHydromet Equipment Maintenance & Repair Officers to support relevant sectors: Agromet (2), Hydrology (2) and Meteorology (2);

[15] SADIS is an operational system dedicated to primarily to aeronautical meteorological information in line with ICAO (International Civil Aviation Organization) worldwide provision. It provides a point to multipoint service on a 24-hrs basis via satellite. The receiving system consists of a 2.4 m diameter-receiving antenna at the receiving unit mounted indoors. A processing displayed system connected to the receiver for generating/viewing/printing the SADIS products. The products received by SADIS are: 1. Upper air wind /temperature, tropopause and maximum wind forecast in GRIB code; 2. Coded digital facsimile charts for upper wind/temperature at selected flight level and SIGWX forecasts; 3. OPMET (operational meteorological) information like METER, TAFS, SIGMET, AIREPs, Volcanic ash and tropical cyclone advisory messages.

1.3.5 Develop partnership between NIM and the CIAT (Ministry of Agriculture, Fisheries and Rural Development) for collaboration in AMESD-PUMA e-stationutilization for the establishment of an Agrometeorology Monitoring System;

1.3.6 In close partnership with NIM, DGRNE and CIAT use AMESD_SYNERGIE system and PRESAO 3 Forum to develop a standard seasonal forecasting to support agriculture and in particular cocoa farming.

Output 1.4: *5 Meteorologists, 5 Meteorological Technicians, 4 Forecasting Superintendent Officers 10 Specialist Superintendent Officers are trained to support EWS data handling and forecasting operations.*

142. Through Output 1.4 LDCF funds will be used to strengthen the technical capacity to make use of the generated data to produce daily to seasonal climate forecasts. Given the reduced number of forecasters available as well as Meteorological technicians to make use of the newly acquired equipment and facilities, a systematic capacity development programme will be supported by the project. Under this programme 5 Meteorologists, 5 Meteorological Technicians, 4 Forecasting Superintendent Officers 10 Specialist Superintendent Officers are trained to support EWS data handling and forecasting operations. The 5 meteorologists will be trained in a sandwich type of approach with some trainings taking place at international Training Centers and other training component carried out in country under a supervision of International consultants to be contracted. Candidates for this training programme will be selected using a gender sensitive approach and primarily from other NIM's existing staff categories. This will link to ongoing activities at the NHMS and will ensure the capacity to run numerical weather prediction models, or be able to usefully generate and use data from these models run elsewhere with the region or at international centres and also disseminate through local media (TV, Radio). The data from these models should be linked to tailored products developed in output 2.2 and in the decision processes in output 2.3 and will make use of the information packaging capacity development programme through Output 2.1.

Indicative activities

1.4.1 In straight alignment with GoSTP investment plan for National Meteorological Institute (NIM) develop in-service and on-the-job capacity development programme for 4 gender sensitive Meteorological Technicians to perform as Forecasting Superintendent Officers (ex-WMO Class III staff category); and 10 gender sensitive Meteorological Technicians to perform as Specialist Superintendent Officers (ex-WMO Class IV staff category);

1.4.2 Establish partnership with WMO Regional Meteorological Centers (Angola, Dakar, Portugal and Brazil) for regional or in-country gender sensitive capacity development of 5 Meteorological Technicians;

1.4.3 Make procurements for the delivery of a regional/internationaland/or in-country weather forecasting capacity development programme for experienced 5 Meteorological Technicians to become Meteorologists;

1.4.4 Develop a capacity development programme for the training of other technical personnel for NIM including 2 Meteorologist Television Weather Presenters.

Output 1.5: *An Integrated Community Based EWS (ICB-EWS) network of 5 pilot sites is established to reduce vulnerability of local fishing and farming communities to flash flooding, stormy weather and develop resilience to drought episodes.*

143. Through Output 1.5 the LDCF resources will be used to establish an Integrated Community Based EWS (ICB-EWS) network of 5 pilot demonstration sites. These ICB-EWS will consist of : i) an array of AWSs located in the vicinity of each of the 5 pilot locations, managed by the NIM; ii) a series of river gauges installed in major Rivers crossing these locations and managed by the water sector-DGRNE; and iii) a network of rainfall gauges installed around the coastal line and managed by The ministry of Agriculture-CIAT, NIM, DGRNE, Community Based Organizations, Schools and AgroFotestry organizations. The AWSs and river flow data will be of the responsibility of NIM and DGRNE respectively and will be shared with end user institutions through Output 2.3. The rainfall data will be collected by all the above referred institutions/organisations and will be made available and also shared through Output 2.3. The LDCF will develop capacitance of Local Community Radios to be able to effectively disseminate forecasts and warnings. Some resources will be used to provide Hand Crank / Solar Powered Weather Alert Radio to fishing communities to be able to receive forecasts and warnings while at sea. Within this setup there will be also a series of environmental awareness actions and support for monitoring and surveillance of local climate features (local knowledge on mechanisms of onset of flash floods and tidal waves and the interaction between extreme rainfall events and sea water invasion on the onset of diseases such as cholera) to foster practices in forecasting. In addition,to build ownership of the (ICB-EWS), Output 1.5 carries a set of small scale community based adaptation initiatives on "Cash-for-Work" scheme to be developed with strong participation of women associations. Through this Output resources will be used to further strengthen the Local Disaster Risk Management Committees (LDRMC) and establish partnership with local NGO's & CBO's for the development of training-awareness programme for local women communities in further assessment of local risk levels and analysis of appropriate mechanisms for dissemination of Early Warnings on extreme weather events.The sustainability of LCDF project interventions will be strengthened through an awareness campaign undertaken by trained trainers to explain to the communities the benefits of the installed equipment and the need to prevent the equipment from being vandalized.

Indicative activities

1.5.2 Establish ICB-EWS units at Neves, Santa Catarina, Malanza, Ribeira Afonso and Sundy by installing an AWS, community manned rainfall gauges network and river monitoring station with strong participation of Women Associations and youth groups;

1.5.3 Establish with a strong participation of women and youth (charcoal producer) a community-based of small-scale adaptation activities for flood and drought resilience in the above five pilot under a "Cash-for-Work" scheme;

1.5.4 Develop capacity and make provision to strengthen Community Radio stations (equipment/battery/Energy solar or wind) in target districts of Neves, Santa Catarina, Malanza, Ribeira Afonso and Sundy, to strengthen nowcast and warning dissemination service to community groups (fishermen, farmers and women association);

1.5.5 Further strengthen the Local Disaster Risk Management Committees (LDRMC) and establish partnership with local NGO's & CBO's for the development of training-awareness programme for local women communities in assessment of local risk levels and appropriate dissemination of Early Warnings on extreme weather events;

1.5.6 In partnership with NGO's, CBO's, local mobile phone provider and other institutions develop community based innovative warning dissemination systems for fishing and farming communities including text and pictorial "sms";

1.5.7 In close cooperation with LDRMC and Local Shore Coordination Officer provide FM-SW radio sets to the fishing communities in pilot sites to enable reception of warnings while at sea.

OUTCOME 2. Efficient and effective use of hydro-meteorological information for generating early warnings and support long-term development plans

144. Much of the value of early warnings (whether a user changes their actions or lives/assets are safeguarded) is dependent on the packaging, communication and dissemination of those warnings. The effectiveness of warnings can be improved either through improving the forecasts/monitoring information, communications or the decision-making process. This Outcome 2 is primarily concerned with improving these aspects of the EWS and will be achieved through development of human technical capacity to use the data collected from the modernized hydromet, weather and climate observation established under Outcome 1 for making early warnings and use the data collated and streamlinedthrough the information management systems for long-term development plans. This Output will also address the issue of packaging information and the establishment of a national system for dissemination.

Baseline – without LDCF intervention

145. Currently, no climate risk or climate change early warning systems exist in São Tomé and Principe.The hydrological sector under the DGRNE does not have a functioning of this Hydrological Modelling Unit neither issue any flood risk forecasting. The NIM is the sole institution in the country issuing weather forecasts. Both of these institutions do not have qualified technical human resources to produce tailored sector forecasts and package information nor have the structure and framework for warning dissemination. Data weather data transmission through the international established channel as the Global Telecommunications System (GTS) is not being fully utilized undermining the dissemination and reception of valuable information required for production of accurate forecasts and effective downscale of information from the regional and international products.

146. The Civil Protection Services including the Fire Brigade and The National Centre for Emergency Operation (CENOE), together with The Army and Marine Coastal Guards are the national institutions fulfilling the role of rescue and response. The Portuguese Cooperation Agency has funded training for the Civil Protection Services in rescue and life saving, within their program of collaboration with the Marine Police, the Civil Protection, Fire Brigade and Police and the Red Cross. However, following extreme flood events in 2008-10, the Government of STP is investing seriously in short-term recovery measures and is looking for further international assistance to strengthen its climate resilience. It identified a source of deep-sea sand as a replacement to beach sand mining and it established a new Council for the Prevention and Response to Disasters (CONPREC); it allocated US$1.3 million in budgetary resources for disaster contingency funds and another US$1.4 million for emergency coastal erosion works; and, with assistance from Taiwan, the African Union, Japan/UNDP, Taiwan, and own resources, it is upgrading the hydrometeorological network. Therefore CONPREC is responsible for the

Disaster Management at GoSTP level, with the role on the dissemination and response aspects of the future EWS.

147. CONPREC has also benefited from parallel Government support with a substantial annual allocation for coastal areas (US$136,000/year) and is earmarking decentralized capital budgets to vulnerable coastal communities (ca. US$35,000/village/year) which could prove key to gradually helping move them to lower risk areas. However, partly due to the Government's limited resources, these measures do not yet take an integrated climate risk-reduction approach, nor do they address community adaptation needs beyond the reconstruction of damaged major transport infrastructure. Regional development plans also do not factor in the projected intensification of weather events associated with changing climate and increasing climate variability.

148. The national capacity and inter-sectoral framework for mainstreaming weather and climate information into national development planning policies, district disaster preparedness and management is almost inexistent. The World Bank led LDCF project has recently (2012) initiated with support of the Directorate General for the Environment (DGA) the establishment of a "Climate Observatory ("Observatório do Clima") information data base to gather environmental data related to Climate Change issues. It is unknown the spectrum of the data to be stored and its final use.

149. The level of performance of NIM and DGRNE has been over the years intrinsically linked to that of the national economy. The GoSTP has recently (2012) passed the National Institute of Meteorology Bill through the Parliament but awaiting implementation. The anticipated impact of the Bill will be the transformation of the STP National Institute of Meteorology into a GoSTP Agency (an autonomous body). Quality Policy, Quality Objectives, Quality Procedures and other Quality Manuals for Quality Management System (QMS) Certification have not yet been developed. The plan is that once the implementation comes into force the process of attaining ISO 9001:2008 certifications will follow. The major revenue sources for NIM are government direct billing, the private sector and government reimbursements.

Associated baseline projects

150. There are several ongoing baseline development projects that are relevant for the proposed outcome:

- **The DFID and IDRC** program, "KSIDS: Capacity Building and Knowledge on Sustainable Responses to Climate Change in Small Island States" (2009-2012) aimed to enable municipal governments in SIDS to incorporate climate change adaptation into long-term planning/decision-making. This included GIS tools to help visualize climate change scenarios[16]. However no practical results are available from these initiatives, (US$200,000);

- The Infrastructure Rehabilitation for Food Security Support Project-**PRIASA** (US$7.8 million) and the second phase of the livestock development project-**PADE II** (7.5 million), financed through **AfDB Group** have developed some initiatives to help small farmers and in particular Cocoa Farmers to reduce their vulnerability to episodes of drought with cross-sectoral capacity-building and infrastructure for irrigation. However, there no indications on the practical the use of weather, climate and hydrological data for crop water management;

[16]http://web.idrc.ca/en/ev-148720-201_105838-1-IDRC_ADM_INFO.html

- The **European Commission** through the *Road Network Rehabilitation and Maintenance Programme* (US$9.3 million), including feeder roads. The road network in São Tome, small by essence, is vital not only to the circulation of goods and persons, and especially crucial for the artisanal fisheries sector, but also in Early Warning response and rescue particularly during landslide occurrence.

- The **World Bank** led GEF-LDCF project: *"Sao Tomé and Principe: São Tomé and Principe Adaptation to Climate Change" focusing on Coastal Adaptation for Vulnerable Communities"* (2011-2016; $4.1m). This project includes activities in two components which though no Co-financing will be seek this LDCF will be build on somespecific actions on**Component 1:** Establishment of an early warning system for coastal communities and near-shore fisheries (LDCF US$1.44 million, Co-financing US$0.66 million);and on **Component 2:**Community Preparedness (LDCF US $0.43 million, Co-financing US $0.07 million) and Coastal Protection for Vulnerable Communities (LDCF US $1.33 million, Co-financing US $10.01million).

- The **Government of São Tomé and Príncipe** (GoSTP)support to the Council for the Prevention and Response to Disasters (CONPREC), comprised of representatives from 15 sectors and NGOs, for implementation of mobilization of coastal communities into disaster management committees which this LDCF will benefit from and will be part of the EWS strategy in dissemination and response flash floods and other climate related hazards (US$1.4 million).

- The **Government of São Tomé and Príncipe** (GoSTP)strengthening of hydro-meteorological system with rehabilitation of 6 river monitoring hydrological stations (US$366,500) and installation of 4 weather stations (US$202,500);

- The **Government of São Tomé and Príncipe** (GoSTP support to The Ministry of Public Works and Natural Resources with US$1,4 million for urgent coastal erosion and flood control works on major river deltas, including completion of remedial works in Ribeira Afonso. This initiative will also benefit this LDCF project in the prevention of flash floods and protection of local communities following an Early Warning for heavy rainfall and coastal storm surge.

- The **African Monitoring of the Environment for Sustainable Development (AMESD)** Project. The project was entrusted to the Niamey-based Regional Centre for Training and Application of Agrometeorologyand Operational Hydrology (AGRHYMET). This represents a baseline investment of approx. $27 million. Of this, $2 million will count as baseline for this project.

Adaptation alternative - with LDCF Intervention

151. Under this component of the project the Government of São Tomé and Principe will be able touse LDCF resources to effectively put in place an Early Warning System through a set of integrated actions directed to enhance capacities of relevant national level partners i.e. the National Institute of Meteorological (NIM), The hydrological sector-DGRNE, The Ministry of Agriculture-CIAT all CONPREC Members including The Coastal Guards, Civil Protection Service, The Directorate General for the Environment, the STP Red Cross Society, The Ministry of Health.Support, guidance and training will be given to CONPREC to be able to establish the legal framework for standardized processes, mandates, roles and responsibilities of all organizations involved in generating and issuing warnings in São Tomé & Principe.

152. At the national level, the capacity to analyze and process integrated forecast information will be strengthened through training in tailored Weather Forecasting and Special Warning Packaging, investments into equipment including advanced workstations, computer soft- and hardware, and very importantly through improving the communication system of dissemination and data relation back to the end user. Internal communication system amongst all concerned stakeholders and international data dissemination will be strengthened. LDCF resources will also strengthen the international and global communication capability for data transmission.

153. Weather, climate and hydrological data handling and data sharing mechanism will be systematized and Climate Change risk/vulnerability GIS based information to support integration CC risks into national policies and plans will be developed. The LDCF will support the General Directorate of Environment (DGA) and will build on the initiative launched by the World Bank led LDCF to strengthen the "Climate Observatory ("Observatório do Clima"). In close collaboration with CIAT (Centre for Investigation of Agricultural Techniques), and using the "Climate Observatory database and GIS technology, agromet sector warnings to support farming management and to strengthen resilience to climate change induced droughts will be developed.The LDCF funds will also help NIM to develop a Plan for financial sustainability based on cost-recovery service provision to support future EWS operation and maintenance.

154. Expressly LDCF funds will build on the above mentioned baseline projects in the following manner:

- **Output 2.1.:**15 Meteorologists and 6 Hydrologists are trained in tailored Weather Forecasting, Special and Warning Packaging. (DGRNE, NIM)
- **Output 2.2.:**Sector tailored early warning products – based on interagency harmonized agreements and international standards and protocols – are developed and made accessible to Disaster Management structure in STP. (NIM)
- **Output 2.3.:**National capacity and inter-sectoral framework for mainstreaming weather and climate information into national development planning policies, district disaster preparedness and management is built specifically targeting Neves, Santa Catarina, Malanza, Ribeira Afonso and Sundy. (DGA)
- **Output 2.4.:**National (Civil Society and Government) Communication Channels, dissemination and response mechanisms, including "sms" text and pictorial alerts are established. (CONPREC)
- **Output 2.5.:**A Plan for financial sustainability based on cost-recovery service provision to support future EWS operation and maintenance developed and implemented, including the operationalisation of a public-private platform. (DGRNE/NIM))

155. Following feasibility assessments and stakeholder consultations conducted between September 2012 and April 2013, LDCF resources will be used to achieve the following outputs:

Costs component 2	
Co-financing:	**US$ 24,600,000**
GEF allocation:	**US$ 1,110,000**

Outputs and activities

Output 2.1.:*15 Meteorologists and 6 Hydrologists are trained in tailored Weather Forecasting and Special Warning Packaging.*

156. The capacity to make and use daily to seasonal climate forecasts will be developed through Output 2.1. Partnerships between Regional and International Meteo Centres will be established including WMO Regional Centres, ACMAD to build synergies with African Regional Early Warning System developed by ACMAD's through ViGiRiC project and develop, install and operationalise a Nowcast, Medium and Short term forecasting system of quantitative rainfall and other extreme weather events for São Tomé & Principe. To sustain these system LDCF resources will be used to capacitate 15 Meteorologists to run numerical weather prediction models and be able to usefully generate and use data from these models run elsewhere with the region or at international centres. In addition 6 Hydrologists will also be capacitated in hydrological simulation modeling to be able use national and international weather and hydrological datato generate information necessary to develop flood risk forecasting. The project will support the establishment of a national framework for the integration of sector tailored weather forecasting and hydrological forecasting and Disaster management elements to feed future Early Warning System. The project will foster a partnership between CIAT (Centre for Investigation of Agricultural Techniques) and ClimDevAfrica programme so to transfer the necessary know-how for the development of agromet sector warnings to support farming management.

157. The LDCF funds will be used to procure international consultancy to carry out a capacity development programme to be delivered in country to train 15 meteorologist and 6 hydrologists in programme in sector tailored weather forecasting techniques and information packaging. This will build on the work of the SICLIMAD project and will strengthen the ability to provide warnings e.g. for the coastal regions. Special training for EW packaging in local languages to assist fishing communities and farmers will be also developed.The data from these models will be linked to tailored products developed in output 2.2 and the decision processes in output 2.3.

Indicative activities

2.1.1 Establish the necessary partnerships with Regional and International Meteo Centres (including WMO Regional Centres, ACMAD) to develop, install and operationalise a Nowcast, Medium and Short term forecasting system of quantitative rainfall and other extreme weather events for São Tomé & Principe;

2.1.2 Develop a capacity programme in sector tailored weather forecasting techniques and information packaging for all NIM meteorologists;

2.1.3 Develop capacity programme in hydrological modeling and sector tailored hydrological forecasting techniques and information packaging for hydrologists;

2.1.4 Develop community based EW packaging in local languages to assist fishing communities and farmers;

2.1.5 Establish a national framework for the integration of sector tailored weather forecasting and hydrological forecasting and Disaster management elements to feed future Early Warning System;

2.1.6 Establish partnerships to build synergies with African Regional Early Warning System developed by ACMAD's through ViGiRiC project;

2.1.7 In close collaboration with CIAT (Centre for Investigation of Agricultural Techniques) and partnership with ClimDevAfrica programme, develop agromet sector warnings to support farming management to strengthen resilience to climate change induced droughts.

Output 2.2.:*Sector tailored early warning products – based on interagency harmonized agreements and international standards and protocols – are developed and made accessible to Disaster Management structure in STP.*

158. Output 2.2 will develop new tailored products 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. Information and data from the monitoring infrastructure (weather, hydrological stations and satellite monitoring) will be combined to produce new user-relevant information. The Forecasting Centre of National Institute of Meteorology and the DGRNE Hydrological Forecasting Centre will be both strengthened by providing allnecessary IT infrastructure to be connected to data monitoring and collection network, advanced workstations to acquire global products to downscale to STP locations and conditions and by Renewing or purchasing Numerical Prediction Models and hydrological modelling licenses to produce accurate tailored forecast and analysis.

159. The LDCF resources will be used to procure technical assistance to guide CONPREC to establish a legal framework for standardized processes, mandates, roles and responsibilities of all organizations involved in generating and issuing warnings in São Tomé & Principe. The same Consultancy will deliver training programme for CONPREC Members, The Coastal Guards and Civil Protection Services to learn how to harmonize agreements and interagency protocols to ensure consistency of early warning management (language and communication channels where different hazards are handled by different agencies).

160. Still using the same technical consultancy a national framework involving NIM, DGRNE, CIAT and CONPREC will be developed and established for the development of sector tailored early warning products including colour-coded advisories, watches and warnings for flood, drought, severe weather and agricultural stresses by integrating and customising standard forecasts.

Indicative activities

2.2.1 Strengthen NIM Forecasting Centre by providing: i) necessary IT infrastructure to be connected to data monitoring and collection network, to able to transmit, analyze, exchange and archive the data from multiple systems and end users; ii) advanced workstations to acquire global products to downscale to STP locations and conditions and produce accurate tailored forecast and analysis; iii) Renewal/purchase of Numerical Prediction Models and operation licenses;

2.2.2 Setup/strengthen the DGRNE Hydrological Forecasting Centre by providing: i) necessary IT infrastructure to be connected to data monitoring and collection network, to able to transmit, analyze, exchange and archive the data from multiple systems and end users including WHYCOS (World Hydrological Cycle Observing System); ii) advanced workstations to acquire global products to downscale to STP locations and conditions and produce accurate tailored forecast and analysis; iii) Renewal/purchase of hydrological modelling licenses (e.g MIKE BASIN) including training for two (2) DGRNE technicians with modeling software and development of flood risk warning;

2.2.3 Support CONPREC to guide establishment of legal framework for standardized processes, mandates, roles and responsibilities of all organizations involved in generating and issuing warnings in São Tomé & Principe;

2.2.4 Develop and deliver training programme for CONPREC Members, The Coastal Guards and Civil Protection Services to learn how to harmonize agreements and interagency protocols to ensure consistency of early warning management (language and communication channels where different hazards are handled by different agencies);

2.2.5 Establish a national framework involving NIM, DGRNE, CIAT and CONPREC for the development of sector tailored early warning products including colour-coded advisories, watches and warnings for flood, drought, severe weather and agricultural stresses by integrating and customising standard forecasts;

2.2.6 Conducted household surveys of targeted users of climate information to understand the social and economic costs and benefits of using advisories and warnings for ex-anti risk management in agriculture and water management.

Output 2.3.:*National capacity and inter-sectoral framework for mainstreaming weather and climate information into national development planning policies, district disaster preparedness and management is built specifically targeting Neves, Santa Catarina, Malanza, Ribeira Afonso and Sundy.*

161. Assimilating the forecasts from output 2.1 and tailored products from output 2.2 into existing EWS activities and processes is the aim of Output 2.3. This will involve assessing the information needs of different decision-making processes e.g. for flood warnings, drought warnings, food security, water management etc and designing a set of information products that will inform the process. ExistingEWS for particular sectors (e.g. Agromet and floods) can be used to extend knowledge and skills to other sectors which need similar EWS and experience. Climate monitoring information from component 1 and forecasts from output 2.1 will be combined to identify regions where risks are currently high and likely to get worse. Where necessary satellite imagery will be used to assess the current extent of climate-related hazards and this information will be combined with agricultural (crop), flood risk or other sectoral models to help the decision making process. In this context Project funds will foster Establish Partnership between NIM, DGRNE and CIAT (Ministry of Agriculture, Fisheries and Rural Development) and in cooperation with ongoing AGRHYMET programmes for exchange of data and develop an online agricultural advisory forecasting service to support cocoa & coffee farming against "Harmattan" impact. Training on the use of GIS technologies will be provided where needed. 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 digitised and used to better describe local microclimates, hence improving the baseline hazard mapping. International or national consultancy will be procured with LDCF funds to assist integration of CC risk/vulnerability information into the National and District disaster preparedness and management Plans particularly for the districts of Neves, Santa Catarina, Malanza, Ribeira Afonso and Sundy.

Indicative activities

2.3.1 Provide CLIMSOFT facilities for data treatment (digitalization) and quality control and high capacity data storage, workstation GIS equipment and training on risk/vulnerability assessments techniques;

2.3.2 Support the establishment of a partnership between The Coastal Guards and the Observatory Centre ("Observatório do Clima")at the General National Directorate of

Environment (DGA) for the operationalisation of an AMESD remote workstation at DGA to support and facilitate the strengthening of "Observatório do Clima" built under the WB-GEF project;

2.3.3 Facilitate inter-institutional data sharing and production of climate risk/vulnerability assessments to satisfy EWS requirements.

2.3.4 Develop CC risk/vulnerability GIS based information to support integration CC risks into national policies and plans;

2.3.5 Procure and hire technical advisory services to support the integration of CC risk/vulnerability information into the National and District disaster preparedeness and management Plans particularly for the districts of Neves, Santa Catarina, Malanza, Ribeira Afonso and Sundy;

2.3.6 Establish Partnership between NIM, DGRNE andCIAT (Ministry of Agriculture, Fishries and Rural Development) and in cooperation with ongoing AGRHYMET programmes for exchange of data and develop an online agricultural advisory forecasting service to support cocoa & coffee farming against "Harmattan" impact.

Output 2.4.:*National (Civil Society and Government) Communication Channels, dissemination and response mechanisms, including "sms" text and pictorial alerts are established.*

162. Output 2.4 will establish communication strategies and processes targeted to each identified sector and user. The aim is to effectively communicate early warnings, and advisory packages developed through Output 2.3, in the most useful way for different users/audiences. The priority will be to use project funds to provide DGRNE and NIM with an updated observations and data communication system suitable for inclusion in the Global Telecommunications System (GTS). LDCF resources will also be used to strengthen dissemination and response communication system of all CONPREC Members in particular the National Centre of Emergency Operations for Civil Protection, Fire Brigade, CENOE, CIAT, The Costal Guard, &Local Disaster Risk Management Committees (LDRMC).The strategies to achieve this will vary as communications technologies, language and cultural norms vary. Optical fibre and special software and technology will be used in innovative ways in particular the mobile SMS-FrontLine technology to assist Local Disaster Risk Management Committees (LDRMC) in remote and vulnerable coastal areas. The project will also support regular national drills involving all actors of future EWS to test effectiveness and readiness of the system.

Indicative activities

2.4.1 Provide DGRNE and NIM with an updated observations and data communication system suitable for inclusion in the Global Telecommunications System (GTS) for global and regional circulation in close cooperation with GEO (Group on Earth Observations), AfriGEOSS and the WMO regarding the Global Framework for Climate Services;

2.4.2 Strengthen communication system of National Centre of Emergency Operations for Civil Protection (CENOE), CIAT, (Centre for Investigation of Agricultural Techniques) endowed with the necessary means and sufficient resources for its operation complementing with all other on-going initiatives (WB – GEF, EU);

2.4.3 Strengthen The Costal Guard communication network for EWS dissemination/response and coastal disaster information management with provision of at least 50 ("AquaQuake") VHF IC-M71 radios;

2.4.4 Strengthen The Civil Protection & Fire Brigade communication network for EWS response operations and disaster information management with provision of at least 50 VHF radios;

2.4.5 Make procurements for acquisition and installation of two-way communication network using optical fibre for intersectoral management of warnings connecting all stakeholders in the Monitoring and Warning and Dissemination and Response operations of future EWS;

2.4.6 Develop and establish a EWS two-way communication and dissemination systems tailored to the needs of target communities using the already established Local Disaster Risk Management Committees (LDRMC) and providing at least 7 (one for Principe Island) mobile SMS-FrontLine technology equipment;

2.4.7 Undertake field visits and stakeholder consultations to understand how users of early warning advisories and warnings use the information for managing climate and weather related risks and how their decision frameworks affect the interpretation of advisories and warnings;

2.4.8 Conduct regular national drills involving all actors of future EWS to test effectiveness and readiness of the system;

Output 2.5.:*A Plan for financial sustainability based on cost-recovery service provision to support future EWS operation and maintenance developed and implemented, including the operationalisation of a public-private platform.*

163. Output 2.5 will assess the sustainability of the EWS, taking cognizance 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. LDCF funds will used to contract technical assistance to help NIM to carry out a comprehensive needs assessment for climate services (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 private and public. Where suitable legal arrangements exist and where 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. The same contract of technical assistance will, in collaboration with GoSTP carry out studies to establish a Plan and a financial framework based on cost-recovery service provision for NIM sustainability in the context of forthcoming transformation into STP Meteorological Agency. Similar activities within the country or region will be approached to learn from their experiences (e.g. the Weather Information for Development (WIND) initiative in Kenya). No baseline projects were identified with this output at this stage. To ensure sustainability of monitoring networks public-private cost-recovery partnerships and service level agreement between the NIM and DGRNE and national internet service provider will be fostered with regards to start-up costs for servers and modems as well as running bandwidth costs for internet connection to collect, analyse, exchange and archive data.

Indicative activities

2.5.1 Develop a communication and awareness raising strategy for targeted GoSTP stakeholdersand EWS private end users to inform on potential benefits of EWS products;

2.5.2. Carry out an inventory of private stakeholders likely to become potential EWS users and prepare a technical plan underlining private sector contribution of EWS establishing partnerships in particular with the Internet and mobile phone providers;

2.5.3 Engage in inter-institutional consultation for the establishment of an EWS platform and National Fund budget line using GoSTP yearly sectoral budgets (CONPREC, CST, EMAE, Coastal Guards, ENAPORT, ENASA, CIAT);

2.5.4 In collaboration with GoSTP carry out studies to establish a Plan and a financial framework based on cost-recovery service provision for NIM sustainability in the context of forthcoming transformation into STP Meteorological Agency;

2.5.5 Establish and operationalise a public-private platform for risk management to engage private sector in climate proofing;

2.5.6 Establish a public-private cost-recovery partnership and service level agreement between the NIM and DGRNE and national internet service provider with regards to start-up costs for servers and modems as well as running bandwidth costs for internet connection to collect, analyse, exchange and archive data

2.5.7 Organize bi-annual workshops, seminars and dialogue sessions for senior policy makers to raise awareness of the climate change issues and adjust the needs for EWS.

2.5. Key indicators, risks and assumptions

164. The proposed project indicator framework follows the GEF-5 Adaptation Monitoring and Assessment Tool (AMAT) and is aligned with the UNDP M&E Framework for Adaptation. Objective level indicators and outcome level indicators are specified according to the UNDP nomenclature of Results Based Management (RBM). The project design further foresees the development of more specific M&E tools, especially at the local implementation level. Participatory local level M&E can be a powerful management and communication tool, especially tracking and demonstrating project results at the demonstration sites. It is foreseen that a more detailed M&E project framework is developed during the project inception phase for national management purposes.

165. An overall project M&E plan has been devised and is included in the respective section of the project document below. It foresees the regular progress reporting, as well as audits, a mid-term evaluation and an end of project evaluation.

166. The outcome indicators are designed to measure changes in the coverage, impact, sustainability and replicability of the project outcomes. The project indicators are as follows (Table 4):

Table 4. Outcome indicators

Indicator	Time scale and Measurement
Outcome 1.*Enhanced capacity of national hydro meteorological (NHMS) and environmental institutions to monitor extreme weather and climate change*	
Indicator 1 1. *Percentage of national coverage of climate monitoring network.* (baseline: 20%; target: >60%)	Time Frame: By end of Project Measured by: Capacity assessment scorecard.
Indicator 2	Time Frame: Mid Term and by end of Project

Indicator	Time scale and Measurement
2. Frequency data transmission (baseline: 6 AWS x once daily; target: 18 AWS x twice daily)	Measured by: MidTerm Review,PIR reports;
Outcome 2. *Efficient and effective use of hydro-meteorological and environmental information for making early warnings and long-term development plans.*	
Indicator 1 *1. % of population with access to improved climate information and related hazard rainfall warnings (disaggregated by gender). Baseline (20%,30%). Target (30%, 45%)*	Time Frame: Mid Term and by end of Project Measured by: *MidTerm Review and Final PIR Report.*
Indicator 2 *2. Number of GoSTP development Plans and land-use plans at National/District level incorporating climate change risks into their design.* (baseline: 0; target 2)	Time Frame: By end of Project Measured by: PIR
Indicator 3 *3. Sector-specific strategies and plans that integrate climate change risks in particular at coastal districts.*	Time Frame: By end of Project Measured by: PIR

167. Risks that could potentially affect the success of the project are included with recommended countermeasures in Annex 1.

RISKS	ASSUMPTIONS
São Tomé and Principe does not have enough government financing to continue monitoring and to cover recurring O&M costs	São Tomé and Principe has enough government financing to continue monitoring and will consider recurring O&M costs for new infrastructure in government budget lines because of the utility of EWS/CI
Poor co-ordination among implementing and executing agencies	There is sufficient political support and capacity within the EWS agencies for successful execution and implementation of the project
The project cannot resolve the lack of coordination between EWS agencies and with EWS-related initiatives to improve the ability to work cross-sectorally	The project will resolve the lack of inter-agency and inter-project collaboration and their ability to work cross-sectorally
New climate infrastructure is not extensive nor reliable enough to support improved forecasts	Forecasts will be improved by local data assimilation collected from new climate/weather monitoring infrastructure
Telecommunication (SMS) communication systems used for data transmission from manual stations will be robust enough to be able to effectively contribute to EWS/CI	Manual equipment rehabilitated with enhanced SMS communication systems will not limit transmission of hydro-meteo data
Continuity breaks in National Hydro-meteorological services due to the work required with new equipment installation and other project needs	There is and will continue to be sufficient qualified personnel within the NHMS to handle the new equipment, data transmission/storage/treatment
Lack of qualified personnel within the NHMS to operate	Ministry of Public Work, Natural Resources, Energy

and maintain new equipment, data transmission/treatment/storage processes and forecasting models	and Environment (MoPWNREE) is able to recruit enough technical personnel for project implementation.
NHMS personnel leave the ministry and are unable to transfer knowledge	TORs mandating that new trained personnel must stay within their agency for 5 years will support knowledge sharing.
Natural disasters damage infrastructure (particularly floods)	Equipment are robust enough or there are sufficient spare parts to handle infrastructure damage caused by natural disasters (e.g., floods)
Data sharing is hindered by lack of coordination / willingness of agencies to share data or by technical constraints (e.g., bandwidth issues or local mobile telecommunication networks)	Data sharing protocols can be agreed upon between information production agencies and the DRM and data can be presented in a sufficiently utilitarian way for local application. Data sharing will not be hindered by lack of coordination between agencies or by technical constraints such as bandwidth issues or local mobile telecommunication networks
Relevant ministries do not have a vested interest to fully integrate EWS/CI into their disaster risk planning and poverty- reduction strategies	The Ministry of Planning and Finance and the Ministry of Interior, Ministry of Public Work, Natural Resources, Energy and Environment (MoPWNREE) will have a vested interest to fully integrate climate information into their poverty reduction strategies and disaster risk management plans due to the utility of EWS/CI for long-term planning cross-sectorally
NHMS does not have enough capacity to tailor climate products to suit vulnerable populations and private sector needs by the end of the project	NHMS will acquire enough capacity to tailor climate products by the end of the project
False alarms	False alarms may occur but enough awareness has been provided to end-users to understand the reality of forecasting uncertainty and to inform them how they can get involved to improve early warnings and tailor CI suited to their needs
Procurement and installation of equipment is delayed due to slow release of funds, lengthy administration processes and deficient data transmission systems locally.	UNDP supervision will ensure that funds are released on time for speedy procurement processes and international and national technical assistance will be in place for equipment installation, testing and operationalisation.
There are not enough AWS transmitting data by the end of the project;andno SADIS/SYNERGIE systems to support forecasting; and not enough trained forecasters capable of producing accurate forecasts.	The technical assistance foreseen by the project will ensure that by the end of the project at least 12 AWS will be transmitting daily weather data and that there will be sufficient supporting facilities (SADIS/SYNERGY) and sufficient number of forecasters properly trained.
Early Warnings do to not reach local radios in the communities and local Radios are not capacitated to receive and broadcast early warnings.	The project foresees capacitance and support to local radios and the identified community radios are willing to be capacitated and cooperate.

2.6. Cost-effectiveness

168. In order to fully monitor and contribute to the adaptive capability of the country to climate change, a good network of meteorological stations fully equipped to adequately monitor the parameters responsible for initiating and propagating the change is therefore very imperative. Strengthening the adaptive capability of the country to climate change impacts was identified in the NAPA as an urgent and immediate adaptation priority, with the highest immediate cost-benefit ratio. The project is fulfilling NAPA's four out of twenty two identified urgent and immediate priority adaptation options that require urgent attention. Additionally, the project has been designed to complement and build on the on-going work of line agencies including other major donor-assisted projects as described in detail in Section 2.3, thereby increasing its efficiency, cost-effectiveness and sustainability.

169. All costs for inputs, human resources, supplies are meant to be competitive, both in national and international context. The project aims to reach a total of direct and indirect beneficiaries benefiting from community livelihood enhancement brought about by the Integrated Community Based EWS, of approximately 9,050 people with an average investment of US$440 per each member of vulnerablecommunity directly affected by the project(total LCDF budget, including management cost). The tangible benefits coming from this investment per household will be far outweighing the cost.

170. This LDCF project is not a standalone project; it is part of a wider multi-country programme that will implement similar initiatives on climate information and Early Warning Systems in at least 10 countries in Africa (including Benin, Burkina Faso, Ethiopia, Liberia, Malawi, Sierra Leone, São Tomé & Príncipe, Tanzania, Uganda and Zambia). Synergies between these projects will be used to enhance the cost-effective hiring of specialized technical staff, coordination of data and information (including inter-country sharing where feasible), training (operations & maintenance of equipment; forecasting techniques; tailored advisories and warnings), and effective use of communications and standard operating procedures.

171. Surveying the technical support needs for each country a set of common specialized technical staff were identified, each with particular skills related to the development of hydroclimatic observing systems, the effective design and implementation of standard operating procedures and tailored warnings/advisories, as well as the communication of advisories/warnings. Hiring 3-4 full-time technical staff, which can provide the needed support for all countries, will be more cost effective than hiring the same staff as consultants for each country. Further benefits include time saved on HR procurement procedures (e.g. for hiring, advertising etc.) and the ability to compare and standardize support across countries where possible. UNDP will directly undertake the recruitment for all project staff who will support all countries in this multi-country programme.

172. Training and capacity building for operations and maintenance of the hydromet infrastructure and for modeling and forecasting (Outputs 1.3, 1.4 and 2.1) can also be done at a regional level, bringing together participants from all countries to encourage knowledge sharing and the development of collective skills. This has several advantages, namely: i) promoting the sharing of information and learning between countries; ii) encouraging discussions of best practices i.e. what works, reasons for failure etc; and iii) increasing the effective pool of skilled resources which each country can draw upon (increasing the potential for future trainings to be conducted by experts within the region). Such activities will be closely coordinated with other regional and international partners/centres e.g. WMO/GFCS, ICPAC etc.

173. Regional support will also be used to help strengthen the development of standard operating procedures (both the procedures themselves and their legal basis), for the issuing and communication of warnings/advisories, where possible incorporating warnings issued by neighbouring countries e.g. in the case of shared watersheds (Output 2.2). Where private sector engagement (Output 2.5) includes multi-national corporations, regional support will assist engaging head offices in multiple countries, increasing the total effective services being offered and hence bargaining position of each government. In the case of mobile (cellular) communications (which may be used for both disseminating alerts and the collection

of data used to generate alerts), the regional support programme will leverage collective negotiations for data services, as well as engaging with corporate social responsibility programmes to enhance services where possible.

174. In addition, this initiative being part of a GEF funded multi-country programme means there is significant scope for many activities to be coordinated at the regional level thereby enabling economies of scale, which reduce costs and increase effectiveness (especially in terms of knowledge generation and training). In particular activities under Output 1.1 and 1.2, which will procure hydrological and meteorological equipment, will benefit from the core technical staff who will help design and identify appropriate cost-effective observing networks. Activity 1.4.2 and 1.4.3 of output 1.4 (as well as activities under outputs 2.1) can also be implemented in collaboration with other countries to provide training on infrastructure operations and maintenance, weather and climate forecasts and development of tailored warnings/advisories e.g. activity 2.1.2 and 2.1.3 which focuses on training of forecasters and modellers. Furthermore, this project is also designed with several strong baseline projects and investments in place one of which is described in Section A7 of this CEO Endorsement and others in Section 2.3 of Project document. Building on such strong baseline projects provides a unique opportunity for cost-effective planning of key interventions. Consequently, from the perspective of further cost effectiveness, the design of this LDCF has been based on a complementarity approach to all investment and capacity development programmes currently underway through the identified baseline projects. Specifically all investments planned by this LDCF in terms of Automatic Weather Stations (AWSs) were considered taking into account the investments already made or to be made during the lifetime of the project (2013-2017). As such, the number of AWSs outlined in Output 1.2 will complement those six already installed by SICLIMAD project ("Sistema de Informação Climática e do Estado do Mar para Apoio ao Desenvolvimento Sustentável") and the four AWSs installed in 2011 under the AAP- UNDP Climate Change Adaptation project funded by Government of Japan *"Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa - São Tomé and Príncipe"*.

175. Similarly, the planning of the capacity development programme outlined in Output 1.4 and Output 2.1 was carried out based on the potential synergies identified during the PPG phase. The number of technicians to be trained by this LDCF will also complement (i) the three (3) meteorologists trained under SICLIMAD project.

176. At international level, coordination amongst the various countries targeted by this EWS programme will be enhanced by:

- A dedicated highly specialised technical assistance that will be delivered to support the Implementing Partner in the various countries of this EWS programme using common resources from a pool of project based chief technical advisors (hydrological and meteorological specialists assisting weather, climate and hydrological observation systems and forecasting, communication systems, knowledge sharing, SOPs and fund mobilization) under a regional based coordination. This approach will lower the global costs required to procure and assist countries at individual level.
- Regional level linkage to Weather/Climate Centres/Institutions such as ACMAD, AGRHYMET, WMO, Regional Climate Outlook *Fora* (PRESAO, SARCOF, GHACOF, etc.) facilitating the integrating of systems and coordination of training/capacitance, forecast product access, etc.
- The up-scaling capacity of lesson learnt from each individual country and replication opportunity of good practices across all countries that this regional support facility will benefit to all EWS Projects in the region, helping to smoothly overcome similar constraints and problems that will be encountered during project's implementation.

177. Moreover all projects under this EWS programme are dedicated to weather and climate monitoring, identification and assessment of vulnerability and risks to climate change hazards and impacts, improvement of national forecasting capacities and best ways of disseminating warnings as well as response. Therefore, monitoring equipment to be used by individual countries, though of different manufacturers and makes they should follow WMO standards. The same applies for training and capacity development activities that can be developed at regional level or under countries partnerships. Though delivered by different training organizations and institutions they should obey WMO specifications and standards.

178. Also, to ensure a consistent and systematic up-scaling of lesson learnt and replication opportunity of good practices across all countries, yearly regional technical conference can be organised to joint all Project's Management Units (PMU) so to assess countries' achievements and shortfalls and discuss new approaches, methodologies and techniques to overcome possible identified constraints particularly after project's mid-term review.

179. Furthermore, LDCF project activities will build on existing networks, achievements and planned actions by NIM and DGRNE. This will allow institutional capacity to be built cost-effectively, ultimately assisting in planning and implementing the early warning system. This approach of complementing existing, related projects is more cost-effective than if the implementation of a separate initiative, as it will allow the LDCF project to be managed within the existing institutional and management frameworks. The LDCF project will also work closely with existing NIM and DGRNE projects to co-produce outputs. This will promote cost-sharing with these other projects, reducing overheads and enhancing cost-effectiveness.

180. Lessons learned from on-the-ground climate monitoring and early warning interventions will be captured and disseminated through *inter alia*: i) in-house training for meteorologists; ii) internships in national meteorological hydrological services; iii) a weather and climate information online platform; and iv) a toolbox that will include courses, handbooks and manuals. This integrated approach provides a cost-effective manner of informing an extensive range of stakeholders, which include government technical staff, policy-makers, restoration practitioners, scientists, university students, school children and the general public.

181. Finally with regard to procurement of project inputs, standard procedures of the GoSTP and UNDP will be carefully applied to ensure value for money in all purchases of goods and procurement of services for the project, and the project will use strict internal and external audit controls that meet international standards.

2.7. Sustainability

182. To sustain the LDCF project interventions beyond the project implementation period, ownership of the LDCF project by government structures (primarily the National Institute of Meteorology and Directorate General for National Resources and Energy) is essential. Consequently, relevant government departments, as well as local communities, need to be involved in the design and implementation of project interventions. This participatory approach has been initiated through collaboration with national government departments in designing the LDCF project approach and interventions. Implementation of the project activities will include technical capacity building focused on appropriate government departments that will coordinate and/or support the implementation of the LDCF project. Furthermore, local communities will be consulted during the development of early warning systems in all selected pilot sites and major EWS end users. Community needs will therefore be addressed by the LDCF

project, which will encourage community ownership of the project's activities. Government staff will be involved in these community capacity building exercises, and as a result the capacity of government staff working within the project to develop and implement climate monitoring and early warning-related measures will be significantly strengthened, which will be beneficial for future projects within São Tomé and Principe.

183. The project addresses key national development priorities highlighted in the São Tomé and Principe Second Poverty Reduction Strategy Paper (PRSP II) 2012-2016 as well as climate change-related priorities identified and specified through the participatory and bottom-up NAPA process. The project has strong government support as well as buy-in at the district level. Consequently, a high commitment to carry out project activities and to internalize them in long-term government actions and budgets is ensured. In addition, other key stakeholders including private sector consulted during the PPG phase have expressed their full support as it addresses urgent and immediate adaptation priorities identified through the NAPA.

184. Moreover, the GoSTP has expressed the wish to transform the NIM into a semi-autonomous Agency (São Tomé and Principe Meteorological Agency) which will guarantee cost recovery management framework. The Council for the Prevention and Response to Disasters (CONPREC), due to its naturenand after the recent disasters, is also one of the institutions that the GoSTP has pledged to commit significant amounts of funding in the next few years. This will further strengthen the sustainability of the project as whole.

185. The project is designed with a strong capacity building focus as well as broad stakeholder participation and consultation so that project activities can be continued beyond the period of LDCF support. As per the monitoring network, once the data transmission costs with mobile phone communications providers is addressed, their maintenance will not be too costly and can be integrated into the future São Tomé and Principe Meteorological Agencyassociated budgets.

2.8. Replicability

186. The originality of this project is that it will be the first to attempt to build national networks for hydro-meteorological monitoring and alert dissemination and to provide support to tailor climate products in São Tomé and Principe. The needs for capacity building (both equipment and human resources) are too great to cover the entire country. As a result, the efficacy of EWS/CI will be tested in the most vulnerable zones in particular the coastal areas as outlined in STP's NAPA. Lessons learned from these pilot zones in terms of EWS/CI will be transferred in between the network of decentralized and national level focal pointsto be established through this project (associated withNGOs, CBOs and Local Disaster Risk Management Committees-LDRMCs). The pilot zones are therefore a means to further improve alerts nationally. Any activity or improvement to an activity can be easily replicated because the core network of national hydro-meteorological services and communication mechanisms are being developed in this project and can easily be built upon.

187. Furthermore, specific attention has been given to the limitations of local agencies to disseminate information. A national SOP for communication will be developed as a result which will include an important mechanism to share lessons learned will be the feedback mechanism developed in Output 2.2 and 2.4. The feedback mechanism canenable end-users to give direct comments and suggestions on the efficacy and utility of CI/EWS to the focal points for alert generation and dissemination (NIM, DGRME and CONPREC respectively).For instance, the alert generation and dissemination focal points can be contacted via SMS.

188. There are also various mechanisms of knowledge transfer so that the agencies become more self-sufficient and less reliant on outside agencies for repair. The learning-by-doing approach will be

reinforced on local, regional and international levels. For example, links with international (e.g., UKMO, Brazil CEPETEC and MeteoFrance) and with regional (ACMAD, responsible for the African Early Warning and Advisory Climate Services, or ViGIRisC project and for the ClimDevAfricaprogramme) centers will help build national forecasting expertise. Expertise can be easily transferred to new personnel because civil servants in São Tomé and Principe are mandated to remain in the Ministry. Also, as a security measure, Terms of Reference have been created to ensure that personnel who are hired to support this project must transfer knowledge within their respective agency after receiving specialized training. Training recipients are outlined below:

- NIM, DGRNE, and CIAT technicians/engineers for operation and maintenance
- NIM/DGRNE forecasters for regional and international training
- CONPREC disaster risk personnel and communication support nationally
- NGO/CBOs and Local Community Radios communication teams nationally
- Local Disaster Risk Management Committees-LDRMCs focal points and NGOs and Women Associations representatives at the village level to better communicate alerts and inform the general population how provide feedback to designated focal points for EWS/CI
- Training for technicians on how to properly define O&M costs to ensure government support in the long-run
- Training for information producers on how to develop public private partnerships (PPPs) and develop a suite of revenue-generating tailored climate products

189. Data will be accessible to all pertinent agencies, particularly those like the Ministry of Health and STP Red Cross Association who require weather data to make analyses on the spread of diseases with respect to weather variables such as temperature. Datahas the potential to be shared across borders via ftp password access. Overall, data sharing will promote the regular use of EWS/CI so that more agencies will realize its potential and utility.

190. The pilot program to test tailoring climate products for specific socio-economic sectors can be easily be up-scaled to address other private sector interests/needs. Similarly, the market research conducted under this project to support the development of a mobile-phone based platform for agricultural advisories can easily be extended as public awareness on the utility of EWS/CI is heightened.

191. Finally, UNDP's Adaptation Learning Mechanism (ALM) will be used as dissemination and sharing tool that is accessible by all and constantly updated will the most recent information from the project. As stated in the TOR, the project management unit will be required to contribute to ALM on a regular basis noting case studies, successes and challenges.

2.9 Stakeholder involvement plan

192. All major stakeholders have been consulted in the project conceptualization and design phase before and during the project preparatory phase, as part of their mandates as key governmental counterparts of the process.

193. The draft proposal was presented to a wide range of stakeholders at a National workshop in (March 2013) and their inputs were used to further develop the project design and the core of the Project Document. Two additional missions were carried out to the country to establish the baseline of Communities' and stakeholders vulnerability towards climate change induced extreme weather events (September 2012) and to find out about community and stakeholders priorities for Early

Warning/adaptation measures (January 2013). SeeAnnex 2 for the full list of project stakeholder analysis and consultations.

194. All major stakeholders have been consulted in the project conceptualization and design phase before and during the project preparatory phase, as part of their mandates as key governmental counterparts of the process.

195. The draft proposal was presented to a wide range of stakeholders at a National workshop in (April 2013) and their inputs were used to further develop the project design and the core of the Project Document. In total 3 missions were carried out to the country to establish the baseline of Communities' and stakeholders vulnerability towards climate change induced extreme weather events (September 2012) and to find out about community and stakeholders priorities for Early Warning/adaptation measures (January 2013). In addition there two *Community Consultations and site visits (CC-SV)*-scoring meeting were held during January 2013, and April 2013 with Fishing and Agriculture community Members, Community Based Organizationn and NGO's at selected locations of Neves, Santa Catarina, Ribeira Afonso and Malanza (SeeAnnex 2 for the full list of project stakeholder analysis and consultations).

196. Stakeholders involved in all consultations that were undertaken during the project preparation phase include a range of types of groups, all with their own interests and concerns (Table 5). They have different roles to play in the project and the Table below indicates key stakeholders and their possible roles. National level groups will include central government, and autonomous GoSTP agencies like NIM, DGRNE, DGA, CIAT and COMPREC-SPCB. Traditional leadership, although civil is appointed through state institutions.The lead institution for all project outputs is the Ministry of Public Works, Infrastructure, Natural Resources and Environment (MPWINRE). The implementation strategy for the project is dependent on comprehensive stakeholder participation.

Table 5. Relevant partners and stakeholders identified for engagement by project outcome/output.

Outcome	Outputs	Lead institution	Key Partner	Key Responsibilities
OUTCOME 1. Enhanced capacity of the National Institute of Meteorology (NIM) and the Directorate General for Natural Resources and Energy (DGRNE) to monitor extreme weather and produce sector tailored	**Output 1.1** 12 Automatic Hydrometeorological stations complete with remote data transmission and archiving and 12 river gauges are installed in São Tomé Island and Principe Island.	MPWINRE (DGRNE)	National Institute of Meteorology (NIM).	For coordination, system integration, capacity building and rainfall monitoring network management. Undertake systematic analysis. Procure and install AWLSs. Undertake repairs. Procure spare parts. Integrate HASs into existing DGRNE network.

weather forecasting.	**Output 1.2** A network of 4 synoptic and 8 climatological automatic weather stations, WMO standard, complete with remote data transmission and archiving are installed and 12 manual WMO standard are rehabilitated to support the establishment of an Early Warning System.	MPWINRE (NIM)	DGRNE	For coordination, system integration, capacity building and rainfall monitoring network management. Undertake systematic analysis. Procure and install AWSs. Undertake repairs. Procure spare parts. Integrate AWSs into existing NIM network.
	Output 1.3 10 workstations to support, AMESD-SYNERGIE and SADIS systems are installed to strengthen the capacity of São Tomé Airport Forecasting Centre.	MPWINRE (NIM)	DGRNE	For coordination, system integration, capacity building and rainfall monitoring network management.
	Output 1.4 5 Meteorologists, 5 Meteorological Technicians, 4 Forecasting Superintendent Officers 10 Specialist Superintendent Officers are trained to support EWS data handling and forecasting operations.	MPWINRE (NIM)	DGRNE	Develop communication network, data transmission & communication coordination. Training of meteorological personnel. Establish operation and maintenance training facilities. Assist trained meteorologists and hydrologists to conduct training workshops. Assist trainers to conduct training of weather observers.
	Output 1.5 An Integrated Community Based EWS (ICB-EWS) network of 5 pilot sites is established to reduce vulnerability of local fishing and farming communities to flash flooding, stormy weather and develop resilience to drought episodes.	Ministry of Defence (CONPREC/SPCB) and MPWINRE (NIM)	DGRNE, MAFRD (CIAT), DGA	Develop communication network, data transmission & communication coordination. Training of meteorological personnel. Establish operation and maintenance training facilities. Assist trained meteorologists and hydrologists to conduct training workshops. Assist trainers to conduct training of weather observers
OUTCOME 2. Efficient and effective use of hydro-meteorological information for generating early warnings and support long-term development plans	**Output 2.1** 15 Meteorologists and 6 Hydrologists are trained in tailored Weather Forecasting, Special and Warning Packaging.	MPWINRE (NIM)	DGRNE	For training and technical support, capacity development and system integration;
	Output 2.2 Sector tailored early warning products – based on interagency harmonized agreements and international	MPWINRE (NIM)	DGRNE	Identify, review and propose revisions to sectoral policies, strategies, investment plans and annual budgets. Develop the capacity of Sub-County and District

	standards and protocols – are developed and made accessible to Disaster Management structure in STP.			LDRMCs. Develop a national weather and climate information and early warning system communication and coordination strategy.
	Output 2.3 National capacity and inter-sectoral framework for mainstreaming weather and climate information into national development planning policies, district disaster preparedness and management is built specifically targeting Neves, Santa Catarina, Malanza, Ribeira Afonso and Sundy.	MPWINRE (DGA**)**	NIM, DGRNE, CIAT	Identify, review and propose revisions to sectoral policies, strategies, investment plans and annual budgets. Develop the capacity of Sub-County and District DMCs. Develop a national weather and climate information and early warning system communication and coordination strategy.
	Output 2.4 National (Civil Society and Government) Communication Channels, dissemination and response mechanisms, including "sms" text and pictorial alerts are established.	MD (CONPREC)	NIM, DGRNE	Develop SoPs. Develop an early warning system dissemination national and local toolbox. Equip and facilitate CONPREC-LDRMC to support the dissemination of weather and climate information. Develop a SMS-based alert system.
	Output 2.5 A Plan for financial sustainability based on cost-recovery service provision to support future EWS operation and maintenance developed and implemented, including the operationalisation of a public-private platform.	MPWINRE (NIM)	DGRNE, DGA	Conduct a comprehensive study to establish the viability of different sources of revenues – rated as mixed good/commercial as well as public good. Develop and implement sector-specific marketing strategy and program. Review and propose revisions to the current cost recovery arrangements/government reimbursements. Develop service-level agreements for government organizations and private companies requiring specific customized meteorological services.

3. PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: By 2016, the Government and districts, as well as the population, adopt techniques and behaviours that promote a sustainable environment and ensure better prevention and management of risks and natural disasters					
Country Programme Outcome Indicators: Number of monitoring systems in place for pollution and disaster risk management					
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 3. Promote climate change adaptation					
Applicable SOF (e..g GEF) Strategic Objective and Program: Objective 2 "Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level".					
Applicable SOF (e.g. GEF) Expected Outcomes: Outcome 2.1"Increased knowledge and understanding of climate variability and change-induced risks at country level and in targeted vulnerable areas"; and Outcome 2.2 "Strengthened adaptive capacity to reduce risks to climate-induced economic losses".					
Applicable SOF (e.g .GEF) Outcome Indicators: • Relevant risk information disseminated to stakeholders • Type and no. monitoring systems in place • % of population covered by climate change risk measures					
	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
Project Objective[17] To strengthen the climate monitoring capabilities, early warning systems and available information for responding to climate shocks and planning adaptation to climate change in São Tomé and Principe	1.Capacity as per capacity assessment scorecard (BASELINE: 22; TARGET: 161)	1.Limited capacity to generate EWS and CI on a national scale for extreme hydro-meteorological phenomena Limited disaster risk prevention capacity on local levels within CONPREC - CP No Standard Operating Procedure (SOP) for alert communication by CONPREC - CP with the support of NGOs/CSOs Current score: 22	1. Capacity assessment TARGET score 161 for all combined EWS agencies	1. Capacity assessment scores	There is no political will to invest in monitor extreme weather and climate change.

[17] *Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR*

	2.Domestic finance committed to the relevant institutions to monitor extreme weather and climate change	2.Existing budget plans do not have sufficient funds to maintain and operate environmental monitoring infrastructure Current budget: $500,000	2. TARGET: 30% increase in domestic financing for equipment operation and maintenance across all institutions	2. Ministry budget lines for recurring costs	GoSTP institutions and other key stakeholders would keep the same level of interest and willingness to support NIM
	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
Outcome 1[18] Enhanced capacity of national hydro-meteorological (NHMS) and environmental institutions to monitor extreme weather and climate change.	1.% national coverage of climate/weather and hydrological monitoring infrastructure	1.Currently, there is <20 % national coverage for climate/weather monitoring with respect to the optimal arrangements defined in NIM/DGRNE feasibility reports and WMO standards. Baseline is 7 AWS, 2 Automatic water level stations and 58 manual synoptic/agro/hydrometric stations needing upgrades.	1. Increase to 60 % national coverage to take steps in achieving NHMS optimal monitoring arrangements as defined in feasibility studies Target: 31 AWS, 14 automatic water level stations and 58 manual synoptic/agro/hydrometric stations upgraded	1.Review of budget spent on equipment procurement and rehabilitation and data held on servers to show that new equipment is operational	Procurement and installation of equipment is delayed due to slow release of funds, lengthy processes and deficient data transmission systems locally.
	2.Frequency and timeliness of climate-related data availability (BASELINE: monthly);	2.Data from manual weather and hydrological stations is collected monthly and transmitted by post.	2. TARGET for data transmission frequency: daily	2.Analysis of data frequency transmission using storage servers within each information production agency	Funds are released on time for speedy procurement processes and technical assistance in place for equipment installation and operationalisation.

[18]All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

Outcome 2 Efficient and effective use of hydro-meteorological and environmental information for making early warnings and long-term development plans.	1.% of population with access to improved climate information and flood, drought, strong wind and coastal warnings (disaggregated by gender)	1. There are existing EWS initiatives for regional drought and famine alerts; however, a national alert system concerned with extreme hydro-meteorological phenomena is not available. There is a limited understanding of technical alert jargon (alerts are not translated into national languages). No mechanism exists for most vulnerable populations to be involved in the alert process to ensure its sustainability. Current access to warnings: 30% men, 20% women	1. Increase to 50% for both men and women who have access to improved EWS/CI Target: 50% men; 50% women	1. a) Gender disaggregated survey on receipt of alerts b) Record of debriefings by NIM/DGRNE post extreme weather events c) NIM/DGRNE record of end-user feedback	Early Warnings do to not reach local radios in the communities. Local Radios are not capacitated to receive and broadcast early warning. The project foreseen capacitance and support to local radios and they are willing to cooperate. Communities are able to receive warnings through CONPREC dissemination set up.
	2. GoSTP Development Plans and land-use plans at National/District that integrate climate information in their formulation of poverty reduction strategies and links	2.Development frameworks do not incorporate any EWS/CI products such as risk maps or climate change predictions into long-term planning Current score: 0	2. At least 2 of the PRSP policy briefs incorporate analyses of risk maps and/or climate change projections influencing long-term planning proposals Target score: 2	2. Review of GoSTP Development Plans and land-use plans at National/District to validate incorporation of risk, weather and/or climate information	GoSTP is not interested nor have the capacity to analyse vulnerability and incorporate climate change risks into the design of development Plans and land-use Plans.

	between poverty and the environment at local levels (BASELINE: No integration; TARGET Integration of at least 1 National and 1 district development Plan and land-use Plan incorporates climate change risks into their design into the revised in 2015)				The partnership between DGA and NIM for development of systematic streamlining of digital information will help GoSTP to address this issue. Vulnerability and Risk Maps will be produced.
	3.Sector-specific EW products and strategies that integrate climate risks in fisheries, tourism, and land management sectors)	3. Sector specific strategies do not include EWS/CI because the quality of weather forecasts and climate predictions are poor and not tailored for specific uses, particularly seasonal forecasts. Current score: 0	3. Development of at least 2 tailored climate products and presentation of market research plan on how to implement mobile phone based fishing and agricultural advisories, both supporting targeted weather/climate service delivery Target score: 2	3.a) Partnerships formed between information producers and the DGRNE, DGA and CIAT, private sectors, NGOs and women organizations to support weather/climate service delivery; b) Sector specific products delivered by Met and disaster management.	Government is not committed to integrate climate change risk and adaptation needs in these elected sector-specific strategic plans; The partnership between DGA and NIM for development of systematic streamlining of digital information will help GoSTP to address this issue. There will be technical capacity for advice.

4. TOTAL BUDGET AND WORKPLAN

Award ID:	00074452	Project ID(s):	00086865
Award Title:	PIMS5103-STRENGTHENING CLIMATE INFORMATION-EWS		
Business Unit:	STP10		
Project Title:	Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change - São Tomé and Principe		
PIMS no.	5103		
Implementing Partner (Executing Agency)	The Ministry of Public Works, Infrastructure, Natural Resources and Environment (UNDP)		

Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	See Budget Note:
Outcome 1: Enhanced capacity of national hydro-meteorological (NHMS) and environmental institutions to monitor extreme weather and climate change.	**The Ministry of Public Works, Infrastructure, Natural Resources and Environment**	**62160**	**GEF LDCF**								
				72100	Contractual Services- companies	42,000	42,000	42,000	42,000	168,000	a
				71300	Local Consultants	75,600	75,600	75,600	75,600	302,400	b
				71200	International Consultants	61,500	57,000	57,000	61,500	237,000	c
				72300	Materials and Goods	200,000	500,000	500,000	200,000	1,400,000	d
				74200	Audio Visual and Print Production Costs	7,600	9,000	9,000	6,000	31,600	e
				75700	Training, Workshops and Conferences	10,000	50,000	25,000	25,000	110,000	f
				72200	Equipment and Furniture	45,000	8,000	8,000	0	61,000	g
					Total Outcome 1	**441,700**	**741,600**	**716,600**	**410,100**	**2,310,000**	
Outcome 2 Efficient and effective use of hydro-meteorological and environmental information for making early warnings and long-term development plans.	**The Ministry of Public Works, Infrastructure, Natural Resources and Environment**	**62160**	**GEF LDCF**								
				72100	Contractual Services	37,500	37,500	37,500	47,500	160,000	h
				71200	International Consultants	92,000	92,000	92,000	92,000	368,000	i
				71300	Local Consultants	60,500	60,500	60,500	60,500	242,000	j
				74100	Professional Services	25,000	15,000	15,000	8,500	63,500	k
				72300	Materials and Goods	25,000	25,000	25,000	25,000	100,000	l
				74200	Audio Visual and Print Production Costs	6,000	6,000	6,000	6,000	24,000	m
				75700	Training, Workshops and Conferences	25,000	25,000	25,000	25,000	100,000	n
				72200	Equipment and Furniture	32,500	10,000	10,000	0	52,500	o

					Total Outcome 2	**303,500**	**271,000**	**271,000**	**264,500**	**1,110,000**	
Project Management	**The Ministry of Public Works, Infrastructure, Natural Resources and Environment**	**62160**	**GEF LDCF**	71300	Local consultants	15,000	25,000	25,000	25,000	90,000	p
				71600	Travel	5,000	5,000	5,000	5,000	20,000	q
				74500	Miscellaneous Expenses	2,000	3,000	3,000	2,000	10,000	r
				74500	UNDP cost recovery chrgs-Bills	10,000	15,000	17,000	18,000	60,000	s
					Total Project Management Cost	**32,000**	**48,000**	**50,000**	**50,000**	**180,000**	
					PROJECT TOTAL	**777,200**	**1,060,600**	**1,037,600**	**724,600**	**3,600,000**	

Summary of Funds:[19]

	Amount Year 1	**Amount Year 2**	**Amount Year 3**	**Amount Year 4**	**Total**
GEF	777,200	1,060,600	1,037,600	724,600	3,600,000
Ministry of Planning and Finance (MPF)	3,725,000	3,725,000	3,725,000	3,725,000	14,900,000
Ministry of Agriculture, Fisheries and Rural Development (MAFRD)	3,825,000	3,825,000	3,825,000	3,825,000	15,300,000
Ministry of Public Works, Infrastructures, Natural Resources and Environment (MPWINRE)	2,325,000	2,325,000	2,325,000	2,325,000	9,300,000
Ministry of Public Works, Infrastructures, Natural Resources and Environment (MPWINRE)	198,750	198,750	198,750	198,750	795,000
TOTAL	**10,850,950**	**11,134,350**	**11,111,350**	**10,798,350**	**43,895,000**

[19] *Summary table should include all financing of all kinds: GEF financing, cofinancing, cash, in-kind, etc...*

Budget Note	Description of cost item
a	Companies contract services for installation of observational equipment and forecasting systems + initial training -60 days @$400/day; DSA @ $173/day and 2 flights @3810/eax 4 months
b	Nationals specialist 1 - Hydrologist Contract $2000/month48 months National Specialist 2 –MeteorologistContract $2000/month48 months Administration and finance support@$1500 x 12 months x 4 years. Procurement Officer support$800 x 12 months x 4 years
c	Midterm review @ $4500/ea and 1 flight and DSA for the RAP @ $2000 Annual review@ $4500/each and 1 flight and DSA for the RAP@$2000/ea/year Midterm review and workshopreview @ $3000 and workshop and dislocation to ARP@ $3000Year 2 Annual review and workshopreview @ $3000 and workshop and dislocation to ARP@ $3000Year 2 Final evaluation and validation workshopreview@ $9500 and tripartite @$2000Year 4 Contract Services for individual (IC/FTA) 120 days @ $400/day + 1 flight @ $2,000/ea x 4 yrs International M&E expert (15 days @ $550/day +1 flight @ $2,000 +5days DSA @ $200/day). Conduct 2 Budget/Project audits (2 @ $3000/ea).
d	• Procure and Install 12 Automatic Hydrometeorological stations, and 12 river gauges in São Tomé Island and Principe Islandwith telemetry, archiving and data processing @ $11000 ea • Procure and operationalise one mobile Hydromet Automatic Station (HAS) for sensor's field calibration @ $43000 ea • 4 synoptic and 8 climatological Automatic Weather Stations (AWS) all with telemetry, archiving and data processing facilities (6 will be installed in S. Tomé Island at Angolares, S. Jorge, Boa Nova, Canavial, Neves, Juliana de Sousa; 2 in Principe Island at Infante D. Henrique and Sundy;1in Ilhéu das Rolas; 2 spare AWS for S. Tomé Island; and1 spare AWS for Principe Island all WMO standard @$11000ea. • Installation and construction costs (including weather fencing @ $3500) for 16 AWSs @$5500ea. • Installation and construction costs for 12 river gauges, 2 water level (limnimetric scale). @$10000ea. • Rehabilitation of 40 manual Hydrometeorological stations including procuring and replacing gauge plates, installation and civil works @$700ea. • Rehabilitation of 6 manual weather stations @$1000ea • Procure AWLSs spare parts and equipment. • Telecommunications infrastructure including computers, computer servers and software, radiotelephones, portable telephones, GSM/GPRSGSM/GPRS modems and other equipment for internet access. • Upgrade 32 manual stations - including thermometers, stevenson screens, manual wind and solar sensors with digital sensors and calibrate thermometers and barometers @$5260ea. • Installation and construction costs for 32 manual stations, including stabilizing power supply with solar panels, batteries and inverters and upgrading weather fences @$5000ea. • Replace barometers in 12 manual stations @$700ea. • Upgrade 6 AWSs - replacing the unit @$4000ea. • Upgrade 6 AWSs - replacing sensors on units @$1500ea. • Upgrade 6 AWSs - replacing data loggers on units @$800ea. • Relocate 6 AWS stations, including installation of new weather fencing @$5500ea. • Stabilise power at 32 AWSs through the provision of dry cells, upgrading solar panels, and batteries @$2300ea.

	• Calibration and installation costs for 32 AWS upgrades including fieldtrips to sites @$3000ea. • Procure equipment (hardware and software) and ensure connectivity (internet modems and access) for 16 modern forecasting workstations to support NMC at Sao Tome airport and synoptic stations @$4000ea. • Buy data rescue and digitization equipment for NIM and DGRNE archives. • Development, hosting and maintenance of an integrated hydro-meteorological database and information management system. • Development, hosting and maintenance of online platforms including websites and databases. • Field supporting equipment (GPS digital cameras, GPS devices, digital recorders, etc.)	
e	Bundle of project guidelines @ $1600/ea; communications @$500/month Year 1 Bundle of project guidelines; communications @$750/monthYear 2 Bundle of project guidelines; audiovisual communications @$750/monthYear 3 Bundle of project guidelines; communications @$500/monthYear 4	
f	One on the job training event @$10000/ea Year 1 Two on the job training event @$25000/ea one in- houseYear 2 One training event @$25000/eaYear3 One training event @$25000/eaYear 4	
g	Vehicles for technical hydro-meteorological staff and disaster management offices for field visits and other project activities related to ensuring the effective operation and maintenance of all equipment installed. Years 1 to 3	
h	Contractual services(companies/individual for providing services related to procured hardware/technology): 45 days/year @$500/day and DSA @ $173/day and 2 flights @ $2250/ea for 4yrs.	
i	Contract Services for individual (IC/FTA)120 days @ $400/day + 1flight @ $2,000/ea x 4 yrs Contractual services for individual$2000/month @12 x 4yrs NCs X 3 @ $500/ea/month @ 12 x 4yrs A study on the costs and benefits of accurate, timely and accessible weather and climate forecasts (including tailored forecasts and alerts) Costs of data collection and/or VRA for informing early warning systems established for target regions@$26750/ea Year 1 International M&E expert (15 days @ $550/day +1 flight @ $2,000 +5days DSA @ $200/day) Budget/Project audits (2 @ $3000/ea) 6	
j	Local consultants costs to supervise installation of monitoring equipment, operations & maintenance of equipment, forecasting operations, data communications and procedures, as well as monitor the utility of forecasts/predictions for end-users and the efficacy of the Standard Operation Procedure for alert communication. Local consultant cost to organise workshops, meetings and feedback sessions from users of forecasts and SOPs. Team includes following positions to lead implementation activities (team will be from CONPREC, DGA, NIM AND DGRNE): • 4 persons @ contract of $1000/monthx 12 months x 4 yearsand contractual services (NCs) • 2TRIPS TO PRINCIPE/YEAR @ $6250/TRIP FOR 4 TECHNICIANS FROM DGA, INM, CONPREC AND DGRNE	
k	Service providers for mobile communications and data transfer	Service providers@ $25.000. Year 1 Service providers@ $15.000. Year 2 Service providers@ $15.000. Year 3 Service providers@ $ 8.500. Year 4
l	Material and goods	Procurement and installation of GIS system @ $50.000; Procurement of software and IT equipment for Hydrological Modelling Unit @ $50.000
m	Communication, audio visual, strategies and other materials	$500/month x 4 years

n	One training/year		Initially abroad, then in-country (train the trainers) @ $25000/year
o	Equipment (mobile and others equipment/assets)		Mobile equipment for relaying warnings and communications e.g. sirens, radios, mobile phones etc.
p	Project Management Unit costs		Project staff recruitment (48 months @ $2085/month)
q	Travel		In country travel or to and from Principe Island for the project unit @ 2 flights @ $2500/ea including DSA. Years 1 to 4
r	Equipment (mobile and otherequipment/assets)		O&M of vehicles**.** Reporting costs Communications (telephone and internet)
s	DPC (currently estimated)	Payment Process	45 contracts x 12months x 4years x $10.08
		Consultants	13consultants x 12months x 4 years x $63.98
		Staff selection	$146.53 x 4 years
		Tickets request	10 tickets/year x 4 years x $13.19
		Miscellaneous sundry	$138 /months x 12 months x 4 years

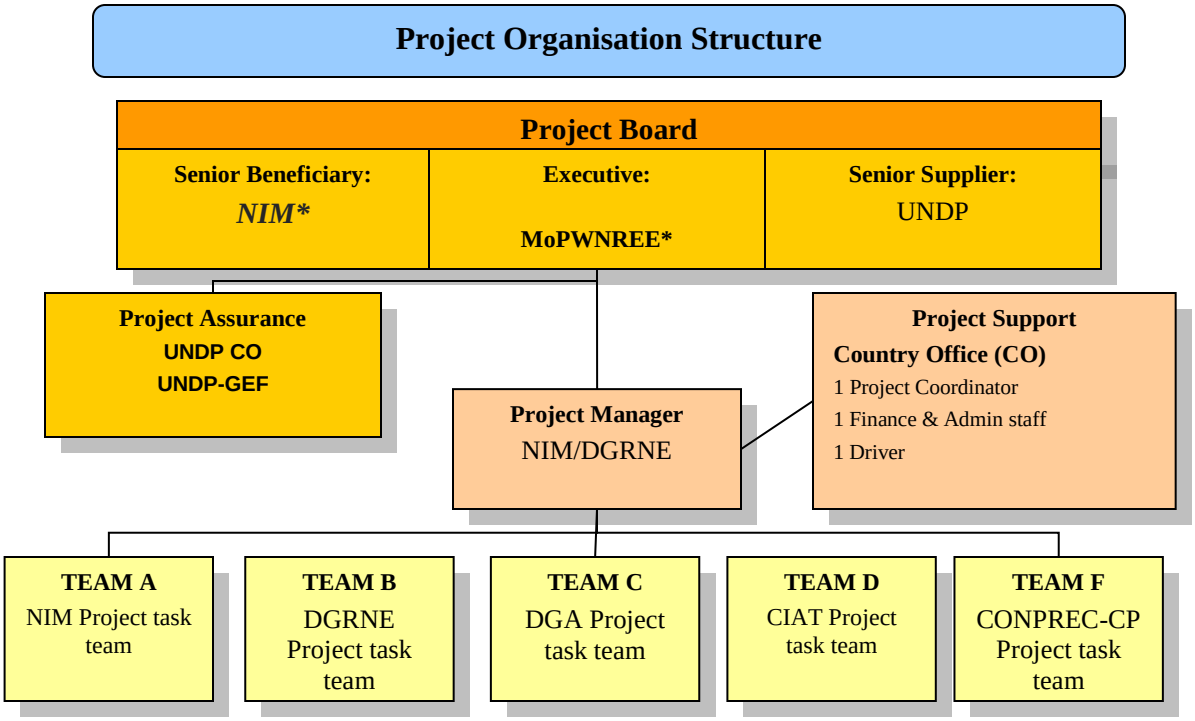
5. MANAGEMENT ARRANGEMENTS

197. The project will be implemented by the UNDP under its National Implementation (NEX) Modality and Harmonized Approach to Cash Transfer (HACT) procedures. The project is a four year intervention from expected to run from 01 October 2013 to October 2017. The Implementing Partner in São Tomé and Principe is the Ministry of Public Works, Infrastructure, Natural Resources and Environment (MoPWINRE MoPWINREE). The project will be executed in close collaboration with NIM, DGRNE, DGA and CONPREC (as responsible parties) and the selected pilot communities, responsible for the local level pilot interventions of the project.

198. According to the capacity assessment (see Annex 5) MoPWINREE is a competent execution partner, with the country's mandate for safeguarding communities. The Ministry has a track record of successfully implementing programmes such as this and other donor support programmes. It is envisioned that the project team be housed at MoPWINREE. The NIM has the major mandate for coordinating weather monitoring and forecasting as well as climate change related programmes and policies, and as such will execute relevant outputs under the policy-focused component, component 1 of the project. The Implementation oversight will be by UNDP, MoPWINREEand the UNDP Regional Service Centre. UNDP has overall responsibility foroversight and quality assurance over the lifetime of the project.Prior to implementation, a review of the capacity assessment will be made and measures put in place to ensure the project is implemented in full alignment with UNDP policies and procedures.

199. However, given the result of the HACT capacity assessment carried out independently (Annex 7), on the request of the Government of São Tomé and Principe, UNDP CO has overall responsibility for supervision, project development, guiding project activities through technical backstopping and logistical support. Prior to implementation, a Letter of Agreement (LoA) will be provided and measures put in place to ensure the project is implemented in full alignment with UNDP policies and procedures. Therefore, UNDP, to which the MoPWINRE will be accountable, will support the project implementation and oversight, according to the UNDP regulations and procedures.

Figure 2: Proposed Project Operational Structure



200. Project activities will primarily be implemented at a national level with a demonstration component at sub-national level. The Implementing Partner will establish a Project Board (PB) comprising national and sub-national representatives to guide and oversee the project.

201. **Project Board** is responsible for making management decisions for a project in particular when guidance is required by the Project Manager. The Project Board plays a critical role in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual WorkPlan, the Project Board can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

202. The responsibilities of the PB will be to:

- Supervise and approve the annual workplans and short term expert requirements
- Supervise project activities through monitoring progress and approving annual reports
- Review and approve work plans, financial plans and reports
- Provide strategic advice to the implementing institutions to ensure the integration of project activities with national and sub-national sustainable development and climate resilience objectives.
- Ensure inter agency coordination and cross-sectoral dissemination of strategic findings
- Ensure full participation of stakeholders in project activities
- Assist with organization of project reviews and contracting consultancies under technical assistance

- Provide guidance to the Project Manager.

203. In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP Project Manager.

204. Potential members of the Project Board are reviewed and recommended for approval during the PAC meeting. Representatives of other stakeholders can be included in the Board as appropriate.The Board contains three distinct roles, including:

1) **An Executive**: individual representing the project ownership to chair the group.

   The National Director of Ministry of Public Works, Infrastructure, Natural Resources and Environment (MoPWINREE)

2) **Senior Supplier**: individual or group representing the interests of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project.
   - *UNDP*
3) **Senior Beneficiary**: individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries.
   - *National Directors of DGA, CONPREC, DGRNE, NIM.*
4) The **Project Assurance** role supports the Project Board Executive by carrying out objective and independent project oversight and monitoring functions. The Project Manager and Project Assurance roles should never be held by the same individual for the same project.
   - *Portfolio Manager (Environment and Disaster Risk Management), UNDP São Tomé and Principe, Regional Technical Adviser Climate Change Adaptation, UNDP Regional Service Centre*

205. 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 Board. The Project Manager's prime 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.

206. Project Support: The Project Support role provides project administration, management and technical support to the Project Manager as required by the needs of the individual project or Project Manager.

207. This project in Sao Tome & Principe is part of a multi-country programme on Climate Information and EWS supported by UNDP-GEF. In response to LDCF/SCCF Council recommendation that a regional component be explored to enhance coordination, increase cost effectiveness and, most importantly, benefit from a regional network of technologies, a cohort of technical advisors and a project manager will be recruited to support each of the national level project teams. In particular they will support countries to develop robust adaptation plans and provide technical assistance and deliver training for accessing, processing and disseminating data for early warning and national/sectoral planning related purposes on a systematic basis. The cost of these project staff has been prorated across the project budgets in all countries that are part of this multi-country programme including Benin, Burkina Faso, Sierra Leone, Liberia, Ethiopia, Uganda, Malawi, Tanzania and Zambia. To ensure cost-savings and maximize on

efficiencies in procurement for each project, recruitment of these posts will be done centrally on behalf of EWS projects that are part of this multi-country programme.

6. MONITORING FRAMEWORK AND EVALUATION

208. The project will be monitored through the following M& E activities. The M&E budget is provided in the table below. The M&E framework set out in the Project Results Framework in Part III of this project document is aligned with the AMAT and UNDP M&E frameworks.

209. **Project start**: A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

210. The **Inception Workshop** should address a number of key issues including:

- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- Based on the project results framework and the LDCF related AMAT set out in the Project Results Framework in Section III of this project document, and finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule PB meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first PB meeting should be held within the first 12 months following the inception workshop.

211. An **Inception Workshop report** is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP/GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logswill be used to monitor issues, lessons learned. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

212. **Annually**: Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR

213. **Periodic Monitoring** through site visits: UNDP CO and the UNDP-GEF region-based staff will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

214. **Mid-term of project cycle**: The project will undergo an independent Mid-Term Review at the mid-point of project implementation (expected to be in September 2014 PROJECT SPECIFIC). The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term review will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The LDFC/SCCF AMAT as set out in the Project Results Framework in Section III of this project document) will also be completed during the mid-term evaluation cycle.

215. **End of Project**: An independent Terminal Evaluation will take place three months prior to the final PB meeting and will be undertaken in accordance with UNDP-GEF guidance. The terminal evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term review, if any such correction took place). The terminal evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The LDFC/SCCF AMAT as set out in the Project Results Framework in Section III of this project document) will also be completed during the terminal evaluation cycle. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response, which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

216. **Learning and knowledge sharing**: Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.There will be a two-way flow of information between this project and other projects of a similar focus.

217. Audit: Project will be audited in accordance with UNDP Financial Regulations and Rules and applicable audit policies.

Table 6: Project Monitoring and Evaluation

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project Manager (MEE) ▪ PIU ▪ UNDP CO, UNDP GEF	Indicative cost: 10,000	Within first two months of project start up
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. ▪ PIU, esp. M&E expert	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager (MEE) ▪ PIU, esp. M&E expert ▪ Implementation teams	To be determined as part of the Annual Work Plan's preparation. Indicative cost is 20,000	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager (MEE) ▪ PIU ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly
Mid-term Review	▪ Project manager (MEE) ▪ PIU ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: 30,000	At the mid-point of project implementation.
Terminal Evaluation	▪ Project manager (MEE) ▪ PIU ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost : 45,000	At least three months before the end of project implementation
Audit	▪ UNDP CO ▪ Project manager (MEE) ▪ PIU	Indicative cost per year: 3,000 (12,000 total)	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly for UNDP CO, as required by UNDP RCU
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 117,000 (+/- 5% of total GEF budget)	

7. LEGAL CONTEXT

218. This document together with the CPAP signed by the GoL and UNDP which is incorporated by reference constitute together a Project Document as referred to in the Standard Basic Assistance Agreement (SBAA) and all CPAP provisions apply to this document.

219. Consistent with the Article III of the SBAA, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

220. The implementing partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried; and
b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

221. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

222. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

ANNEX 1. RISK ANALYSIS

#	Description	Date Identified	Type	Impact & Probability	Countermeasures/Mngt response	Owner	Submitted, updated by	Last Update	Status
1	Insufficient qualified human capacity	*September 2012*	Operational	P = 4 I = 5	Strong capacity development approachincorporated in project design. Specific training opportunities e.g.for technical staff concerned withthe establishment of the EWS,trainings for district staff on variousCC risk and adaptation issues;dedicated capacity buildingprogramme at community level. PPG report undertook initial training needs assessment.	RTA	Who submitted the risk *(In Atlas, automatically recorded)*	When was the status of the risk last checked *(In Atlas, automatically recorded)*	e.g. dead, reducing, increasing, no change *(In Atlas, use the Management Response box)*
2	Lack of political will to support the project	*September 2012*	Political/ Strategic	P = 2 I = 4	The proposed project is strongly supported by the Government of São Tomé and Principe (GoSTP) and other key stakeholdersand development partners including the private sector. The GoSTP is actively supporting the transformation of NIM into a semi-autonomous Agency. Theproject team, in conjunction withUNDP, will therefore take advantageof this opportunity to seek substantialsupport from the Government andforge strong partnership with otherdevelopment partners.	RTA			
3	Poor co-ordination among implementing and executing	*September 2012*	Strategic/ Political	P =1 I = 3	The PPG phase consultations have shown the good institutional cooperation between GoSTP departments participating in the project implementation.				

	agency.				The above and clear Project Management arrangements should build the foundation for a good success for project implementation.				
4	Low Institutional/ Execution Capacity	*September 2012*	Strategic/ Operational	P =3 I = 4	A capacity support approach hasbeen developed, which aims tobuild the capacities of the GoSTP institutions and partners of the project todeal with climate change risk andCC adaptation. A major part of the project is to strengthen institutional and technical capacity of two major players of the project the NIM and the CONPREC. Specialist technical input will be contracted in, to work with local technical staff. A CTA will work closely with the Project Manager to ensure smooth and timely delivery of project outputs.				

ANNEX 2. STAKEHOLDER INVOLVEMENT PLAN

Stakeholder consultation has been a key feature in the design of this LDCF Proposal, and stakeholders have been involved in identifying and prioritizing the proposed intervention activities. Details of the stakeholder engagement during the PPG Phase were provided in Section 1.4 and 2.8 above. Ongoing public consultation is critical for successful implementation. This section outlines some of the key consultation principles and processes at a strategic level that will need to be translated into practical action during the project implementation. It provides guidance based on the initial stakeholder analysis, conducted as part of the project preparation process, and the consultations so far. This can be used to define exact activities that will form part of a communications and consultation strategy developed during the inception period of implementation. Consultation is a regulatory process by which the Stakeholder's input on matters affecting the community is sought. The main goals are primarily in improving the efficiency, transparency and public involvement in large-scale project activities and policies. As involvement means the act of sharing in the activities of a group, it is important therefore, to specify goals and objectives for Stakeholder Involvement Plan, identifying key stakeholders (shown in Table 8 above) and their interests relative to the project and to describe how stakeholders will be involved in the implementation of each project outcome. Therefore, during the consultation process from September 2012 to April 2013, approximately 150 professionals were engaged at national, sub-national, municipal and community level. Key stakeholders with a major direct role in the project were identified and consulted at different stages during the Project Preparation Grant (PPG) phase to obtain their inputs and feedback for designing the project. The stakeholder consultation process that was undertaken included the following major activities summarised below:

Mission 1:

Inception Workshop:

The mission was undertaken to support the UNDP Country Office to engage with the Government of "São Tomé & Principe" and other key stakeholders in the design of a project on climate information and Early Warning Systems (EWS), to be financed by the LDCF. The primary tasks of this mission were:

1) to detail the baseline of how climate information and EWS is currently used in São Tomé & Principe and;
2) to create a suitable work plan to develop the UNDP project documents for the LDCF financed project on Climate information and EWS for climate resilient development.

These tasks were addressed by holding a workshop among the stakeholders, including the producers, operators and end-users of EWS and conducting meetings with key representatives of bilateral/multilateral organizations represented in São Tomé & Principe. Potential co-financing sources, including projects and institutions managing/developing relevant on-going/planned EWS related initiatives were also consulted to ensure the UNDP-GEF/LDCF project can leverage and mutually support (and be supported by) other projects.

An interactive national workshop on climate information and EWS was held on Wednesday 18th September 2012 at UNDP Conference Room, UN Building, São Tomé to bring together the producers of hydro-meteorological information, those in charge of disseminating alerts and parties concerned with the management of catastrophes and natural disasters to contribute towards the design phase of this LDCF initiative.

The workshop was also used to present the intended scope of the project (as cleared by LDCF/Council) to the technical and financial partners and to exchange ideas on strategies to elaborate, implement and develop a sustainable EWS in São Tomé & Principe. Annex II shows the agenda for the workshop. The workshop involved twenty five participants from organizations ranging from government agencies with key roles to play in the LDCF project, as well as UN agencies, the local Universities (Instituto Superior Politécnico de São Tomé e Príncipe (ISPSTP), Universidade Lusíada de S.Tomé e Príncipe), local Press and bi-lateral donors. There was a Working session during the second part of the workshop involving all participants.

The workshop was attended by twenty five participants.The event was facilitated by Mr. Lourenço Monteiro, the GEF Operational Focal Point in São Tomé & Principe who introduced and facilitated discussions on the following presentations:

1."Current State of the National Institute of the Meteorology: Activities and Capacities". Mr João Vicente- Director National Institute of Meteorology;

2."Sao Tome current state to response and communication to Natural Disaster"- Mr Cecílio Sacramento - Deputy Director of the Council for the Prevention and Response to Disasters (CONPREC);

3."Data monitoring, treatment, forecasting and diffusion (climate, hydrology, water resources)"- Mrs Lígia Barros and Ms Bernardina Vaz from National Directorate of Natural Resources and Energy;

4."Climate Change Adaptation in Sao Tome and Principe: Existing and completed relevant initiatives to EWS project"- Mr Arlindo Carvalho – Director General of National Directorate for the Environment (DGA).

Bilateral consultations took place with:

GoSTP technical institutions including the following:
-The National Institute of Meteorology who has the custodian of all weather and climate data monitoring and handling in the country;
-The Council for the Prevention and Response to Disasters (CONPREC) who is responsible for the Disaster Management at GoSTP level, whose role on the dissemination and response aspects of the EWS will be important, as well as being an implementing partner of the World Bank (WB) led LDCF project on coastal adaptation;
-The Director General of National Directorate for the Environment (DGA) who has been the GoSTP dealing with CC Adaptation issues and the main partner of the WB-led LDCF project on coastal adaptation;
-The National Directorate of Natural Resources and Energy who has the mandate for watershed management including hydrological data monitoring, collection and handling;
-The National Directorate of Agriculture and Forestry dealing with food security and land management aspects;
-The Marine Coast Guards Department and bilateral/multilateral donors such as the World Bank via PMU of LDCF-AF World Bank led project on coastal adaptation;

International and private institutions including the following:
-UNICEF who has been operating in the area of urban/rural sanitation linked to CC impacts and;
-The EcoBank Management Department who is a possible partner on using climate information for extreme weather event insurance products, and a potential source of co-financing;
-The World Bank who is the Implementing Agency for the LDCF Coastal Adaptation Project in São Tomé & Principe

The purpose of these meetings was to inform the relevant institutions and departments of the scope of the proposed LDCF project, to understand the role of key information and EWS actors, elicit details that could be factored into the LDCF project during the design phase so as to ensure that the LDCF financed project coordinates and complements other ongoing and planned initiatives. The needs and estimated costs for developing and facilitating EWS capacity and efficiency were also discussed.

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Mission 2:

The mission was undertaken to support the UNDP Country Office to engage with Government of "São Tomé and Principe" and other key stakeholders in the design of a project on EWS and climate information systems, to be financed by the LDCF. The primary purposes of this mission were: a) to engage stakeholders in consultations on the possible design of the project document; b) to finalize baseline assessment of the current EWS initiatives in the country on EWS; c) to finalize baseline

assessment of capacity development, infrastructure, equipment; d) to identify potential Output/Activities and pilot sites for further characterization and baseline development.

The Stakeholders Consultation Workshop was held atUNDP Conference Room, UN Building, São Tomé on Wednesday 10th January 2013 and it was attended by 35 participants representing government agencies with key roles to play in the LDCF project, as well as UN agencies, the local university, local Press, bi-lateral donors (UNICEF, World Bank), private sector and NGO's. Stakeholders presented their views on the proposed equipment, infrastructure and human capacity development. Particular emphasis was given to the need of linking national and community-based EWSs as an important aspect upon which the LDCF-funded EWS project. The selection of potential implementing partners was also discussed in particular the roles of National Institute of Meteorology (NIM), Hydrology Department (DGRNE), COMPREC, the Civil Protection, the Ministry of Agriculture (CIAT) and the General Directorate of Environment (DGA). All stakeholders present (See Table below) agreed on a set of criteria to be used for selecting the most vulnerable communities in which to implement or pilot the enhanced EWS projects.

A Community Consultations and site visits (CC-SV)- scoring meeting were held during January 2013, with Fishing and Agriculture community Members, Community Based Organizationn and NGO's at selected locations of Neves, Santa Catarina and Ribeira Afonso.

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17	COSME DIAS	INM	9909825
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29	AURELIANO CASTRO	SANTA CATARINA (Chefe Praia)	9840304
30	IVO MENDES	RIBEIRA AFONSO	9923338
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32		CENTRO NACIONAL DE EDUCAÇÃO PARA A SAUDE	
33		PROJECTO SAUDE PARA TODOS	
34	HERMENEGILDO SANTOS	PRESIDENTE ASSOCIAÇÃO DAS AUTRAQUIAS LOCAIS	
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37	ALINE CASTRO	DGA	
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39		ZATONA ADIL	
40		ALISEI	
41		SECAB	
42		AGRIPALMA	
43		SATOCAO	
44		FONG-STP	
45		DIRECÇÃO EDUCAÇÃO BASICA	
46		CIAT	
47		PECUARIA	
48		AGRICULTURA	
49		PRIASA	
50		IANE	
51		BAD	
52		ENASA	

Mission 3:

The 3rd Mission to São Tomé and Principe for the UNDP-GEF EWS project was undertaken from 11-19 April 2013. This mission had several objectives including: 1) To prepare and facilitate the validation workshop; 2) To discuss and secure co-finance letters from other partners; and 3) to work with the UNDP CO office, the main Implementing Partner (MoPWINREE) and other execution partners on the Outputs and Indicative Activities and 4) To carry out additional Community Consultations and site visits.

The Validation Workshop for the UNDP-GEF EWS project UNDP was held at the Conference Room, UN Building, São Tomé on Wednesday 17th April 2013. The purpose of this workshop was to update stakeholders on the Project design, solicit feedback on the information presented, and agree upon any changes to be made to the Project design. The two Project outcomes and their respective indicative activities and indicators were presented at the workshop:

- Outcome 1: Enhanced capacity of national hydro-meteorological (NHMS) institutions to monitor extreme weather and produce sector tailored weather forecasting.
- Outcome 2: Efficient and effective use of hydro-meteorological information for generating early warnings and support long-term development plans.

These outcomes were endorsed by the fifty seven participants who attended the workshop, including representatives from government agencies with key roles to play in formulating and implementing the project. Some adjustments were suggested by the participants to be introduced in the project document concerning the implementation of indicative activities so to seek better articulation between all execution partners, particularly the role of the Ministry of Agriculture through CIAT and CONPREC through the local disaster management committees at Community Base EWS pilot sites.

A second Community Consultations and site visits (CC-SV) - scoring meeting were held during 18th April 2013, with Fishing and Agriculture community Members, Community Based Organization and NGO's at selected locations of Malanza, Ribeira Afonso and other vulnerable coastal sites in Eastern coastline.

Atelier de Validação do Documento de Projecto Alerta Climático
17 Abril de 2013
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57		COBSTP REPRESENTATIVE		
58		OCEANIK BANK REPRESENTATIVE		

59		ECOBANK REPRESENTATIVE		
60		AFRILAND BANK REPRESENTATIVE		
61		ISLAND BANK REPRESENTATIVE		
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ANNEX 3. INCEPTION REPORT OCTOBER 2012

Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change – Country:São Tomé & Principe

INCEPTION REPORT

Author:
T C Ferreira
International Consultant

October, 2012

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1. Executive summary

This report contains a description of all the initial activities which included a Training workshop for the Project Development Team in Cape Town, South Africa between 13th and 14th August 2012 to discuss the kick-off the PPG phase of the project: *"Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change",* leading to the Inception Workshop that took place on Wednesday 18th September 2012 at UNDP Conference Room, UN Building, São Tomé.

The report develops in some detail the main activities that were undertaken during the IW including the Initial Consultations, the project development aspects linked to the Current Situation, Current Equipment needs for project development, Current Training Needs for project development, Site Selection and Main Gaps. Then the reports goes into analysing the potential Implications for Project Budget and Co-Financing, the Institutional Coordination and Implementation, the Identified Risks and finally the Follow-up activities – Timeline and Workplan.

The Training Workshop provided the opportunity to all International Consultants involved in the design of the project documents of the selected 10 countries (Malawi, Benin, Burkina Faso, Tanzania, Uganda, Ethiopia, Zambia, São Tomé and Príncipe, Liberia, Sierra Leone) to get to know each other and discuss general guidelines and GEF rules underlining Project design.

The IW resulted in Identification of major stakeholders and potential Implementing Partners to the project namely:

GoSTP technical institutions

- The National Institute of Meteorology (INM) who has the custodian of all weather and climate data monitoring and handling in the country;
- The Council for the Prevention and Response to Disasters (CONPREC) who is responsible for the Disaster Management at GoSTP level whose role on the dissemination and response aspects of the EWS will be important and a implementing partner of the WB led LDCF project on coastal adaptation;
- The General of National Directorate for the Environment (DGA) who has been the GoSTP dealing with CC Adaptation issues and the main partner of the WB led LDCF project

on coastal adaptation;

- The National Directorate of Natural Resources and Energy who has the mandate for watershed management including hydrological data monitoring, collection and handling;
- The General Directorate of Agriculture including Forestry dealing with food security and land management aspects;
- The Marine Coast Guards Department and bilateral/multilateral donors such as the World Bank via PMU of LDCF-AF World Bank led project on coastal adaptation;

International and private institutions specifically the following

- UNICEF who has been operating in the area of urban/rural sanitation linked to CC impacts and;
- The EcoBank Management Department who might be a possible partner on EWS for extreme weather event insurance products therefore with a potential for co-financing leverage;
- The World Bank who is the Implementing Agency for the LDCF Coastal Adaptation Project in São Tomé & Principe.

The IW also provided the opportunity to identify individuals with great knowledge of the country and its current conditions related to Environment and Climate Change issues with whom an initial Consultation was conducted to ascertain the existing baseline for project development and how far the PPG phase would have to cover.

The current constraints of INM run from lack of suitable equipment, shortage of qualified Met officers and breakdown of the supporting Met Departments particularly the Forecasting Services. The strengthening of the INM will be attained with the installation of:

- Automatic Weather Station (AWS) network of nine (6 +3 spares) stations;
- Lightning network in substitution to a Radar system which cost is beyond the budget available for this project;
- Satellite Aviation Data International Service (SADIS) system to assist the aviation wing and the other sectors of INM;
- The rehabilitation the EUMETSAT-Satellite imagery (PUMA follow-up) via AMESD (African Monitoring of the Environment for Sustainable Development) e-station.

The shortage of qualified Met officers and breakdown of the supporting Met Departments requires INM to train a significant number of:

- 9 Technical Meteorologist (WMO Class II &IV);
- 7 Meteorologists(WMO Class I & II);

At the end of the training programme all 10 (5 existing + 5 trained) Meteorologists WMO Class I and all 6 (to be trained) Meteorologist Forecasters WMO Class II should undergo specific training to increase their capacity on climate projections downscaling and EWS sector tailored weather forecasting techniques.

Given the large number of electronic/automatic equipment being acquired there is urgency in training of at least six (6) officers, from relevant sectors (Agromet (2), Hydrology (2) and Meteorology (2)) to maintain and repair equipment, computer infrastructure and telecommunications.

Additional training should be provided to sector Institutions cooperating with EWS so to develop the necessary expertise in Dissemination and Response to warnings.

There are two phenomena, which on occurring put population and socio-economic activities at risk in STP. These are:

i) The extreme rainfall event leading to landslides and flash floods mainly in the SE tip of the main Island which is influenced by the southern moist flow taking place during the rainy season, and
ii) The dry and warm conditions leading to drought conditions at the NE tip of the main Island which is influenced by the NE wind flow ("harmattan") from the Sahelian region taking place during the dry season.

With this situation under context locations for monitoring the EWS impact on hazards such as floods and related landslides or drought and fire related hazards will have to be:

- In the NE region where economic activity based on agriculture and grazing lays and are often affected by cumulative water deficit leading to drought events; and
- In the SE region where about 40% of the population is concentrated and are frequently affected by intense rainfall, run-off, landslides, flash floods and epidemics.

The report points at the main gaps identified and the risks associated to the EWS project development which the design of the project document should address so to minimize the impacts.

Finally a Work plan is presented and attached the follow-up activities and timeline.

2. Initial activities, workshop and consultations

2.1 Initial activities

i) Training workshop for the Project Development Team in Cape Town, South Africa on 13-14th August 2012 to discuss the kick-off the PPG phase of the project: *"Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change"* to be developed in Malawi, Benin, Burkina Faso, Tanzania, Uganda, Ethiopia, Zambia, São Tomé and Príncipe, Liberia, Sierra Leone.

ii) **In attendance were:** PradeepKurukulasuriya (STA, UNDP-GEF), Mark Tadross (TA, UNDP-GEF), Eugene Poolman (Resource Person- EWS in South Africa), Benjamin Larroquette (Resource Person- EWS for Tsunami Warnings), Tim Caetano Ferreira (Project Development Consultant for UNDP-GEF), Cara Tobin (Project Development Consultant for UNDP-GEF), James Reeler (Project Development Consultant for UNDP-GEF), Mike Jennings (Project Development Consultant for UNDP-GEF) & Petra de Abreu (Research Analyst for UNDP-GEF) and;
Not In-attendance was: Joana Talafre (Project Development Consultant for UNDP-GEF).

iii) The training workshop provided an overview of the activities that have been undertaken prior to PIF approval by GEF by looking at the Project background; PIF structure and reasoning in the context of EWS;key Issues that will need to be examined during the project formulation phase; an overview of PPG Phase with timelines and inputs needed at the country level; Discussion of individual country contexts and UNDP procedures and regulations and finally the Regional Component on project formulation.

iv) During the training workshop comments on the PIF's received by the various partners and in particular the World Bank, US Government, German government were reviewed and amongst other recommendations the following were particularised and be sure to address during the project document design:

- Make the project documents country specific by having realistic understanding of current state of hydro-met + past failures and their causes; taking into consideration the limitations of current capacity to develop many of the proposed activities in some countries; having realistic cost estimates for equipment training and O&M (operations & management).
- Making clear how climate information will be integrated into development plans – as focus in PIF tends to be on early warnings and not include long term changes to extreme weather events.
- Recommend quantification of targeted people that should be reached through communication channels in sub-component 2.2 and making sure that the most vulnerable populations are reached (making vulnerability a country specific measurement).
- Consider gender issue by assuring that the project will also benefit women by making them receive EW messages in designing communication channels.
- The need for a Regional Component of the project by linking with other Weather/Climate Centres/Institutions (ACMAD, AGRHYMET, WMO, etc) and by integrating systems and coordinating training/capacitance, forecast product access, etc.
- Properly defining hazards by country priorities, climate vs weather aspects/events.

2.2 Inception workshop

i) A mission was undertaken between 17-21 September to the Island of São Tomé & Principe to support the UNDP Country Office to engage with the Government and other key stakeholders in the design of a project on climate information and Early Warning Systems (EWS), to be financed by the LDCF (**Annex I** provides details of the mission schedule). During this mission an interactive national workshop on climate information and EWS was held on Wednesday 18th September 2012 at UNDP Conference Room, UN Building, São Tomé to bring together the producers of hydro-meteorological information, those in charge of disseminating alerts and parties concerned with the management of catastrophes and natural disasters to contribute towards the design phase of this LDCF initiative.

ii) The workshop was also used to present the intended scope of the project (as cleared by LDCF/Council) to the technical and financial partners and to exchange ideas on strategies to elaborate, implement and develop a sustainable EWS in São Tomé & Principe. Annex II shows the agenda for the workshop. Inception Workshop was also attended by representatives of UNDP, H.E Minister of Public Works and Natural resources, The GEF Operational Focal Point, National Institute of the Meteorology, Disaster Management Directorate (CONPREC), National Directorate for the Environment (DGA), National Directorate of Natural Resources and Energy, Forestry Directorate, General Directorate of Agriculture, Police, Defence Ministry, Fire Brigade, Marine Coast Guards, Directorate General for Tourism, Department for Planning and Finance, academia, journalists and local NGO MARAPA (Annex III provides a full list of Participants).

iii) The PPG Inception Workshop was made of two Sessions: Session 1 – Project background and ongoing activities and Session 2 – Review of project design and planning key activities both facilitated by Mr.Lourenço Monteiro, the GEF Operational Focal Point in São Tomé & Principe who introduced and facilitated discussions on the following presentations during Session 1:

1.“Current State of the National Institute of the Meteorology: Activities and Capacities”. Mr João Vicente- Director National Institute of Meteorology;

2.“Sao Tome current state to response and communication to Natural Disaster”- Mr Cecílio Sacramento - Deputy Director of the Council for the Prevention and Response to Disasters (CONPREC);

3.“Data monitoring, treatment, forecasting and diffusion (climate, hydrology, water resources)”- Mrs Lígia Barros and Ms Bernardina Vaz from National Directorate of Natural Resources and Energy;

4.“Climate Change Adaptation in Sao Tome and Principe: Existing and completed relevant initiatives to EWS project”- Mr Arlindo Carvalho – Director General of National Directorate for the Environment (DGA).

These presentations were followed by a description of the project background and the need for EWS in the African context (including the different aspects of EWS that may need to be strengthened).

In Session 2: A short review of the project background was presented by the UNDP CO to help participants to understand how the outcomes/outputs were developed during the PIF phase of the project. Two working groups discussed the validity of the proposed outcomes and outputs. Feedback and comments on the draft project design (outcome and outputs) from the two working groups have been the basis for the evaluation of Current Equipment status, Current Met Office Manpower situation, Current Met Office Forecasting Products and Facilities, Current Hydro-meteorological situation, Current Early Warning situation and Current Equipment and training needs per output.

2.3 Initial consultations

Following the initial discussions with UNDP CO officials and the Inception Workshop there were bilateral consultations with the main stakeholders. The purpose of these meetings was to inform the relevant institutions and departments of the scope of the proposed LDCF project, to understand the role of key EWS actors, elicit ideas on details that could be factored into the LDCF project during the design phase so as to ensure that the LDCF financed project coordinates and complements other ongoing and planned initiatives. The needs and estimated costs for developing and facilitating EWS capacity and efficiency were also discussed. During these consultations, the following GoSTP technical institutions and International and private institutions were engaged:

GoSTP technical institutions:

-The National Institute of Meteorology who has the custodian of all weather and climate data monitoring and handling in the country;

-The Council for the Prevention and Response to Disasters (CONPREC) who is responsible for the Disaster Management at GoSTP level whose role on the dissemination and response aspects of the EWS will be important and a implementing partner of the WB led LDCF project on coastal adaptation;

-The General of National Directorate for the Environment (DGA) who has been the GoSTP dealing with CC Adaptation issues and the main partner of the WB led LDCF project on coastal adaptation;

-The National Directorate of Natural Resources and Energy who has the mandate for

watershed management including hydrological data monitoring, collection and handling;
-The General Directorate of Agriculture dealing with food security and land management aspects;
-The Marine Coast Guards Department and bilateral/multilateral donors such as the World Bank via PMU of LDCF-AF World Bank led project on coastal adaptation;

International and private institutions specifically the following:

-UNICEF who has been operating in the area of urban/rural sanitation linked to CC impacts and;
-The EcoBank Management Department who might be a possible partner on EWS for extreme weather event insurance products therefore with a potential for co-financing leverage;
-The World Bank who is the Implementing Agency for the LDCF Coastal Adaptation Project in São Tomé & Principe.

3. Project development

3.1 Current situation

The National Institute of Meteorology in São Tomé & Principe has gone through very difficult times since post colonial rule in 1975 with the sudden departure of its specialized workforce and gradual deterioration of the equipment and infrastructure due to chronic lack of maintenance. Therefore, the LDCF-GEF project has a major challenge in lessening the acute shortage of specialized manpower required to increase the capacity for managing the weather and climate monitoring and collection network and producing advanced Early Warning products.

Current Met Office Observational Network
The National Institute of Meteorology (INM) in 1975 had a total of 67 (sixty seven) observation stations distributed as 2 (two) Synoptic weather stations; nine Agromet stations, 18 (eighteen) Climatological stations and 40 (forty) rainfall measuring stations. However, in 2009 INM has benefited from a Portuguese Cooperation programme (SICLIMAD) through CRIA Agency which delivered 6 (six) Automatic Weather Stations (AWS):2 (two) Synoptic stations (1 at S.Tomé Island and 1 at Principe Island); 2 (two) Climatological and 2 (two) pluviometric (rainfall) stations. More recently in 2011,the AAP-UNDP programmehas further supported INM delivering4 (four) AWS of which 3 were located in S. Tomé Island (Porto Alegre, Bombaim and Santa Catarina) and 1 at Principe Island (Belo Monte).

With all those inputs from the SICLIMAD-CRIA Agency and the AAP-UNDP programme the current (2012) equipment situation of INAM is made of a total of:

- 5 AWS installed in main Island of S. Tomé (at S.Tomé Airport, LagoaAmélia, Bombaim, Santa Catarina, Porto Alegre);
- 2 AWS installed in the Principe Island (at Santo António and Monte Santo);
- 3 AWS stored and not installed for lack of technical capacity.

The three (3) AWS at S.Tomé Airport and Lagoa Amelia at S. Tomé Island and Santo António at Principe Island do not have direct link for data transmission, requiring periodical travelling to the stations to retrieve the data manually.

Current Met Office Manpower situation

The human resources of INM also suffered its up and downs through the years with a massive loss of 20 of its technical staff in 1975 at the time of independence from colonial rule. In 2009 INM trained for the first time its first 35 national staff. However, as a result of the GoSTP recent forced retirement rules the Met Office has reduced the staff number to 26.Out of these 26 only 10 are Technical Personnel capable of dealing with weather observations. In addition, amongst these 10 there are only 5 Forecasters two of which are on special leave or on secondment.

Current Met Office Forecasting Products and Facilities

The National Institute of Meteorological (INM) currently produces various types of forecast covering a range of advance period and directed at various end users and these are shown in Table 1.

Table 1. Types of forecast currently produced by the National Institute of Meteorological (INAM) in São Tomé & Principe and their characteristics.

Type of Forecast	Advance Period	Purpose/End User	Remarks
Seasonal	3-6 months	Regional Forum	PRESAO 3
Monthly	30 days	Agriculture	
Daily	24h	Media and public	
Aeronautical	30h		Validated @ 6h
Tendency	every 2h	Aviation	

INM also carries out provision of data and services for related disciplines such as Agriculture, Marine, Construction, Hydrology, Tourism, Media, and Public. To produce these forecasts INM counts on access to regionalPRESAO 3 Forum forecast products and Internet access to forecast products from regional (Dakar) and international (UK Met Office, Meteo France and Brazil CEPETEC) Centers. Unfortunately INM does not count on the EUMETSAT-Satellite imagery (PUMA off spring e-station) via AMESD (African Monitoring of the Environment for Sustainable Development) e-station which is installed at the Marine Guards Department. This is an issue to be taken care during the implementation of the project.

Current Hydro-meteorological situation

Strangely INM does not have access to hydrology data in the country and no special forecast is dedicated to flood events. The Hydromet data collection network and data handling are of the responsibility of Department of Hydrology, National Directorate of Natural Resources and Energy. The Hydrology Department (HD) oversees a radial type of watershed (Figure 1) running from the mountain elevation at the centre (Pico of S. Tomé alt. 2,024 m (6,640 ft)) of the island towards the sea covering 116 watersheds and 223 watercourses. Annual flow rates are in the order of 0.2km³/year NE and 1.12km³/year SE (potential flash flooding zone with 40% of population) of the S. Tomé Island with six intermediate watershed (Cantagalo, Caué, Lembá, Lobata, Água Grande, Mézóxi) flow rates subdivisions.

Figure 1. Map of São Tomé & Principe showing the main watershed network and the six intermediate watershed (Cantagalo, Caué, Lembá, Lobata, Água Grande, Mézóxi) flow ratessubdivisions.

The Hydrology Department had in 1960 a monitoring and collection network made up of 13 Manual Hydromet stations distributed over both Islands. However by 1970 the number of monitoring stations reduced to 5 Manual Hydromet Stations. With all the changes that took place during and post independency period the GoSTP decided in 1980 to renewed the entire HD network with 13 manual Hydromet station measuring water level, flow rates and meteorological data (Rainfall, Relative Humidity and Air temperature). Unfortunately between 1980 and 2011 the entire Hydromet network was vandalized due to common believe that Mercury in the thermometers was a precious metal with a high commercial value.

Most recently in 2012 two Hydrometric AWS (Water level & flow rate) were installed at Bombaim (500 m alt. at the centre of the island) and at Manuel Jorge River (27 m alt. at the coast NE) both without direct data transmission facility so that data are manually collected periodically on site.

The HD also carries out periodical manual water level measurements at about 70 locations around the island, lacking however adequate equipment (Water level rulers, water proof boots and garments). In addition, the HD has a hydrological database which was set up with cooperation with The Institute for Water of Portugal but does not issue any flooding or flash flooding warning as they have no direct link to Met Office or any institutional data exchange.

Current Early Warning situation

Early Warning in STP is its infancy with the INM only issuing a normal weather forecast on TV (by videotape) and local radio by Telephone and the Fire Brigade being up to 2009 the nation's sole institution to respond to any natural disaster or extreme weather event supported by UN Agencies such as WFO, UNICEF, FAO. However, after the flash floods and massive land slide that occurred in 2009 in Ribeira Afonso district, the GoSTP created by a Decree a new organization named CONPREC (Council for the Prevention and Response to Disasters) to oversee, manage and coordinate Prevention and Response to Disaster in the Country. CONPREC is Council set up with help of Mozambique INGC, which congregates key institutions (Met Office, National Directorate for the Environment (DGA),National Directorate of Natural Resources and Energy, Department of Hydrology, Police, Defence Ministry, Fire Brigade, Marine Coast Guards and others) which can intervene in a disaster occurrence.

Due to its nature and mandate the World Bank led LDCF project has selected CONPREC to be one of their implementing partners, providing them with training in Disaster Management, organization of Local Disaster Risk Management Committees (LDRMC), basic communications systems, a OP-State Mapping software and facility for high-resolution mapping, Emergency Communication Kits, and a Doppler Radar for extreme weather events monitoring (to be installed either at Marine Coast Guards or Met Office). **T**he overall picture shows that CONPREC within the GoSTP geopolitics has the potential to grow and be the forefront institution in disaster management in the country similarly to INGC in Mozambique. However, this organization lacks an institutional framework, leadership and above all it faces fierce political competition from National Directorate for the Environment (DGA) who has been up to recently the sole recipient of all CCA funds.

3.2 Current equipment needs for project development

Countries having similar environmental condition as São Tomé & Principe Islands where extreme rainfall events frequently result in floods and occasional catastrophic flash floods do require a strong meteorological and hydrological services with the express purpose of coordinating data monitoring, collection and handling to support forecasting and warning products. To attain such capacities requires the provision of sufficient and adequate equipment with installation of meteorological and hydromet monitoring stations around the main watershed and key locations so to produce sufficient data to allow the establishment of an Early Warning System for preventive warning to protect population at risk.

Hydromet Equipment

Discussions held during the IW to evaluate the needs required for strengthening the hydromet services in São Tomé & Principe indicated that the Hydrology Department due to its current situation would require at least 6Hydromet AWS (Weather, Water level & flow rate) one for each of the six sectors to be able to function. However, ideally and to be able to know the net flow in each of the six intermediate flow rates subdivisions it would be necessary to have 2 AWS per sector, considering that annual flow rates are in the order of 0.2km³/year in the NE reaching 1.12km³/year in the SE were potential flash flooding zone could occur threatening the lives of around 40% of population living in the area. Therefore the minimum number of hydromet stations required for optimal functioning would be 14 (12 plus 2 for

spares).Becausethe HD carries out periodical manual water level measurements at about 70 locations around the island, it was also agreed at IW that more equipment should be made available to this Department to carry out these spot measurements such as Water level & flow rate, Water level rulers, water proof boots and garments (the numbers to specify during the PPG phase). Currently the HD does not issue any flooding or flash flooding warning. There should be an established framework for data exchange between HD and National Meteorological Department backed by a direct communication link and facilities to allow the resumption of hydromet forecast. This will require specific training and other ancillary equipment that should carefully assessed by the NC during the PPG phase.

Meteorological Equipment

As seen above, the total number of AWS currently installed and functioning in STP is 5 AWS in main Island of S. Tomé (at S.Tomé Airport, Lagoa Amélia, Bombaim, Santa Catarina, Porto Alegre) and 2 AWS in the Principe Island (at Santo António and Monte Santo) with 3 (three) AWS (Campbell CR800) stored and not installed awaiting for technical support from the provider (Quantific, SA, Portugal). As it was also found above that the three (3) AWS at S.Tomé Airport and Lagoa Amelia at S. Tomé Island and Santo António at Principe Island do not have direct link for data transmission, requiring periodical travelling to the stations to retrieve the data manually. Base on these facts the National Institute of Meteorology expressed the wish for assistance to strengthen their data collection and monitoring network with a provision of at least 12 more AWS with direct data transmission to the Forecasting Centre at S. Tomé Airport. These stations are to be located as:

- 6 (six) at **S. Tomé Island** (Angolares, S. Jorge, Boa Nova, Canavial, Neves, Juliana de Sousa);
- 2 (two)at**Principe Island** (Infante D. Henrique and Sundy);
- 1(one) at **Ilhéu das Rolas**;
- 2 (two) **spare** AWS for S. Tomé Island; and
- 1 (one) **spare** AWS for Principe Island

Forecasting support facilities

The above meteorological equipment is the minimum number of stations to be deployed. However, this number can be reviewed during the PPG phase discussion to be held with other stakeholders and ongoing programmes dealing with Climate and Environment issues in STP. One of these programmes currently undergoing is the World Bank (WB) led Coastal Adaptation project (WB–CA) which implementation programme foreseen a provision of an unspecified number of meteorological equipment. It was established that further consultation should take place by this LDCF-GEF National Consultants and the Project Management Unit of that project to ascertain the type and number of equipment to be supplied so to develop synergies between both projects.

The Forecasting Centre of INM is currently deprived of any other ancillary devices or facilities to support their local weather analysis for producing the forecasts other than the products made available by the Regional and International Forecasting Centers accessed thought the Internet System. Project Identification Form (PIF) of this LDCF project has foreseen the provision of forecasting supporting facilities, one of which is a Meteorological Radar. However, discussions

held within the working group during the Inception Workshop reflected the need to replace a radar installation with a cheaper system such as a lightning network. This decision was reached after an analysis of the impact of the potential cost of such equipment on the overall project budget given other priorities for enhancing the current system, and the likelihood that the WB–CA project would also provide a Doppler radar for the Marine Coast Guards.

Similarly, the conclusions of the working group during the workshop also reflected the need to replace the installation or rehabilitation of upper air monitoring stations with the provision of the satellite Aviation Data International Service (SADIS) system[20] to assist the aviation wing and the National Institute of Meteorology. The argument for this conclusion is twofold: Firstly, an upper air system will require sustainability to cope with the running costs for a daily launching of a balloon and radiosonde as well as to run a reliable source of gas (hydrogen, helium), which is extremely high on an annual basis. Secondly, the data provided by such system locally could be assessed using other countries products, such as from Gabon where there is an upper air sounding in operation (Libreville/Leon 00.27N, 09.25E, alt. 15m).

However, as said above, to support the execution of their daily forecast, INM has internet access to forecast products from the region (Dakar) and international (ECMWF, UK Met Office, Meteo France and Brazil CPTEC) Centers. INM has also the capacity to have in operation the EUMETSAT-Satellite imagery (PUMA follow-up) via AMESD (African Monitoring of the Environment for Sustainable Development) e-station. The standing issue is that the ASMED terminal, which normally is installed into Departments dealing with Environment, Agriculture, Land Management, happens to be in S. Tomé under the custody of the Marine Coast Guards. During the inception workshop the representative of this institution expressed the wish that this facility should be reinstalled at either the Agriculture or Environment Departments, as they are not fully benefiting given its potential.

3.3 Current Training needs for project development

The minimum Capacity development to support the EWS project development was discussed by the two working groups at the IW. The conclusions of this discussion indicated the need for a large training programme involving all Meteorological Departments (INM headquarters, Forecasting Centre at São Tomé Airport and Outer station posting).The capacity of STP to use information from numerical weather prediction models should be strengthened as there are only (5) forecasters (WMO Class I), two of them on special leave or on secondment. Therefore, given the size of the INM and the foreseen night passenger flights in São Tomé Island to start early next year, INM should train 5 additional Meteorologists (WMO Class I) which will oversee and give scientific support to all aspects of Forecasting and development of EWS products.

[20]SADIS is an operational system dedicated to primarily to aeronautical meteorological information in line with ICAO (International Civil Aviation Organization) worldwide provision. It provides a point to multipoint service on a 24-hrs basis via satellite. The receiving system consists of a 2.4 m diameter-receiving antenna at the receiving unit mounted indoors. A processing displayed system connected to the receiver for generating/viewing/printing the SADIS products. The products received by SADIS are: 1. Upper air wind /temperature, tropopause and maximum wind forecast in GRIB code; 2. Coded digital facsimile charts for upper wind/temperature at selected flight level and SIGWX forecasts; 3. OPMET (operational meteorological) information like METER, TAFS, SIGMET, AIREPs, Volcanic ash and tropical cyclone advisory messages.

The start of night passenger flights in São Tomé Island will also require a further training of at least 6Meteorologists on duty and be able to satisfy the daily shift rota.

The INM supporting staffs is made up of Technical Meteorologist, which are presently in reduced number. Therefore, there should be an in-service and on-the-job training programme to be developed during the PPG phase and for which an International Consultancy will be required to oversee the training standards, so to comply with WMO requirements. However, the suggested number of officers to be trained will depend on the GoSTP policy in opening new vacancies in the civil service structure and/or on the availability of lower grade met officers in a position to benefit from in-service training programmes.

The preliminary results from the training needs assessment carried out during the IW mission are summarised in Table 2. A detailed assessment should however be carried out during the PPG phase.

Table 2. Summary of the minimum capacity development required at INM to support EWS project in São Tomé & Principe.

Item No	Met Officers Grade	Duty/ Responsibility	Qty Available	Qty Needed	Remarks
1	Technical Meteorologist	To observe, and record the weather data and compile climatological data	11	20	In-service and on-the-job training programme for 9 new officers
3	Meteorologist	To assist the Meteorologist to forecast the weather	7	16	The project to train 9 Forecasters
5	Television Weather Broadcast	To present the weather on TV	0	2	4 weeks training for Two MET Officers to be Weather presenters
6	IT & Electronics	Met Equipment Maintenance & Repair	1	5	From relevant sectors: Environment (2), Hydrology (2) and Meteorology (2)
7	EWS Trained forecaster	To issue EWS sector tailored weather forecasting	0	16	Specialized training in forecast downscaling and EWS sector tailored

					weather forecasting techniques
8	Information Technology /GIS Specialists	To operate and manage the ASMED terminal	0	4	To be trained at Agrymet, ACMAD or other International Centres

Given the current difficulty that INM and the country in general faces with an acute shortage of IT/Electronic professionals, and considering the large amount of electronic/automatic equipment to be acquired, the working group at the IW recommended the need for specific training in maintenance and repair of equipment, computer infrastructure and telecommunications, including the capacity to use cost-effective technologies to interface with existing equipment/software. The institutions lacking this expertise are primarily the National Institute of Meteorology, the Hydrology Department and National Directorate for the Environment (DGA). The number of officers to be trained was agreed to be not less than 6 officers in total i.e. two per institution. This number was reached on the basis of current workforce mobility and the likelihood that one of the officers in each sector can be lost/transferred.

The main hazards hitting the Islands are: flash floods that result from the combination of excessive runoff and abnormal spring tides; the sudden formation of "squall lines of thunderstorms" (southern moist flow) giving intense rainfall which can cause landslides; and the sudden invasion of a dust storm (NE wind "harmattan"). Bilateral meetings held with CONPREC has indicated that this institution is seeking the support of the STP Met Office to provide EWS forecasts which can predict the intensity and extent of the above Climate/Weather related events and be rapidly *communicated* to communities at risk (or generated by the community itself), who should have *preparedness plans* in place. Therefore INM needs to train all 16 meteorologists to be able to produce accurate forecasts of these phenomena, and issue timely EW information to CONPREC in appropriate technical language whenever these phenomena occur, so to disseminate the alert and put response actors on guard. In addition, all of the available Forecasters (WMO Class I & II) at INM should also undergo specific training to increase their capacity on climate projections downscaling and EWS sector tailored weather forecasting techniques.

During the discussions held during bilateral meetings with both CONPREC and STP Met Office it became clear that both institutions wish to collaborate and need help in developing conditions for them to operate jointly. Therefore, besides the training of Met Officers already expressed in the above and on Table 2, there should be training of CONPREC officers in Disaster Managementissues taking into account the probable consequences resulting from an impact of such hazards, including the handling of EWS Alerts.

The development of these training programmes should be complemented with a simultaneous setting up of a communication system between STP Met Office Forecasting Centre and CONPREC which currently is nonexistent. Therefore, there should be created a direct line of communication between these two institutions to enable rapid transmission of warnings and dissemination of alerts. As flash floods are one of the hazards, this communication system

should also link other institutions such as the Operational Division of the Hydrology Department and the Marine Coast Guards. Finally, as the WB-CA project will also be working with these institutions, further discussions should take place during the PPG phase to assess where there should be complementarities both in equipment, facilities and specific training needs.

3.4 Site selection and Gaps

Site Selection

The locations were AWS are already installed are the 5(five) at S.Tomé Airport, Lagoa Amélia, Bombaim, Santa Catarina, Porto Alegre (São Tomé Island) and 2 (two) at Santo António and Monte Santo (Principe Island). Further installations under the LDCF project will be 6(six) at Angolares, S. Jorge, Boa Nova, Canavial, Neves, Juliana de Sousa in São Tomé Island and 2(two) Infante D. Henrique and Sundy at Principe Island with a single one at Ilhéu das Rolas. In summary there will be 11(eleven) AWS at the main lsland of São Tomé 4(four) at Principe Island and 1(one) at Ilhéu das Rolas. All these 16 AWS will be monitoring weather and other environmental conditions locally to support the forecasting activities and production of Early Warnings against hazards ranging from:

- Flash floods that result from the combination of excessive runoff and abnormal spring tides;
- "Squall Lines of Thunderstorms" sudden formation (southern moist flow) giving intense rainfall which can cause landslides; and
- Sudden invasion of a dust storm (NE wind "harmattan").

Therefore there are two phenomena which on occurring put population and socio-economic activities at risk. These are (Figure 2): the extreme rainfall event leading to landslides and flash floods mainly in the SE tip of the main Island which is influenced by the southern moist flow taking place during the rainy season (October to May), and on the other hand the dry and warm conditions leading to drought conditions at the NE tip of the main Island which is influenced by the NE wind flow ("harmattan") from the Sahelian region taking place during the dry spell (January & February) and the dry season (June-September).

Figure 2. Map of São Tomé & Principe showing the regions where main hazards occur: the W (Santa Catarina)-SE side (Ribeira Afonso) with landslides and flash floods due to extreme rainfall events and N-NE with dry and warm conditions due to the influence of ("harmattan") from the Sahelian region.

With this situation under context locations for monitoring the EWS impact on hazards such as floods and related landslides or drought and fire related hazards will have to be:

- In the NE region where economic activity based on agriculture and grazing lays and are often affected by cumulative water deficit leading to drought events; and

- In the SE region where about 40% of the population is concentrated and are frequently affected by intense rainfall, run-off, landslides, flash floods and epidemics.

The exact locations where the project will work with communities in monitoring the performance of EWS will a matter of further discussions and planning during the PPG phase.

Implementation arrangements
The Institutional Framework and Project Implementation Arrangements will be completed after the next consultation to take place during the PPG phase of the project. However, UNDP will be the GEF implementing agency for this project. The implemented modality under UNDP it be will defined later after discussions with the CO and assessment of the Institutional Capacity. Discussions held with the UNDP RC/RR do indicate that the current capacity of the receiving institutions in STP to execute the project under a NIM modality is low. There have been severe delays in the implementation quality issues of projects in STP supported by UNDP and the tendency now would be to adopt the DEX/DIM implementation modality. Therefore this is an issue that should be further assessed. Depending on the implementation modality to be adopted a Project Management Unit (PMU) would coordinate and direct the project execution. As a first approach, the PMU will be headed by a Project Manager (PM) with two support staff (an administrator/financial assistant and a driver if necessary). The PMU will be responsible for work plans, reporting, preparation of TOR, coordination of all the partners involved in project execution.

As part of the project implementation structure it is foreseen to have a Project Steering Committee (PSC) who will oversee the project. This committee will be composed of representatives from government line ministries, institutions, parastatals, UNDP, NGOs and representatives of the pilot communities including the Local Disaster Risk Management Committees (LDMRC). The Chairman of this PSC will be appointed by the NEA. The PSC will be constituted from the kick off Inception Workshop.

The PSC will meet quarterly during the first year and semi-annually thereafter. The PSC will provide high level policy guidance to the project and will provide guidance and assistance for the resolution of any difficulties experienced during implementation. The PSC will endorse annual work plans. In this way, the PSC will be the main body to monitor and evaluate the project during its implementation. The PSC will further facilitate resource mobilization for the implementation of the National Action Plan. The PSC can draw expertise from other ministries/ departments /organizations when required.

The Institutional responsibilities by Outcome will be known after the Stakeholders Consultation to take place during the PPG phase.

A Regional Component to the project was accepted by all participants and the majority of training activities in specialized fields would benefit from a joint process with all other countries involved in this programme. Similarly the procurement process for AWS and other specialized equipment could also benefit from a coordinated Regional Component once the rules and agreements between the various countries are sought. Access to forecasting products of Regional Centers or International institutions for EWS requiring a specific Memorandum Of Understanding (MOU) could also be channelled though the Regional Component.

Gaps
During the consultations carried out in the country and results from the working groups at the Inception Workshop the following four major gaps were identified:

1. The capacity for the country to carry out climate monitoring and reliable field data collection is extremely low particularly due to reduced human capacity, Infrastructural constraints linked to Equipment and Weather Forecasting facilities:

2. Weak capacity to produce Warnings and lack of an organised system to communicate climate and CC information to end users;

3. Low effectiveness of the policy impact to ensure some measure of climate change are mainstreaming into relevant policies for disaster management;

4. Dispersed and weak scientific and data foundations leading to poor intersectoral information and data sharing network.

3.5 Implications for the project budget and co-financing

Due to the constraints that the INM is currently facing and the gaps identified above the project should be design in order to address to some of these constraints and try and fill the existing gaps. The project PIF already indicates two large areas of action which makes the main components of the project. In the design of the project there should be the intention to:

- Enhance the 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;

- Support improved and timely preparedness and response to forecast climate-related risks and vulnerabilities;

- Establish a national framework of data sharing and use across the sectors so to enhance the capacity of decision makers in their task to develop Climate Change adaptation measures in key sectors.

Given the acute shortage of adequate equipment and human resources at INM and all main stakeholders, a considerable amount of money will be directed to:

- The purchase of equipment and setting up of monitoring and collection of weather, climate and hydromet data as well as;
- The capacity development of the human resources of the main stakeholders.

Nonetheless, there is an urgency in also addressing issues concerning to the institutional framework required to establish a strong and efficient dissemination and response apparatus for a EWS, as well as, the need for data and information sharing network across all institutions. This will promote the gathering and sharing of scientific material for strengthening the foundations for ESW sustainability.

To fulfil the goals and objectives of the project there should be a significant component of cooperation between all stakeholders and also with all ongoing projects and programmes in STP dealing with weather, climate and development aspects to leverage co-financing, rationalise resources and avoid overlapping of activities. The areas/actions and programmes for further discussion to ensure alignment with the proposed LDCF project is highlighted below:

a. The AGRHYMET on the AMESD-ECOWAS initiative ($2 million) who has adopted the theme of water resource management and the management of crops and pastures to make sure that STP can be able to resume reception of remote sensing data for environmental application, which channels were put inactive by the Marine Coast Guards;
b. Carry out an inventory of the Portuguese Initiatives (SICLIMAD & KSIDS) to evaluate the current status of this programme and identify possible synergies and areas of co-financing ($450,000 in total);
c. Follow up on the current status of the European Commission (EC) programme under the Road Sector Support Project (US$1,350,000) for coastal protection works in priority roads and assess any areas of co-financing;
d. To identify activities still to be developed by the African Development Fund (ADF) of the AfDB programme ($1.985,000 million) to improve food security and reduce rural poverty in STP, by supporting the development of agriculture and livestock farming, phase II (2008-2012) that may be of interest in terms of synergies and co-financing to this LDCF project;
e. To follow up on the current status of The PRIASA (2011 – 2014) programme to improve food security and poverty reduction in STP ($7.8 million), being implemented on the 2 islands of Sao Tome and Principe to assess areas of synergy and co-financing;
f. Follow up is the Participatory Smallholder Agriculture and Artisanal Fisheries Development Programme (PAPAFPA, funded by IFAD), which has just started the 3rd phase and is designed to contribute to the sustainable improvements in the living conditions and incomes of small scale farmers and artisanal fishers;
g. To discuss with the Project Management Unit (PMU) of the World Bank-GEF led project on coastal adaptation to identify areas of synergy and complementarity in terms of equipment and facilities;

h. Consult with AAP PMU and make an inventory of all equipment provided and training/capacity development that took place under the AAP programme to ascertain complementarity in capacity development programmes.

The current budget allocation covering outcomes 1 and 2 will probably need to be rearranged depending on the degree of co-financing and synergies that will result from the contacts suggested above and to be carried out during the PPG phase.

3.6 Institutional coordination and implementation

Institutional Coordination and Implementing Partners

Two national Institutions are naturally positioned as the implementing partners of this LDCF project. These are The National Institute of Meteorology (INM) who has the custodian of all weather and climate data monitoring and handling in the country and The Council for the Prevention and Response to Disasters (CONPREC) who is responsible for the Disaster Management at GoSTP level, whose role on the dissemination and response aspects of the EWS will be important, as well as being an implementing partner of the World Bank (WB) led LDCF project on coastal adaptation. Currently, it is not clear which institution has the mandate to issue warnings. However, from the IW group discussions other key sectors/users of climate information and EWS have been also identified as potential implementing partners. These are: Marine Coast Guards, The Hydrology Department, The National Directorate for the Environment and The Ministry of Agriculture. The implementation of this LDCF project could potentially have the STP Met Office (INAM) as the main implementing partner depending on their Institutional Capacity which has yet to be tested as indicated above. However, as all participants at the IW agreed, an important consideration for the successful use of climate warnings would be the capacity to relay information in almost real time based on the pre assessment of its usefulness and properly vetted for instantaneous dissemination to target communities. As all the above listed stakeholders (+ others) are represented in the Advisory Board of CONPREC and given its mandates, this institution is naturally positioned as then best organization to be responsible for the disaster management aspect (implementation of the dissemination and response phases) of any future EWS in S. Tomé & Principe. The question arising so far is how warnings should be directed within any proposed EWS cycle, as there is *currently no direct communication between the STP Met Office (INM) and the end users/beneficiaries of the EWS* including COMPREC. The following schematic diagrams (Figure 3a, 3b) illustrate possible arrangements for the establishment of an organized structure in the country responsible for the issuing of warnings and the dissemination/response phases of EWS.

Proposed national structure of future EWS

There should a Monitoring and Warning Cycle (MWC) and a Dissemination and Response Cycle (DRC) of a future EWS made up of a set of institutions sharing an established framework for cross sectoral cooperation in the EWS. The institutions most indicated to be part of the MWC are (Figure 3a): STP Met Office (INM), The National Directorate for Natural Resources (DRNE), the National Directorate of Environment (DGA), Marine Coast Guards, Ministry of Agriculture and Forest, Ministry of Health and Sanitation, the Local Disaster Risk Management Committees (LDMRC) and COMPREC at the centre receiving data, advisory information and forecasts (Hydro, Meteo and Marine) as ingredients for a Warning to be issued.

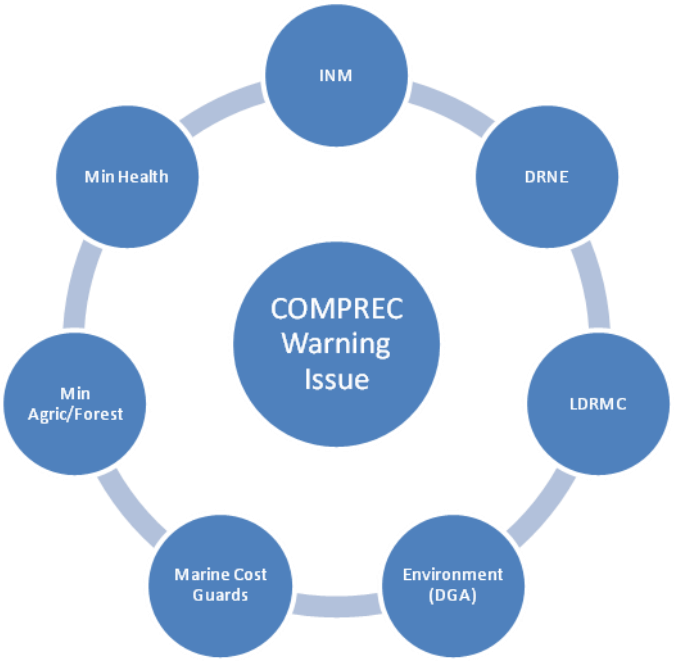

Figure 3a. Schematic representation of the potential EWS-Monitoring and Warning Cycle (MWC) and main stakeholders involved in São Tomé & Principe.

However, for these EWS cycles to function there should be a fast and reliable and efficient communication network installed for both Monitoring and warning activities and Dissemination and Response actions, which will constitute the backbone of the EWS dissemination vehicle. Notably, in the MWC, the Local Disaster Risk Management Committees (LDMRC) will be the institution at the community level to both inform on any impeding hazard and also receive warnings from COMPREC for proper dissemination and response action. These LDMRC if provided with FrontLineSMS[21] technology will constantly update CONPREC on risk/disasters/hazards (such as coastal tidal waves, local landslides) that may be occurring locally and for what no means exist for the various monitoring Services in town to register or be aware of the event. These Local Disaster Risk Management Committees are currently being set up at specific locations in the context of the WB-GEF project at Cantagalo (South), Caué (South), Lembá (North), Lobata (North), Agua Grande (Centre), Me-Zochi (NE) plus 3 in Principe Island.

The same LDMRC within the communities will constitute the center organization working directly with CONPREC in the dissemination process and response strategy of the EWS Dissemination and Response Cycle (DRC) shown in Figure 3b.

[21]FrontlineSMS enables users to connect a range of mobile devices to a computer to send and receive SMS text messages. The software works without an internet connection by connecting a device such as a cell phone or GSM modem with a local phone number. FrontlineSMS can send and receive messages, group contacts, respond to messages, and trigger other events. If internet access is available, FrontlineSMS can be connected to online SMS services and set up to feed incoming messages to other web or e-mail services. By leveraging basic tools already available to most NGOs — computers and mobile phones — FrontlineSMS enables instantaneous two-way communication on a large scale. It's easy to implement, simple to operate, and best of all, the software is free; you just pay for the messages you send in the normal way (http://www.frontlinesms.com/).**FrontlineSMS:Radio**is a tailored version of the core software optimised for radio DJs. Radio represents the dominant media source for many people worldwide and it represents a vital outreach particularly for rural communities; however this type of communication has been mostly one way. By capturing, organizing and smartly representing incoming data from listeners—live—FrontlineSMS:Radio is fostering two-way dialogue in a way that is immediate and relevant (http://www.frontlinesms.com/about-us/frontlinesmssister-organisations/).

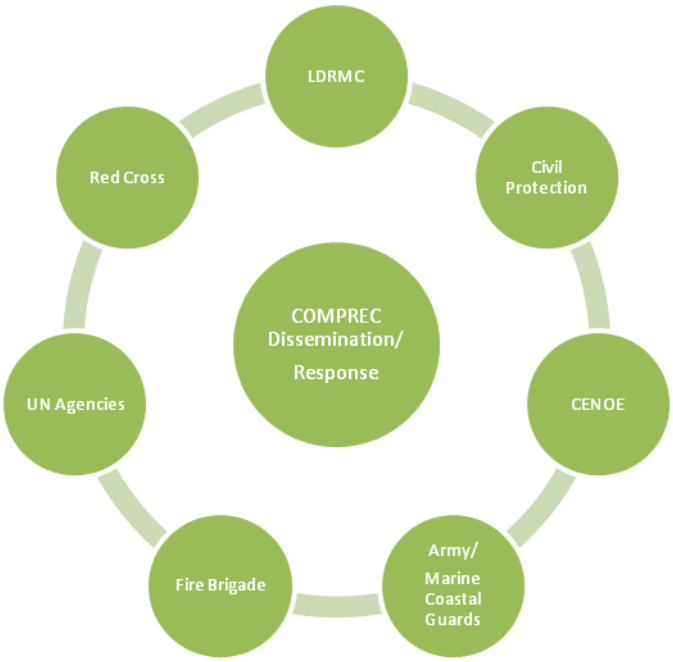

Figure 3b. Schematic representation of the potential EW-Dissemination and Response Cycle (DRC) and main stakeholders involved in São Tomé & Principe.

In this DRC, besides the LDMRC at community level, there will be other institutions such as the Red Cross, The Civil Protection, The National Centre for Emergency Operation (CENOE), The Army and Marine Coastal Guards, The Fire Brigade and all UN Agencies dealing with Emergency situations (WFP, UNICEF, FAO) collaborating directly with CONPREC. These are all provisional arrangements which during the PPG phase there must be consultations with all direct stakeholders to assess how to develop the best national framework under which these propose structure can be operationalised. In addition, specific training on information dissemination will also be provided to all stakeholders handling EWS information, as well as the members of the LDMRC and target communities. Details of these training programmes should be also object of further discussions and development during the PPG phase.

Data sharing and coordination for risk knowledge of EWS

It was clear from the discussions during the Inception Workshop that there is a need to not only increase climate monitoring and forecasts to timely identify extreme events but also use this information to help the decision making process in disaster management particularly towards flash flooding, intense rainfall and associated risk of landslides, dust storm risks to health, sanitation problems during flooding and intense rainfall and drought/food security issues. This requires coordination and the sharing of data to support the countries' effort to minimize the impact of such described hazards, reducing the risk and vulnerability that communities are exposed to. To help this to be achieved in the long run there is a need to establish a national and inter-sectoral framework for data and information management that would strengthen the capacity of decision-makers and planners to understand how to integrate data and information on the expected impacts of such hazards on communities, ecosystems and infrastructure. This could be achieved through the setting up of a virtual **EWS - Climate Change Risk Information Centre** where all existing and to be collected scientific data (Meteo, Hydro, Environment, Land Management, Agriculture, Forestry, health, coastal) could be stored and

handled. The handling of such data and information could be through a robust research information, and systematic integration of up-to-date knowledge about climate change risk prevention, particularly on: the identification/description of hazards, looking at their patterns and trends, and developing vulnerability and risk maps which can help planners make appropriate planning choices in the pivotal sectors, such as the land use vs urban/rural planning, community health safety, community and infrastructure risk/vulnerability and development of agriculture/forestry sectors.

This requires the setting up of a coordinated programme for intersectoral data collection, training in data handling, GIS techniques for development of community-based EWS climate risk mapping supported by an established protocol for functioning of such virtual centre.

This setup of the virtual EWS - Climate Change Risk Information Centre would cover the risk knowledge aspect of the future EWS. The needs for training, capacitance, equipment and facilities to attain this objective should be carefully assessed through consultation with all stakeholders during the PPG phase.

3.7 Identified risks

The list of risks potentially associated to the implementation of this project is innumerous given the difficult conditions of the country. However, those risks which are obvious and known to stakeholders met during the IW are shown in Table 3.

Table 3. Summary of the identified risks, Risk level and risk category.

Identified risks	Risk Level	Risk Category
Lack of political will to support Project	L	Political
Lack or poor coordination between implementing and executing Agencies	M	Strategic and organizational
Low Institutional/ Execution Capacity	M/H	Strategic and organizational
Insufficient qualified human Resources	M/H	Organizational
Inadequate provision, and/or late deployment and poor maintenance of critical EWS infrastructure and climate monitoring equipment	M/H	Organizational
Limited capacity to tackle all project components	M	Strategic and organizational
Inability to effectively sensitize communities to the magnitude of alerts and warnings	M	Strategic
Inadequate or poor level of collaboration and commitment of participating communities to share information and/or adopt project interventions	M	Strategic
Inadequate sensitization of relevant authorities to undertake climate change and EWS sensitive policy reforms	M	Strategic

Poor coordination among the participating stakeholders (government, non-government and private)	M	Organizational and political
Extreme weatherevents	M	Environmental
Delays in funding disbursement and administrative slowness	M	Operational

Most of risks identified are organizational and or strategic in nature. These risks and their level is a reflection of the current relatively low institutional and individual capacities of the Meteorological Services and indeed of the stakeholder institutions who potentially collaborate with the project. Those risks which can be high are those where the project should concentrate efforts in tackling the gaps and barriers so to minimize their impact.

Annex 1: Initial mission schedule

Mission to Sao Tome & Principe from 17 to 21 Septembre2012

Strengthening climate information and Early Warning Systems in Western and Central Africa for climate resilient development and adaptation to climate change - São Tomé and Principe"

INCEPTION PPG WORKSHOP MISSION

TIMOTEO CAETANO FEREIRA- INTERNATIONAL CONSULTANT

ACTIVITY	TIME	NOTES
Monday 17 September 2012		
Arrival of TimoteoFereira	*09h00*	*Airport + Hotel*
Meeting with Laurent(UNDPCO EFP)	*10h00-17h00*	*Workshop agenda and budget validation*
Meeting with Mr Antonio Viegas (UNDP ARR/Programme)	*18h-18h30*	
Tuesday 18 September 2012		
Inception workshop	*8h00-17h15*	• *With main stakeholders*
Wednesday 19 September 2012		
Meeting with Carlos Diaz (Conprec)	*9h00-9h45*	• *Discussion on synergies, Project implementation and management arrangement*
Meeting with Lourenco Monteiro (GEF OFP)	*10h00-10h45*	• *Project implementation and management arrangement*
Meeting with the General Director of Environment (ArlindoCarvalho)	*11h00-11h45*	• *Discussion on synergies, Project implementation , management arrangement and co-financing*
Meeting with the INMeteorology	*12h00-12h45*	• *Discussion on synergies and possible co-financing*
Lunch	***12h30-14h30***	
Meeting with Ligia Barros (Director of Natural Resources and Energy)	*14h30h 15h00*	• *Discussion on synergies, Project implementation , management arrangement and co-financing*
Meeting with the Forestry and Agriculture Directors (Faustino	*15h00- 15h30*	• *Discussion on synergies and possible co-financing*

ACTIVITY	TIME	NOTES
Oliveira and Meyer)		
Meeting with ADB representative(HelderNeto)	*15h30-16h00*	• *Discussion on synergies and possible co-financing*
Meeting with UNICEF OIC (Tanya)	*16h00-16h30*	• *Discussion on synergies and possible co-financing*
Meeting with the RC/RR UNDP(Jose Salema)	*16h30-17h30*	• *Courtesy visit and project management arrangement*
Thursday 20 September 2012		
Meeting with the Civil protection , Coastal Guards, Red Cross and FONGs	*9h00-11h*	• *Discussion on synergies and possible co-financing*
Meeting with private sectors Ecobank and Commercial Bank	*11h00-12h00*	• *Discussions on possible co-financing*
Lunch	***12h30-14h30***	
Debriefing with UNDP	*14h30 – 15h30*	• *The Way forward*
Friday 21 Sept	***Departure***	

Inception Workshop Agenda

Time	Programme		speaker	Facilitator
08.15-09.00	Arrival participants and registration			Laurent Ngoma
09.00–10.00	Official Opening (Introduction of chairperson/Chairman's opening statement)			Antonio Viegas
	Statements i. The GEF Operational Focal Point		Lourenco Monteiro	
	ii. The UNDP Representant Resident		Jose Salema	
	iii. H.E Minister of Public Works and Natural resources		Carlos Manuel Vila Nova	
	Workshop Programme Presentation		Laurent Ngoma	Laurent Ngoma
10.00 – 10.15	**Tea Break**			
	Session 1 – Project background and ongoing activities			
10.20 – 10.35	**Presentation 1:**	Current State of the National Institute of the Meteorology: Activities and Capacities.	Joao Vicente- Director National Institute of Meteorology	Lourenco Monteiro
10.40-10.55	**Presentation 2:**	Sao Tome Current state to response and communication to Natural Disaster	Cecilio Sacramento- Conprec-	
11.00 – 11.30	**Presentation 3:**	Data monitoring, treatment, forecasting and diffusion (climate, hydrology, water resources)	Lígia Barros and Bernardina Vaz	
11.35-11.50	**Presentation 4:**	Climate Change Adaptation in Sao Tome and Principe: Existing and completed relevant initiatives to EWS project	Arlindo Carvalho- DGE	
11.50 -12.20	**Debates**		**All Speakers**	
12.25- 12.55	**Presentation 5:**	Introduction to EWS in the African context, gaps, needs and outline of the project aims and outcomes	Timoteo Gaetano, International consultant	Cosme Diaz
	Presentation 6:	Project components and timeline - the regional approach and potential benefits		
13.00-14.00	**Lunch**			
	Session 2 – Review of project design and planning key activities			
14.15-15.30	Working Groups	Validation of Outcome/Outputs: Hydro-met equipment and technical requirements; Training and capacitance needs, Implementation of EWS for disaster management and long term planning.	Timoteo Gaetano, International consultant	Victor Bonfim
15.30-15.45	**Tea Break**			
15.45– 16.45	Group Presentations- 10 minutes per group		Group leads	

16.45 –17.00	Close of workshop	Laurent Ngoma and Tim Caetano	

List of stakeholders and contact details

VENUE: UNITED NATIONS CONFERENCE ROOM

	NOME	INSTITUICAO	TELEPHONE
1	DUDENE VAZ LIMA	DGRNE	9944809
2	JUSTINA CARVALHO LIMA	DGRNE	9931220
3	BERNARDINA VAZ	PAMCZC	9904156
4	ADILSON DA MATA	D. FLORESTA	9928560
5	JOAO PESSOA LIMA	D. DAS PESCA	9904683
6	JOSE LUIZ ONOFRE	INM	9810023
7	KIAKISIQUE NASCIMENTO	POLICE NACIONAL	9957631
8	ARISTOTOMENES NASCIMENTO	INM	9923709
9	GILBERTO C.D	ONG MARAPA	7855200
10	ELISIO NETO ESPIRITO SANTO	ONG MARAPA	9914510
11	LUCRECIO MADRE DEUS ALEMAO	FENAPASTP	9919047
12	MARCOS VIEGAS	FASTP/CONPREC	9915013
13	HAMILTON DA SOUSA	GUARDA COSTEIRA	9925844
14	HELIODORO QUARESMA	DSGC	9907647
15	EUGENIO DA GRAÇA	DP	9907630
16	BAKISSY DE COSTA LIMA	DCS	9819853
17	COSME DIAS	INM	9909825
18	JOAO ZUZA TAVARES	SNPEB	9908390
19	VICTOR BONFIM	DGA	9907470
20	LOI HENG	MOPRN	9903059
21	LOURENÇO DE JESUS	DGA	9904445
22	CARLOS MENDES DIAS	CONPREC	9926921
23	JOAO VICENTE LIMA	INM	9911013
24	TIM FEREIRA	INT. CONS.-UNDP	9813729
25	AIDA D'ALMEIDA	AAP	9933633
26	LAURENT-MASCAR NGOMA	UNDP	9800868

ANNEX 4. INCIDENCE OF CLIMATE CHANGE RELATED PHENOMENA IN SÃO TOMÉ AND PRINCIPE ISLANDS (ADAPTED FROM NAPA, 2006)

Items	Important Facts	Country Incidence
1	Decrease of riverflow	100%
2	Lack of water	80%
3	Decrease of riverflow in the dry season.	100%
4	Floods at the banks and rivermouths	70%
5	Decrease of rains	100%
6	Long dry seasons	100%
7	Sea level rise and consequent invasion of sea water	100%
8	Lack of drinking water (lack of treated)	65%
9	Floods(during rainy season)	50%
10	Quality of water	50%
11	Contamination of river water	100%
12	Several diseases caused by floods	50%
13	Decrease of agricultural productions	70%
14	Coastal erosion caused by sea level rise	100%
15	Landfalls due to strong rains	50%
16	Existence of overhead irrigation system	20%

ANNEX 5: CAPACITY ASSESSMENT

CAPACITY ASSESSMENT SCORECARD

PROJECT: STRENGTHENING CLIMATE INFORMATION AND EARLY WARNING SYSTEMS IN AFRICA FOR CLIMATE RESILIENT DEVELOPMENT AND ADAPTATION TO CLIMATE CHANGE

This capacity assessment scorecard will be adapted and applied to:

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

PROJECT OUTCOME 2: Efficient and effective use of hydro-meteorological and environmental information for making early warnings and long-term development plans

The scorecard is arranged according to functional capacities for agencies to both monitor and forecast climate-related hazard information, share and package such information with relevant agencies, disseminate both warnings and advisories based on such information and provide appropriate legal and procedural frameworks.

To establish the baseline capacity stakeholders are asked to score their understanding of the existing capacity, where they would like to move the capacity to in the project timeframe, and how they would prioritize each capacity.

The scoring can be adapted and locally defined. The standard scale is:

1. No evidence of capacity
2. Anecdotal evidence of capacity
3. Partially developed capacity
4. Widespread, but not comprehensive capacity
5. Fully developed capacity

CAPACITY OF AGENCIES TO PRODUCE INFORMATION

Capacity Indicator	Baseline: Level of Existing Capacity					Target level of Capacity in the project timeframe	Priority of Capacity (h/m/l)
	1	2	3	4	5		
Capacity to service the observational infrastructure e.g. hydrological and meteorological stations, radar, upper air monitoring, satellite technology etc.	X					INM, DGRNE	H
Capacity to generate weather/climate forecasts e.g. Numerical weather prediction (1-7 days), seasonal forecasts etc.	X					INM, DGRNE, CONPREC	H
Capacity to utilize internationally and regionally available monitoring and forecast products		X				INM, DGRNE, CONPREC	H
Capacity to send local observations to international centres	X					INM, DGRNE, CONPREC	H
Capacity to record and use national/local observations for monitoring current meteorological and hydrological hazards in a timely manner	x					INM, DGRNE, CONPREC	H
Capacity to record and use national/local observations to forecast future meteorological and hydrological hazards in a timely manner	X					INM, DGRNE, CONPREC	H
Capacity to utilise satellite information for climate and environmental monitoring.	X					INM, DGRNE, CONPREC, DIRAGRIC,	H
Capacity to form partnerships with key stakeholders to ensure effective delivery of agricultural/hydrological support services	X					INM, DGRNE, DIRAGRI	H
Capacity to be able to monitor the cost of operations and maintenance of current equipment		X					
Capacity to assess and understand key stakeholder's needs for climate information	X						
Capacity to enable a free flow of information (e.g. generate, and provide access to data and information to partners and other users)	X						
Capacity to plan cost recovery mechanisms	X						
Capacity to sell products to the private sector	X						

Capacity Indicator	Baseline: Level of Existing Capacity					Target level of Capacity in the project timeframe	Priority of Capacity (h/m/l)
	1	2	3	4	5		
Capacity to fully understand impacts of climate variability and change on food security (e.g. on fisheries , crop production, livestock, etc)	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	H
Capacity to fully understand impacts of climate variability and change on water resources and flooding (e.g. dam management and flood risk modelling)	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	H
Capacity to combine climate monitoring and forecast information with current agricultural assessments to provide agriculturally specific advisories	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	H
Capacity to combine climate monitoring and forecast information with current hydrological assessments to provide hydrologically specific advisories	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	H
Capacity to partner with national government structures and academic institutions to develop tailored, sectorally specific information and packaged products	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST,	H

						DIRAGRI	
Capacity to feed climate information into policy briefs and long-term strategies	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	H
Capacity to analyze relevant data/information for policy strategies such as agricultural production, infrastructure development, credit, insurance and marketing	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	H
Capacity to feed climate information, forecasts and tailored information to disaster risk management agencies and frameworks		X				INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	M
Capacity of disaster risk management agencies to assess information in a timely manner	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	H

Capacity Indicator	Baseline: Level of Existing Capacity					Target level of Capacity in the project timeframe	Priority of Capacity (h/m/l)
	1	2	3	4	5		
Capacity to disseminate warnings and advisories in local languages		X				INM, CONPREC	M
Capacity to disseminate warnings and advisories related toexisting indigenous practices and technologies.		X				INM, CONPREC	M
Capacity to disseminate alerts in a wide range of media (e.g., privileged telephone communication systems, CB radios, SMS alerts etc.)	X					INM, CONPREC	H
Capacity for district and community focal points to understand the content of warnings and advisories		X				INM, CONPREC	M
Capacity to establish and sustain mechanisms to raise awareness on the impacts of climate shocks and long-term change		X				INM, DGA, CONPREC, MARINE CNOE, REDCROSS	M
Capacity to coordinate with government agencies to respond to warnings		X				INM, DGA, CONPREC, MARINE CNOE, REDCROSS	M
Capacity to coordinate with CSOs to respond to warnings		X				INM, CONPREC, MARAPA	M
Capacity to disseminate warnings and advisories to the district level or community focal points		X				INM, DGA, CONPREC, MARINE CNOE, REDCROSS	M
Capacity of local populations to understand climate change and it's long term effects	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS	H

Capacity to receive feedback on the usefulness of alerts fromaffected communities		X				INM, DGA, CONPREC, MARINE CNOE, REDCROSS	H

CAPACITY OF LEGISLATIVE AND GOVERNANCE FRAMEWORK

Capacity Indicator	Baseline: Level of Existing Capacity					Target level of Capacity in the project timeframe	Priority of Capacity (h/m/l)
	1	2	3	4	5		
Capacity for national coordination of emergency response activities	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS	H
Capacity of standard operating procedures to guide the production, dissemination and response to warnings	X					INM, DGA, CONPREC, MARINE CNOE, REDCROSS	H
Capacity of legislative system to mandate designated authorities e.g. which authority will disseminate warnings, which will produce warnings etc.		X				INM, DGA, CONPREC, MARINE CNOE, REDCROSS	M
Capacity of multiple agencies to contribute to the issuing of warnings through national structures e.g. disaster management committees etc.		X				INM, DGA, CONPREC, MARINE CNOE, REDCROSS DIRFOREST, DIRAGRI	M

ANNEX 6: AGREEMENTS (INCLUDING CO-FINANCING LETTERS)

Programme des Nations Unies pour le Développement

REF: PRO/ 111 /13
FILE: 00086865

Au service des peuples et des nations

S.Tome, July 11th, 2013

Dear Adriana,

Re. Strengthening climate information and early warning systems in western and central Africa for climate resilience development and adaptation to climate change in Sao Tome and Principe. UNDP co-financing letter

UNDP São Tome and Principe confirms its commitment to the above project and reaffirms the importance of this project in the government agenda as detailed in the PRSP2 (2012-2016) and the UNDAF / UNDAF action Plan 2012-2016.

The UNDP Sao Tome and Principe would like to contribute as parallel financing to the above project **US $ 795.000,00 (Seven hundred ninety-five thousand US dollars)** through the UNDP Sao tome funded Integrated Water Resources Management Project.

Activities under this project will provide support to the STP direction of natural resources and Energy, the General directorate of environment and the National institute of meteorology which are relevant to the implementation of the project Strengthening climate information and early warning systems in western and central Africa for climate resilience development and adaptation to climate change in Sao Tome and Principe .

Please accept the assurance of our highest cooperation.

José Salema
Resident Representative

Mrs. Adriana Dinu
Executive coordinator GEF/UNDP
Energy and Environment Group, BDP
304 East 45th Street, 9th Floor
New York, NY10017, USA
Fax: 1 212 906 6998
Email: gefinfo@undp.org

Cc: Lourenço Monteiro
GEF Focal Point
Sao Tome and Principe

República Democrática de São Tomé e Príncipe

(Unidade – Disciplina – Trabalho)

MINISTÉRIO DO PLANO E FINANÇAS

AFAP – *AGÊNCIA FIDUCIÁRIA DE ADMINISTRAÇÃO DE PROJECTOS*

REFª.22/AFAP/2013

03th April 2013

Mr Jose Xavier Salema

UNDP Resident Representative

United Nations Development Programme

United Nations House

PO BOX 109 São Tome

Sao Tome and Principe

Subject: Co-financing for the GEF funded Project on "strengthening climate information and early warning system in western and central Africa for climate resilient development and adaptation to climate change in Sao Tome and Principe"

This letter is to confirm the commitment of the Fiduciary Agency on Projects Management to support the UNDP/GEF funded project mentioned above through the following ongoing project activities and project:

	CO-FINANCING PROJECTS	AMOUNT	CURRENCY
1	OPTIC FIBRE WORLD BANK PROJECT	14.900.000	USD
	TOTAL	14.900.000	USD

We consider that a lot of activities under this project contribute and are relevants to the implementation of the GEF funded project on "strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in Sao Tome and Principe" as parallel financing.

Best regards,

Agência Fiduciária de Administração de Projectos
AFAP
PASS/FAST TRACK/ CABO SUB-MARINO

Alberto F. Leal
(Coordinator)

cc. **Dr. Naoko Ishii**

CEO and Chairperson

Global Environment Facility

República Democrática de S. Tomé e Príncipe

Ministério das Obras Pública, Infra-estruturas,Recursos Naturais e Meio Ambiente

INSTITUTO NACIONAL DE ESTRADAS

REF 89-OF/INAE/2013

29th March 2013
Mr Jose Xavier Salema
UNDP Resident Representative
United Nations Development Programme
United Nations House
PO BOX 109 São Tome
Sao Tome and Principe

Subject: Co-financing for the GEF funded Project on "strengthening climate information and early warning system in western and central Africa for climate resilient development and adaptation to climate change in Sao Tome and Principe"

This letter is to confirm the commitment of the government of the Democratic Republic of Sao Tome and Principe through the Ministry of Public Works, Infrastructure, Natural Resources and Environment represented by the Roads National Institute to support the UNDP/GEF funded project mentioned above through the following ongoing project activities and projects:

	CO-FINANCING PROJECTS	AMOUNT	CURRENCY
1	Coastal Zone Protection on National Highway 1	5.300.00	Euros
2	Road Maintenance Project	4.000.000	Euros
	TOTAL	9.300.000	Euros

These two projects contribute and are relevant to the implementation of the GEF funded project on "strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in Sao Tome and Principe" as parallel financing.

Best regards

Maria Nazare Pires Tiny Rita
Executive Director

cc. **Dr. Naoko Ishii**

CEO and Chairperson
Global Environment Facility

REPÚBLICA DEMOCRÁTICA DE S.TOMÉ E PRÍNCIPE

MINISTÉRIO DA AGRICULTURA, PESCAS E DESENVOLVIMENTO RURAL

DIRECÇÃO GERAL DA AGRICULTURA E PESCAS

(Unidade-Disciplina-Trabalho)

29th March 2013

Mr Jose Xavier Salema

UNDP Resident Representative

United Nations Development Programme

United Nations House

PO BOX 109 Sao Tome

São Tome and Principe

N/REF: 187 /DGAP/MAPDR/2013.

Subject: Co-financing for the GEF funded Project on "Strengthening climate information and early warning system in western and central Africa for climate resilient development and adaptation to climate change in Sao Tome and Principe"

This letter is to confirm the commitment of the government of the Democratic Republic of São Tome and Principe through the Ministry of Agriculture, Fishery and Rural Development represented by General Directorate of Agriculture and Fishery to support the UNDP/GEF funded project mentioned above through the following ongoing project activities and projects:

	CO-FINANCING PROJECTS	AMOUNT	CURRENCY
1	PADE II. AFDB on development of Agriculture and livestock	7.500.000	USD
2	PRIASA-FOOD SECURITY	7.800.000	USD
	TOTAL	15.300.000	USD

These two projects contribute and are relevant to the implementation of the GEF funded project on "strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in São Tome and Principe" as parallel financing.

Best regards

Carlos Pires dos Santos

General Director for Agriculture and Fishery

cc. **Dr. Naoko Ishii**

CEO and Chairperson

Global Environment Facility

==========

Direcção Geral de Agricultura e Pescas do Ministério da Agricultura Pescas Desenvolvimento Rural, situado na Avenida Marginal 12 de Julho, Tel.: 00239 22 22682

ANNEX 7: HACT CAPACITY ASSESSMENT INAM

Relatório de Micro Avaliação

Instituto Nacional de Meteorologia

MILLENNIUM CONSULTING, LDA
São Gabriel, CP 590
E.mail: millenniunconsulting@hotmail.com

ÍNDICE

1. Introdução

O presente relatório tem por objetivo descrever as constatações feitas no decurso do exercício de micro avaliação realizada no quadro do contracto assinado, visando a identificação dos pontos fortes e lacunas no que se refere a capacidade de gestão financeira do Instituto Nacional de Meteorologia, bem como submeter a consideração dos responsáveis deste Instituto as recomendações julgadas necessárias para o reforço dessas capacidade enquanto parceiro de nacional da agência das Nações Unidas.

A necessidade de uma Micro avaliação ao Instituto Nacional de Meteorologia, enquadra-se no âmbito da sua candidatura como parceiro de implementação do Projeto *"Consolider l'information climatique et système d'alerte précoce en Afrique de l'Ouest et du centre pour le développement de la résilience et l'adaptation ou changement climatique dans république démocratique de São Tomé et Príncipe.*

Atendendo as especificidades do procedimentos de gestão financeira do PNUD e os riscos resultantes da gestão financeira, humana e material, a disposição para a tingir os objetivos, torna-se necessário a realização do estudo a fim de determinar em que medida INM dispõe de condições internas que lhes permite fazer uma boa gestão de fundo e atingir com eficácia os objetivos preconizados.

2. Metodologia

A metodologia seguida para a presente micro-avaliação subdividiu-se em quatro fases como se segue:

FASE I – Revisão Documental: Leitura das documentações e informações;

FASE II – Entrevista com a direção e o Staff do INM e aplicação do questionário de micro avaliação dos agentes de implementação do PNUD;

FASE III – Sumarização das conclusões e Elaboração do *Draft*do relatório, bem como a apresentação da versão preliminar para discussão;

FASE IV – Elaboração do relatório final.

3. Constatações

3.1 Classificação do Risco Global do Parceiro

Apesar do INM ter-se transformado num instituição com Autonomia Administrativa e Financeira através do Decreto nº 10/2012, na prática ela ainda não está organizada nos moldes estabelecidos pelo novo quadro legal.

Por outro lado, ela depende do orçamento geral do estado e por consequência ela está submissa às limitações gerais do sistema de gestão financeira do País. Os escassos recursos financeiros disponíveis são geridos através da apresentação de pedidos de fundos ao da DAF do Ministério das infraestrutura e Recursos Naturais, a fim de adquirir os bens e serviços necessários para o seu funcionamento.

O INM dispõe de um quadro com experiencia na coordenação de projetos do PNUD e do Banco Mundial, no entanto, não dispõe de quadro que possui e conhecimento e experiencia em matéria de contabilidade suficiente que possa ser adaptado as novas exigências de gestão direta de recursos financeiros provenientes do sistema das Nações Unidas e eventualmente, outros parceiros de desenvolvimento.

Embora do ponto vista legal, o novo Estatuto do INM permite-lhe autonomia administrativa e financeira e por outro lado a existência de um quadro no Instituto com experiência no domínio de coordenação de Projetos do sistema das Nações Unidas e do Banco Mundial, consideramos que INM ainda apresenta riscos elevados relativamente aos mecanismos de controlo e de capacidade de gestãofinanceira, cujos principais fatores de riscos estão sumarizados nas conclusões.

3.2 Análise de Risco

3.2.1 Parceiro de Execução

O instituto Nacional de Meteorologia foi legalmente criado através do artigo 55º do Decreto-lei nº 21/1979 publicado no diário da República noº 12 de Abril do mesmo ano, ao qual atribuía ao Instituto um estatuto igual aos Organismos Centrais do Estado.

Posteriormente, o artigo 3º do Decreto-lei nº 18/92 que define o estatuto orgânico do Ministério do Equipamento Social e Ambiente veio atribuir o Instituto Nacional de Meteorologia o Estatuto de Organismo Autónomos. No entanto esse dispositivo legal não havia sido regulamentado até a Maio de 2012, altura em que o através do Decreto nº 10/2012 aprovou-se o Estatuto do Instituto Nacional de Meteorologia que regula a instituição dotando-a de uma nova estrutura orgânica as quais incluía o presidente, um conselho de administração, um Conselho Geral (técnico-científico). No departamentos técnicos é constituído por:

A) Departamento de exploração e redes e das aplicações;
B) Secretaria administrativa e financeira;

Esta nova estrutura orgânica permite trabalhar conjuntamente com o Sistema das Nações Unidas, pela flexibilidade apresentada. No entanto, é absolutamente necessário que seja reforçado a estrutura do Instituto com um sector de contabilidade e pessoal qualificado.

O endereço postal do INM é o seguinte:

Bairro do Aeroporto

C.P. 30

São Tomé
São Tomé e Príncipe
Tel : 222686

O INM tem as seguintesatribuições :

- Manter e desenvolver os sistemas nacionais de informação e vigilância meteorológica, sismológica e da qualidade do ar, possuindo a exclusividade de emissão de avisos de mau tempo de caracter meteorológico, às entidades públicas e privadas;

- Promover e assegurar o estudo e a formação a nível nacional e internacional nos domínios da meteorologia, sismologia e da qualidade do ar;

- Assegurar a prestação de serviços nos domínios da meteorologia, sismologia e da qualidade do ar a diferentes agentes socioeconómicos, nacionais e internacionais ;

- Promover o desenvolvimento das relações internacionais e de cooperação nos domínios de meteorologia, sismologia e da qualidade do ar, assim como as mudanças climáticas de forma geral ;

- Instrução do pessoal técnico de meteorologia ;

- A prossecução ou coordenação das diligências para o cumprimento dos compromissos internacionais de carácter técnico e científico, assumidos pela Nação no campo da meteorologia.

O INM já foi beneficiado de um projeto financiado pelo Sistema das Nações Unidas que teve o seu términoem 1995. No entanto a coordenação e gestão financeira do referido projeto foi feita de forma autónoma a estrutura orgânica do INM e os atuais dirigentes não participaram na gestão direta do referido projeto.

3.2.2 Fluxos de Fundos

Na estrutura orgânica do INM existe um departamento administrativo, que ocupa da tarefa de instrui os pedidos de fundo e pagamento a DAF do Ministério.

A utilização dos fundos inscritos no Orçamento Geral do Estado é feita através da DAF do Ministério das Infraestrutura Recursos Naturais e Energia.

Em função das necessidades financeira, o departamento administrativo do INM envia a requisição de fundos a DAF, que se encarrega de seguir todo o processo.

Por outro lado, o INM obtém receitas que provêm dos serviços prestado no âmbito de fornecimento de informação meteorológica. Esses fundos são depositados numa conta aberta para esse efeito. A utilização dessas receitas para cobrir as despesas as instituição e remunerações são feitos por via de emissão de cheque assinados por dois dos 3 titulares da conta.

Esse subsídio que o INM recebe mensalmente da ENASA é utilizado para atribuição de um acrescimento de remuneração a todos os funcionário e a outra parte pata a compra de equipamentos e consumíveis.

Não são efetuados registos contabilísticos formais para efeito de elaboração de demonstrações financeira ou outros mapas similares, justificado, com o facto de os montantes das receitas e os depósitos recebidos serem quase todo ele utilizado para o pagamento de subsídio aos trabalhadores.

Somos de opinião que o INM dispõe de um quadro legislativo para desempenhar a função da agente de implementação do projeto. Evidentemente certas adaptações devem ser feitas de modo a criar condições organizacionais que lhe possa permitir receber e gerir fundos.

Nesse sentido concluímos que no que concerne a fluxo de fundos a instituição é de um risco elevado.

3.2.3 Gestão de Recursos Humanos

Como referido no ponto anterior, INM dispõe de um departamento administrativo com apenas uma funcionário que trata de assuntos administrativos e contabilísticos.

De acordo com as suas qualificações académicas e experiencia profissional (CV Anexo) consideramos que a referida funcionaria tem conhecimentos básicos que pode ser aproveitado para aplicação de uma adequada pratica de gestão administrativa a financeira.

A funcionária do sector administrativo e financeiro não conhece os procedimentos de transferência de fundos provenientes do Sistema das Nações Unidas.

Verificamos que a funcionária beneficiou de algumas formações no âmbito de gestão financeira o que evidencia a sua potencialidade para adaptação as novas exigências.

Conforme as condições existentes nos recursos humanos, o risco de gestão de recursos humanos é elevado.

É de salientar que o INM dispõe de um quadro com experiencia na coordenação de projetos do PNUD e do Banco Mundial.

3.2.4 Políticas e Procedimentos Contabilísticos

O INM depende do Orçamento Geral do Estado. A DAF do Ministério que tutela o Instituto é responsável pelo tratamento dos pedidos do INM em conformidade com o orçamento aprovado. Todas as transações financeiras, contabilísticas e orçamentais, bem com o seguimento orçamental são realizadas pela DAF do Ministério.

Os registos contabilísticos bem como a classificação dos documentos de suporte são da responsabilidade da DAF. O instituto apenas conserva as copia dos pedidos de fundo.

Como referido anteriormente, o seguimento orçamental é feito pela DAF.

Quanto as receitas próprias do Instituto são geridas numa conta bancária as quais são conservadas noa arquivos apenas as cópias do cheque. Nos entanto, não são efetuadas reconciliação da conta bancaria.

3.2.4.1 Segregação de Funções

Constatamos que as funções exercidas por cada departamento do INM são segregadas com base no quadro legislativo que cria essa instituição.

Como o INM ainda funciona como um organismo sem autonomia administrativa e financeira, tem seguido orientações de sistema de administração financeira do Estado através do DAF do Ministério. Neste sentido, verificamos, que as funções exercidas pelos diversos organismos estão segregadas, ou seja o pedido de compra é efetuado pelo INM ao DAF que adquire e envia para o Instituto.

Quanto a gestão das receitas próprias, constatamos que o controlo, receção e pagamento estão segregados. Contudo, constatamos que a Instituto não tem feito a reconciliação bancaria.

3.2.4.2 Sistema Orçamental

Apesar de já ter sido aprovado a Lei que dota o INM autonomia administrativa e financeira, o processo orçamental desse instituto ainda não sofreu alteração que o adapta a nova realidade. Pois, até a presente data o orçamento do Instituto são elaborados no quadro do OGE e centralizado na DAF.

O Diretor do Instituto participa nas negociações do orçamento para o Instituto, mas, no entanto, devido as restrições orçamentais, muitas vezes a direção do orçamento faz corte, aos quais o Instituto não tem margem para negociar.

Relativamente as receitas próprias do instituto, não tem sido prática a elaboração do orçamento anual e o respetivo seguimento.

3.2.4.3 Pagamentos

Conforme já indicada anteriormente as despesas orçamentadas para INM, são executadas diretamente pelo DAF do Ministério, pelo que a intervenção do Instituto é muito limitada neste processo.

No entanto, no que se refere a pagamentos efetuados com base nas receitas próprias contatamos que os pagamentos são feitos através de cheques aos quais os beneficiários acusam a receção no ato de recebimento.

3.2.4.4 Políticas e Procedimentos

O INM não dispõe do Manual de procedimentos contabilísticos porque todos o orçamento dotado para o Instituto é gerido pela DAF do Ministério. A DAF do Ministério segue as normas e procedimentos de contabilidade orçamental pública em vigor no país.

3.2.4.5 Caixa e Banco

O INM dispõe de uma conta bancária destinada a receber as receitas internas, relativas aos serviços meteorológicos prestados.A conta movimentada a debitada através de duas assinaturas, das quais uma do diretor e outra de um dos responsáveis do instituto ou do chefe de secretaria.

3.2.4.6 Salvaguarda dos ativos

Constatamos que o INM dispôs de uma lista de bens imobilizado que se encontram sobre a sua responsabilidade. No entanto, contatamos que essa lista não é atualizada desde a tomada de posse do atual diretor. Os trabalhos inerentes a atualização do inventário em função das novas entradas, transferências e saídas e alienação não têm sido feitos.

Por outro lado não existe a ficha individual do cadastro dos bens, o que dificulta o exame das informações individuais relativas a cada bem imobilizado.

3.3. Mecanismos de Controlo e Seguimento

No momento atual em que o instituto ainda não possui na prática uma verdadeira autonomia administrativa e financeira o controlo e fiscalização deve ser efetuado pela inspeção geral das finanças, enquanto órgão competente do estado nessa matéria, quando se observa que há indícios de irregularidade na gestão do Instituto.

Perspetiva-se com a implementação do novo estatuto do INM que o mesmo será obrigado a apresentar as suas contas anualmente devidamente auditadas.

Nesse contexto consideramos os riscos de mecanismo de controlo e seguimento é elevado.

3.3.1 Auditoria Interna

Devido a dimensão do próprio Instituto, a sua orgânica não contempla um departamento de auditoria interna como parte integrante da sua estrutura. Todavia, enquanto uma Instituição estatal, ela poderá ser auditada pelas instituições de auditoria do estado, nomeadamente o Tribunal de Contas e a Inspeção das Finanças.

Sendo que não existe um sistema de auditoria interna, os riscos relativos a auditoria interna são considerados como moderados.

3.3.2 Auditoria Externa

Constatamos que nunca foi realizada uma auditoria externas as contas do INM uma vez que:

- O instituto não faz gestão direta dos recursos financeiros postos a sua disposição pelo através do OGE.
- Não existe nenhum projeto em execução do Instituto,
- Ausência de serviço contabilístico;

- Não existem indícios de fraude;
- Iniciativa de realização de auditoria depende dos órgãos competentes do estado.

3.3.3 Relatório e Seguimento

Como referido no ponto anterior as condições técnicas e estruturais adequadas para a elaboração de relatórios financeiros não existem.

Os riscos relativos ao sistema de reporte e de seguimento e avaliação são consideráveis na medida em que dependerá do sistema que será implementado.

3.3.4 Sistema de Informação

O INM dispõe de computadores e outros equipamentos de secretaria para a realização das suas atividades técnicas e tratamento de dados no quadro da sua atividade quotidiana. No entanto, não existe um programa contabilístico que permita fazer a gestão dos recursos financeiros.

Nesse sentido o risco relativo ao sistema de informação é significativo.

4. Conclusões

Na sequência dos trabalhos de micro avaliação da capacidade de gestão financeira do INM, concluímos que esta Instituição, nas condições atuais apresenta um elevado grau de risco relativo a capacidade de gestão financeira de projeto financiado pelo Sistema das Nações Unidas tendo em conta as seguintes constatações:

- Atualmente, todo o processo de gestão de fundo proveniente do OGE é gerido pela DAF do Ministério de Infraestrutura e Recursos Naturais.
- A instituição não tem montado um sistema contabilístico que permita o registo e elaboração das movimentações e mapas financeiros relativos as receitas próprias;
- O instituto não a pratica de um de reporte financeiro;
- Não são elaborados orçamentos anuais para as receitas próprias;
- A instituição não tem implementado mecanismo de seguimento e controlo financeiro;
- A instituição não tem experiencia recente de questão de projeto financiado pelo sistema das Nações Unidas;

No entanto, constatou-se também alguns pontos fortes, nomeadamente:

- O INM é uma instituição legalmente constituída;

- O novo quadro legal dota o Instituto de flexibilidade para efetuar gestão direta de recursos financeiros;

- O INM dispõe de um quadro com experiencia na coordenação de projetos do PNUD e do Banco Mundial;

5. Recomendações

Face as constatações listadas no ponto anterior particularmente no diz respeito a fraca capacidade gestão financeira do INM, **recomendamos a implementação do Projecto através da metodologias DIM.** Esta abordagem afigurar-se como sendo a mais adequada na medida em que assegura um bom desempenho na execução do projecto e ao mesmo tempo permitirá o desenvolvimento de capacidade de gestão financeira interna no INM na realização de gestão directa dos recursos financeiros.

Por outro lado, recomendamos o seguinte:

- Preceder mensalmente a reconciliação da conta bancária;

- Reforçar o departamento financeiro do INM através do recrutamento de um quadro com larga experiência no domínio da gestão financeira de projeto que tenha bom domínio da língua francesa e/ou inglesa;

- Criar a ficha individual de cadastro de cada bem imobilizado;

- Codificar todos os bens corpóreos e preceder periodicamente a atualização do inventário;

- Reforço as capacidades da direção administrativa do INM;

- Implementação de um sistema contabilístico que permita o registo das operações relativas as receitas próprias;

- Realização de acção de formação sobre as regras e procedimentos para o pessoal administrativos e financeiros;

- Criar condições internas para preceder o seguimento orçamental;