



GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Naoko Ishii
CEO and Chairperson

December 11, 2014

Dear LDCF/SCCF Council Member:

UNDP as the Implementing Agency for the project entitled: *Angola: Promoting Climate-resilient Development and Enhanced Adaptive Capacity to Withstand Disaster Risks in Angola's Cuvelai River Basin*, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with UNDP procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by LDCF/SCCF Council in March 2013 and the proposed project remains consistent with the Instrument and LDCF/SCCF policies and procedures. The attached explanation prepared by UNDP satisfactorily details how Council's comments have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at www.TheGEF.org. If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

Naoko Ishii
Chief Executive Officer and Chairperson

Attachment: GEFSEC Project Review Document
Copy to: Country Operational Focal Point, GEF Agencies, STAP, Trustee



REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: LDCF

For more information about GEF, visit TheGEF.org

PART I: PROJECT INFORMATION

Project Title: Promoting climate-resilient development and enhanced adaptive capacity to withstand disaster risks in Angolan's Cuvelai River Basin			
Country(ies):	Angola	GEF Project ID: ¹	5177
GEF Agency(ies):	UNDP (select) (select)	GEF Agency Project ID:	5166
Other Executing Partner(s):	Ministry of Environment	Submission Date:	Aug. 28, 2014
		Resubmission Date:	Oct. 29, 2014
GEF Focal Area (s):	Climate Change	Project Duration(Months)	4 years (48 months)
Name of Parent Program (if applicable):	n/a	Project Agency Fee (\$):	779,000
<ul style="list-style-type: none"> ➤ For SFM/REDD+ <input type="checkbox"/> ➤ For SGP <input type="checkbox"/> ➤ For PPP <input type="checkbox"/> 			

A. FOCAL AREA STRATEGY FRAMEWORK²

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount (\$)	Cofinancing (\$)
CCA-1 (select)	1.2: Reduced vulnerability to climate change in development sectors	Output 1.2.1: Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability	LDCF	1,305,000	7,698,330
CCA-2 (select)	2.1: Increased knowledge and understanding of climate variability and change-induced threats at country level and in targeted vulnerable areas	Output 2.1.2: Systems in place to disseminate timely risk information	LDCF	1,200,000	7,479,923
CCA-2 (select)	2.2. Strengthened adaptive capacity to reduce risks to climate-induced economic losses	Output 2.2.1: Adaptive capacity of national and regional centers and networks strengthened to rapidly respond to extreme weather events	LDCF	1,305,000	7,698,330
CCA-3 (select)	3.1: Successful demonstration, deployment and transfer of relevant adaptation technology in targeted areas	Output 3.1.1 Relevant adaptation technology transferred to targeted groups	LDCF	4,390,000	23,596,421
(select) (select)			(select)		

¹ Project ID number will be assigned by GEFSEC.

² Refer to the [Focal Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

(select)	(select)			(select)		
(select)	(select)			(select)		
(select)	(select)			(select)		
Total project costs					8,200,000	46,473,004

B. PROJECT FRAMEWORK

Project Objective: To reduce the climate-related vulnerabilities facing the inhabitants of Angola's Cuvelai River Basin through targeted investments and capacity building.

Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount (\$)	Confirmed Cofinancing (\$)
1. Transfer of appropriate technologies and related capacity building for climate and environmental monitoring infrastructure	(select)	Enhanced capacity of national and local hydro-meteorological services, civil authorities and environmental institutions to monitor extreme weather and climate change in the Cuvelai Basin	<p>Output 1.1: 7 Automatic Weather Stations (AWS) (6 fixed plus 1 mobile) at least 6 rainfall gauges complete with remote data transmission and archiving, are installed in Province of Cunene to support flood forecast early warning systems (FFEWS), Grant Type Inv.</p> <p>Output 1.2: A hydrotelemetric monitoring system of 4 river gauging stations, 4 water level stations, are installed in Cuvelai and Miu Rivers to support flood forecasting and early warning system (FFEWS), Grant Type Inv.</p> <p>Output 1.3: At least 50 officers from MINAMB, INAMET, Provincial government, Civil Protection, INRH, CETAC and other relevant institutions are trained to operate, maintain climate monitoring infrastructure and assist dissemination and response mechanisms of the FFEWS, Grant</p>	LDCF	3,953,333	1,968,292

			<p>Type TA</p> <p>Output 1.4: A comprehensive Flood Forecasting & Early Warning System (FFEWS), – based on interagency harmonized agreements and international standards and protocols – are developed and warnings made accessible to Disaster Management structure in Cunene Province as well as relevant public institutions to enable appropriate planning and response measures, Grant Type TA</p>			
2.Enhanced human and institutional capacity for increased sustainable rural livelihoods among vulnerable communities	(select)	Increased resilience of smallholder farmer communities in the Basin to climate-induced risks and variabilities.	<p>Output 2.1: Locally-appropriate climate proofed germplasm resources are accessed by regional agricultural and water technicians and amongst communities in the Cuvelai Basin,Grant Type TA</p> <p>Output 2.2: Extension Services (Estações de Desenvolvimento Agrário-EDA's) are trained in climate change risks and resilience agriculture techniques to support vulnerable communities in Cuvelai Basin (Mukolongondjo, Mupa, Evale),Grant Type TA</p> <p>Output 2.3: Water access and quality that mitigate climate change vulnerability are improved by piloting technologies, through partnerships with</p>	LDCF	2,041,833	38,637,712

			<p>Provincial Government and INARH (e.g. Opening/rehabilitation of water reservoirs (Chimpacas), conservation measures, water harvesting, opening or remedial work on existing boreholes), Grant Type Inv.</p> <p>Output 2.4: Small-scale adaptation initiatives are set as a safety net to strengthen resilience of Province of Cunene communities' livelihoods to extremes of climate variability, Grant Type Inv.</p>			
3.Increased understanding of climate change adaptation and practices in climate-resilient development planning at the local community and government levels	(select)	Local institutional capacities for coordinated, climate-resilient planning strengthened & Capacity for effective community-based climate change adaptation (including traditional knowledge practices) improved at local level.	<p>Output 3.1: A CC-Environmental Information System of Angola (CC-ENISA) is established to allow systematic storage and mainstreaming of digital information to support decision making in sector planning, Grant Type Inv.</p> <p>Output 3.2: Capacity and inter-sectoral framework for mainstreaming weather and climate resilience in the Province of Cunene Master Plan is built for target communities (Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva), Grant Type TA.</p> <p>Output 3.3: The existing dissemination/response system under the</p>	LDCF	1,822,232	5,407,000

			Serviço Nacional e Provincial de Protecção Civil e Bombeiros (SNPCB) is strengthened to support FFEWS, Grant Type TA. Output 3.4: Community based FFEWS (CBFFEWS) network is developed in target areas to enhance and test its impact on risk reduction in sectors and population, Grant Type TA.			
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
Subtotal					7,817,398	46,013,004
Project management Cost (PMC) ³				LDCF	382,602	460,000
Total project costs					8,200,000	46,473,004

C. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME (\$)

Please include letters confirming cofinancing for the projeSct with this form

Sources of Co-financing	Name of Co-financier (source)	Type of Cofinancing	Cofinancing Amount (\$)
National Government	MINAMB - Ministry of Environment	Cash	2,000,000
National Government	National Directorate of Hydrologic Resources - Ministry of Energy and Water (MINEA)	Cash	1,000,000
National Government	INAMET - National Institute of Meteorology and Geophysics	Cash	968,292
National Government	Ministry of Energy and Water (MINEA) - Programme of Public Investment (PIP)	Cash	39,037,712
GEF Agency	FAO's corporate Strategic Objective 5 (SO5 - increase the resilience of livelihoods to threats and crises).	In-kind	1,600,000
GEF Agency	UNDP Core Resources	Cash	917,000
Others	Development Workshop Angola (Local NGO)	In-kind	950,000
(select)		(select)	
Total Co-financing			46,473,004

³ PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

2. Two key strategy documents provide a chapeau for the project's fit within the UN and UNDP's Programmes in Angola: the United Nations Development Assistance Framework (UNDAF) and the UNDP Strategic Plan (SP). The UNDP Angola SP (2014-2017) underpins the Angolan national vision of "sustainable human and economic development and strengthened national cohesion and democracy".
3. UNDP Strategic Plan Outcome 5 states: "Countries are able to reduce the likelihood of conflict and lower the risk of natural disasters, including from climate change". Therefore, this project will make a key contribution to UNDP's Strategic Plan Outcome #5 and specifically the Output 5.4 "Preparedness systems in place to effectively address the consequences of and response to natural hazards" (e.g. "geo-physical and climate related and man-made crisis at all levels of government and community"), under which a concerted UN approach is geared to provide a framework for national and decentralized institutions, strengthened preparedness systems for a responsive disaster and climate risk management is integrated in the development planning and budgetary frameworks of key sectors (e.g. water, agriculture, health and education), integrated rural development, ensuring food security with due consideration for environmental protection, natural resource management and adaptation to climate change.

A.4. The baseline project and the problem that it seeks to address:

4. In summary, overall the baseline investments for the project have increased significantly from the PIF stage and now represent a co-financing ratio of more than 5:1 (co-finance to the GEF grant). The World Bank (WB) commitment to Angola remains significant with a total investment of US\$177 million up to 2019 of which the Government of Angola has been taking a direct role in supporting the implementation of the activities of this programme through the Ministry of Energy and Water and its National Directorate for Water Supply and Sanitation-DNAAS. Although the activities funded by this WB programme will not contribute directly to the baseline co-financing, this LDCF will however share and complement parallel activities in the development of various infrastructure projects in the water sector.
- A. 5. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:
5. The significant increase in GoA co-finance contributions for the project (now representing about 94% of all co-finance compared to 70% in the original PIF) is a testament to the importance the Government attaches to the project and the successful attainment of its objectives.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

Risk	Rating	Assumptions
Procurement and installation of hydro-meteorological equipment, including hardware and software, is delayed because of complications with the release of funds and/or national procurement procedures.	Medium/High	<ul style="list-style-type: none"> Effective administrative planning will be undertaken, with support from UNDP CO, which will include procuring equipment at an early stage in the project implementation phase.
Poor coordination between implementing and executing agencies.	Medium	<ul style="list-style-type: none"> There will be a clear project management arrangements and regular interactions between the stakeholders. Clear project management arrangements and regular interactions between the agencies.

Unavailability of requisite human resources and data	Medium	<ul style="list-style-type: none"> • The issue of the unavailability of requisite human resources will be mitigated by recruitment of international consultants who will work closely with in-country counterparts and by targeted capacity building activities. Training activities of local personnel will also be part of all aspects of the work and the relevant institutions will be encouraged to expand the staff base if it is weak in particular areas.
INAMET does not have enough capacity to tailor climate products to suit vulnerable populations in Province of Cunene and private sector needs by the end of the project.	Medium	<ul style="list-style-type: none"> • During project development, INAMET already indicated that they have some experience working with private sector representatives to understand their needs for tailored products. This project will continue to build all information production agencies to tailor services. The project foresees a strong supportive training and capacitance programme so that INAMET will acquire enough capacity to tailor climate products by the end of the project.
Capacity cannot be built on national and decentralized levels in the Cunene Province of SNPCB to assist with alert dissemination and crisis prevention	Medium	<ul style="list-style-type: none"> • SNPCB will undergo significant capacity development through this project and budgets have been allotted to training and improving their outreach and communication systems. A training programme for gender sensitive SNPCB field officers and Local Disaster Risk Management Committees (LDRMC's) will be delivered by the project. Budget includes the provision of privileged communication systems (e.g., CB radios) for all alert dissemination agencies in need. Therefore, capacity can be built on decentralized levels to implement a Standard Operating Procedure for Alert Communication.
Installed hydro-meteorological equipment fails because it is vandalized or not properly maintained.	Medium	<ul style="list-style-type: none"> • There will be awareness raising activities in target communities to highlight the importance of the installed equipment. In addition, it is expected that the equipment will be housed within a secure fence and under the responsibility of local Community Leaders and/or Government Institutions.
Climate shocks occurring during the design and implementation phase of the LDCF project result in disruptions to installed equipment and severely affect communities, prior to the EWSs being established.	Medium	<ul style="list-style-type: none"> • It is expected that disaster mitigation and response activities will be prioritized at the target communities whilst the EWS is being established
Telecommunication (SMS) communication systems used for data transmission from Automatic Weather Stations will not be robust enough (e.g., bandwidth issues or local mobile telecommunication networks) to be able to effectively contribute to EWS data sharing and real time forecast development.	Medium	<ul style="list-style-type: none"> • Costs of equipment and training will not rise dramatically during project implementation. • Technical expertise and equipment for upgrading the network is available.
Insufficient institutional support and political commitments and lack of coordination of the various key stakeholders.	Low	<ul style="list-style-type: none"> • Government is committed to integrating climate change risk and adaptation needs in development planning of Province of Cunene; • Planning will be conducted in a participatory manner to ensure that adaptation measures are appropriated by the community; • Stakeholders are committed to implement the project interventions and provide the necessary support.
Communities in target <i>Comunas</i> are not committed to cooperate and/or accept proposed adaptation measures	Low	<ul style="list-style-type: none"> • Financial, Technical and political support will be given to EDA's for training of staff and implementation of activities as planned. • Communities in target <i>Comunas</i> are willing to cooperate and adopt climate change adaptation measures. • A participatory and transparent project implementation will be established as well as adequate sensitization of the importance of the project and potential benefits from the project will minimize/eliminate this risk
Complex technical and organizational management of knowledge base that can delay project implementation	Low	<ul style="list-style-type: none"> • Activities programmed for equipment purchase and training of staff in GIS are implemented as planned. • Adequate and timely national and international support for sharing and exchange of climate change data, modelling information and other relevant data and information.

A.7. Coordination with other relevant GEF financed initiatives

Several other on-going national and regional projects relevant to climate change adaptation needs and capacity gaps, agricultural production systems for food security and water resources and sanitation are being implemented and will provide opportunities for collaboration, information sharing and lessons learned with this project. Most directly, the on-going UNEP/UNDP /GEF project “Addressing urgent coastal adaptation needs and capacity gaps in Angola (GEF ID 5230)” will be implemented along with this project by a team in which the Technical Advisor (TA) post will be shared with this LDCF project. Through these mechanisms, the project will share valuable information and lessons learned on the climate change adaptation sector in the country and on the development of new technologies (weather and climate monitoring equipment on the one hand and flood and drought early warning systems on the other) as well as generating knowledge of the risks (vulnerability & hazard) of climate variability and change at national level. This project will also learn from the FAO developed GEF/LDCF project entitled “Integrating and up-scaling climate resilience through soil fertility management into agricultural and agropastoral production systems for food security in key productive and vulnerable areas through the Farmers Field School approach.” which is piloting various types of sustainable crop production and diversification interventions schemes to meet the CCA needs of the agro-pastoral sectors in the Central Plateau so to increase the resilience of small farmers to cope with declining ecosystems services due to increasing climate variability, droughts, and extreme events.

The project will be nationally implemented (NIM) by the Ministry of Environment (MINAMB) with UNDP Country Office support, in line with the Standard Basic Assistance Agreement (SBAA of 18 February, 1977) and the UNDP Country Programme Action Plan (CPAP 2009-2013 of 14 May, 2009) signed between the UNDP and the Government of Angola. The MINAMB as the Implementing Partner of the project will provide overall leadership for the project in close collaboration with the Ministry of Energy and Water (National Institute of Water Resources), the Ministry of Interior (Civil Protection), the Government of the Cunene Province and the National Institute of Meteorology (INAMET). The day-to-day management of the project shall be entrusted to the Project Management Unit (PMU) which will be accountable to the Board for the performance of the project. The project team will be partially based in Luanda and partially based in Cunene to be able to properly cover local as well as central level needs. The Unit will be manned by a fulltime staff complement comprising a Project Manager, Finance Manager, Technical Advisor and Project Assistant. Overall responsibility for Project Implementation will rest with the PMU whilst individual site intervention will be supported by the relevant government technical agencies such as INAMET in the case of meteorological stations or National Institute for Water Resources in the case of river gauging stations. The representatives of these technical agencies shall form the Project Support Team (PST) in order to provide technical advice and guidance to the PMU. The PST shall also include traditional village authorities as representatives of local communities.

A.8. Are gender considerations taken into account? If yes, briefly describe how gender considerations will be mainstreamed into project preparation taking into account the differences, needs, roles and priorities of men and women.

In least developed countries, women tend to have lower incomes and fewer opportunities than men do, and their capacity to adapt to the effects of climate change is therefore constrained. Despite their capability to innovate and lead, women have historically also been marginalized from local and national decision-making processes. It is therefore important to identify gender-sensitive strategies to ensure that women are included in measures designed to improve their resilience and capacity to adapt to climate change. Aggregate data shows that women comprise about 43 percent of the agricultural labor force globally and in developing countries in Sub-Saharan Africa, women make up almost 50 percent of the agricultural labor force, an increase from about 45 percent in 1980. The averages in Africa range from just over 40 percent in Southern Africa to just over 50 percent in Eastern Africa. In Cunene Province it is estimated that woman make up 54 percent of the agricultural labor force. In this pastoralist and mixed farming system, livestock play an important role in supporting women and improving their financial situation, and women are heavily engaged in the sector. The field study supporting this project (Annex 5 in the project document), that was carried out in the main Comunas of the Cuvelai Basin have highlighted the positive role of women in the development of activities relating to

small scale farming and livestock raising, two important activities of this traditional and itinerant agriculture based on dry land cultivation and livestock which are the drivers for livelihood and food security. In all consulted Comunas during December 2013 field mission (Annex 5), several farming associations operating in the visited comunas were contacted and more than 60% (e.g. 56% out of 68 in Mukolongondjo; 66% out of 329 in Evale) of the farmers interviewed were women.

In the rural environment of the Cunene Province and in particular in Cuvelai Basin, the burden of traditional farming activities such as weeding, harvesting and threshing, water carrying, livestock keeping and caring for home gardens is generally left to women. However, in terms of the domestic or child-rearing sphere, there is little change from traditional gender roles. As elsewhere, women's concerns in Cunene Province are broader and related to overall family well-being (including access to water, education and health in post-disaster conditions). While women's vulnerabilities to climate change and disaster in Cuvelai Basin are similar to those of men, they do have specific additional concerns, linked to their key roles in the society and households, for example: (i) The need for provision of water and firewood; (ii) Damage to seeds and failing of crops under drought and flooding events; and (iii) lack of access to markets and hence sale of products/ generation of cash. However, much of their interest is in communally produced crops for subsistence and cash sales in some cases, where either they share the money or go into a commercial venture together. Most women's groups have only one or two literate members, usually the Secretary and/or the Treasurer. Therefore, the specific involvement of women and gender-sensitive activities have been mainstreamed and are fully integrated in the proposed Project Document and gender equality issues will need to be considered throughout the duration of the proposed LDCF project as outlined. Activities planned by the proposed LDCF project are not limited to responding to gender differences but have been also designed to reduce gender inequality by empowering women and seeking their inputs. Aligning the project with the needs of women will increase the utility and longevity of the investments.

With this in mind, the project design was conducted so that most of the activities foreseen are gender balanced, particularly in the training and capacity-building approaches which are recommended to be gender sensitive (*Outcome 1. Output 1.3 - Indicative activities 1.3.1*). Furthermore, adaptation technologies to be deployed in the local communities, such as promoting dissemination of seed packets of climate-resilient crops for subsequent multiplication will target primarily smallholder farmer groups/Cooperatives/Women Associations. The *Indicator 2.1* under Outcome 2 will specifically track the percentage change in gender disaggregated household income in the 7 targeted comunas as a result of project intervention via perception based survey (VRA). *Outcome 2 - Indicator 2.2*. No. of household in targeted comunas engaged in climate resilient farming methods and livelihoods will also be gender-disaggregated.

In addition, community-based communication and information sharing tools using local languages (community media: TV, local community based radios and newspapers) for climate and hazards predictions/dissemination through pilot small-scale Community based FFEWS (CBFFEWS) network in 7 selected sites will be established with a strong participation of women and youth (*Outcome 3. Output 3.4 - Indicative activities 3.4.3*). This equal participation of women and men is in line with the principles underlying UNDP's gender equality strategy as well as the GEF's own guidance and standards (Mainstreaming Gender at the GEF, 2008). In addition to gender, the project will promote the requirements of other disadvantaged and more vulnerable groups including the elderly, children and disabled.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation.

The project implementation will build on baseline activities of Development Workshop (DW) Angola programme. This is a local NGO and key project stakeholder that has been very active in the country, developing national capacity in GIS technology, including data handling and risk mapping. Additionally, Development Workshop are pioneering innovative community-based communication and data gathering techniques that must be strengthened. Development Workshop Angola has been actively involved in the PPG consultations and has contributed towards the design of the project document. Information gathered at that stage indicates that despite these activities in GIS utilization at national and provincial level, specific climate change disaster risk response strategy for vulnerable districts and communities have not yet been developed and integrated into GoA existing plans and strategies. However, DW program is a relevant baseline for establishing a CC-Environmental Information System of Angola (CC-ENISA). The LDCF will build on the baseline to complement the DW capacity building activities by

supporting trainings to MINAMB cadres on how to carry out GIS based climate risks and vulnerability assessment and mapping as well as integrate this information in National and Provincial DRR Plans. The ultimate objective of the LDCF will be to set up a comprehensive CC-Environmental Information System of Angola (CC-ENISA) building on the experience acquired by DW on this subject. The LDCF will also build on the DW experience in the country to carry out further training and capacity development programmes towards the estimation of the impact of climate change and variability on water resources and development of environmental risk mapping in the framework of CC-ENISA objectives.

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

At national level, the installation of weather observation network and computer infrastructure will benefit the National Institute of Meteorology (INAMET), the National Institute of Hydrologic Resources and its staff (through training and technological advancement). Still at national level the Ministry of Environment (MINAMB) will benefit from the establishment and operationalization of a Climate Change Environmental Information System furnish with appropriate advanced workstations and GIS facilities to function as National Climate Change information Portal. This is an important gain at national level to allow systematic storage, integration and mainstreaming of climate and environmental data to assist Disaster Management and other interested agencies and to facilitate inter-institutional data sharing.

At a local level and in particular the Province of Cunene and the Cuvelai River Basin will benefit from a flood forecast early warning systems (FFEWS) which will enable early warnings and climate hazard mapping, which once disseminated correctly and acted on appropriately, can provide economic benefits through reducing losses and destruction from extreme weather events such as floods and droughts. This will particularly address current gaps in the observation network in the vulnerable areas of the country as well as build on activities supported by other initiatives such as the proposed USAID pilot for the Cunene Province implemented through World Learning.

The delivery of a training in small-scale irrigation to Extension officers working within EDA's, NGO's and CBO's and installation of equipment for construction of small-scale water management works for irrigation (water pumps, drip irrigation systems, water reservoirs) will benefit the region and will strengthen and develop the capacity of vulnerable local communities to withstand drought impact. The project will also promote clean technologies to improve water access and quality that mitigate drought impact including rainwater harvesting technologies and techniques through which to improve water availability at demonstration sites. These on-the-ground activities are likely to provide benefits such as: i) improving access to water for sanitation and drinking purposes; ii) improving agricultural productivity by increasing the availability of water for irrigation purposes (with positive consequences for food security and income streams). Therefore, through project activities, adaptation benefits will also arise through the protection of livelihoods from adverse climate change impacts on water resources.

Perhaps the largest economic benefits are associated with the project will be the improved coordination between government departments and the sharing of information particularly at Provincial level, which can lead to improved products and services and accrued benefits to the vulnerable communities. The total population benefiting from these developments currently estimated at 400,000 inhabitants has the potential to grow hugely if warnings extend to a reasonable percentage of the total population e.g. through, radio, TV, mobile phone relay or similar system. Many of the beneficiaries will be women, especially within the small agriculture sector where they often make up the majority of smallholder farmers, yet are most vulnerable to food insecurity

B.3. Explain how cost-effectiveness is reflected in the project design:

For Component #1 LDCF project activities will build on existing networks, achievements and planned actions by INAMET and INARH. This will allow institutional capacity to be built cost-effectively, which will ultimately assist in planning and implementing the flood forecast early warning system. This approach of

complementing existing related projects is more cost-effective than the implementation of a separate green-field 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 INAMET and INARH projects to co-produce outputs. This will promote cost sharing with these other projects, reducing overheads and enhancing cost-effectiveness.

Cost information was determined for the small-scale, on-the-ground adaptation measures (Component #2) as a result of the consultations undertaken during the PPG Phase and, based on this, the activities were deemed cost-effective. Where actual techniques and small-scale adaptation measures are to be identified by community members and stakeholders in the inception phase (following research into various options), cost-effectiveness will be a key factor taken into consideration. In addition, the effectiveness of these activities in increasing resilience to climate change will be tested and measured during the course of the project. This will be achieved through economic and cost-benefit analyses to ascertain whether each activity is an economically viable option given climate change conditions. The most successful activities will be prioritized for up-scaling to neighboring communities and details regarding their implementation will be disseminated widely at the workshops/training events undertaken by the project.

The cost-effectiveness of the proposed LDCF project's interventions are discussed in further detail below.

Cost-effectiveness of FFEWS

The floods that hit the southern Cunene Province in Angola in 2009 were dramatic, causing widespread destruction throughout the Cuvelai Basin, with 125,000 people directly affected and 25,000 people losing their homes (as well as along the northern parts of Namibia, where 276 000 were displaced). These floods resulted in the loss of crops, houses, schools, medical centres and roads; it exacerbated a cholera outbreak in the Cunene Region in Angola and Namibia and was responsible for a direct rise in reported cases of Malaria. The floods struck again in March 2010, resulting in over 12 000 people affected by flooding in Cuvelai Basin with 10,937 people losing their livelihoods. These are the issues that the project addresses in Outcome 1 through the development and operationalisation of the FFEWS to minimize the impact of such extreme events on population and their livelihoods. Therefore, the project will design and implement pilot FFEWS in at least seven communes with an overall objective of reaching a total of direct and indirect beneficiaries benefiting from community livelihood enhancement brought about by the Community based FFEWS, of approximately 400,000 people (with exception of Ondjiva the Capital) with an average investment of 21USD per household (total LCDF budget, including management cost). The tangible benefits coming from this investment per household will far outweigh the costs. The guiding principles for this FFEWS will be affordability (low cost), low-maintenance technology and sustainability (ability of the Government to cover the long-term running cost without expecting external support). Local communities and district officers will be provided with training and capacity building to operate and maintain FFEWS and associated infrastructure.

Quantifying the cost effectiveness of improved climate information and early warning system investments is acknowledged to be difficult, and is therefore not regularly undertaken. One of the difficulties is that it is often not possible to determine the economic savings of reliably avoided losses, and factors other than destruction of property and the number of deaths are generally not taken into account. This is particularly true for developing countries in Africa, where cost-benefit data and analysis of investing in improved climate monitoring and effective early warning systems are scarce.

In Europe, hydro-meteorological information and early warning systems – which is used to inform climate-related preparedness actions – save several hundred lives per year, avoid between Euro 460 million and Euro 2.7 billion of disaster asset losses per year, and produce between Euro 3.4 and Euro 34 billion in additional benefits per year for sectors vulnerable to climate change, including agriculture and energy. In developed countries in general, the benefits of improved weather services to inform severe weather warnings exceed costs by an average of more than 10 times (taken from Tsirkunov and Rogers, 2010) . In developing countries, there is potential for similar cost-benefits to be realized through investing in improved climate monitoring and early warnings systems. The cost of improving hydro-meteorological services and producing the required warnings

elsewhere is estimated to be lower than US\$1 billion. Therefore, the average benefit-cost ratio for developing countries is between 4 and 36. Some of the most advanced countries in Africa—such as South Africa—spend about US\$5 million yearly preparing for natural hazards, which are estimated to cost US\$1 billion yearly. If forecasting research can make even a small contribution to better public decisions about mitigation of recovery costs, preparedness, and crisis management, it would justify sustaining the effort in research on climatic forecasting. Investments in early warning systems for flooding, droughts, tsunamis, and hurricanes can also help save thousands of lives, and even reduce the financial costs of disasters. There is much room for improvement in climate forecasting in Africa: the density of weather watch stations is eight times lower than the minimum level recommended by the World Meteorological Organization, and reporting rates there are the lowest in the world. Therefore, the FFEWS address both of these shortfalls by increasing the density of weather monitoring network and frequency of reporting data through national and international transmission systems. Therefore FFEWS at the scale of the Cunene Province will result in a high average benefit-cost ratio.

Moreover 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 hydrological services; and iii) a weather and climate information online platform. This integrated approach provides a cost-effective manner of informing an extensive range of stakeholders about the FFEWS, which include government technical staff, policy-makers, restoration practitioners, scientists, university students, schoolchildren and the public.

Cost-effectiveness of CC Adaptation and Resilience initiatives for Cuvelai Basin Farming communities

The dominant agriculture system found probably in most of Angola, reaching roughly 90% of the households and properties, is the Small Subsistence Family Farms. These contain among the most vulnerable stakeholders of society (widows, single women, elderly, disabled, young marriages, etc.). In recent years, apparently due to climate change, unfavorable rainfall resulted in more than 60% losses in average productivity for these family farmers. The 2013 droughts in Cuvelai left about 40 to 50 percent of dried water spots in the communes of Curoca, Cahama, Namacunde, Cuanhama, Cuvelai e Ombandja affecting about 500,000 people and 2 million livestock at a cost of 6,000 tons/month of external food assistance for these vulnerable populations. In that year alone the GoA through UNICEF needed to spend US\$ 14.3 million for emergency assistance to the Cuvelai population .

Anecdotal evidence suggests that out of the 400,000 people covered by the FFEWS in Cunene province not less than 10-15% (40-60,000) farmers will benefit from the strong increase in production resulting from higher cropping intensities, cultivation of higher value crops, and diversification toward non crop activities (Outcome 2). The concerted actions under Outputs 2.1, 2.2, 2.3 and 2.4 will be developed in collaboration with the local communities and local Extension Officers in relevant EDA's. In the long run these activities will result in a significant increase of local yields and household income resulting from a modest investment. The budget for this Component has been designed along principles of cost-effectiveness. All costs for inputs, human resources, and supplies are structured in such a way so that the proposed targeted achievements of Outcome 2 will be reached with an average investment of USD 50 per community member. In addition, the surface area covering six of the communes Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati (excluding the capital Ondjiva) is around 25,000 km². Considering that 3.29% of the total land-area in Angola is arable and the permanent cropland (% of land area) in Angola is about 0.2, therefore the total land area benefitting from improved livelihood enhancement against climate change impact within the Cuvelai watershed will be at least 50,000 hectares.

Furthermore, the adaptation measures to be piloted by the project through Community Based FFEWS, and small-scale adaptation initiatives through the Communal Centres for Agro-pastoral Resources Transformation (particularly the small-scale drought resilient vegetable farming activities and small-scale fish aquaculture production - see Output 2.4), will work as safety net to strengthen resilience of Province of Cunene communities' livelihoods to extremes of climate variability and will have multiple benefits for a wide-range of beneficiaries for a modest investment capital. Measures such as the introduction of rainwater harvesting techniques and opening/rehabilitation of traditional water reservoirs and boreholes (see Output 2.3) will be cost-

effective in the longer run as it will allow communities to capitalize on episodes of increased rainfall or recharging of aquifers as a result of climate change using relatively low-cost equipment.

Finally, a baseline self-capacity assessment was conducted during the project preparation phase in order to guide the identification and prioritisation of stakeholder needs. Equipment and capacity-building investments were selected based on identified priorities as well as the available budget and focal areas of the LDCF project. Proposed outputs and procurements were reviewed in a representative validation workshop and revised to reflect considerations of sustainability and cost-effectiveness. A detailed assessment of the cost-effectiveness for each proposed output with alternatives considered can be found in Table 7 of the Project Document – Section 2.6.

C. DESCRIBE THE BUDGETED M & E PLAN:

The UNDP Project Document provides a detailed description of the monitoring, reporting and evaluation to be undertaken during the Project (Section 6). Full details of indicators, baseline values and targets are presented in Annex 1 to this document (Results Framework). Monitoring and evaluation activities will follow standard UNDP and GEF monitoring and evaluation policies and guidelines. Monitoring and evaluation of progress in achieving project results and objectives will be done based on the targets and indicators established in the project Results Framework (Annex 1). The project will develop a detailed M&E strategy presenting the methodology for that will be used to measure the progress and realization. This methodology will be mainly based on the Randomized Trial Control (RCT) principle. The project Monitoring and Evaluation Plan has been budgeted at US\$132,000 (see Table below). Integrated into all outcomes, the project monitoring and evaluation approach will also facilitate learning and mainstreaming of project outcomes and lessons learned into international good practice as well as national and local policies, plans and practices. A summary of the envisaged M&E activities is provided in the following table.

M&E Workplan and Budget

Type of M&E activity	Responsible Parties	Indicative Budget US\$ <i>Excluding project team staff time</i>	Time frame
Baseline study	<ul style="list-style-type: none"> ▪ M&E expert 	10,000	Within first two months of project start up
Inception Workshop and Report	<ul style="list-style-type: none"> ▪ Project Manager ▪ M&E expert 	5,000	Within first four months of project start up
Measurement of Means of Verification of project results.	<ul style="list-style-type: none"> ▪ M&E expert oversight by PM 	10,000	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	<ul style="list-style-type: none"> ▪ M&E expert oversight by Project Manager 	20,000	To be determined as part of the Annual Work Plan's preparation. Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> ▪ Project manager (MEE) ▪ PIU ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG 	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> ▪ Project manager and team ▪ Financial assistant ▪ M&E expert 	None	Quarterly
Mid-term	<ul style="list-style-type: none"> ▪ External Consultants (i.e. 	30,000	At the mid-point of project implementation.

Review	evaluation team)		
Terminal Evaluation	▪ External Consultants (i.e. evaluation team)	45,000	At least three months before the end of project implementation
Audit	▪ UNDP CO ▪ Project manager ▪ Financial assistant	Indicative cost per year: 3,000 (12,000 total)	Yearly
Visits to field sites and BtOR	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives ▪ M&E expert	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\$ 132,000 (+/- 5% of total GEF budget)	


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

- A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this form. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Dr Carlos Avelino Manuel Cadete	National Director of Statistics	PLANNING AND STUDIES CABINET	4 TH SEPTEMBER 2012

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Adriana Dinu, Executive Coordinator UNDP/GEF		Oct. 29, 2014	Lucas Black	+27 71 055 6862	Lucas.black@undp.org

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

<p>This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: Outcome 6: Strengthen national capacities to mainstream environmental protection into national development plans and programmes through a pro-poor growth perspective; Output 6.3: Increased institutional capacity for monitoring environmental trends in nation-wide scale; output 6.4: Climate change adaptation is mainstreamed into national development policies and plans</p>					
<p>Country Programme Outcome Indicators: i) Number of national policies on sustainable development; ii) Number of programmes focusing on mainstreaming environmental protection; iii) Number of programmes and policies on sustainable use of resources (Land and water); iv) Number of international environment conventions being reported/monitored</p>					
<p>Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR</p> <p>2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. Expanding access to environmental and energy services for the poor.</p>					
<p>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”.</p>					
<p>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”.</p>					
<p>Applicable SOF (e.g .GEF) Outcome Indicators:</p> <ul style="list-style-type: none"> • 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
<p>Project Objective⁵</p> <p>To reduce the climate-related vulnerabilities facing the</p>	<p>Percentage change in vulnerability of local community to climate risks.</p>	<p>The vulnerability of the site is high. The baseline will be determined at project onset during the inception phase.</p>	<p>At mid-term 35% increase of VRA score; at end-of-project 70% of VRA score.</p>	<p>Gender sensitive field survey / VRA.</p>	<p>Assumptions:</p> <ul style="list-style-type: none"> • Government is committed to integrating climate change risk and adaptation needs in development planning of Province of Cunene;

⁵Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR
GEF5 CEO Endorsement Template-February 2013.doc

inhabitants of Angola's Cuvelai River Basin through targeted investments and capacity building.					<ul style="list-style-type: none"> • Planning will be conducted in a participatory manner to ensure that adaptation measures are appropriated by the community; • Stakeholders are committed to implement the project interventions and provide the necessary support. <p><i>Risk:</i> Insufficient institutional support and political commitments and lack of coordination of the various key stakeholders.</p>
Outcome 1⁶ Enhanced capacity of national and local hydro-meteorological services, civil authorities and environmental institutions to monitor extreme weather and climate change in the Cuvelai Basin.	1.1 A Flood Forecasting & EWS that is useful to communities developed and forecasts disseminated to target communities in Province of Cunene.	1.1 Currently no Flood Forecasting & EWS established in Province of Cunene.	1.1 By the end of the project a Flood Forecasting & EWS is developed and forecasts are being disseminated to target communities in Province of Cunene.	1.1 Field survey and PIR	Assumptions: Costs of equipment and training will not rise dramatically during project implementation. <ul style="list-style-type: none"> • Technical expertise and equipment for upgrading the network is available. <p><i>Risk:</i> Telecommunication (SMS) communication systems used for data transmission from Automatic Weather Stations will not be robust enough (e.g., bandwidth issues or local mobile telecommunication networks) to be able to effectively contribute to EWS data sharing and real time forecast development.</p>
Outcome 2 Increased resilience of smallholder	2.1 Percentage change in gender disaggregated household	2.1 N/A at present – project will undertake a gender disaggregated VRA at project onset.	2.1 At mid-term 25% gender disaggregated increase of VRA score; By the end of the project 50% gender disaggregated	2.1 Survey/VRA	Assumptions: <ul style="list-style-type: none"> • Financial, Technical and political support will be given to EDA's for training of staff and implementation of activities as planned.

⁶All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

farmer communities in the Basin to climate-induced risks and variabilities.	<p>income in the 7 targeted comunas as a result of project intervention via perception based survey (VRA)</p> <p>2.2. No. of household in targeted comunas engaged in climate resilient farming methods and livelihoods</p>	2.2 Few households have access to resilient livelihood assets and methods (Score=2)	<p>increase of VRA score</p> <p>2.2 Score improved to 4: By the end of the project, at least 50% of targeted households have engaged in climate resilient farming methods and livelihoods introduced/strengthened in the project.</p>	2.2 Household surveys using an appropriately designed household livelihood asset/method index	<ul style="list-style-type: none"> Communities in target <i>Comunas</i> are willing to cooperate and adopt climate change adaptation measures. <p><i>Risk:</i> Poor coordination and weak capacity of relevant stakeholders to implement climate change adaptation measures in target <i>Comunas</i>.</p> <p><i>Risk:</i> Communities in target <i>Comunas</i> are not committed to cooperate and/or accept proposed adaptation measures.</p>
Outcome 3 Local institutional capacities for coordinated, climate-resilient planning strengthened & Capacity for effective community-based climate change adaptation (including traditional knowledge practices) improved at	3.1 CC-Environmental Information System of Angola (CC-ENISA) is established, risk assessed and vulnerability maps developed for the Cunene Province and the Cuvelai in particular.	3.1 Climate Change risks have not been modelled Angola and no vulnerability maps have been developed so far for Cunene Province and the Cuvelai in particular.	3.1 By the end of the project CC-ENISA has been running Risk modelling and Vulnerability maps for the Cunene Province and the Cuvelai in particular have been developed.	3.1 Project evaluation reports (PIR) and Vulnerability maps developed.	Assumptions: <ul style="list-style-type: none"> Activities programmed for equipment purchase and training of staff in GIS are implemented as planned. Adequate and timely national and international support for sharing and exchange of climate change data, modelling information and other relevant data and information. <p><i>Risks:</i> Complex technical and organizational management of knowledge base that can delay project implementation.</p>
	3.2 Number of National or Provincial relevant plans and/or policy documents that integrate	3.2 Currently, no plans and policies that explicitly integrate climate change flood and drought risks are in place.	3.2 By the end of the project CC flood and drought risk/vulnerability are integrated into at least one National and one Provincial disaster preparedness and	3.2 Project evaluation reports (PIR) and Plans and policies developed.	

local level (equivalent to activity in ATLAS)	climate change flood and drought risks		management Plans.		
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ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Comments	Responses	Changes made in full project
GEF Secretariat		
8. Please ensure all relevant objectives are identified and reflected in table A.	Agreed. All relevant objectives are now been identified and included into Table A.	Table A of CEO Endorsement.
11. Further Please provide further information on baseline projects, namely Angola Water Sector Institutional Development Project, and further justifications on how the LDCF-funded activities would be additional.	<p>Agreed. Baseline project #2 (USAID's Global Climate Change Integration (GCCl) Pilot Proposal for Angola) has been removed from the list of baseline project.</p> <p>During consultations undertaken during the PPG phase some key projects involving physical activities were identified with the Baseline Project # 1 and 3 namely:</p> <p>i) <u>The Ministry of Energy and Water (MINEA) programme</u> for 2014 of strengthening of the water supply system of Ondjiva in the Province of Cunene with a total amount of \$US 39,037, 712 to invest into three main components: <u>"Strengthening of the Water Supply System of Ondjiva" (Phase 1)</u> - \$US860,832.0 This component mainly includes the construction of water distribution networks of some localities potentially benefitting the health and welfare of some 200 000 beneficiaries of Ondjiva and localities of Xangongo-Ondjiva-Sta.Clara, Ondjiva-Anhanca and Ondjiva Chiede-axes, <u>"Strengthening of the Water Supply System of Ondjiva" (Phase 2)</u> - \$US2.690,000. This component mainly provides funds for the rehabilitation and strengthening in the uptake, pumping stations capacity and treatment plant of Xangongo and the installation pipeline Xangongo - Ondjiva (100 Km).</p> <p><u>"Rehabilitation of the Calueque Dam and Construction of a Pumping Station"</u> - \$US 1.035,300,001. This component consists of the rehabilitation and completion of Calueque Dam, including the construction of a pumping station on the north bank of the Cunene River and associated pipelines for water supply and an irrigation scheme still to be set by the Ministry of Agriculture.</p> <p>However, this programme does not foresee the construction of community-level water infrastructure for agriculture and livestock use, nor there is any training or capacity building in climate change integrated water management for the scheme. This LDCF project will complement this substantial investment from the GoA by providing community-level water infrastructure for both the agriculture and livestock sectors which are not foreseen in this MINEA programme. In addition the LDCF will also contribute and complement wherever necessary for the training or capacity building initiatives particularly towards the necessary knowledge in climate change integrated water management for the scheme.</p> <p>ii) <u>INAMET's Strategic Development Master Plan (2014-2020)</u>. The INAMET's Strategic Development Master Plan (SDMP) for 2014-2020 is largely financed by the Government of Angola with a significant investment on its monitoring infrastructure and data base including in the Cunene Province with a contribution of about US\$968,292.0⁷ through the SASSACAL programme. However, INAMET through this programme will be installing a number of Automatic Weather Stations in the Province of Cunene the monitoring network density for the FFEWS in the Cuvelai Basin will not be covered entirely through this investment programme. In addition, the capacity development programme under consideration by the INAMET's Strategic Development Master Plan is not specifically dedicated for the Province of Cunene. Finally the INAMET's SDMP does not consider an operational flood forecasting and early warning system focused on the risk to extreme floods and drought events experienced by the communities in the Province of Cunene and in particular in the Cuvelai Basin.</p>	See Section 2.3 & 2.4 of Project Document.

⁷ Details provided in Section 2.3 paragraph 109.

Comments	Responses	Changes made in full project
	<p>iii) <u>INARH -“Installation of Floods Monitoring Network in the Cuvelai River Basin Project”. (2010-2016).</u> This investment project contemplates a total of US\$1 million and is being developed within the framework of the Angola Water Sector Institutional Development Project financed by the World Bank specifically the Component 2: Water Resources Management: “support the strengthening of the institutional framework for the water resources management sub-sector”. The project implemented via the Ministry of Energy and Water through the National Institute of Hydrologic Resources (<i>Instituto Nacional de Recursos Hídricos</i>) with the following specific objectives for the Cuvelai Basin in the Province of Cunene: a) Installation of hidroclimatological stations in the villages of Tchamutete, Mupa and Cuvelai for monitoring of climatological variables; b) Installation of hidrometric rulers (scales) in one of the Mui River sections, as well as in the towns of Evale, Mupa, Ondjiva and Namacunde for monitoring of river water levels; c) Installation of an operational Monitoring Centre in Ondjiva, to carry out collation of information and dissemination to interested parties in Angola and Namibia. This LDCF will complement the activities being developed by the INARH in the Cuvelai Basin by deploying AWS in 7 locations and 4 Automatic river gauging stations (AHS) and at least 4 manual water level in other sections of the Mui River.</p> <p>iv) <u>Ministry of Environment (MINAMB) programme.</u> The Government of Angola is supporting MINAMB with a total budget of around US\$2 million to carry out a nationwide climate change adaptation education campaigns with specific activities in the Province of Cunene towards the establishment of Flood Forecast and Early Warning System protocols. These activities include pilot communication and dissemination of disaster preparedness and response plans. Still, many villages in the Cuvelai have not yet been reached due to a lack of capacitated human resources at local level. Furthermore, the Government of Angola is supporting MINAMB to mainstream Climate Change Adaptation into National and Provincial Plans. However, this GoA support has not yet been extensive towards establishment of a GIS based Climate Change Environmental System.</p>	
13. Please strengthen the justifications provided linking the baseline initiatives and proposed LDCF-funded activities.	A full and detailed explanation of the linkage between baseline initiatives and proposed LDCF-funded activities are given for each of the Components in Section 2.4 of the Project Document.	See Section 2.4 of Project Document for details.
14. Please ensure that recommendations made in Sections 11 and 13 are reflected in the project framework, as needed.	This is has been also addressed in the Project Document Section 2.4 and in the Project Results Framework.	See Section 2.4 and the Results Framework Table of Project Document for details.
16. By CEO Endorsement, please provide further information concerning the key direct socio-economic benefits expected to reach the target population.	<p>Communities will immediately benefit through seasonal drought warnings related to small-scale agriculture and livestock raising, water and flood management, wildfires etc. This total population benefiting from these developments has the potential to grow hugely if warnings extend to a reasonable percentage of the total population e.g. through, radio, TV, mobile phone relay or similar system. Many of the beneficiaries will be women, especially within the small agriculture sector where they often make up the majority of smallholder farmers, yet are most vulnerable to food insecurity.</p> <p>The project intends to delivery training in small-scale irrigation to Extension officers working within EDA’s, NGO’s and CBO’s and install equipment for construction of small-scale water management works for irrigation (water pumps, drip irrigation systems, water reservoirs). This will benefit the region and will strengthen and develop the capacity of vulnerable local communities to withstand drought impact.</p> <p>The project will also promote clean technologies to improve water access and quality that mitigate drought impact including rainwater harvesting technologies and techniques through which to improve water availability at demonstration sites. These on-the-ground activities are</p>	See Section 2.3.2 of Project Document.

Comments	Responses	Changes made in full project
	<p>likely to provide benefits such as: i) improving access to water for sanitation and drinking purposes; ii) improving agricultural productivity by increasing the availability of water for irrigation purposes (with positive consequences for food security and income streams). Therefore, through project activities, adaptation benefits will also arise through the protection of livelihoods from adverse climate change impacts on water resources.</p> <p>Finally, the total population benefiting from these developments currently estimated at 400,000 inhabitants has the potential to grow hugely if warnings extend to a reasonable percentage of the total population e.g. through, radio, TV, mobile phone relay or similar system. Many of the beneficiaries will be women, especially within the small agriculture sector where they often make up the majority of smallholder farmers, yet are most vulnerable to food insecurity.</p>	
23. Please lower the management cost or provide justifications	Project Management costs have been slightly reduced and justifications are described in the Management Arrangements in Section 5 of the Project Document.	
Germany Comments		
The PIF has already identified important stakeholders, i.e. the Ministry of Environment and the National Directorate of Hydrologic Resources. However, more national and regional stakeholders are important for the implementation of this project	The River Basin Organisation (RBO) has been considered as stakeholders and their objectives and points of view were conveyed through consultations undertaken during the PPG phase with the National Institute of Water Resources (INARH), the national Institution in the coordination of RBO. Suggestions given during these consultations were integrated into the project document wherever convenient to do so. The project will continue to work with RBO through INARH one of the major stakeholders of this LDCF.	See Section 2.3 & 2.4 of Project Document for details.
Besides KfW, the GIZ Program for Transboundary Water Management in SADC acting on behalf of the the German Federal Ministry for Economic Cooperation and Development should be added to this list and be consulted for water-related activities regarding Project Component 1	Similarly the GIZ Program for Transboundary Water Management in SADC have been object of research and consultations held with INARH. As INARH is the leading Government Institution coordinating the GIZ activities in Angola under the framework of Transboundary Water Management in SADC programme it was agreed with INARH that the project would collaborate with GIZ in the framework of the Transboundary Water Management in SADC whenever necessary through INARH one of the major stakeholders of this LDCF.	See Section 2.3 & 2.4 of Project Document for details.
Germany recommends to also considering establishing a knowledge management scheme. The scheme should guarantee that the knowledge will remain in the institutions in the long-run	This LDCF activity includes a robust programme for training and capacitance at all level and involving all major stakeholders e.g. INAMET, the INARH, the Civil Protection, The Ministry of Agriculture and the Provincial Government of Cunene. This will ensure not only the respective institutional strengthening and implementation of the project activities but also the sustainability of actions beyond the project life.	For further details please see Output 1.3 (Component #1); Output 2.2 (Component #2); Output 3.3 (Component #3).
With regard to the livelihood assessments	The LDCF will effectively carry out a participatory mapping of vulnerability to flood and droughts as well as livelihood assessments which will enable decision making leading to the	For further details please see Section 2.4

Comments	Responses	Changes made in full project
outlined in Project Component 2, Germany recommends to further elaborate on how these assessments relate to the activity of disseminating climate-resilient seed packets.	<p>establishment of at least three demonstration sites in farmer's plots in the Basin for <i>in-situ</i> characterization of climate-resilient crop varieties and dissemination of seed packets of characterised climate-resilient crops for subsequent multiplication by smallholder farmers.</p> <p>Additionaly, and in parallel to the development of the above, the project will through this Component 2 develop a dedicated Climate Change Based Extension Training (CC_BET) programme to Extension officers working within the Agriculture and Rural development sector in the Basin. This will be the backbone for the establishment of tailored agricultural extension services to master/access agricultural techniques adapted to increased climate variability in Province of Cunene.</p>	Component #2); Output 2.1.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS⁸

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG Grant Approved at PIF: US\$ 150,000			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF/NPIF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Activity 1: Technical definition and capacity needs assessments	50,000	26,910.75	23,089.25
Activity 2: Institutional arrangements, monitoring and evaluation	45,000	26,450	18,550
Activity 3: Stakeholders Consultations	25,000	18,785	6,215
Activity 4: Financial Planning and co-financing	30,000	13,765	15,235
Total	150,000	86,910.75	63,089.25

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

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

⁸ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.



United Nations Development Programme

Country: ANGOLA

PROJECT DOCUMENT¹

Project Title: Promoting climate-resilient development and enhanced adaptive capacity to withstand disaster risks in Angolan's Cuvelai River Basin

UNDAF Outcome(s):

UNDAF Outcome involving UNDP 4: By 2019, the environmental sustainability is strengthened through the improvement of management of energy, natural resources, access to green technology, climate change strategies, conservation of biodiversity, and systems and plans to reduce disasters and risks.

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: SP 2014-2017 #5: Countries are able to reduce the likelihood of conflict, and lower the risk of natural disasters, including from climate change.

UNDP Strategic Plan Secondary Outcome:

Expected CP Outcome(s):

(Those linked to the project and extracted from the country programme document)

CPD 2015-2019: 4.1. Preparedness systems in place to effectively address the consequences of and response to risks posed by natural and man-made disasters at all levels of government and community

Expected CPAP Output (s)

[final CPAP still to be approved; final CPAP output will be inserted during LPAC]

Executing Entity/Implementing Partner: Ministry of Environment

Implementing Entity/Responsible Partners: UNDP

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

Brief Description

This proposal seeks funding from the Least Developed Countries Fund (LDCF) to implement a Full-Size Project in Angola, specifically in the region of Cuvelai River Basin (province of Cunene). The project will focus on two of the national priorities presented in Angola's National Adaptation Programme of Action (NAPA) submitted to the United Nations Framework Convention on Climate Change (UNFCCC), namely priorities 7 (Create an early warning system for flooding and storms) and 13 (Climate monitoring and data management system).

Angola, particularly the Southern region of Cunene Province, is vulnerable to increasing frequency and severity of droughts, floods and severe storms and these events impact sectors such as agriculture and livestock, water resources, rural development and food security, as well as soil erosion, built infrastructures and livelihoods. Of particular concern are the Cuvelai River Basin communities and sectors such as agriculture, livestock and water resources which are an important component of the economy in the region and form the basis of rural livelihoods in Cuvelai Basin.

The development of the Province of Cunene's capacity to adapt to climate-related hazards is therefore an urgent priority to mitigate the negative impacts of climate change and address the region's socio-economic and developmental challenges effectively. A large proportion of Cunene Province's population is ill-equipped to adapt to climate change. Climate change impacts are likely to be particularly negative on Cuvelai's rural population because of their high dependence on rain-fed agriculture and natural resource-based livelihoods. Climate change impacts are likely to be particularly negative on the Province of Cunene's rural population because of their high dependence on rain-fed agriculture and natural resource-based livelihoods. 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 Angola's region of the Province of Cunene to improve the management of these climate-related hazards it is necessary to:

- Enhance the capacity of hydro-meteorological services and networks to predict climatic events and associated risks;
- Develop a more effective and targeted delivery of climate information including flood and drought forecast early warnings;
- Build skilled human resources to guarantee long-term sustainability of hydro-meteorological services and the Flood Forecasting and Early Warning System;
- Support improved and timely responses to forecasted climate-related risks by strengthening the capacity of the Civil Protection Services; and
- Strengthen the technical capacity of the agriculture extension services to increase resilience of smallholder farmer communities in the Basin.

Barriers that need to be overcome to establish an effective FFEWS in the Province of Cunene and promote climate-resilient development to enhance adaptive capacity of Communities to withstand disaster risks include the following: i) limited knowledge and capacity to fully assess risks posed by climate change to disaster risks in the Province of Cunene; ii) lack of capacity of the extension network to enhance responsiveness and adaptability of subsistence agriculture in the Province of Cunene; and iii) poor intersectorial coordination and weak policy framework to respond to change risks.

Other obstacles in the path include obsolete and inadequate weather and climate monitoring infrastructure, which limits data collection, analysis and provision of meteorological and hydrological services and the absence of an operational Climate Change Environmental Information System in Angola to allow systematic storage and mainstreaming of digital information to support decision making in sector planning. This LDCF-financed project, implemented by the Ministry of Environment, will:

- i) enhance the capacity of national and local hydro-meteorological services, civil authorities and environmental institutions to monitor extreme weather and climate change in the Province of Cunene;
- ii) increase the resilience of smallholder farmer communities in the Basin to climate-induced risks and variabilities via access to locally-appropriate climate data and germplasm resources;
- iii) strengthen local institutional capacities for coordinated, climate-resilient planning; and
- iv) improve the capacity for effective community-based climate change adaptation (including traditional knowledge practices) at local level.

Programme Period:	2009 - 2013	Total resources required	54,673,004
Atlas Award ID:	00081003	Total allocated resources:	54,673,004
Project ID:	00090473	○ Regular	
PIMS #	5166	○ GEF	8,200,000
Start date:	PRODOC signature	○ Other:	
End Date	4 years from signature	○ Government	43,006,004
		○ In-kind	2,550,000
		○ UNDP (Cash)	917,000
Management Arrangements	NIM		
PAC Meeting Date	To be determined after CEO endorsement		

Agreed by (Government):

Date/Month/Year

Agreed by (Ministry of Environment / UNDP):

Date/Month/Year

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LIST OF ACRONYMS

ACMAD	African Centre of Meteorological Applications for Development
AfDB	Africa Development Bank
AGRHYMET	Regional Centre for Training and Application of Agrometeorology and Operational
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
CACS	<i>Conselhos de Auscultação e Concertação Social</i>
AUC	Commission of the African Union
CART's	Centres for Agriculture Resources Transformation
CBFFEWS	Community Based Flood Forecast Early Warning System
CC_BET	Climate Change Based Extension Training
CBO	Community Based Organisation
CC-ENISA	Climate Change Environmental Information System of Angola
CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
CNRF	Angola National Plant Genetic Resources Centre
CO	(UNDP) Country Office
COP	Conference of Parties
ClimDevAfrica	Climate for Development in Africa
CPAP	(UNDP) Country Programme Action Plan
DNAAS	National Directorate for Water Supply and Sanitation (<i>Direcção Nacional de Abastecimento de Água e Saneamento – Ministério de Energia e Águas</i>)
DPEA	Provincial Delegation of Energy and Water (<i>Direcção Provincial de Energia e Águas</i>)
DRR	Disaster Risks Reduction
DWAF	Namibian Department of Water Affairs and Forestry
DW	Development Workshop (NGO)
EDA	Local Extension Services (<i>Estações de Desenvolvimento Agrário</i>)
EFL	The Environmental Framework Law (<i>Lei de Bases do Ambiente</i>)
EIA	Environmental Impact Assessment
ESSP	(UNDP's) Environmental and social screening procedure
EU	European Union
EWS	Early Warning System
FAO	UN's Food and Agriculture Organisation
FFEWS-TF	Flood Forecast Early Warning System multidisciplinary Task Force
FFG	Flash Flood Guidance
GAS	Groups of Water and Sanitation (<i>Grupo de Água e Saneamento</i>)
GCCI	Global Climate Change Integration
GCOS	Global Climate Observing System
GEF	Global Environment Facility
GDP	Gross Domestic Product
GIS	Geographical Information System
Green LECRDS	Green, low-emission and climate-resilient development strategies
GoA	Government of Angola

KTWSP	Cunene Transboundary Water Supply Project
HDI	Human Development Index
IBEP	<i>Inquérito Integrado Sobre o Bem Estar da População</i>
IDA	<i>Instituto de Desenvolvimento Agrario</i>
INARH	National Institute of Hydrologic Resources (<i>Instituto Nacional de Recursos Hídricos</i>)
INC	Initial National Communication
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resource Management
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LDRMC	Local Disaster Risk Management Committees
MDGs	Millennium Development Goals
M&E	Monitoring and Evaluation
MINADER	Ministry of Agriculture (<i>Ministério da Agricultura</i>)
MINAMB	Ministry of Environment (<i>Ministério do Ambiente</i>)
MINEA	Ministry of Energy and Water (<i>Ministério de Energia e Águas</i>)
MININT	Ministry of the Interior
MINPLAN	Ministry of Planning (<i>Ministério de Planeamento e Desenvolvimento Territorial</i>)
MTTI	Ministry of Telecommunications and Information Technologies
NAPA	National Adaptation Programme of Action
NGO	Non-Government Organisation
NIM	National Implementation (Modality)
PIR	Project Implementation Report
PND	<i>Plano Nacional de Desenvolvimento</i>
PNGA	National Environmental Management Programme (<i>Programa Nacional de Gestão Ambiental</i>)
PMU	Project Management Unit
PPG	Project Preparation Grant
PSC	Project Steering Committee
RBM	Results Based Management
RTA	(UNDP) Regional Technical Adviser
SADC	Southern African Development Community
SARCOF	Southern Africa Regional Climate Outlook Forum
SNPCB	National Civil Protection and Fire Brigade Services (<i>Serviço Nacional de Protecção Civil e Bombeiros</i>)
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
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
WHYCOS	World Hydrological Cycle Observing System
WIAG	World International Advisory Group
WL	World of Learning (NGO)
WMO	World Meteorological Organisation

LIST OF ANNEXES

Annex 1. Risk Analysis

Annex 2. Stakeholder consultations

Annex 3. Inception Report

Annex 4. Technical Report

Annex 5. Field Mission Report

Annex 6. Validation Workshop Report (in Portuguese)

Annex 7. Co-Financing and Agreement Letters

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Environmental and Social Screening Checklist

Annex 9. Terms of Reference for key project groups, staff and specialists

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I. SITUATION ANALYSIS

1. Angola located in western southern Africa at 6-18° south of the Equator is one of the key water sources for central and southern Africa, with 47 main river basins draining its extensive, well-watered interior. Seven of its nine watersheds - including the Cunene (Figure 1), Cuando, Cubango, Zaire, and Zambezi - are shared by neighbouring countries. The country's densely populated 'central plateau', where the Cuanza, Cunene, and Okavango rivers originate, is perhaps the most important landform in southern Africa from a hydrological perspective. One of the important watersheds is that of Cunene River which gave its name to the province located south of the country and in the border with Namibia. The inhabitants of the Province which includes the municipalities and comunes of Cahama (municipality), Cuvelai (municipality and comune), Namakunde (municipality and comune), Kuroka (municipality), and Xangongo (comune) are overwhelmingly Ovambo pastoralists practicing for centuries the transhumance of their cattle. The greater part of the territory of the province is part of a great plain through which flows the river Cunene and Cuvelai with slight and gradual slope to the south and drains into the Etosha Delta in Namibia, directly or through a network of valleys and water lines usually dried (*the omulolas*), of which the most known is that of Mucope.

Figure 1. Map of location of Angola and the Province of Cunene where the Cuvelai River is located



2. The relief of Cunene Province is generally very smooth, which facilitates the movement of the cattle in the transhumance but also allows the flooding of large areas (*chanas*) in the rainy season alternating with dry surfaces, like a succession of lakes and very shallow ponds. The *chanas* wetlands, ponds and *omulolas* explain the most important destinations of transhumance of cattle in dry weather looking for pasture and water, as is the case of well known Tchimpopo area (*Oshimolo*) in Cuvelai where ponds *Kelly*, *Amoeba* and *Antuima* are permanently with water and play an important role in the economic life of the people, either by the fishing opportunity, or as a reserve pasture for critical periods. In the Lower Cunene, the riparian zones of Cunene River (Evanda) are also flooded during the peak of the rains, after which the water is retained in ponds (*etala*) that contribute to minimize the suffering of the thirsty cattle and populations in the dry weather.

3. The primary geographic focus of this project – the Cuvelai River Basin – within the Cunene watershed, is one of the regions most affected by climate variability. The Cuvelai Basin is characterised by an interconnected system of shallow ephemeral water courses, the *chanas* (or *oshanas* in the Namibian side) which is the “life-support system” to the most densely populated area in the Province. Though this region has experienced regular flooding for centuries, over the past three decades at least, Angola and the Cuvelai River Basin in particular, have been experiencing significant climate variability shown by alternating floods and extreme drought events.

4. Over the past three hydrological years (2008-2011) the Basin has had extensive floodings with various negative repercussions, including loss of life and property such as that observed during the extensive flooding that occurred between January and April 2011 with at least 234 persons killed, 204,000 displaced and 254,000 directly affected, according to the Angola Civil Protection Commission.

5. At the same time, in many years the Basin becomes extremely dry, as happened in hydrological years (2012-2013). Almost all rain falls in the summer months (October-November till March-April) and the further south in the Basin the more unpredictable the rainfall is and this is typically the area where the most extreme droughts occur. The driest among these in recorded history have led to catastrophic famines, the most disastrous of which resulted in the deaths of up to 40% of the people in the Basin². Moreover, the timing of summer rainfall within one summer may be so erratic that crops fail, even if the total aggregate amount of rainfall received is high.

6. These events are consistent with the analysis of rainfall anomalies from weather records from 1960 to 2006³ which indicates that mean annual rainfall over Angola has decreased at an average rate of around 2mm per month (2.4%) per decade between 1960 and 2006. This annual decrease is largely due to decreases in March, April and May rainfall, which has decreased by 5.0mm per month (5.4%) per decade. By contrast, mean annual temperature has increased by 1.5°C between 1960 and 2006, an average rate of 0.33°C per decade. Interestingly the rate of increase has been most rapid in the winter, at 0.47°C per decade, and slowest in summer at 0.22°C per decade. Notably, daily temperature observations show significantly increasing trends in the frequency of hot days⁴ in all season, and hot nights in all seasons except winter (DJF) with average number of 'hot' days per year increasing by 49 (an additional 13.4 of days⁵) between 1960 and 2003.

1.1. Climate change – induced problem

7. Future climate change models run in connection with the Initial National Communication (INC) to the UNFCCC⁶ and the NAPA⁷ suggest that an increase in temperature of up to 3°C and 4°C can be expected by 2100 in the east, and a slightest smaller increase in the coastal and northern regions of the country. Furthermore, IPCC (Intergovernmental Panel on Climate Change) scenarios (SRES A1B scenario as shown in the IPCC 4th assessment report) has projected an increase of mean annual temperature by 1.2 to 3.2°C by the 2060s, and 1.7 to 5.1°C by the 2090s.

8. Likewise, projections of mean annual rainfall averaged over the country, from different models in the ensemble, project a wide range of changes in precipitation for Angola. The projected change range from -27 to +20% by the 2090s, with ensemble median values of -1 to -6%. Projected decreases in rainfall are largely for SON and JJA rainfall. Projections for these seasons are for changes of -65 to +42% in JJA and -43 to +26% in SON. Interestingly the proportion of total rainfall that falls in heavy⁸ events is projected to

²Mendelsohn and Weber (2011). The Cuvelia Basin, Its Water and People in Namibia and Angola. Development Workshop Angola, Luanda.

³C. McSweeney¹, M. New^{1,2} and G. Lizcano¹. 2008. UNDP Climate Change Country Profiles. <http://country-profiles.geog.ox.ac.uk>

⁴'Hot' day or 'hot' night is defined by the temperature exceeded on 10% of days or nights in current climate of that region and season.

⁵The increase in frequency over the 43-year period between 1960 and 2003 is estimated based on the decadal trend quoted in the summary table.

⁶Ministry of Environment. Angola Initial National Communication. (2011) Under the United Nations Framework Convention on Climate Change (UNFCCC). 194 p.

⁷Ministry of Environment. (2011). National Adaptation Programme of Action (NAPA). Under the United Nations Framework Convention on Climate Change (UNFCCC).

⁸A 'Heavy' event is defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in current the climate of that region and season.

increase in all seasons except for JJA, when decreases are indicated. Projections indicate that maximum 1- and 5-day rainfalls may increase in magnitude in DJF and MAM.

9. Such trends and variability will obviously result in changes in the run-off regime of rivers. Decreased precipitation in Angola (particularly in the Upper Cunene where up to 75 % of the flow is generated) will have a marked effect on the entire Cunene Basin⁹. According to one USAID/Southern Africa report¹⁰, the Cuvelai Basin is likely to be more vulnerable to climate disasters (mainly increased flooding) than any other area in the entire SADC region.

10. To compound the Basin's vulnerability to climate disasters, Cunene – the Angolan province falling within much of the Basin – is among the poorest provinces in Angola. The great majority of livelihoods in the Province are subsistence-oriented and dependent on rain-fed agriculture. The current population in the Province is approximately 750,132 inhabitants spread across six municipalities: Kwanhama; Ombadja; Namacunde; Curoca; Cuvelai; and Cahama. The provincial capital (Ondjiva) is located in Kwanhama and thus has the highest population in the province. Most homesteads are built entirely as traditional structures of wood and thatch and the HIV/AIDS rate is among the highest in the country.

11. The Government Institutions of Angola and in particular of the Province of Cunene lack the technical capacity, management capacity, physical and financial resources to overcome or cope with the anticipated climate 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 and financial assistance to adapt to and overcome worsening climatic conditions (NAPA, 2011).

12. From the above, it is seen that the main climate change-induced problem facing the Province of Cunene communities and to be addressed by the project is that climate change is likely to further enhance on one hand, the frequency of severe weather associated with convective activity and extreme rainfall events potentiating the likelihood of frequent flash floods and soil erosion; and on the other hand, the acute rainfall variability and temperature increase leading to extreme and recurrent drought episodes. Such extreme events pose not only serious livelihood and direct health risks but can also affect a potential decrease in the length of the rainy season, waterborne disease vectors in highly detrimental ways.¹¹

1.2. Root causes

13. It is not possible to analyse climate change impacts in Province of Cunene in isolation, and separate them from the country's general development challenges. Likewise, root causes of low adaptive capacity or high vulnerability to climate change are driven by both climatic and non-climatic factors. Therefore, root causes of the problem include natural constraints (such as the intrinsic physical vulnerability), institutional weaknesses that do not support Government development plans (such as limited capacity for hydrometeorological monitoring and Early Warning Service), and structural factors (such as the traditional practice of itinerant agriculture based on dry land cultivation and livestock low productivity methods and limited investment capacities). In synthesis, the following root causes make the manifestations of climate change (predominantly droughts and floods) in the Province of Cunene particularly destructive. These include *inter alia*:

⁹<http://www.kunenerak.org/en/river/climate+and+weather/climate+change/climate+change+in+the+Basin.aspx>

¹⁰Global Climate Change Integration Pilot Proposal. NGO Strengthening for Improved Resilience and Climate Governance in Angola's Cuvelai Basin. Submitted by USAID/Angola on November 4, 2011. 11p

¹¹USAID - Global Climate Change Integration Pilot Proposal (draft)

i) Intrinsic physical and climate vulnerability

14. The geographic and geophysical characteristics of the Province of Cunene, make its communities intrinsically vulnerable to climate and other natural hazards. The Cuvelai Basin in the Province of Cunene is perhaps unique in the world as a drainage system that consists of hundreds of channels that join and separate thousands of times. Most of the channels are dry for much of the year. The flows that do occur vary between slow trickles and massive floods that slowly make their way down the drainage system¹². Climatically, the Cuvelai spans an area between what may be called sub-tropical in the north and semi-arid in the south. Rainfall in the northern-most catchment averages about 900 millimetres per year, just over double the average of 400 millimeters in the extreme south. In the southern half of the Basin, rainfall is higher in the east than in the west, which reflects the effect of prevailing winds that bear moist air from the north-east. The further south in the Basin, the more unpredictable rainfall is, and this is where the most extreme droughts occur.

15. Therefore, the inherent physical characteristics, the geographical location of the Province of Cunene and the large climate features that dominate the environmental conditions of the region are the underlining factors determining the intrinsic physical and climate vulnerability of local communities. The location of the Province of Cunene in the semi-arid *southwest* zone it is affected by its closeness to the Kalahari Desert with low temperatures in the hot season given the great continental tropical air masses as well as the influence of the Benguela cold water current. Additionally, meteorological conditions in Angola and in particular in the Province of Cunene, are also influenced by: i) the El Niño Oscillation¹³; ii) the seasonal movements of the rain-bearing Inter-Tropical Convergence Zone (ITCZ); and iii) the northward flow of the cold Benguela Current off the coast. The ITCZ oscillates between the northern and southern tropics over the course of a year, bringing rain in Angola between October and April of 100-250mm per month. The maritime coastal currents (the Benguela Cold Current and the Gulf of Guinea current) are part of the system that redistributes energy at a global level, and influences changes in climate of the Province of Cunene. Therefore, alterations on the above described large scale climate features are inducing changes in climate, expressed in the Province of Cunene by the projected (NAPA, 2011) variability of temperature and rainfall patterns. Projected increase in temperature will result in drought episodes and will have an impact on cropping patterns and yields, soil moisture retention and disease tolerance as well as on pest control. Likewise, changes in precipitation pattern and hydrology will result on possible flood events and will also affect rainfed agriculture.

ii) Limited capacity of understanding of current and future risks

16. The NAPA indicates that the impact of climate variability and change on all socioeconomic sectors of Angola may seriously compromise the efforts of current economic growth, as well as sustainable development, if adequate and immediate adaptation measures are not taken. Unfortunately, the projections for rainfall, run-off and soil humidity in the future are still very uncertain. There is still not enough information on the possible impacts of climate change in Angola at national or sub-national level but neither is it appropriate to suppose that the climate and hydrological conditions of the past will continue into the future. In every area, it is therefore necessary to have a better understanding of the systems affected by climate change, the vulnerabilities of these systems and to test strategies to reduce these vulnerabilities in the local communities. There is currently insufficient knowledge, scientific research, or data to be able to concretely assess the specific amplitude of impacts expected on water,

¹²Development Workshop Angola. 2012. "Water and climate change risks in Angola's coastal settlements". Proposal Presented to IDRC's Water and Climate Change Programme. Luanda - March 2012

¹³ El Niño is a meteorological phenomenon in the Pacific Ocean that is accompanied by movements of air masses at a global level. El Niño influences the conditions in the Atlantic Ocean, and so the conditions in Angola.

natural systems, soil, forests or coastal zones. Furthermore, there is insufficient data and technical capacity available in climate monitoring to be able to emit legitimate and timely forecasts, early warnings, let alone long-term projections.

iii) Limited capacity for hydrometeorological monitoring and Early Warning Service

17. The National Institute of Meteorology (INAMET) has benefited from limited investment in infrastructure and human resources over the years. As a result, for such a large country, the weather monitoring network is limited and very little functioning meteorological equipment can be found in particular in the Province of Cunene let alone in the Cuvelai Basin. The number of stations went from almost 500 to 20 during the course of 1975. It is only after 2002 that a consistent, though gradual, programme for improved data collection has been put in place¹⁴. In many areas there are gaps of thirty years of meteorological information, which coincides with the period of possible climate change. In addition, staffing levels have dropped significantly from even post conflict levels in 2002 – this is a result of retirement, sickness and abandonment. Therefore, the INAMET does not currently have the capacity to meet all World Meteorological Organisation (WMO) weather monitoring guidelines and is in need of support to be able to minimally monitor the Cunene Province and in particular the Cuvelai Basin where climate variability has been shown to be on increase.

18. Similarly hydrological information is scarce for Angola. Mapping of river basins and collection of information on stream flows developed more slowly than in other countries of the region. The development of an effective system of measurement was interrupted by the lack of staff and conflict from 1975 onwards and it has only been since 2002 that this work has been effectively re-established (DNAAS, 2005). Currently, the capacity of both the Hydromet sector and Meteorology Services is weakened 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. There is no flood forecast or severe weather warning being issued for the Cunene Province and even though hydrometeorological data is scarce, no formal sharing of data and information currently exist between the Meteorology and Hydrology Services.

iv) Traditional practice of dry land cultivation and livestock low productivity methods

19. The total population of the Province of Cunene now amounts to about 1.2 million people of which some 34% live in Angola and the remaining 66% in Namibia. Across the entire Basin, 84% of people reside in rural homes while 16% live in towns. Nevertheless, the population density varies enormously across the rural Cunene with significant areas largely devoid of people (the north-eastern Calemo-Caundo and Eastern Sand Basin drainage zones) mostly owing to the unsuitability of soils for sustainable cropping or the non availability of fresh water. Households are thus clumped into proper villages which are then separated from others by stretches of deep, infertile Kalahari sand that provide only grazing and wildlife and plants to be hunted and gathered. A great percent of the Province of Cunene's population is rural and has subsistence agriculture as their main source of income. Therefore, subsistence and small scale (rain-fed) farming is the predominant feature and this includes both livestock and dryland crop

¹⁴Development Workshop Angola. 2012. "Water and climate change risks in Angola's coastal settlements". Proposal Presented to IDRC's Water and Climate Change Programme. Luanda - March 2012

farming with sorghum and corn as the main cereals. A special feature of this socio-economic organisation brought about by the wettest cycles over tens or hundreds of thousands of years is the traditional practice of nomadism expressed as itinerant agriculture system based on dry land cultivation and livestock movements. Though livestock plays an important role in this system for the livelihoods of the rural population, this transhumance system also leads to a low productivity levels of food crops at local level.

20. The distribution and intensity of rainfall is erratic and water storage capacity is limited. As a result, the Province of Cunene is prone to serious droughts as well as floods. Overall, the situation can be considered as one of water scarcity, primarily due to lack of water storage. The projected climate change induced increase of mean annual temperature by 1.2 to 3.2°C by the 2060s and a reduction of 10-20% in rainfall by 2045-2065 over the Angolan catchments of the Zambezi, Kavango, Cuvelai and Kunene rivers is expected to lead to a reduction in runoff and drainage in these river systems by +/- 25%. Considering that livestock plays a central role in the communities' livelihoods, the likely increase in temperature will exceed the heat stress threshold for some popular indigenous livestock breeds such as Nguni, which, being smaller animals, require lower maintenance, more easily met by the available rangelands compared to European and other less adapted breeds. Under climate change, with a projected decrease in rainfall, some areas may experience reductions in perennial drainage and generalised water scarcity. Crop yields are already low, mainly caused by the resource-poor and high-risk farming environment and the lack of access to appropriate production technologies and farm inputs. Therefore, climate change impacts will further enhance the vulnerability of the Province of Cunene and in particular of the Cuvelai Basin's communities.

v) Poverty levels amongst rural communities of the Province of Cunene

21. Though the oil based Angolan economy has been performing impressively well in recent times, economic growth has however yet to make a significant impact on poverty and youth development, which remain critical issues in the country. Angola's ranking in the Human Development Index (HDI) deteriorated in 2012 (148th in the overall ranking, compared 146th in 2010). According to recent estimates (2013 Human Development Report), 54.3% of the population lives on less than USD 1.25 per day. The *Inquérito Integrado Sobre o Bem Estar da População* (IBEP) recently estimated that the proportion of the rural population living below the national poverty line is 58% (compared to 19% in urban areas). With around 46% of the population under 18, and the country's population set to grow from about 19 million today to 24.5 million in 2020, Angola will face significant demographic challenges in the near future. Life expectancy at birth has slightly increased to 51.5 years¹⁵.

22. At provincial level, these statistics are even more depressing and such is the case of the Cunene Province where about 74% of the rural population drinks entirely untreated water and more than 80% of the population does not have access to improved sanitation facilities¹⁶. Therefore, poverty prevents rural Cunene communities from investing in appropriate adaptation practices and infrastructure (such as rainwater harvesting, drilling new boreholes, and drip irrigation technologies) in order to cope with expected climate change impacts. As a result, a large number of rural households suffer from food insecurity and are reliant on food aid. This inherently low capacity to adapt, increases the vulnerability of the Cunene Province communities to climate change.

1.2.1 The problem this project seeks to address

¹⁵Instituto Nacional de Estatística (2011). Inquérito Integrado sobre o Bem-Estar da População (IBEP).

¹⁶Instituto Nacional de Estatística (2011). Inquérito Integrado sobre o Bem-Estar da População (IBEP).

23. The main problem facing the country today and in particular the Cuvelai Basin in Cunene Province is its high vulnerability to climate change together with its low capacity to address and adapt to this phenomenon. Relief and rehabilitation (*reactive actions*) have been the focus of climate and disaster management in Cunene Province. Therefore, the fundamental problem that this project seeks to address is that a comprehensive flood forecast and early warning system (FFEWS) – including downscaled seasonal forecast delivery for flood and drought events, climate monitoring and data management system - which generates knowledge of the risks (vulnerability & hazard) and has the capacity to monitor, analyze and forecast hazards, provides communication and dissemination of alerts and warnings, does not function in Cunene Province as well as it ought to be relevant and useful for long-term planning, management and risk reduction activities. In the Province of Cunene and in particular the Cuvelai Basin, this status unnecessarily imperils lives and assets, particularly amongst communities dedicated to livestock-raising, principally cattle and small scale rain-fed farmers suffering the impacts of flash floods and extreme drought episodes.

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

24. It is therefore expected that as climate change unfolds, the frequency and intensity of climate related shocks such as floods and droughts will change. One way to help mitigate the impact of these climate-related shocks is to warn vulnerable sector of the population, businesses and government departments in advance of an impending or likely damaging event. For that reason, establishing Early Warning Systems (EWSs) is one way to adapt to a changing climate so to be able to accurately predict impending hazards on communities and society as a whole and avoid loss of lives and unnecessary pressure on communities and infrastructure. As an adaptive measure, EWS will allow the monitoring and implementation of anticipatory measures to reduce climate change risks on those sectors, ultimately benefiting the poorest segments of society, those who do not necessarily benefit from large protective infrastructure projects¹⁷. Furthermore, improving the EWS also provides benefits for long term planning and helps Hydrological, Meteorological and other institutions build capacity to service other needs for example by providing long-term datasets for monitoring and trend detection.

25. To augment the capacity of the Cunene Province to manage severe weather-related disasters, ensure food security and agricultural production and make their socioeconomic development process less vulnerable to climate-related risks it is essential that:

i. The hydro-meteorological monitoring network and forecasting capacity to support Early Warning System at Provincial level is improved

26. The lack of meteorological and hydrological monitoring stations in Angola has meant that many populations vulnerable to climate hazards – such as those in the Cunene Province – are currently not monitored e.g. drought conditions (rainfall) are not monitored for important agricultural lands, intense rainfall is not monitored in areas prone to landslides and flooding, and rapid rises in rivers as a precursor to flooding goes unnoticed. In the preferred solution, the strengthening of the monitoring capacity of hydro-meteorological services to adequately monitor hydrological data and information as well as weather data will be achieved by installing more hydromet and weather stations to increase the coverage of the network in particular the Cunene Province. 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 Ondjiva Meteorological Center at the Airport and also at INAMET in Luanda. These actions should be supported by a capacity development programme for INAMET staff in particular at Cunene Province, to

¹⁷World Bank (2010). Natural hazards, Unnatural disasters: Effective prevention through an economic lens. World Bank and United Nations. 231 pp.

allow data handling and analyzes that can enable development of flood and drought forecast in a timely manner; and providing ancillary forecasting equipment to INAMET (e.g satellite based systems such as SADIS¹⁸, SYNERGIE¹⁹) to aid early identification of convective weather systems so to increase the accuracy of forecasts and warnings being delivered for the Cunene Province.

27. In the preferred solution, gauging stations that transmit information on flow levels on a regular basis would be required on both the Cuvelai and Miu rivers to guarantee adequately forecast flood occurrence. Similarly, other gauging stations are required on some of the major *iishana* and the gauging stations should be equipped with rainfall recorders to alert observers to local storms. These gauging stations would augment what has been established on the Namibian side.²⁰ Also essential to disaster planning and prevention in the face of a changing climate is the provisioning of appropriately scaled climate projections. It is now common practice to utilize satellite imagery as a useful tool for monitoring areas where meteorological and hydrological monitoring stations do not exist and aspects of the environment useful for assessing current risks e.g. vegetation monitoring helps assess crop performance and images of floods help understand which areas are more at risk. Additionally, satellite data may be used to predict rainfall or monitor severe weather. All of these systems are urgently needed in Angola and particularly in the Basin, as reflected in NAPA priority areas #7, #13 and #15.

ii. The existing dissemination/response system in the Cunene Province is strengthened

32. In the preferred long term solution a set of concerted actions should be adopted to develop to a more effective, efficient and targeted delivery of climate information including early warnings on extreme weather events and flash floods: i) enhancement of the capacity of INAMET and the National Institute of Hydrologic Resources (INARH) to store and handle weather and hydrological information that would be collected by the future monitoring networks and transmitted to the forecasting centers in Luanda; ii) strengthening of the capacity of INAMET at national level to analyze the data and generate accurate forecast to be transmitted to those entities (SNPCB) with mandate to issue warnings; iii) develop a communication and institutional framework for warning dissemination to end users including vulnerable communities; and iv) boost the technical capacity of the Ministry of Environment (MINAMB) 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 Agriculture, Tourism and Land Use and Planning.

33. The long term solution would imply that once the weather monitoring network is in place and all meteorological and hydrological information is available to produce accurate weather and flood forecasts, a structure would be set in place at provincial level with a legal and clear mandate to analyse the warnings and integrate local specific information before issuing the warnings. The institutional Framework that currently exists (*Comissão Nacional de Gestão de Riscos*) at provincial level, would be strengthen so that warnings being issued at national levels can be appropriately packaged for translation into information that can be easily understood by users in the various sectors with need to take preventive actions. Dissemination of warning would be carried out to reach a wider audience possible in particular the dispersed communities in the Province of Cunene. Therefore, the aim is to create/strengthen an official process for generating warnings at provincial level that include communication between sectoral

¹⁸SADIS 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. One of the products received by SADIS is upper air wind /temperature, tropopause and maximum wind forecast in GRIB code, which supports Early Warning development.

¹⁹EUMETSAT-Satellite imagery (PUMA off spring e-station) via AMESD (African Monitoring of the Environment for Sustainable Development) e-station.

²⁰ Mendelsohn and Weber (2011)

ministries represented in the Province of Cunene with communities where disasters are expected or experienced. Similarly, the response capability of SNPCB should be strengthened to rapidly assist those in danger or in need of protection and help.

iii. Local capacity is strengthened to successfully respond to the climate change risks affecting water resources and agricultural production

34. The preferred solution would see an urgent need to determine what areas of the Province of Cunene are most vulnerable to flooding and analyze the density and distribution of people (particularly farmers) and their socio-economic vulnerability and livelihoods. It is clear from some studies that most rural households in the Angolan part of the Basin rely much more on subsistence crops than the majority of rural homes in Namibia, where non-farming sources of income are most important.²¹ However an identification of those communities has not yet been done. Moreover the Provincial Government also requires the creation of a registry to track which persons have received DRR assistance or livelihoods support so that there is no duplication of assistance and the resources are targeted towards the most vulnerable target populations.

35. A second pressing need that should be considered under the long term solution is the dissemination and uptake of locally-specific, climate-resilient, open pollinated varieties of drought- and flood-resistant seeds (particularly for sorghum and food crops) that are suited to ecological conditions in the Basin which has been already identified and collected by the Angola National Plant Genetic Resources Centre (CNRF) in Luanda. The LDCF-funded project should support the characterization of these drought resistant seed varieties. Subsequently, dissemination of these adapted seeds will be carried out in collaboration with the Provincial Government, through its Extension Services (EDAs – *Estação de Desenvolvimento Agrário*) and selected farmer's fields so to enhance the resilience capacity of local vulnerable communities. In addition, establishment and dissemination of short-term seasonal climate forecasts as part of the early warning system would support climate-resilient seed dissemination in the Basin and extension outreach. These forecasts will support farmers' decision making process in specific farming operations such as planting, harvesting and husbandry decisions. Currently, the Southern Africa Regional Climate Outlook Forum (SARCOF) make these forecast available at a coarse scale requiring however a downscaling process to country and provincial specific conditions (as part of the early warning system) and then efficiently communicated to farmers in a useful and understandable form using appropriate mediums such as Short Message System²² ("sms") messaging and radio.

36. The preferred solution would also see local capacity strengthened to effectively respond to and manage the climate change risks threatening water resources, agricultural production and livelihoods. Communities will therefore be equipped with the knowledge and appropriate infrastructure associated with innovative climate change adaptation responses, based on technologies to improve water access and quality that mitigate climate change risks. These pilot intervention should be developed through partnerships with Provincial Government of Cunene(e.g. rainwater harvesting, opening/rehabilitation of water reservoirs "*Chimpacas*", conservation measures, water harvesting, opening or remedial work on existing boreholes).

²¹Ibid

²²FrontlineSMS 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

Barriers

1. Limited knowledge and capacity to fully assess risks posed by climate change to disaster risks in Angolan's Cuvelai River Basin

37. At present, information related to the likely impacts of climate change on Province of Cunene communities' vulnerability and risks is insufficient to allow for adaptive planning and management. Additionally, at national level, Angola does not have yet a clear policy on how to manage impacts of climate change within the water sector. As the NAPA notes, one of the challenges to implementing any NAPA priority in Angola is the "scarcity of human resources with the skills to translate the strategies into actions at a community level where the impacts of climate change are evident." The overall level of knowledge of climate change adaptation and climate-resilient development practices in the Province of Cunene, let alone in the Cuvelai Basin, remains very low. Investments in a comprehensive Flood Forecast and Early Warning System (FFEWS), micro-seasonal forecasts and drought-resistant seed varieties will only be effective if the knowledge base of all stakeholders as regards climate change impacts is increased.

This knowledge capacity should be concentrated in adequately equipping Staff within MINAMB with GIS based tools and training to be able to assess risks and vulnerabilities and update both the Cunene Infrastructure Master Plan and the Emergency Disaster Plan. In addition, Civil Protection officials in Province require training on climate change impacts and adaptation measures and awareness raising campaigns about climate change impacts on watershed resources and on human activities are needed at the village level.

2. Lack of capacity of the extension network to enhance responsiveness and adaptability of subsistence agriculture in the Cuvelai Basin

38. It is clear that in the Province of Cunene, the climate change impact is already beginning to exacerbate existing food insecurity and substantial work and support should be dedicated to the vulnerable communities to ensure crop productivity in the long-term, despite increasing climatic variability, which without adequate adaptation measures, may reduce the already relatively low production. Though the Ministry of Agriculture, through the Institute of Agricultural Development (*Instituto de Desenvolvimento Agrário- IDA*), has a network of Extension Services (*Estações de Desenvolvimento Agrário-EDA's*) which is active in parts of the Province of Cunene supporting the rural communities, the Ministry of Agriculture is reconstructing itself and its restricted budget has a very limited capacity for outreach. Above all, rural agricultural extension agents in the Province have very little knowledge of resilient farming methods (plant density, drought resistant varieties of local crops, suitable seed provision, mulch application, etc.), and low-cost water conservation/irrigation technologies in areas prone to diminishing or highly variable rainfall during crop growing season; and this handicap need to be addressed if the current situation is to be improved.

3. Poor intersectorial coordination and weak policy framework to respond to change risks

39. In Angola as in any other large territorial country there is largely a weak institutional arrangements, absence of policy and legal frameworks to guide the provision of climate change risk and vulnerability information, and limited appreciation and use of climate information by other sectors of the economy. The Ministry of Environment (MINAMB) is responsible for the coordination of environmental issues. At present, inter-sectoral coordination between sub-sectors is poor particularly at Provincial level. This

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 or be expressed as adaptive measure or warnings for vulnerable sectors/communities. Furthermore, this results in limited agreements on official processes for sharing climate information and issuing warnings.

1.4. Stakeholder baseline analysis

40. The preparation of this NAPA follow-up project was guided by a comprehensive and extensive participatory process involving all stakeholders, including local communities, 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. Therefore, during the consultation process from May 2013 to March 2014, over 220 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 was undertaken by running two workshops during Inception phase and one national workshop for Validation of Project Document, as well as a series of bilateral meetings with GoA and International Institutions, site visits and interviews to community Members and NGO's and CBO's (Annex 2).

41. The importance of strong engagement by NGOs, community-based organizations and communities in the project was flagged at the first stakeholder consultation workshop (carried out both at National level in the capital Luanda and Provincial level in Ondjiva, the capital of the Province of Cunene, where the Cuvelai Basin is located) including the need to ensure that future consultations capture the full range of perspectives, including those of minorities, less vocal groups and village residents who may not have been present at the time of the consultation. The importance of gender equity and other gender aspects was emphasized throughout the consultation process and later during site visits in November 2013.

42. The project preparation phase (PPG) (May 2013 to March 2014) included a series of bilateral meetings between members of the PPG Team and representatives and resource persons from other projects, GoA agencies, NGOs and other organizations including main Universities. These bilateral meetings targeted key Angolan Government Institutions, International Agencies and donor community in Angola and those representation offices in the Province of Cunene, Non-Government Organizations and the private sector which some of these are listed in Annex 2.

Key Angolan Government Institutions:

43. The implementation of this LDCF-funded project on "Climate-resilient development and enhanced adaptive capacity to withstand disaster risks in Angolan's Cuvelai River Basin" will involve specific GoA institutions besides the Ministry of Environment (MINAMB) the leader of the project. The hydrological component in Angola is within the Ministry of Energy and Water (hereinafter called the MINEA) is the Ministerial Department Advising the President of the Republic, on the design, conduction, execution, and control the policy of the Government in the areas of energy and water. The National Institute of Water Resources (*Instituto Nacional de Recursos Hídricos*, INARH) has amongst many responsibilities the preparation of the national policy on water resources as well as ensuring the implementation, monitoring and follow-up of water resources planning, project development, and enhancement of efficient use of water resources.

44. The Ministry of Agriculture (*Ministério da Agricultura*-MINADER) has the mandate to develop and implement forestry and agricultural policy. Two statutory institutions, the Instituto de Desenvolvimento

Agrário (IDA) and The Office for Food Security (*Gabinete de Segurança Alimentar*, GSA) fall under the administrative umbrella of MINADER. The IDA is responsible for defining and implementing extension services to support small farmers and is under the supervision of MINADER and they have a provincial representation and several Agrarian Development Stations at local level (*Estações de Desenvolvimento Agrário-EDA's*) making the connection between the IDA's and the small scale farmers. Amongst other duties the GSA is responsible for Agrometeorological monitoring the climate situation and early warning for food security. It also deals with assembly of equipment, training and monitoring climate regions agroforestry, evaluation of national food security situation, including at provincial level and Vulnerability Assessment and adaptation measures.

45. The national institution with mandate for monitoring the weather and climate is the National Institute of Meteorology (*Instituto Nacional de Meteorologia*, INAMET). This is also a research organization and provides scientific services in the fields of meteorology and geophysics under the Ministry of Telecommunications and Information Technologies (MTTI). Among other duties the INAMET ensures the functioning of the network of automatic stations and conventional observations of atmospheric parameters, carrying data storage, processing and dissemination. INAMET is represented across the country through its provincial departments.

46. The Civil Protection Services of Angola are twined with the Fire Brigade and known as National Civil Protection Services and Fire Brigade (*Serviço Nacional de Protecção Civil e Bombeiros*, SNPCB). Amongst other duties they are responsible for coordination and control in the areas of prevention of risks arising from possible accidents, natural or technological disasters and the duty of mitigate the collective risks, as well as limit its effects. SNPCB is supervised by the Ministry of the Interior (MININT) subject to the powers of the Angolan State and represented at national, provincial and municipal level.

47. National Plant Genetic Resource Centre (*Centro Nacional de Recursos Fitogenéticos*, NCRF) The NCRF is an infrastructure of research and development at Agostinho Neto University, established as a centre for characterization, conservation, research and utilization of plant genetic resources, and staff training at undergraduate and postgraduate in the field of plant genetic resources.

48. Ministry of Planning and Territorial Development (*Ministério do Planeamento e Desenvolvimento Territorial*, MINPLAN) is responsible for ensuring that sectoral strategies and programs developed for the areas of project implementation, are fully in tune with other sectoral policies, programs and strategies. Will integrate budgets projected in the broader macroeconomic program for the country.

Provincial Government:

49. The central government administers the country through 18 provinces (each with a provincial Governor), 173 municipalities and 618 communes. The communes - made up of neighbourhoods (*barrios*) and villages (*povoações*) - represent a sub-division of municipalities consisting of administrative bodies that have been decentralized from the central government in their respective areas. The central government appoints all sub-national governments. The *Conselhos de Auscultação e Concertação Social* (CACS) are oversight committees at the Provincial and Municipal levels, responsible for supporting the respective government administrations in the decision-making process for economic and social policy in that jurisdiction. Traditional leaders are generally called *Sobas*, although the name varies regionally. The *Sobas* are the undoubted leaders of their village, and act as a bridge between the community at a village level and government. A *Soba Grande* is appointed, or inherits the position by lineage, to lead the *Sobas* within a commune. The Government of the Province of Cunene is made up all GoA Ministries and Institutions representation at provincial and local level.

International Agencies and donor community in Angola

50. United Nations (UNDP, UNICEF, FAO, IFAD) agencies, multilateral and bilateral donors including the World Bank, EC, USAID and others maintain an active presence in Angola and play influential roles in determining national priorities and mechanisms for their implementation in Angola's post war reconstruction. The issue of resilience, climate change and food security, flood and drought vulnerability particularly Early Warning Systems (EWS) 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 such as those of Province of Cunene and infrastructure. Therefore these donors' institutions have been contacted to ascertain the current activities they are undertaking and how they may be built on through this LDCF-funded project.

Non-Government Organizations

51. Although there has been a modest increase in the number of environmental NGOs and CBO's in the last decade, their role has been limited, given the cumbersome enabling legal framework. The registration process under the Law of Associations (14/91) is very complex, lengthy, and expensive, making it discouraging for NGOs and CBO's to register. Key and relevant environmental NGOs include:

52. ***Development Workshop Angola (DW)*** is a non-profit organisation working to improve settlements and livelihoods of the poor in less-developed communities. With offices in Luanda, Huambo, Cabinda, and Lunda Norte, they have worked in Angola since 1981, initially at the national government's request to assist with self-help housing. DW has worked for many years of conflict through a protracted and complex humanitarian crisis in Angola. They continue to have one of the strongest NGO presences in Angola and currently manages a large number of successful projects in the following sectors: Water and Sanitation, Participative Planning, Micro-finance, Shelter, adaptation to climate change, Peace building and Citizenship, Decentralisation, Monitoring, Research & Strategy, and Land Tenure. They focus on building up local capacities and searched for sustainable solutions even within the emergency environment.

53. ***World Learning (WL)*** currently implements the USAID/Angola NGO Strengthening Programme, a five-year, \$43 million cross-cutting programme that builds domestic NGO capacity through health service delivery, advocacy and other activities. WL is the thought center for civil society promotion in Angola. The organization maintains an extensive database of 302 Angolan NGOs and recently released a comprehensive report on the state of NGOs in Angola. WL has extensive grants administration experience in Angola and globally. WL has developed processes, procedures, and manuals which allow it to quickly issue competitive sub-grants and effectively oversee their administration. WL will utilize its current database of 302 Angolan NGOs to identify those working in the Province of Cunene when distributing calls for concept papers.

Private Sector

54. The development of a project on "Climate-resilient development and enhanced adaptive capacity to withstand disaster risks in Angolan's Cuvelai River Basin" 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, particularly floods and droughts. At national level, the state owned oil company Sonangol is the most likely sectors to contribute substantially to the programme. At provincial level, the most likely partner and contributor to this LDCF-project is the

private owned “DAR – Angola” already working in supporting local Government in lessen the impact of extreme flood events by building hard infrastructure for flood water retential with walls around the provincial capital Ondjiva. Also, DAR-Angola has been developing the Cuvelai Basin Master Plan through MINEA funds, which will be a key document for the implementation of the project.

II. STRATEGY

2.1. Project rationale and policy conformity

55. The Government of Angola (GoA) has requested the Least Developed Countries Fund (LDCF) to support this Full-Sized Project (FSP) in order to implement Angola’s NAPA priority interventions n°7: “Create an early warning system for flooding and storms” and n°13: “Climate monitoring and data management system”. The LDCF project will therefore contribute to overcoming the above-identified barriers by strengthening climate monitoring and early warning systems in Angola at national and at Provincial level, largely through improving national and provincial 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 clean technology, infrastructure and skills to hydro-meteorological services (INAMET and INARH), user-agencies (MINAMB, SNPCB and MINADER) and end-users (local communities) in the country, particularly at local level in the Province of Cunene.

56. It will achieve this through the following Components:

1. *Enhanced capacity of national and local hydro-meteorological services, civil authorities and environmental institutions to monitor extreme weather and climate change in the Province of Cunene;*
2. *Increased resilience of smallholder farmer communities in the Province of Cunene to climate-induced risks and variabilities via access to locally-appropriate climate data and germplasm resources;*
3. *Local institutional capacities for better coordinated, climate-resilient planning strengthened and Capacity for effective community-based climate change adaptation (including traditional knowledge practices) improved at local level.*

57. The Project sets clear priorities for the development of complementary activities such as: i) developing the capacity for generating climate change risk analysis and mainstreaming it into policies, investment plans and sector budgets; iii) developing capacity building of the hydro-meteorological institutions; ii) strengthening the capacity of the national disaster management structure to disseminate and respond to warnings at national, sub-national e local level; and iv) strengthening the intrinsic resilience of the Province of Cunene communities through the provision of locally-appropriate farming, water resources and livelihoods options.

58. The project is well timed to strengthen and support the further roll-out of GoA and donor activities under the “Angola 2025: Long-Term Strategy” (*Estratégia de Longo Prazo*)²³ and the *Plano Nacional de Desenvolvimento* (PND) 2013-2017. The proposed LDCF project’s focus on Flood Forecasting and Early Warning System (FFEWS) as a tool for climate change adaptation as well as a developmental instrument is consistent with these plans and processes and will contribute knowledge to them.

²³ Angola 2025. Angola um País com Futuro. ESTRATÉGIA DE DESENVOLVIMENTO A LONGO PRAZO PARA ANGOLA (2025)

59. The link between this project strategy and the NAPA is also centred on a common goal of informing climate resilient development planning and sector management through improved national systems that generate relevant climate information. This project would build not only the capacity of the Angolan National Institute of Meteorological, in order to enable it to properly monitor weather systems and climate; and in particular to be in a position to provide a Flood Forecasting and Early Warning System (FFEWS), but also will further strengthen the objectives of the National Plan for Preparation, Contingencies, Response and Recovery from Calamities and Natural Disasters (2009 – 2014), approved by Presidential Decree no. 205/10 of 21 September, in particular which concerns the scenarios set for: 1. Floods and mudslides that may be: Localised — activating the Provincial Plan; and 2. Drought: Activation of provincial or national plans depending on the magnitude of the phenomenon.

60. In addition to the National Plan for Preparation, Contingencies, Response and Recovery from Calamities and Natural Disasters, the project is in line with a range of other development and national resources management policies in Angola, which directly or indirectly promote the greater integration of climate change aspects into resources management, development planning (e.g. the PND; Agriculture Sector Policy, National Environmental Management Program(NEMP, 2009), etc.) and in particular the National Strategy for Food and Nutritional Security and its Plan of Action, approved by Resolution 130/09 of 29 December which recognises the right to food as fundamental, and aims to create conditions to guarantee that every Angolan citizen has lasting food security, reducing the level of inequality in income distribution and structurally reducing extreme poverty.

LDCF conformity

61. The Republic of Angola signed the UNFCCC in 1992, ratified in 2000, and is classified among the non-Annex 1 parties. It also ratified the Kyoto Protocol in 2007, thus pledging political and practical commitment in the direction of sustainable development, while creating conditions to benefit from opportunities in this framework. Thus, Angola has developed and submitted its NAPA in 2011 and is entitled to benefit from the LDCF funds for the implementation of priority measures identified in its NAPA. Furthermore, Angola's NAPA top priorities comply with the LDCF eligibility criteria.

62. The Angolan NAPA (2011) identified 15 'top priority' adaptation actions for Angola. This project specifically focuses on support for NAPA priority adaptation action n° 7: "Create an early warning system for flooding and storms" and n°13: "Climate monitoring and data management system". These two NAPA priorities are intricately linked (and have therefore been bundled together for the purpose of this project) since establishment of a comprehensive flood forecast early warning systems (FFEWS) – including downscaled seasonal forecast delivery systems – is one key component of a more broad-based climate monitoring and data management system, which also includes climate information dissemination and capacity-building.

63. In addition, of the country's number 7 and 13 priority interventions, the NAPA clearly identifies a further priority adaptation response n° 15 on *Increase water availability through village-level wells and boreholes*". Therefore, from the listed 15 urgent and immediate adaptation needs three were identified (Table 1) as related to the theme of this project. However, this project is not associated with any one particular sector and is expected to be relevant to multiple sectors, including food/agriculture, water management, health and infrastructure.

Table 1. Angola NAPA related priority Rank and activities

64. This project is fully in line with LDCF/SCCF focal area Objective 2: to “increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level” and Objective 3: to “Promote transfer and adoption of adaptation technology”. In addition, 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.

Country drivenness and undertaking a participatory approach:

65. Activities to be undertaken by the project were selected through numerous stakeholder consultations of the PPG (see Section 1.4 Stakeholder baseline analysis for details) and thus are in line with country priorities. See Section 2.1.2 for information on country drivenness. Additionally, the project is in line with GEF/LDCF (2006) as this project was identified and conceived through the participatory NAPA process in Angola. Moreover, it was designed to be consistent with, and supportive of, national development strategies, as expressed in the Vision for “Angola 2025: Long-Term Strategy” (*Estratégia de Longo Prazo*), PND 2013-2017 and related documents.

Implement NAPA priorities:

66. The project addresses the urgent and immediate activities identified in the NAPA, in particular the project will specifically address NAPA adaptation priorities 7 and 13 and is in line with other NAPA priority adaptation response (15) as well as sectors identified in GEF/LDCF (2006) on a global basis. Notably, this project focuses on urgently needed adaptive capacities in disaster risk reduction.

Supporting a “learning-by-doing” approach:

67. The project will use the applied interventions to demonstrate how properly package early warning messages to help rural communities and other stakeholders living in vulnerable areas of the Cunene Province and specifically in the Cuvelai River Basin to better prepare for and adapt to extreme climate change events. In addition the project will use, synthesized lessons learned for replication elsewhere with the ultimate goal of improving Flood Forecasting and Early Warning System (FFEWS) performance and Civil Protection responses as tools for climate change adaptation as well as a developmental instrument. 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 the existing systems in place.

<u>Multi-</u>	NAPA Priority Rank	Activity
	7	Create an early warning system for flooding and storms
	13	Climate monitoring and data management system
	15	Increase water availability through village-level wells and boreholes

disciplinary approach:

68. The project includes three main components and within each, the project will undertake a number of activities (see Project Objective, Outcomes and Outputs/activities Section 2.4) to ensure a multi-sector approach to building capacity for adaptation while reducing disaster risk to climate change impacts.

Gender equality:

69. Project's outcomes will contribute to an understanding of how adaptation responses can be designed to strengthen gender equality. To achieve this, the project will use a gender-sensitive approach during the implementation of all activities, ensuring the application of a gender balance policy on the selection of direct beneficiaries. It will be monitored along the implementation and duly reported.

Complementary approach:

70. 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 Angola (see Section 2.3 for details).

Overall GEF Conformity

71. 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 Flood Forecasting and Early Warning System (FFEWS) will generate approaches, tools and methods that can be addressed elsewhere in Angola and finally lead to the establishment of a fully functional national approach. See section on replicability below for more details;
- Stakeholder involvement: The project was designed in a participatory manner to ensure significant stakeholder inputs, and will be implemented in a way to ensure their full participation in all implementation aspects including monitoring and evaluation.

2.2 Country ownership: country eligibility and country drivenness

72. The Government of Angola has ratified the UNFCCC and is classified among the non-Annex 1 parties. These countries have also developed and submitted their National Adaptation Plans of Action (NAPA) and are entitled to benefit from the LDC Fund for the implementation of priority measures identified in their respective NAPAs. In 01 December 2011 the Angolan Government officially presented the NAPA which was developed according to the guidelines set out in decision 28/CP.7 of the United Nations Framework Convention on Climate Change regarding the annotated guidelines for the creation of the National Adaptation Programmes of Action for the Least Developed Countries. In implementing priority interventions identified in the NAPAs, the project is consistent with the Conference of Parties (COP-9) and satisfies criteria outlined in UNFCCC Decision 7/CP.7 and GEF/C.28/18. In addition to supporting NAPA priorities, the project is in line with a number of other government plans and projects as outlined in Section 2.3.

Linkages with CPAP, MDG, CAS and UNDAF

73. The UNDP Angola Environment Programme is positioned within existing frameworks of the UN system, such as its Millennium Development Goals (MDGs), Multilateral Environmental Agreements (MEAs), and the legislative instruments of the Government of Angola. It responds to the priorities identified from analyses undertaken over the past decade in Angola, and in particular, to the UNDP Strategic Plan (SP) for 2014– 2017 and the National Programme for Environmental Management (*Programa Nacional de Gestão Ambiental - PNGA*) of the Ministry of Environment.

74. Two key strategy documents provide a chapeau for the project's fit within the UN and UNDP's Programmes in Angola: the United Nations Development Assistance Framework (UNDAF) and the UNDP Strategic Plan (SP). The UNDP Angola SP (2014-2017) underpins the Angolan national vision of "sustainable human and economic development and strengthened national cohesion and democracy".

75. UNDP Strategic Plan Outcome 5 states: "Countries are able to reduce the likelihood of conflict and lower the risk of natural disasters, including from climate change". Therefore, this project will make a key contribution to UNDP's Strategic Plan Outcome #5 and specifically the Output 5.4 "Preparedness systems in place to effectively address the consequences of and response to natural hazards" (e.g. "geo-physical and climate related and man-made crisis at all levels of government and community"), under which a concerted UN approach is geared to provide a framework for national and decentralized institutions, strengthened preparedness systems for a responsive disaster and climate risk management is integrated in the development planning and budgetary frameworks of key sectors (e.g. water, agriculture, health and education), integrated rural development, ensuring food security with due consideration for environmental protection, natural resource management and adaptation to climate change.

Country eligibility

76. Countries such as Angola that have ratified the UNFCCC, and are classified among the non-Annex 1 parties once they have developed and submitted their National Adaptation Plans of Action (NAPA) are entitled to benefit from the LDC Fund for the implementation of priority measures identified in their respective NAPAs. 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).

77. This project fully reflects the priority measures identified by Angola'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 Angola. The LDCF project, which will address the top 2 NAPA priorities (Table 1) and was designed specifically to meet the objectives of Priority Activity 7 of the NAPA ("Create an Early Warning System for Flooding and Storms"). 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.

Country drivenness

78. The NAPA follow-up project significantly contributes to sustainable development in Angola particularly to the Cunene Province; 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.

79. Angola 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 Angola 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 Angola which are relevant to the project, are outlined below:

80. **The National Strategy for food and nutritional security and its Plan of Action**, approved by Resolution 130/09 of 29 December, recognizes the right to food as fundamental and aims to create conditions to guarantee that every Angolan citizen has lasting food security, reducing the level of inequality in income distribution and structurally reducing extreme poverty. This project seeks to directly address issues of food insecurity caused by climate change in a targeted region by increasing the resilience of smallholder farmer communities in the Province of Cunene to climate-induced risks and variability via access to locally-appropriate climate data and germplasm resources.

81. **The National Plan for Preparation, Contingencies, Response and Recovery from Calamities and Natural Disasters 2009 - 2014**, approved by Presidential Decree no. 205/10 of 21 September. The general objective of the National Plan for Preparation, Contingencies and Response is to define the lines of authority that guide a suitable and concerted response to a natural disaster and the conditions and essential means to minimize the adverse effects of a serious accident or catastrophe that affects the Angolan population. The Plan sets out scenarios for 1. Floods and mudslides that may be: Localized — activating the Provincial Plan; Medium — activating the National Plan; Exceptional — Activating the National Plan, with a declaration of a state of emergency and a request for international health; 2. Drought: Activation of provincial or national plans depending on the magnitude of the phenomenon.

82. **The Emergency Action Plan or Contingency Plan for Cunene Province**. More specifically, this project directly supports (and has been specifically defined in relation to) the *Plano de Contingência* for the Province of Cunene (Emergency Action Plan or Contingency Plan for Cunene Province) which has as its objectives to: 1) increase the operational and functional capacity of Civil Protection Authorities to prepare for and respond to floods, droughts and natural disasters; 2) mobilize adequate resources to allow for timely and effective responses to floods, droughts and natural calamities at the provincial level; and 3) increase the awareness of the province's inhabitants to such threats and increase cooperation among different organs of government to response to such threats.²⁴ The project has also been informed by several technical studies done by the Technical Committee for Infrastructure for the Province of Cunene.²⁵

83. **The Angolan Water Act**, 6 of 2002, establishes the State as the custodian of the country's water resources and prioritizes the use of water resources within the boundaries of Angola. As custodian, the State is responsible for administering the water user rights system. The Act also acknowledges the rights of the individual and entities to water. Furthermore, the themes of Integrated Water Resource Management (IWRM), institutional co-ordination and community participation are highly encouraged. The Act encourages the development of new administrative policies in the water sector, as well as a decentralized system of control. This project supports the procurement and installation or rehabilitation of various hydrometric stations (as well as strengthening hydrological monitoring capacity among Provincial authorities) in the Province of Cunene which is in line with the Act and established IWRM principles more generally.

²⁴REPÚBLICA DE ANGOLA MINISTÉRIO DO INTERIOR, DELEGAÇÃO PROVINCIAL DO CUNENE COMANDO DO SERVIÇO DE PROTECÇÃO CIVIL E BOMBEIROS, Plano de Contingência, 2011/2012

²⁵Several external consultants were involved in the studies, including Vladimir Russo, Engº Fernando Pacheco and Dr. Pedro da Fundação Kissama

84. **The National Environmental Management Programme (NEMP) / Programa Nacional de Gestão Ambiental (PNGA)**. The post-war process of national reconstruction has placed increased emphasis on the process of sustainable development through environmental best practice as an essential determinant of achieving human development and well-being. The commitment of government towards this goal is expressed in the National Environmental Management Programme (NEMP) / *Programa Nacional de Gestão Ambiental* (PNGA), which, in conformity with the *Lei de Bases do Ambiente*, is a key vehicle for achieving environmental protection and sustainable use goals.

85. **The Environmental Framework Law-EFL** (*Lei de Bases do Ambiente*), Law 5/98 of 19 June 1998 is the overarching instrument for the implementation of the environmental provisions in the Constitution. The EFL provides the framework for all legislation and regulations in Angola. It facilitates the protection, preservation and conservation of the environment; promotes the quality of life; and the sustainable use of natural resources.

86. **The Decree on Environmental Impact Assessment** (*Decreto sobre Avaliação de Impacte Ambiental*) No. 51/2004 of 23 July is to ensure better environmental protection, particularly of human activities likely to have an impact on the environment (e.g. mining, civil construction, exploration of natural resources, etc.).

87. **The Local Administration Law 17/10**. Since 2007 the Government of Angola has adopted a series of strategy, policy and legal frameworks aimed at strengthening local governance systems. This Local Administration Law clarifies the responsibilities for service delivery at the provincial, municipal and communal levels; allows municipalities to become independent budget units; and establishes a direct connection with the central government through the Ministry of Territorial Affairs (MAT). The law institutionalizes civic participation through the creation of the *Conselhos de Auscultação e Concertação Social* (CACS).

88. **The new Constitution of the Republic of Angola** (*Lei Constitucional da República de Angola*) was adopted by the National Assembly on February 4, 2010. It provides for the state to ‘*take the requisite measures to protect the environment and species of flora and fauna throughout (the) national territory, maintain the ecological balance, ensure the correct location of economic activities and the rational development and use of all natural resources ...*’ and guarantees that ‘*Acts that endanger or damage conservation of the environment shall be punishable by law*’ (Article 39 Environmental Rights).

89. **The Land Use Planning and Urban Development Act** (n° 3/04 of June 25). This law adopts a concept of integrated planning, which does not only include socio-economic aspects but also attempts to create synergies between the relationship between the city and countryside. This law calls for the establishment of a decentralized system to coordinate the work of planning land use. The lack of integrated and coordinated plans associated with an inefficient development and growth of the cities to respond to the growing number of people has motivated the development of this law.

90. **The Land Law** (*Leis das Terras* - 9/04 of November 9, 2004) considers all land, and the natural resources on that land, to be the property of the State. Article 19 of the Law presents land classification schemes for administrative purposes, and affirms the right of the government to establish marine and terrestrial protected areas. This new Land Law contains a number of environmental related aspects which are important to foster sustainable development in Angola as well as better use of the soil and natural

resources. It presents two land classifications, namely urban land (areas for construction of buildings) and rural land (areas for agriculture, livestock raising, forestry and mining).

91. The Local Municipalities Act, No. 17 of 1999 (*Lei das Autoridades Locais*). Establishes that local governments are responsible for the promotion of development, basic sanitation, environmental protection and land management.

2.3. Design principles and strategic considerations

2.3.1 Ongoing relevant national and regional initiatives

92. The LDCF-funded 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 Angola.

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

National - Government led initiatives

94. **Establishment and maintenance of a major system of flood-resistant dikes around the Provincial capital of Ondjiva.** The Government of Angola has budgeted a significant amount of resources (**US\$8 million**) on short-term DRR assistance and long-term infrastructure investments in the Basin. This includes: the establishment and maintenance of a major system of flood-resistant dikes around the Provincial capital of Ondjiva; the funding for several infrastructure studies in the Basin by the Technical Committee of the Provincial Government of Cunene and MINAMB; significant investments in new houses for flood victims from the past three years (2008-2011); major funding for disaster preparedness for the Provincial Delegation of the civil protection; and the rehabilitation of 524 boreholes in Cunene Province and 600 new boreholes.

95. **Centre for Plant Genetic Resources (CRF) Project.** Within the framework of the SADC Plant Genetic Resources Centre (SPGRC), a non-profit making Southern Africa Development Community (SADC) institution, the National Plant Genetic Resources Centre (NPGRC) of Angola has been working as a beneficiary of this African network. The Angola Centre for Plant Genetic Resources (CRF) has been carrying out activities related to conservation and characterization of national germplasm. The main objectives of the Angolan CRF are:

- To collect all genetic diversity of local varieties of food crops from different areas, especially those which were inaccessible for more than 13 years;

- Characterize the accessions stored in the gene bank at morphological, agronomic and molecular level.

In 2012/2013 the Angolan government through the Centre for Plant Genetic Resources (CRF) funded the project called “Morphological and agronomic characterization of local varieties of cowpea (*Vigna unguiculata* L.) for their application in breeding programs access”. This project allowed the assessment of the potential of seeds to crop improvement. This project also facilitated the work of the peasants creating other improved varieties with higher productivity. The total project cost was estimated at approximately **US\$16,000.0**.

National - Others

96. USAID’s Global Climate Change Integration (GCCCI) Pilot Proposal for Angola, on “NGO Strengthening for improved resilience and climate governance in Angola Cuvelai Basin” (2012-2015). (USD \$1.8 million for a two year project that will end in 2015). It is part of USAID’s 2012-2016 Climate Change and Development Strategy designed to enable countries to accelerate their transition to climate-resilient low emission sustainable economic development. The proposed USAID pilot will be implemented through World Learning and will focus primarily on the Angolan portion of the Province of Cunene with an emphasis on the province of Cunene. The project proposal has three main components:

- Improve community preparedness to climate change disasters;
- Improve government coordination for delivery of climate adaptation services;
- Increase the participation of, and advocacy from CSOs for improved climate adaptation services.

This USAID project is a relevant baseline for a FFEWS because it will allow to build on the above activities developed in the target locations and will provide to the Angolan NGOs to partner with the provincial and national government to develop the infrastructure needed for an effective flood forecasting and early warning system (FFEWS). In addition will also support the Angolan NGOs to partner with the provincial government to improve the dissemination of short-term seasonal climate forecasts. However, the USAID project does not include the short and medium terms monitoring of climate induced river flow fluctuations to allow more accurate forecasting, early warning and monitoring of floods risks.

97. World Bank financed project – Angola Water Sector Institutional Development Project (WSIDP). This project to run from 2013-2019 will be implemented via the Ministry of Energy and Water and its National Directorate for Water Supply and Sanitation-DNAAS to support improved water supply access. The objective of the project in the amount of **US\$177 million dollars**, is to strengthen the institutional capacity and efficiency of agencies in the water sector to improve access and reliability of water service delivery. The project is financing the following four components:

- **Component 1: Development of Institutions in the Water Supply and Sanitation Sub- Sector:** The objective of this component is to strengthen the institutional framework for the water supply sub-sector at both the central and regional levels.
- **Component 2: Water Resources Management:** The objective of this component is to support the strengthening of the institutional framework for the water resources management sub-sector.
- **Component 3: Rehabilitation of Water Supply Systems:** This component will support the physical rehabilitation of selected urban water supply systems in order to increase the level of water supply services provided and to promote the economic sustainability of newly created water supply and sanitation utilities.
- **Component 4: Capacity Building and Change Management:** The overall objective of this component is to improve the sustainability of water supply by strengthening the ability of GoA to

improve the efficiency of water supply and by increasing the managerial and technical capacity of the staff in Angola by engaging stakeholders, managing and communicating change. This project will collaborate with parallel activities to be developed in Cunene Province particularly in the field of water resources management in the Cuvelai Basin and capacity building to improve the efficiency of water supply at community level.

98. **UNEP/UNDP developed LDFC Project entitled “Addressing urgent coastal adaptation needs and capacity gaps in Angola (GEF ID 5230)”**: there will be great synergy with this project as UNDP is the UN agency responsible for the component “Enhanced institutional coordination and systemic capacity for proactive adaptation in Angola”. These two projects will also share a Technical Advisor on Adaptation to ensure synergies and coordination. Likewise lessons learnt from one project will benefit the other. In addition to this, UNEP/UNDP project also includes an operational forecasting and early warning system for climate-induced extreme events along the coast, which will further strengthen the national capacities on forecasting and early warning systems.

99. **NORAD Project funded NAWASMA (National Water Sector Management)**, started in 2002 and centers around institutional cooperation between the Angolan National Water Directorate and the Norwegian Water Resources and Energy Directorate (NVE). The rehabilitation of the Angolan network of hydrometric stations is foreseen within the bilateral cooperation with the Angolan National Water Sector. The activities already developed in the Province of Cunene including training and capacity building under this NAWASMA project will benefit the LDCF and will be an important activity baseline for this LDCF.

100. **UNICEF’s Water, Health, and Sanitation (WASH) Project** in Angola had activities implemented in the Province of Cunene from 2008- 2011 at a cost of approximately \$860,000. Thanks to these efforts, an estimated 30,000 people, 27 communities and six schools in the Province of Cunene municipalities of Kwanhama and Ombadja have improved access to safe water. Although the donor-funded programme has ended, community-managed *Grupos de Agua e Saneamento* (GAS) (Groups of Water and Sanitation) continue to manage and maintain water infrastructure in a sustainable manner with support from local government administrators who also received training under the programme. It is expected that these Groups of Water and Sanitation still active will collaborate with this LDCF in other municipalities of the Province of Cunene where the project is going to be implemented.

Regional

101. **Regional FAO developed project** entitled “Disaster risk reduction/management to support agropastoral communities affected by recurrent droughts and other natural disasters in southern Angola and northern Namibia”. The proposed interventions fall under FAO’s corporate Strategic Objective 5 (SO5 - increase the resilience of livelihoods to threats and crises). The interventions proposed aim to strengthen livelihood systems by consolidating DRR/M in southern Angola (Cunene, Namibe and part of Huila provinces) and northern Namibia, focusing on agropastoral and pastoral communities. The activities are intended for a three year period with an initial 12 months introductory phase budgeted at USD\$1.6 million. This LDCF will benefit a great deal from the FAO project particularly from the activities to be developed in the Province of Cunene at sub-provincial, or *Municípios*, level and linked to Early Warning Systems and Analysis for DRR/M and Food Security and Improvement of grazing and water management, animal access to fodder and water, and animal nutrition.

102. The programme under the **Department of Water Affairs and Forestry (DWAF) in the Ministry of Agriculture, Water and Forestry (MAWF)** is the Namibian institution responsible for setting up monitoring systems, coordination of monitoring activities and data analysis. The Hydrology Division in

the Department of Water Affairs and Forestry (DWAF) continuously monitors the stream flow on the major rivers in Namibia, including those within the Cunene River Basin. The Hydrology Division also operates river gauging stations (Ombuku, Minimahoro) on the ephemeral tributaries of the Lower Cunene River. The Namibia Meteorological Services (NMS) in the Ministry of Works and Transport (MWT) is responsible for monitoring, analysing and reporting meteorological data on rainfall, temperature, humidity, atmospheric pressure and wind. The LDCF project will cooperate with these institutions in river basin hydrological and weather monitoring and forecasting capability.

103. **Climate for Development in Africa Programme (ClimDev-Africa)** is a joint initiative of the Commission of the African Union (AUC), the African Development Bank (AfDB) and the United Nations Economic Commission for Africa (UNECA). The ClimDev-Africa programme supports Africa's response to climate variability and change by building regional, sub-regional and national policy capacity. This project will support the LDCF project to improve the quality and availability of information and analysis to decision-makers.

104. 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. This LDCF will benefit the satellite facilities from the AMESD project in its endeavour to improve INAMET services to provide weather forecasts and monitor extreme weather events in the Province of Cunene.

105. The **Global Climate Observing System (GCOS)** is a joint undertaking of the World Meteorological Organization (WMO), the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational Scientific and Cultural Organization (UNESCO), the United Nations Environment Programme (UNEP) and the International Council for Science (ICSU). The project intended to be a long-term, user-driven operational system capable of providing the comprehensive observations and research to improve understanding, modelling, and prediction of the climate system. It includes both in situ and remote sensing components, with its space-based components coordinated by the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS).

106. The **Southern African Development Community Hydrological Cycle Observing System (SADC-HYCOS)** is a regional component of the World Meteorological Organisation (WMO) programme aimed at improving the basic observation activities, strengthening regional cooperation and promoting free exchange of data in the field of hydrology. The World Hydrological Observing System (WHYCOS) International Advisory Group (WIAG) guides the programme. The aim is to ensure that participating countries, individually and collectively, attain the technical capability, effective management and equitable use of the freshwater resources of the sub-region and to establish a Water Resources Information System as an effective decision making tool.

107. **Cunene Transboundary Water Supply Project (KTWSP).** The government is also a major co-financier with a contribution of 17 million USD through the Ministry of Energy and Water. The Xangongo water scheme of the KTWSP corresponds to Phase 2 of the Water Master Plan of Cunene Province and is financed and implemented by the government. In the Xangongo scheme, water will be treated and then distributed to various towns and villages including Ondjiva, Namacunde, Santa Clara and Chiede. The scheme includes the construction of a water treatment plant and distribution systems and

sewer networks in all towns and villages. This scheme will help to increase community household resilience to projected climate risks such as acute droughts periodically occurring in the region.

108. Though not Co-financing, the project will work in conjunction with and benefit on the baseline from the above ongoing project interventions in Angola in order to avoid the duplication of project efforts and to benefit from synergies. However, the following relevant projects will serve as parallel co-financing for the project.

109. **Baseline Project #1 – Government of Angola (various multi-sectorial investments by National and Provincial Authorities). Around US\$43 million** (from various government budgets and including relevant co-financing for the Programme of Public Investment (PIP) through the Ministry of Energy and Water (MINEA).

110. **The Government of Angola through the Ministry of Energy and Water (MINEA)** will be the major financier of a sizable programme of strengthening of the water supply system of Ondjiva in the Province of Cunene with a total amount of **\$US 39,037, 712** to invest into three main components:

- **“Strengthening of the Water Supply System of Ondjiva” (Phase 1) - \$US860,832.** This component mainly includes the construction of water distribution networks of some localities in Xangongo-Ondjiva Ondjiva-Hongo-Chiede, Ondjiva-Anhanca and Xangongo Humbe-axes at Oihole, sewers in Xangongo Ondjiva and the recovery of Ondjiva current distribution systems. With this project, is expected to potentially benefit some 200,000 people of Ondjiva and localities of Xangongo-Ondjiva-Sta.Clara, Ondjiva-Anhanca and Ondjiva Chiede-axes of both the Urban areas of cities as well as other areas, benefits that have implications, not only at the level of the health and welfare of beneficiaries but also the rebirth of some local industries;
- **“Strengthening of the Water Supply System of Ondjiva” (Phase 2) - \$US 27,567,124.** This component mainly provides funds for the rehabilitation and strengthening in the uptake, pumping stations capacity and treatment plant of Xangongo and the installation pipeline Xangongo - Ondjiva (100 Km) and centers of intermediate water distribution and their pumping stations in Môngwa Bulanganga. With this project, is expected to potentially benefit some additional 200 000 people of Ondjiva and both the urban areas and the vicinity of the localities axes of Ondjiva Xangongo-and-Sta.Clara Ondjiva-Chiede;
- **“Rehabilitation of the Calueque Dam and Construction of a Pumping Station” - \$US 10,609,756.** This component consists of the rehabilitation and completion of Calueque Dam, including the construction of a pumping station on the north bank of the Cunene River and associated pipelines for water supply and an irrigation scheme still to be set by the Ministry of Agriculture.

111. However, this programme does not foresee the construction of community-level water infrastructure for agriculture and livestock use, nor there is any training or capacity building in climate change integrated water management for the scheme.

112. **INAMET’s Strategic Development Master Plan for 2014-2020.** The Government of Angola²⁶ is supporting implementation of INAMET’s Strategic Development Master Plan for 2014-2020²⁷. In the

²⁶ Diário da República. Decreto Presidencial nº 17/14. I Série nº8. Segunda Feira, 13 de Janeiro de 2014. Republica de Angola.

²⁷ INSTITUTO NACIONAL DE METEOROLOGIA E GEOFÍSICA Programa de Modernização do INAMETe Operacionalização do Plano de Desenvolvimento Estratégico (PDE) 2014-2020. Março de 2013.

framework of the Presidential Decree 17/2014 (13 January), the GoA will be financing the rehabilitation of the whole Meteorological Monitoring Network with installation of Automatic Weather Stations with an investment of **US\$968,292** for the Province of Cunene. In addition, to support the operationalization of this monitoring network, this investment will support the establishment of Meteorological and Climate Data Communications Systems that will contribute towards the development of the FFEWS in the Province of Cunene. However, the number and location of the proposed AWS in the Cunene Province does not cover the requirements for Cuvelai Basin. These investments in the Cunene Province do not include capacity development in management and maintenance of these AWS.

113. Ministry of Environment (MINAMB) programme. The Government of Angola is supporting MINAMB to carry out a nationwide climate change adaptation education campaigns with with a budget of **US\$2 million** dedicated to specific activities in the Province of Cunene towards the establishment of Flood Forecast and Early Warning System protocols. These activities include pilot communication and dissemination of disaster preparedness and response plans. Still, many villages in the Cuvelai have not yet been reached due to a lack of capacitated human resources at local level. Furthermore, the Government of Angola is supporting MINAMB to mainstream Climate Change Adaptation into National and Provincial Plans. However, this GoA support has not yet been extensive towards establishment of a GIS based Climate Change Environmental System.

114. INARH -“Installation of Floods Monitoring Network in the Cuvelai River Basin Project”. (2010-2016). This investment project of **US\$1 million** is being developed within the framework of the Angola Water Sector Institutional Development Project financed by the World Bank specifically the Component 2: Water Resources Management: “support the strengthening of the institutional framework for the water resources management sub-sector”. The project implemented via the Ministry of Energy and Water through the National Institute of Hydrologic Resources (*Instituto Nacional de Recursos Hídricos*) with the following specific objectives for the Cuvelai Basin in the Province of Cunene: a) Installation of hidroclimatological stations in the villages of Tchamutete, Mupa and Cuvelai for monitoring of climatological variables; b) Installation of hidrometric rulers (scales) in one of the Mui River sections, as well as in the towns of Evale, Mupa, Ondjiva and Namacunde for monitoring of river water levels; c) Installation of an operational Monitoring Centre in Ondjiva, to carry out collation of information and dissemination to interested parties in Angola and Namibia.

115. Baseline Project #2 – Development Workshop Angola (local NGO) / International Development Research Center (IDRC) – Project on Water and Climate Change Risks in Angola’s Coastal Settlements. US\$950,000 budget to be funded partially by IDRC.

The overall objective of this project – developed by one of Angola’s leading non-government organization and to be implemented in partnership with Canada’s International Development Research Center (IDRC) – is twofold: 1) to provide information that will assist policy-makers to address water-supply issues and environmental management challenges in Angola’s coastal urban areas, to estimate the impact of climate change and variability on water resources and infrastructure in urban informal settlements, and to propose better water governance mechanisms for these areas; and 2) to develop the capacity of national government and civil society organizations to climate-proof infrastructure and develop community-based adaptive management schemes through partnership with these bodies. The project will also involve collaboration with the local government administrations for each urban area. The project will be of three-year duration from mid-2012 to mid-2015. This LDCF project will build on the findings from the two DW implemented (IDRC-supported) projects particularly on the programs dealing with innovative approaches to participatory uses of GIS in demographic and environmental risk mapping.

116. **Baseline Project #3 – UNDP Angola Project supporting the National System of Civil Protection (US\$917,000)** to improve its response capacity and structure at Provincial and Municipal level. DRR participatory methodologies, best practices and key tools will be provided to Municipal Commissions of Civil Protection. Cunene is also a target province of this intervention, thus, their Municipal Commissions will be strengthened at this stage and this effort will be used as a solid base for building of this new proposal. In addition to this support, UNDP will also allocate core funds to the development/implementation of the project in Province of Cunene.

117. Below (Table 2) are the associated baseline projects and the indicative co-financing amounts upon which this LDCF project will build. This is further elaborated in Section 2.4 for each of the LDCF project's outcomes and the co-financing letters of support are given in Annex 7.

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

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (US\$)
Recipient Government	MINAMB - Ministry of Environment	Grant	2,000,000
Recipient Government	National Directorate of Hydrologic Resources - Ministry of Energy and Water (MINEA)	Grant	1,000,000
Recipient Government	INAMET - National Institute of Meteorology and Geophysics	Grant	968,292
Recipient Government	Ministry of Energy and Water (MINEA) - Programme of Public Investment (PIP)	Grant	39,037,712
GEF Agency	FAO's corporate Strategic Objective 5 (SO5 - increase the resilience of livelihoods to threats and crises).	In-Kind	1,600,000
GEF Agency	UNDP	Grant	917,000
Non-governmental organization	Development Workshop Angola (Local NGO)	In-Kind	950,000
Total Co-financing			46,473,004

2.3.2 *Macro and micro-economic benefits of the project National and local benefits*

118. Amongst other gains the project will benefit: i) the poorer segments of society, which do not necessarily benefit from large protective infrastructure projects²⁸; ii) hydro-meteorological services and; iii) the Province of Cunene communities and other user-agencies with regards to long-term planning and extension services.

Macro-economic benefits

²⁸World Bank. 2010. Natural hazards, Unnatural disasters: Effective prevention through an economic lens. World Bank and United Nations. 231 pp.

This project supports national development goals and plans to achieve Millennium Development Goals (MDGs) 1, 3 and 7.

- *MDG 1: Eradicate extreme poverty and hunger* –This project aims to improve flood forecast early warning systems (FFEWS)nationally, providing useful climate information such as seasonal forecasts to considerable number of population of the Cunene Province who are dependent on the agricultural and livestock value chain (NAPA, 2011). Seasonal forecasts can enable the rural population to take adaptive farming measures to ensure productivity;
- *MDG 3: Promote gender equality and empower women* – FFEWS will be tailored to end-user needs, in particular the needs of women who have little access to farming and weather advice, particularly on impact of extreme drought. Women focused NGOs have been implicated in the project through the CBO's.
- *MDG 7: Ensure environmental sustainability* – The foundation of this project is to ensure environmental sustainability by integrating FFEWS initiative into national policies, planning, and decision-making. Such endeavours can assist in the sustainable use of natural resources through good water management practices.

Micro-economic benefits

119. At the local level the setting up of a flood forecast early warning systems (FFEWS) will enable early warnings and climate hazard mapping, which once disseminated correctly and acted on appropriately, can provide economic benefits through reducing losses and destruction from extreme weather events such as floods and droughts. This will also minimize disruption to community livelihoods, will have further knock-on effects on people's health and wellbeing, and thus affects communities and social structures. Communities will immediately benefit through seasonal drought warnings related to small-scale agriculture and livestock raising, water and flood management, wildfires etc.

120. The delivery of a training in small-scale irrigation to Extension officers working within EDA's, NGO's and CBO's and installation of equipment for construction of small-scale water management works for irrigation (water pumps, drip irrigation systems, water reservoirs) will benefit the region and will strengthen and develop the capacity of vulnerable local communities to withstand drought impact.

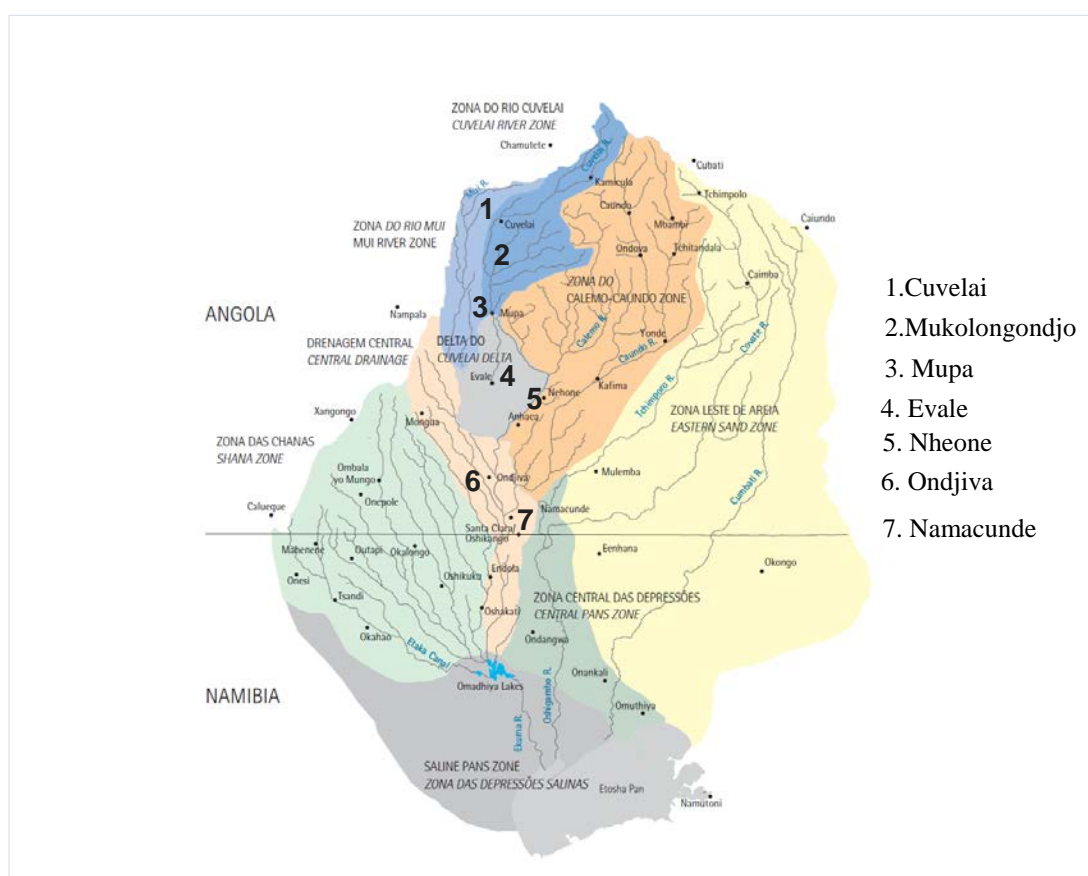
121. In addition there are other social benefits to consider at local level and these are related to on-the-ground activities that are likely to provide benefits such as: i) improving access to water for sanitation and drinking purposes; ii) improving agricultural productivity by increasing the availability of water for irrigation purposes (with positive consequences for food security and income streams). Therefore, through project activities, adaptation benefits will surely arise through the protection of livelihoods from adverse climate change impacts on water resources.

122. A conservative estimate of the number of people who will directly benefit from the Disaster Risk Reduction (DRR), Flood Forecasting and Early Warning System (FFEWS) and other social benefits investments are at least 400,000 as shown next. However, this total population benefiting from these developments has the potential to grow hugely if warnings extend to a reasonable percentage of the total population e.g. through, radio, TV, mobile phone relay or similar system. Many of the beneficiaries will be women, especially within the small agriculture sector where they often make up the majority of smallholder farmers, yet are most vulnerable to food insecurity.

2.3.3. Brief Introduction to Project Pilot Sites

123. A strategic partnership will be developed with the above projects and initiatives listed in Section 2.3.1 in order to complement their activities. Consequently, the proposed LDCF project will establish pilot sites where will collaborate with above projects, Government and Community organizations to test the effectiveness and impact on risk reduction of Community based FFEWS (CBFFEWS) network developed in 7 pilot sites of Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva (Figure 2).

Figure 2. Map of the Cuvelai Basin²⁹ in the Province of Cunene showing the seven target comunas where Community based FFEWS (CBFFEWS) network will be established.



124. The demonstration sites were identified through an extensive consultative process held at both the national, provincial and community levels. During the Inception Workshop (held on 22nd May 2013 in

²⁹Mendelsohn and Weber (2011). The Cuvelia Basin, Its Water and People in Namibia and Angola. Development Workshop Angola, 64p

Luanda and on 27th May 2013 in Ondjiva) and consultations engaged with local Government and Community Based Organisation during field visits undertaken on 25-26th May at Mupa, Evale and Odjiva discussions were conducted to identify a list of potential demonstration sites for the project. Priorities were drawn for these sites (Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva) according to their importance in relation to the flood and drought development process and its impact on the livelihoods of the communities in the Province of Cunene and in particular in the Cuvelai River Basin (See Annex 3 for the Inception Workshop Report).

125. For the selection of the demonstration sites, ten criteria were used to assess the vulnerability to climate variability during the prioritisation exercise, which was carried out at the workshops, during bilateral discussions and field visits in November 2013. These were:

- i) population number and poverty level
- ii) access to safe drinking water;
- iii) pattern and reliance on rain fed agriculture;
- iv) frequency and impact of floods;
- v) frequency and impact of droughts;
- vi) land degradation risks;
- vii) importance of livestock raising activities;
- viii) impact of climate variability to community water resources;
- ix) need and potential for installation of weather and hydrometric automatic stations; and
- x) synergy potentials with ongoing relevant projects.

126. Over this prioritisation exercise weighed also the indication of the Provincial and local Government strategic development Plans as well as the technical views of the main stakeholder institutions of this LDCF project. The National Institute of Meteorology (INAMET) and the National Institute of Hydrologic Resources welcomed the opportunity of extending the coverage of their monitoring network in the Basin and they were ready to support the installation and management of the automatic stations. The Government of Cunene Province (GoCP) and the provincial representative bodies of the Ministry of Environment (MINAMB) and National Civil Protection Service (SNPCB) also welcome the choices of the pilot sites given the importance of the foreseen project activities in further strengthening their local capacities.

127. Given that estimates indicate that over 52,000 people in the less-populated Angolan portion of the Province of Cunene were affected by the 2009 floods and 350,000 have been identified at the demonstration sites during field visits, the conservative estimate of the number of people who will directly benefit from the project investments are at least 400,000.

128. The number of people, whose combined vulnerability to Climate Change can be significantly reduced in the long run by the proposed LDCF project may be estimated by the number of Community Based Flood Forecast Early Warning System (CBFFEWS) elements to be established at Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva to enhance the communities' adaptative capacity to the impacts of climate variability in the Province of Cunene. Therefore, the potential total number of beneficiaries in the Community Based Flood Forecast Early Warning System (CBFFEWS) to be established in these seven pilot sites will be around 403,525 (Table 3).

Table 3. Project pilot sites communities and numbers of direct beneficiaries of the Community Based Flood Forecast Early Warning System (CBFFEWS)

Pilot Sites	Number of Inhabitants	Main Activities	Main Climate Change related Hazards
Mukolongondjo	24,715	Farming and livestock	Floods, drought and wild fires
Mupa	35,934	Farming and livestock	Floods, drought and wild fires
Evale	34,027	Farming and livestock	Floods and droughts
Nheone	114,689	Farming and livestock	Floods, drought and wild fires
Namacunde	32,080	Farming, livestock and fishing	Floods and droughts
Cubati	30,000 ³⁰	Farming, livestock and fishing	Floods and droughts
Ondjiva	132,080	Farming and livestock	Floods, droughts, erosion
Total	403,525		

2.3.4. UNDP Comparative advantage

129. 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 ability 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.

130. UNDP has also a long-standing experience in supporting projects that require the development of climate-related information. Over the past decade, it has actively supported work on National Adaptation Programmes of Action (NAPA), as well as National Communications to the United Nations Framework Convention on Climate Change in some 140 countries. Recent UNDP efforts have focused on assisting national and subnational agencies in their efforts to formulate and implement Green, Low-Emission and Climate-Resilient Development Strategies (Green LECRDS). As part of these Green LECRDS, UNDP has completed detailed climate-scenario development for several regions and is working on several Early Warning System-related projects in Malawi, Zambia, Tanzania, Ethiopia, Uganda, Benin, Burkina Faso, Sierra Leone, São Tomé and Príncipe and Liberia.

131. In Angola, UNDP has been working on environmental sustainability issues for over a decade, and has established strong partnerships with national institutions such as MINAMB, Civil Protection and MINEA, implementing partners such as FAO, as well as donors such as GEF, USAID and the Government of Norway. UNDP has a particularly strong relationship with the Civil Protection and is just starting development of a new project (US\$300,000 budget) to work with the SNPCB as noted in the

³⁰Estimate

previous section on related initiatives.³¹UNDP Angola has one of the largest portfolio of GEF projects under implementation in the country as shown in Table 4.

³¹ASSISTÊNCIA PREPARATÓRIA PARA A GESTÃO E REDUÇÃO DE RISCOS – SERVIÇO NACIONAL DE PROTEÇÃO CIVIL E BOMBEIROS – draft UNDP prodoc, Sept. 2012

Table 4. Summary of current projects under UNDP Angola implementation portfolio which might be of particular relevance to this LDCF

	Project	Budget and Funding	Duration and Site	Partners	Summary and Comments	Status
1	SLM					Concluded
2	Okavango					Concluded
3	Ozone Depletion	\$82.382,- Montreal Protocol	2009-2011 Luanda	Ministry of Environment; UNDP HQs	CO supports UNDP HQs. Preparation of a Hydro chlorofluorocarbon Phase-out Management Plan (HPMP) for Angola. Stage 1 in particular will result in the phase out of 10% of its agreed baseline HCFC consumption, equivalent to 29 ODS tones (or 1.59 ODP tones) in line with the obligation taken by the Government of Angola under the Montreal Protocol on Substances that Deplete the Ozone Layer.	On-going – preparation for training in Cabinda, Namibe and Luanda underway. Discussion with the unit for reimbursement of outstanding funds of 2013 in value of 27.771.91
4	Strategic Environment Programme (2012-2015)	TRAC funds A minimum of \$2,400,000 committed	On-going	Signed in 2013 between the Ministry of Environment and the UNDP	5 key strategic areas: 1. Strengthened national capacities for mainstreaming environmental protection into national development plans; 2. Effective implementation of the National Biodiversity Strategy and Action Plan (NBSAP); 3. Strengthened institutional capacity for sustainable natural resource management in land and water; 4. Climate change adaptation and mitigation strategies and action plans mainstreamed into national development plans and policy; 5. Institutional capacity expanded and strengthened for monitoring environmental trends at a nationwide scale; 6. Effective implementation of the National Plan for Environmental Education and Awareness (NPEEA) and environmental awareness activities at national and provincial levels.	On-going – under implementation
5	National Biodiversity Project: Rehabilitation of the Iona National Park	GEF 4-START allocation – BD: \$2,000,000 EU-10 th DEF: EUR 3,900,000	2013-2016 Namibe Province National level	GEF; GoA - MINAMB European Union;	PIF inherited from the World Bank. Project designed under GEF IV cycle. Two key components: 1) rehabilitation of Iona National Park; 2) capacity building at national level on protected areas	On-going – under implementation

6	Expansion and strengthening of Angola's Protected Area system	GEF 5-START allocation – BD: \$5,800,000	5 years Kissama, Cangandala, Bicular, Maiombe, Mavinga, Luiana-Luingue NPs National level	GEF GoA - MINAMB	Two key components: 1) At the protected area system's level, the GEF investment will facilitate the achievement of ambitious targets set by the government for expanding the terrestrial protected area network to be more representative of Angolan ecosystems. 2) At the level of sites, the project will focus GEF resources on continuing the implementation of the PA rehabilitation programme for three priority national parks.	PRODOC approved by the GEF. Final version submitted to the GEF to be sent by the RTA
7	PREPARATORY PROJECT Promotion of Sustainable Charcoal in Angola through a Value Chain Approach	GEF 5-START allocation – Climate Change Mitigation: \$4,620,000 Funds approved by the GEF for the preparation of the PRODOC: \$100,000	4-5 years To be determined: Huambo, Huila, Kwanza-Sul	GEF, GoA: MINAMB	Main components: 1. Biomass data collection and institutional strengthening of biomass energy stakeholders 2. Dissemination of appropriate technologies for sustainable charcoal production (improved kilns) and efficient combustion in at least eight (8) selected charcoal-producing municipalities (municipalities) in 1-2 target Provinces (selected from among Huambo, Benguela, Kwanza-Sul and/or Huila) 3. Dissemination of charcoal briquetting machines to enterprises in selected peri-urban areas of Luanda and/or Benguela Sustainable charcoal and briquetting certification and marketing scheme at selected retailers in Luanda and Benguela	PIF (Concept Note) approved by the GEF (April, 1 st 2014). Now, we have to start the preparation of the PRODOC. For doing this, an Initiation Plan is being prepared to be signed by the RR.
8	PREPARATORY PROJECT Addressing Urgent Coastal Adaptation Needs and Capacity Gaps in Angola	LDCF/GEF \$6,180,000 (\$1,000,000 will be received by UNDP) Funds approved by the GEF for the preparation of the PRODOC will be managed by UNEP	4 years Luanda, Namibe, Cabinda, Bengo	UNEP/UNDP GEF MINAMB	Main components: 1. Enhanced scientific and technical capacity for adaptation in coastal zone areas 2. Local demonstrations and capacity building interventions on ecosystems restoration and Adaptation measures in coastal areas, and showcasing their associated benefits 3. Enhanced Institutional coordination and systemic capacity for proactive adaptation in Angola (component to be implemented by UNDP)	PIF (Concept Note) approved by the GEF (Oct, 29 th 2013). Now, we have to start the preparation of the PRODOC. UNEP is leading/managing this process.

132. UNDP Angola's value-add as regards implementation of this project includes:

- Trusted, long-term partnership with main counterparts: MINAMB, MINEA and Civil Protection (including major support for Rio+).
- Extensive past experience on DRR interventions and implementation of other GEF projects.
- Consolidated experience on capacity building at provincial and local levels.
- Well-respected as a key convening actor in the environment sector at a national level.

2.4. Project Objective, Outcomes and Outputs/activities

133. The objective of this LDCF is: *to reduce the climate-related vulnerabilities facing the inhabitants of Angola's Cuvelai River Basin through targeted investments and capacity building*. LDCF intervention will be articulated around three components:

- Component 1:** Transfer of appropriate technologies and related capacity building for climate and environmental monitoring infrastructure;
- Component 2:** Enhanced human and institutional capacity for increased sustainable rural livelihoods among those communities' areas most prone to extreme weather events (flooding and drought) in the region;
- Component 3:** Increased understanding of climate change adaptation and practices in climate-resilient development planning at the local community and government levels.

134. Project duration is 4 years starting in at the end of 2014 or at the beginning of 2015 with an overall budget of US\$8,200,000 (+460,000 USD from UNDP TRAC funds) and the project's outcomes are as follows:

Outcome 1: Enhanced capacity of national and local hydro-meteorological services, civil authorities and environmental institutions to monitor extreme weather and climate change in the Cuvelai Basin.

135. This outcome will focus on developing key activities towards enhancing the capacity of all relevant institutions to; adequately install a comprehensive climate monitoring system to be effectively operational in the Province of Cunene and specifically in the Cuvelai River Basin. These activities will include inter alia: (i) strengthen the hydromet monitoring network; (ii) delivery of a overarching capacitance programme with training of key institutions including the SNPCB and the Government of Cunene Province; (iii) establishment of appropriate communication channels and procedures for issuing warnings; (iv) establishment of a national framework for the integration of all monitoring and forecasting components and technical-scientific partnerships for the setting up of a Flood Forecasting and Early Warning System (FFEWS).

Baseline – without project intervention

136. The weather monitoring network of INAMET has been seriously affected by the civil unrest and in particular the Cunene Province. From about 32 manned synoptic stations, 225 climatological stations and 282 rainfall stations, INAMET had in operation by 2010 only 29 manned synoptic stations and 1 rainfall station at national level. Out of the five (5) synoptic weather stations, that INAMET had in the Cunene Province before the war only one Automatic Weather Station (AWS) installed at Ondjiva Airport makes the current monitoring network of the Province. Likewise, the water sector had in operation in 1975 a

total of 189 hydrometric stations and only less than 10% of these are currently in operation in the country. Currently there are no hydrological monitoring stations in the Province of Cunene let alone in the Cuvelai River Basin. For this matter no comprehensive Flood Forecasting and Early Warning System exists in the province to forewarn the population of sudden extreme weather and hydrological events. The expansion of these monitoring networks required for monitoring weather and river flow or even its maintenance at acceptable level of operation has been problematic for both institutions.

137. A further major limitation to climate monitoring and hazard warning efforts of INAMET as well as INARH is the lack of skilled professionals to analyse data and information collected for the determination of risks thresholds. The current human resources capacity of INAMET and Hydrological Services is minimal. There are only 4 Meteorologists at national level. There has been a limited contribution in capacity development of INAMET from the Portuguese Cooperation and other bilateral cooperation efforts. However, there is still an acute shortage of qualified meteorologists and hydrologists able to manage a network of weather and hydrometric stations, let alone to be able to perform 24h forecasting duties. Forecasting products lack the additional benefit of a downscaling process from Regional and International Meteo Centres products.

138. At provincial level, the INAMET service runs with only one on-duty Meteorologist Technician who has to carry out all observation duties and advise the air traffic control on current weather. There are no system in place for the forecasting and warnings to be received in real time or to be able to adjust the forecast to local topographic and environmental conditions. Currently, the forecasting products issued from Luanda the Capital does not include local provincial weather information. Communications systems are still over the telephone line requiring an updating and installation of a more reliable internet communication channels, enabling real time data and information exchange between the Province and the Forecasting Centre at Luanda.

139. The hydrological sector under the National Institute of Hydrologic Resources (INARH) does not have a functioning Hydrological Modelling Unit; neither issues any flood risk forecasting. No hydrometric monitoring exists at Provincial level over the Cuvelai River Basin. The INAMET is the sole institution in the country issuing public and aeronautical weather forecasts but not flood or severe weather warning based on rainfall totals. Both the INARH and INAMET 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 at national level, let alone at provincial level, therefore 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.

140. The National Council oversees the disaster management sector in the country for Civil Protection (CNPC) an inter-sectoral coordination body chaired by the Head of Government and under the Ministry of Interior. However, the National System of Civil Protection (SNPCB) is responsible for the disaster rescue and preparedness activities and is represented at Provincial level by the Provincial Delegation of the Civil Protection and Fire Brigade. In Cunene Province these Services have been active in rescuing people, and supporting preparedness and Emergency Actions according to their Contingency Plan. The Contingency Plan covers disaster prevention, preparedness, and response and sets out roles and responsibilities in preparedness, mitigation and response. Despite the good organisational framework in which the SNPCB are inserted, and the institutional links with other DRR actors such as the INAMET, the INARH and Provincial Government Agencies are weak.

141. The delivery and communication of climate information and weather alerts messages from INAMET and INARH to end users is currently via the SNPCB, which is currently poor especially in rural areas. This situation owes to lack an efficient communications system at provincial level; language of communication – mainly in Portuguese, which a larger number of rural communities do not understand; a restricted type of media of communicating the information to stakeholders, which is mainly through the television and radio. The system also lacks information communication experts to transform technically sound information to down to earth easily understandable messages that will catch the attention and interest of end users so that they can make use of the information and take remedial or adaptation measures. The SNPCB is short in specialised staff and in need of specific DRR and FFEWS capacity development programme.

Associated baseline projects

142. **INAMET’s Strategic Development Master Plan (2014-2020) (US\$968,292.0).**³² The INAMET’s Strategic Development Master Plan (SDMP) for 2014-2020, largely financed by the Government of Angola, will support, through the SASSACAL programme, the installation of 30 Automatic Weather Stations of which the Cuvelai Basin will only be benefited with one at Ondjiva, the capital of Province of Cunene. This investment meant to improve the monitoring and data collection capacity in the Cuevalai Basin will not be enough to reach the required density of AWS for an efficient FFEWS in the Cuevalai Basin. Indeed, for a comprehensive monitoring and data collection system in the Cuvelai Basin, it is necessary to increase the number of AWS to 7 AWS. In addition, under the INAMET’s Strategic Development Master Plan there is no capacity development programme specifically dedicated for the Province of Cunene, to train Meteorological Technicians to handle the data collected by these AWS. Finally the INAMET’s SDMP does not consider an operational flood forecasting and early warning system focused on the risk to extreme floods and drought events experienced by the communities in the Province of Cunene and in particular in the Cuvelai Basin.

143. **INARH -“Installation of Floods Monitoring Network in the Cuvelai River Basin Project”.** (2010-2016). This investment project of US\$1 million is being developed within the framework of the Angola Water Sector Institutional Development Project financed by the World Bank. Its Component 2 “Water Resources Management” supports the strengthening of the institutional framework for the water resources management sub-sector. The project is implemented via the Ministry of Energy and Water through the National Institute of Hydrologic Resources (*Instituto Nacional de Recursos Hídricos*) with the following specific objectives for the Cuvelai Basin in the Province of Cunene: a) Installation of hydroclimatological stations in the villages of Tchamutete, Mupa and Cuvelai for monitoring of climatological variables; b) Installation of hydrometric rulers (scales) in one of the Mui River sections, as well as in the towns of Evale, Mupa, Ondjiva and Namacunde for monitoring of river water levels; c) Installation of an operational Monitoring Centre in Ondjiva, to collect and disseminate hydrometric information (weather, river flow and level) to interested parties in Angola and Namibia. This LDCF will complement the activities being developed by the INARH in the Cuvelai Basin by deploying AWS in 7 locations and 4 Automatic river gauging stations (AHS) and at least 4 manual water level in other sections of the Mui River.

Adaptation alternative - with project Intervention

144. This is the largest single component of the project and builds on the significant baseline investments of the Government of Angola through INAMET, INARH and World Bank funds in the Province, as well

³² Details provided in Section 2.3 paragraph 109.

as parallel activities by USAID supporting development of a FFEWS. Under this component of the project, the Government of Angola will be able to use LDCF resources in Outputs 1 & 2 to procure and install new AWS, and rehabilitate critical existing infrastructure such meteorological observation stations and communication facilities required to strengthen the climate-related observational network in the Province of Cunene. This will include installing 6 Automatic Weather Stations (AWSs) and 4 Automatic Hydro telemetric Monitoring system (AHS) as well as rehabilitating existing manual rainfall stations in priority districts and catchments. These activities will complement the efforts already made by the USAID - “NGO Strengthening for Improved Resilience and Climate Governance in Angola Cuvelai Basin” Pilot Project and will also strengthen the activities being proposed by the INAMET SDMP and the INARH project -“Installation of Floods Monitoring Network in the Cuvelai River Basin”.

145. In Output 3 of this component the project will also strengthen the development of human resources capacities in Meteorology, required for using the equipment and instruments and the interpretation of collected and processed data, to support the forecasting undertaking at national and at provincial level. Under this component’s capacity development programme in Output 3, there will be also specific training of hydrologists, Civil Protection and Provincial government officers, to be technically skilled to develop flood forecasting, disaster management and rural development activities. This extensive capacity development will fill the gaps identified at National level and at GoPC to be able to execute, collate and process data and information of the FFEWS monitoring and dissemination components.

146. To promote, sustain and coordinate the overall activities of this component towards the setting up and operationalization of the Flood Forecast Early Warning System (FFEWS), the LDCF fund will be used through Output 4 of this Component to establish a multidisciplinary Task Force (FFEWS-TF) which will include the INARH, INAMET, SPCB, MINAMB, IDA & GoCP to study/plan/propose integration of communication channels and mechanisms for delivery of EWS products. This Task Force will help to develop effective and reliable communication channels between suppliers of forecasts, the INAMET and INARH and, the end users (SNPCB and GoCP) for warning issuing and dissemination. The FFEWS-TF will also have an important role in developing the capacity and strengthening of Community Radio stations in target communes of the Cuvali River Basin so to strengthen nowcast and warning dissemination service to community groups. Through the FFEWS-TF, appropriate arrangements will be made for connecting the communication system in Angola to SADC-HYCOS transmission network and to Namibian Hydrology Division in the Department of Water Affairs and Forestry (DWAF) for using Flood Forecast products from regional/international Hydrological Modelling Centres. With this regional/international support, the project will facilitate the development of a Hydrological Modelling Unit of water resources so to be able to timely forecast watershed components (rainfall, evaporation, run-off and deep drainage) and the potential of drought or flood occurrence.

147. Following viability assessments and stakeholder consultations conducted between May 2013 and March 2014, LDCF resources will be used to achieve the following outputs:

Costs component 1

Co-financing:	US\$ 1,968,292
GEF allocation:	<u>US\$ 3,953,333</u>
Total.....	US\$ 5,921,625

Outputs and activities

Output 1.1: 7 Automatic Weather Stations (AWS) (6 fixed plus 1 mobile) at least 6 rainfall gauges complete with remote data transmission and archiving, are installed in Cuvelai Basin to support flood forecast early warning systems (FFEWS).

Indicative activities:

- 1.1.1 Assess installation sites for AWS and make arrangements (equipment housing, security, personnel) for installation and testing of remote transmission system to INAMET in Ondjiva & Luanda Forecasting Center;
- 1.1.2 Procure, install and test 6 Automatic Weather Stations (AWS) at Mukolongondjo, Mupa, Evale, Namacunde, Cubati and Nheone and at least 6 rainfall gauges complete with remote data transmission and archiving with display systems at INAMET in Ondjiva & Luanda Forecasting Center;
- 1.1.3 Procure and operationalize a mobile AWS for sensor's field calibration, integrating the Ondjiva AWS recently installed and other INAMET existing AWS and interfacing to central data collection & storage system;
- 1.1.4 Advocate for the establishment of mobile communications to allow for transmission of data between all AWS and central servers at Ondjiva and Luanda through the national telecommunication operators (UNITEL or MOVICEL) identified in the locations including agreements for the sustainable long term use for data transfers or via VHF-U systems and/or Advanced powerful Walky Talky systems³³ using open UHF radio frequencies;
- 1.1.5 Establish a protocol for sharing of data among relevant national and regional public entities (INARH, SNPCB, CETAC, etc) as well as on a cost-recovery basis to other actors (private sector, NGOs, etc.) 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, analyze, exchange and archive data;

Output 1.2: A hydrotelemetric monitoring system of 4 river gauging stations, 4 water level stations, are installed in Cuvelai and Miu Rivers to support flood forecasting and early warning system (FFEWS).

Indicative activities

- 1.2.1 Assess installation sites for automatic river gauging stations and water level stations, make arrangements (equipment housing, security, personnel) for installation and testing of remote transmission system;
- 1.2.2 Procure, install and test 4 automatic river gauging stations and at least 4 manual water level (at the Cuvelai and Miu rivers) stations, complete with remote data transmission and archiving with display systems at INAMET, Civil Protection, INARH, Provincial Government and relevant municipal and communal administrations;
- 1.2.3 Identify and procure the suitable telemetry system component required for data transfer (GPRS Satellite, Circuit Switching Data (CSD) and SMS based data transmission systems), data monitoring storage server (SQL-database connection), automatic data retrieval, SMS data transmission & SMS-Alarm in case of exceeding of predefined thresholds;
- 1.2.4 Explore the potential of using Satellite data (EUMETSAT METEOSAT 9) free transmission system through arrangement with WMO (INAMET) under a licence;
- 1.2.5 install high end PCs to accommodate high volume handling and satellite dish with appropriate low noise block-down-converter (or LNB) and make appropriate arrangements for connections to regional relevant organizations, such as SADC-HYCOS transmission network and to Namibian

³³ 50 km range 400-480MHz/446MHz/350-389MHz walkie talkie.

Hydrology Division in the Department of Water Affairs and Forestry (DWAF) for using Flood Forecast products from regional/international Hydrological Modelling Centres;

Output 1.3: *At least 50 officers from MINAMB, INAMET, Provincial government, Civil Protection, INRH, CETAC and other relevant institutions are trained to operate, maintain climate-monitoring infrastructure and assist dissemination and response mechanisms of the FFEWS.*

Indicative activities:

- 1.3.1 Establish partnership with WMO Regional/International Meteorological Centers (UK, South Africa, Portugal & Brazil) for regional/international or in-country gender sensitive capacity development of Meteorologists, Meteorological Technicians and Hydrologists and;
 - Train 5-10 potential candidates amongst the most experienced Meteorological Technicians with Maths & Physics advanced studies for a 12 months meteorological training programme;
 - Train 5-10 potential candidates amongst the most experienced hydrologists to for a 12 months in operational hydrological modeling and sector tailored hydrological forecasting techniques and information packaging for Early Warning System;
 - Develop an in-service capacity programme in downscale forecast techniques and sector tailored weather forecasting and information packaging for all INAMET meteorologists and INARH Hydrologists;
 - Develop, and implement, capacity programme for at least 2 INARH technicians in operating modelling software and flood risk warning development;
- 1.3.2 20 Provincial government officers from the following sectors: water, IT & Communications, Environment, Planning and Disaster Management Sectors and MINAMB officers to be trained in Climate Change/Variability and management of Flood Forecast and Early Warning System dissemination and response operations;
- 1.3.3 20 Civil Protection officers in Cunene Province and MINAMB officers to be trained as managers of the Flood Forecasting and Early Warning issuing, dissemination and response actions;
- 1.3.4 In partnership with FAO/GSA³⁴/INAMET/CETAC develop capacity development for decision makers in the Cunene Province to use Agromet information and seasonal food security forecast for Early Warning System planning and response.

Output 1.4: *A comprehensive Flood Forecasting & Early Warning System (FFEWS), – based on interagency harmonized agreements and international standards and protocols – are developed and warnings made accessible to Disaster Management structure in Cunene Province as well as relevant public institutions to enable appropriate planning and response measures.*

Indicative activities:

- 1.4.1 Establish a multidisciplinary Task Force (FFEWS-TF) including INARH, INAMET, SNPCB, MINAMB & GoCP to study/plan/propose integration of communication channels and mechanisms for delivery of EWS products;
- 1.4.2 Strengthen INAMET Forecasting Centre by providing: i) necessary IT infrastructure (fibre optics communication systems) –to be connected to data monitoring and collection network (WMO GTS), to enable transmission, analyses, exchange and archive of data from multiple systems and end users; ii) advanced workstations (fast, high memory capacity and high resolution) to acquire global products to downscale to Angola and Province of Cunene locations and conditions and produce

³⁴Gabinete de Segurança Alimentar

- accurate tailored forecast and analysis; iii) Renewal/purchase of Numerical Prediction Models and operation licenses required;
- 1.4.3 Setup/strengthen the INARH Flood Forecasting Centre by providing: i) necessary IT infrastructure to be connected to data monitoring and collection network, to enable transmission, analyses, exchange and archive of data from multiple systems and end users including WHYCOS (World Hydrological Cycle Observing System) and SADC-HYCOS³⁵; ii) advanced work stations to acquire global products to downscale to Angola and Province of Cunene locations and conditions and produce accurate tailored forecast and analysis; iii) Renewal/purchase of hydrological modelling licenses (e.g the MIKE 11/BASIN, MIKE FLOOD WATCH³⁶ and USGS Geo-spatial flood forecasting models);
 - 1.4.4 Develop, install and operationalize in INAMET a Nowcast based, Medium, Short term and seasonal forecasting system of quantitative rainfall and other extreme weather events for Cuvelai Basin in Cunene Province in close partnership with: (i) Regional and International Meteo Centres (including WMO SARFFGS³⁷, WMO Regional Centers products, ACMAD, FAO), (ii) SARCOF³⁸ Southern Africa Regional Climate Outlook Forum, (iii) Joint Research Centre – Institute for Environment and Sustainability (JRC_IES) and (iv) Namibia Meteorological Service;
 - 1.4.5 Enable communication channels and procedures for issuing warnings (through both governmental and non-governmental agencies) and dissemination (e.g. radio, newspapers, mobile phones, television, etc) are enabled.

Outcome 2: Increased resilience of smallholder farmer communities in the Basin to climate-induced risks and variabilities.

148. Component #2 activities are directly linked to Component #1 in an attempt to ensure that climate data and early warning systems are complemented by downstream efforts to certify that climate data actually reaches the community-level and relevant adaptation technologies are transferred to targeted groups, those most vulnerable to floods and droughts. In addition, this Outcome 2 is primarily concerned with increasing the resilience of smallholder farmer communities in the Province of Cunene to climate-induced risks and variabilities, via access to locally-appropriate climate data and germplasm resources. Therefore, GEF funds will build on current research investments and other baseline developments by funding downstream utilization of appropriate climate data and technologies.

Baseline – without LDCF intervention

149. The NAPA and the 1st National Communication has shown that climate change impacts are considered to be already affecting these livelihood activities in the rural areas of the Province of Cunene. Yields of main crops such as maize, sorghum (*massambala*), millet (*massango*) and cowpea (*feijão macunde*) have been declining along the time under the impact of the extremes of climate variability, soil

³⁵SADC Hydrological Cycle Observing System (SADC-HYCOS) was conceived as a regional component of WHYCOS - World Hydrological Cycle Observation System.

³⁶MIKE FLOOD WATCH is also a robust decision support system for Flood Forecasting and Early Warning and real time operations of water resources infrastructure systems.

³⁷The SARFFGS is a WMO flash flood forecast improvement initiative project for southern Africa and is based at South African Weather Service in Pretoria. The SARFFGS products would include calibrated maps or tables of threshold rainfall (Flash Flood Guidance (FFG)) in specific sub-regions or areas.

³⁸SARCOF is a regional climate outlook prediction and application process adopted by the fourteen countries comprising the Southern African Development Community (SADC) Member States: Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe in conjunction with other partners.

degradation and degeneration of seeds, further undermining the communities' resilience to climate change. To address this problem the Centre for Plant Genetic Resources (CRP) in the baseline has been developing an emergency collection project of local varieties of food crops and has collected some 62 seed varieties from the Province of Cunene; however very few of these seed varieties are actually being disseminated in the field to small holder farmers and the Province of Cunene is one of the few provinces without demonstration plots for local seed varieties.

150. Under the expected climate change effects of reduced rainfall and surface runoff the groundwater, reservoirs in the Province of Cunene are particularly vulnerable, since they are recharged by direct infiltration from surface layers. The majority of the Province of Cunene communities rely on natural (*iishanas*) and traditional (*Chimpacas*) surface water reservoirs with about 74% of the population drinking entirely untreated water and more than 80% of the population not having access to improved sanitation facilities. The Government of the Province of Cunene³⁹ have been trying to increase the water availability sources in the rural communities of the Cuvelai Basin by installing/reconditioning a total of 16 boreholes in the Comunes of Mukolongondjo, Mupa, Kalonga, Oshatotua e Kubati with a plan to install/recondition a further 12 boreholes at Mukolongondjo, Mupa and Evale (Annex 5). In addition the Central Government is also launching a major enterprise towards the strengthening of the water supply system of Ondjiva and surrounding areas in the Basin as well as the rehabilitation and completion of Calueque Dam which will feed an irrigation scheme still to be established by the Ministry of Agriculture. However, the number of water source available for the entire rural community in the Cuvelai Basin is still limited. In addition, current support from government technical services for improved management of water resources in the region is sub-optimal, particularly at the decentralized administrative level, where technical and administrative capacities tend to be lower.

151. To aggravate the declining yields due to degeneration of seeds and the shortness of water availability in the rural areas there is the lack of enough rural agricultural extension agents in the Province and the very little knowledge of these seed varieties characterization or how to train farmers on climate-resilient crop and soil management methods. In the baseline the Ministry of Agriculture through the Institute of Agricultural Development (*Instituto de Desenvolvimento Agrário- IDA*), has set up a network of Extension Services (*Estações de Desenvolvimento Agrário-EDA's*) which is active supporting the rural communities to ameliorate the detrimental effects of climate variability impacts on the farming system. However, the Ministry of Agriculture is reconstructing itself and its restricted budget has a very limited capacity for outreach. Additionally and as shown in the Barrier #2, rural agricultural extension agents in the Province have very little knowledge of resilient farming methods and low-cost water conservation/irrigation technologies in drought prone areas requiring therefore a dedicated capacity development programme.

Associated baseline projects

152. **The Ministry of Energy and Water (MINEA) programme of strengthening of the water supply system of Ondjiva in the Province of Cunene - \$US 39,037, 712.** This major investment will be made through three main components namely:

- i) The “Strengthening of the Water Supply System of Ondjiva” (**Phase 1**) - **\$US860,832** which includes the construction of water distribution networks of some localities in Xangongo-

³⁹The Programme “Water for All” (Água para Todos) - Ministry of Energy and Water (MINEA) and The Programme “Drought Emergency” (Programa Emergência da Seca): A Contingency Plan to assist the communities affected by drought being coordinated by the Ministry of Plan and Land Development.

Ondjiva Ondjiva-Hongo-Chiede, Ondjiva-Anhanca and Xangongo Humbe-axes at Oihole, sewers in Xangongo Ondjiva and the recovery of Ondjiva current distribution systems. This initiative will potentially benefit some 200 000 people of Ondjiva and localities of Xangongo-Ondjiva-Sta.Clara, Ondjiva-Anhanca and Ondjiva Chiede-axes and it will support the reawakening of some local industries;

- ii) The “Strengthening of the Water Supply System of Ondjiva” **(Phase 2)** - **\$US27,567,124** which will provides funds for the rehabilitation and strengthening in the uptake, pumping stations capacity and treatment plant of Xangongo and the installation pipeline Xangongo - Ondjiva (100 Km) and centers of intermediate water distribution and their pumping stations in Môngwa Bulanganga; and
- iii) The “Rehabilitation of the Calueque Dam and Construction of a Pumping Station” - **\$US 10,609,756** which will include the rehabilitation and completion of Calueque Dam, pumping station on the north bank of the Cunene River and associated pipelines for water supply and an irrigation scheme which details are still to be well-defined by the Ministry of Agriculture.

This LDCF project will complement this substantial investment from the GoA by providing community-level water infrastructure for both the agriculture and livestock sectors which are not foreseen in this MINEA programme. In addition the LDCF will also contribute and complement wherever necessary for the training or capacity building initiatives particularly towards the necessary knowledge in climate change integrated water management for the scheme.

153. Regional FAO developed “Disaster risk reduction/management to support agropastoral communities affected by recurrent droughts and other natural disasters in southern Angola and northern Namibia” Project. - USD\$1.6 million (2014-2015). The interventions proposed by this FAO programme aim to strengthen livelihood systems by consolidating DRR/M in southern Angola (Cunene, Namibe and part of Huila provinces) and northern Namibia, focusing on agropastoral and pastoral communities. This objective is attained through three following Components:

- i) Establish/Consolidate Early Warning Systems and Analysis for DRR/M and Food Security at the Provincial/Regional level;
- ii) Strengthen capacity and develop skills for DRR/M at the decentralized level (community and local institutions);
- iii) Improve grazing and water management, animal access to fodder and water, and animal nutrition.

This LDCF will complement the improvement of small-scale water infrastructure for livestock and small agricultural use to be carried out in target areas advocated by FAO, by supporting the construction and/or rehabilitation of more traditional water reservoirs (*Chimpacas*). In addition, the LDCF will also support the establishment of an early warning system for food security at sub provincial level (*Municipios*) by providing real time Agrometeorological data and information. Support will also be given to this FAO programme through the collaborative work to developed with the local Extension Services -*EDA*’s for the establishment of agropastoral field schools (APFS) in the target areas focusing on a range of topics crucial to the agropastoral livelihood system, including (but not limited to) animal health and nutrition, animal husbandry, conservation agriculture and soil and water management.

Adaptation alternative - with LDCF Intervention

154. The intervention to be supported by the LDCF under this outcome will build the capacity of national stakeholders and that of smallholder farmer communities in the Province of Cunene. This will be carried out through a suite of actions aiming at increasing their resilience to climate change impact on agriculture production and livelihoods. Under this component of the project, the Government of Angola will be able

to use LDCF resources to effectively carry out a participatory mapping of vulnerability to flood and droughts, to be adopted by provincial government departments, to support planning of actions aiming at strengthening community resilience to climate change impacts in the Province of Cunene.

155. At local level and at identified locations of the Province of Cunene, the LDCF funds will support the setting up of at least three demonstration sites in farmer's plots in the Basin for *in-situ* characterization of climate-resilient crop varieties and dissemination of seed packets of characterised climate-resilient crops for subsequent multiplication by smallholder farmers. Additionally, and in parallel to the development of the above, the project will through this outcome develop a dedicated Climate Change Based Extension Training (CC_BET) programme to Extension officers working within the Agriculture and Rural development sector in the Basin. This will be the backbone for the establishment of tailored agricultural extension services to master/access agricultural techniques adapted to increased climate variability in Province of Cunene.

156. To complement the activities foreseen by the MINEA programme towards the strengthening of the water supply system of Ondjiva and locations in the Cuvelai Basin as well as those to be developed by FAO programme in the target areas, the LDCF will assist vulnerable communities in the Province of Cunene to adapt to climate change impacts on water supply and quality, as well as to capitalise on potential positive impacts emerging through climate change⁴⁰, with deployment of technologies to improve water access and quality that mitigate climate change vulnerability of populations. Three key areas of adaptation measures will therefore be pursued, namely: i) promoting rainwater harvesting; and ii) Opening/rehabilitation of traditional water reservoirs (*Chimpacas*); and iii) supporting opening or remedial work on existing boreholes.

157. In the adaptation alternative, a systematic local level adaptation strategy will be piloted in seven locations of the province (Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva). In this process will be critical that the local farmers and community members, as the key drivers of the adaptation strategy, identify their own local solutions. However, the LDCF funds will support the development of small-scale adaptation initiatives through the establishment of Communal Centres for Agro-pastoral Resources Transformation (CCART's) to enhance Communities livelihood potential in Cuvelai Basin. Therefore, this component instead of promoting single technical 'adaptation technologies', these locally built adaptation strategies will be developed as a holistic 'livelihoods strategy', which incorporates traditional ecosystem based resources and knowledge.

158. Following feasibility assessments and stakeholder consultations conducted between May 2013 and March 2014, LDCF resources will be used to achieve the following outputs:

Costs component 2

Co-financing:	US\$ 38,637,712
GEF allocation:	US\$ 2,041,833
Total.....	US\$ 40,679,545

Outputs and activities

⁴⁰For example, the benefit resulting from increased episodes of heavy rainfall that could be capitalised on rain harvesting to improve water availability.

Output 2.1: *Locally-appropriate climate proofed germplasm resources are accessed by regional agricultural and water technicians and amongst communities in the Cuvelai Basin.*

Indicative activities:

- 2.1.1 The Centre for Plant Genetic Resources (CRF) and CETAC will collect more climate-resilient germplasm resources locally in the target communities of the Basin for further research and application;
- 2.1.2 The CRF, jointly with the CETAC, will identify from their current database locally appropriate⁴¹ crop varieties with climate-resilient characteristics for identification process in the Basin Communities;
- 2.1.3 Through a partnership among the CRF, CETAC and EDA's establish (with the support of local community members in a "cash-for-work" scheme) at least three demonstration sites in farmer's plots in the Basin for *in-situ* characterization of climate-resilient crop varieties;
- 2.1.4 Promote dissemination of seed packets of characterised climate-resilient crops for subsequent multiplication by smallholder farmer groups/Cooperatives/Women Associations.

Output 2.2: *Extension Services (Estações de Desenvolvimento Agrário-EDA's) are trained in climate change risks and resilience agriculture techniques to support vulnerable communities in Cuvelai Basin (Mukolongondjo, Mupa, Evale).*

Indicative activities:

- 2.2.1 Work with the Ministry of Agriculture to establish tailored agricultural extension services to master/access agricultural techniques (seed/plant resistant to drought, irrigation management) adapted to increased climate variability in Province of Cunene;
- 2.2.2 Support the Ministry of Agriculture to deliver a Climate Change Based Extension Training (CC_BET) programme to mainstream/integrate the climate change component into the current extension services allowing the adoption of extension techniques to deal with climate change risks and impact management within EDA's;
- 2.2.3 With the collaboration with the Ministry of Agriculture install water pumps, drip irrigation systems, water reservoirs for the delivery of practical irrigation training to Extension Officers in relevant EDA's;
- 2.2.4 In partnership with IIA, GSA (Food Security Cabinet), CETAC and INAMET support the Ministry of Agriculture to identify adaptation-related elements (crop planting calendar, planting densities, herbicide and pesticide management, crop harvesting and storage techniques, etc.) of subsistence farming system of Cuvelai Basin communities to be incorporated into Climate Based Extension Services (CBEDA's);
- 2.2.5 With collaboration of the IIA, GSA, CETAC and INAMET support the Ministry of Agriculture to identify and map climate change induced soil/water Cuvelai Basin's specific risk trends (evolution of soil water deficit & soil erosion potential) to incorporate into CBEDA's training programme.

Output 2.3: *Water access and quality that mitigate climate change vulnerability are improved by piloting technologies, through partnerships with Provincial Government and INARH (e.g. Opening/rehabilitation of water reservoirs (Chimpacas), conservation measures, water harvesting, opening or remedial work on existing boreholes).*

⁴¹These will be locally-specific, climate-resilient, open pollinated varieties of drought- and flood-resistant seeds (particularly for sorghum and food crops) that are suited to ecological conditions in the Basin. The NPGRC has already collected more than 3,500 accessions of local crop varieties from more than 80% of the municipalities in the country, including some 62 varieties from the Province of Cunene.

Indicative activities:

- 2.3.1 Make an inventory of communities' water needs by collecting, through extension agents, health workers and local government officials, information about the impact of droughts and floods on food security and health hazards in Province of Cunene;
- 2.3.2 Through participatory approach and in partnership with UNICEF, INARH, and local NGO's evaluate water-related risk communities face and help communities through training and awareness campaign to plan for and manage threats to water supply and quality;
- 2.3.3 Support efforts of Provincial Government, including through establishment and/or strengthening Groups of Water and Sanitation (GAS) in the Cunene Province for making available clean, safe water in communities subject to extreme weather events including rehabilitation/construction of waters reservoirs (*Chimpacas*);
- 2.3.4 In partnership with Provincial Delegation of Energy and Water (*Direcção Provincial de Energia e Águas-DPEA*) develop and deliver community-based education and awareness campaign on the importance of proper hygiene and water treatment in disaster response plans to build the capacity of health managers in the target *comunas* (Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva) and improve communities' health and resilience to extreme weather events;
- 2.3.5 Support efforts of INARH and the GoCP to expand the number existing wells and borehole network through construction and/or rehabilitation of not less than six boreholes (Mucolongondjo, Oshatotua and Evale)⁴² to reduce vulnerability of Province of Cunene Communities to extreme drought conditions.

Output 2.4: *Small-scale adaptation initiatives are set as a safety net to strengthen resilience of Province of Cunene communities' livelihoods to extremes of climate variability.*

Indicative activities:

- 2.4.1 Set up Communal Centres for Agro-pastoral Resources Transformation (CCART's) to promote community based adaptation initiatives including the establishment of a community-based small-scale drought resilient vegetable farming activities; small-scale fish aquaculture production, fruit-based products, honey, etc. and/or cattle products (milk, cheese, tannery) to improve Communities livelihoods for target *comunas* (Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva);
- 2.4.2 Support and promote the establishment of small-scale artisanal craft and pottery industry to enhance communities' livelihoods in the poorest drought and flood stricken communes of the Cuvelai Basin;
- 2.4.3 In close collaboration with local EDA's support the CCART's in farmer's capacitance in installation and management of small-scale irrigation systems to lessen the impact of drought on vegetable farming activities;
- 2.4.4 In collaboration with local EDA's support the CCART's in farmer's capacitance in resilient crop/seed storage methods;

Outcome 3: Local institutional capacities for coordinated, climate-resilient planning strengthened & Capacity for effective community-based climate change adaptation (including traditional knowledge practices) improved at local level.

⁴² See Conclusions of the Report (Annex 5) of Field Mission undertaken by the National Consultant in December 2013 in the Cuvelai Basin target communities.

159. Outcome #3 focuses on developing institutional capacities particularly at local level to enhance community-based climate change adaptation initiatives leveraging on traditional knowledge practices. Capacity constraints within Angola are one of the main factors preventing effective adaptation to Climate Change extremes within the various sectors including the water, agriculture and environment. In addition, there is limited capacity for integrating climate change risks into development planning at both local and national levels in Angola. In particular, much of what has been undertaken in this field at national and provincial level in the country is focused on reactive emergency relief with an active role of the Civil Protection (SNPCB) and other DRR bilateral and international Agencies (UNICEF, FAO), rather than on forward-looking risk reduction, preparedness and adaptation. Furthermore, at provincial and local level few people within local communities understand the risks associated with specific development pathways adopted by the Government Institutions. Without sufficient information available upon which they can make decisions or persuade decision-makers to support their needs, local communities will remain vulnerable and at risk.

Baseline – without LDCF intervention

160. At national and local level, the Flood Forecast Early Warning science component must take the advantage and inform policy in order to bridge the science-policy divide. However, policy decisions to mainstream climate change would best be made, when credible evidence is presented on: i) the actual and potential impact of climate events on vulnerable communities; ii) on important sectors of the economy (such as agriculture, livestock, environment and water management); and iii) when the risks associated with particular impending disasters are known and impacted communities are identified as specifically as possible.

161. At the moment in Angola, the majority of climate and environmental data and information that can facilitate the development of detailed risk and vulnerability assessments is dispersed across various ministries and institutions and has not yet been comprehensively assembled or analysed as a whole or shared and disseminated. For that reason, no detailed climate change risk and vulnerability mapping of the country that takes into account each of the identified hazards has been produced. In this process, an important environmental risk management facility or tool is lacking at National level. This is a GIS based integrated climate change environmental information system, which can allow systematic storage and mainstreaming of digital information to support decision making in sector planning.

162. In the baseline, GoA institutions such as the Institute of Rural Development (*Instituto de Desenvolvimento Rural- IDA*) at national level and the Government of Cunene Province, at Provincial level, have been developing GIS data systems in their own sectors. In addition, in the private sector the NGO Development Workshop has been very active in the country developing national capacity in GIS technology, including data handling and risk mapping. However, despite this potential in GIS at national and provincial level, specific climate change disaster risk response strategy for vulnerable districts and communities have not yet been developed and integrated into GoA existing plans and strategies.

163. The Government of Angola has made significant investments in Civil Protection structure and organization even at Provincial level. In addition, the Civil Protection is a key UNDP partner in various disaster preparedness activities and the Provincial Delegation of the Civil Protection in Cunene has prepared an Emergency Action/Contingency Plan. However, and largely due to a lack of information on the long-term impacts of climate change on current communities' vulnerability, risks have not yet been adequately assessed nor integrated into the existing disaster preparedness documents and Emergency Action/Contingency Plans. One such issue is the role played by the Community Based Organisations (such as local community radios) on the warning dissemination mechanism at provincial and local levels.

Although in the baseline MINAMB and the Civil Protection authorities have already started education campaigns around the country on climate change adaptation, many of these have not yet reached the village level. Nevertheless, several NGOs such as Development Workshop are pioneering innovative community-based communication and data gathering techniques that must be strengthened.

164. Under this baseline scenario there is therefore a risk that neither climate change impacts on communities' vulnerability are sufficiently understood nor the role of the Civil Protection on the dissemination and response component of the future FFEWS in the Province is duly considered. In both cases, this baseline situation requires also a dedicated capacitance programme involving not only the communities but also the Civil Protection (SNPCB) itself as well as gender sensitive SNPCB field officers and Local Disaster Risk Management Committees (LDRMC's) in the Provinces/Districts. This will help communities as well as SNPCB officers and other stakeholder to understand the mechanisms of impact of climate change induced extreme weather events, so to help development of a suitable response strategy and proceed with harmonization of communication agreements at community level and establishment of interagency protocols.

Associated baseline projects

165. **DW implemented (IDRC-supported) projects on “Water and Climate Change Risks in Angola’s Coastal Settlements” and “Improved Resilience and Climate Governance in Angola’s Cuvelai Basin” - US\$950,000. (2012-2016).** These DW programmes have developed innovative approaches to participatory uses of GIS in demographic and environmental risk mapping and tools for assessing complex water markets and household affordability. This program is a relevant baseline for establishing a CC-Environmental Information System of Angola (CC-ENISA), however it doesn't integrate the climate information in the assessment of environmental dynamics and risks. The LDCF will build on the baseline to complement the DW capacity building activities by supporting trainings to MINAMB cadres on how to carry out GIS based climate risks and vulnerability assessment and mapping as well as integrate this information in National and Provincial DRR Plans. The ultimate objective of the LDCF will be to set up a comprehensive CC-Environmental Information System of Angola (CC-ENISA) building on the experience acquired by DW on this subject. The LDCF will also build on the DW experience in the country to carry out further training and capacity development programmes towards the estimation of the impact of climate change and variability on water resources and development of environmental risk mapping in the framework of CC-ENISA objectives.

166. **UNDP supported National System of Civil Protection Project - US\$917,000.** This project supported by Angola UNDP is directed to improve the Civil Protection response capacity and structure at Provincial and Municipal level. The Cunene Province is a target province of this intervention, thus, their Municipal Commissions will be strengthened at this stage and this effort will be used as a solid base for this LDCF to build on. However this UNDP project falls short of covering the necessary capacity building, communications required for an efficient FFEWS warning dissemination and response at community level in the Province of Cunene. Therefore, the LDCF will build on the UNDP Project to further support the National System of Civil Protection in Cunene to train and capacitate enough operational officers in FFEWS warning dissemination and response capability. To this end the LDCF will provide dedicated training and capacitance in risk management and response, mobile communication means with VHF radios, satellite based communication technology and funds to conduct regular national drills involving all actors of future FFEWS.

167. **Ministry of Environment (MINAMB) programme - US\$2 million.** MINAMB in close collaboration with the GoPC and the Civil Protection at Provincial level is currently carrying out climate change adaptation education campaigns. This embraces specific activities being developed and to be developed in the Province of Cunene towards the establishment of Flood Forecast and Early Warning System protocols, including pilot communication and dissemination of disaster preparedness and response plans. However, this campaign have not yet reached the village level in the Cuvelai to be able to carry out raising awareness of local vulnerable communities and to develop activities towards the establishment of Local Disaster Risk Management Committees (LDRMC's) that can support disaster preparedness and management processes locally. This LDCF will built on the ongoing activities of MINAMB to strengthen the awareness level of local communities towards the risks of current climate variability for drought and flood events. MINAMB is also embarked in mainstreaming Climate Change Adaptation into National and Provincial Plans and Strategy documents for Environmental Planning with concrete actions to be developed in the Province of Cunene. However, this institutions lack the existence of a GIS based Environmental Information System to collect, process, analyse and synthesize the information required to develop CC vulnerability and risk maps. This LDCF will support MINAMB to set up a GIS based Environmental Information System of Angola (CC-ENISA) which will allow systematic storage and production of digital information required for mainstreaming climate change into National and Cunene Provincial Plans and Strategies.

Adaptation alternative - with LDCF Intervention

168. In the Adaptation Alternative, the Governmant of Angola will use fund allocate to Outcome #3 to tie the two previous Outcome #1 and #2 together with a cross-cutting approach to capacity-building and improved climate planning across the Province, such as funding for the building the capacity for stakeholders to disseminate warnings, put in place a sound response strategy to climate change induced extreme events (droughts and floods); and climate-profing the Province of Cunene Master Plan and Policies. In this Outcome, funds will also be used to develop a suite of activities that will complement various GoA investments as well as NGO efforts, working alongside local institutions and stakeholders in jointly developing technical and policy adaptive innovations and building capacity.

169. Through this outcome, the project will primarily facilitate the integration of climate risk management into key strategic national and provincial programmes, as well as policies related to agriculture and food security, water resources and environment. This will be achieved firstly by establishing and operationalising a Climate Change Environmental Information System of Angola (CC-ENISA) at MINAMB to allow systematic storage and mainstreaming of digital information to support decision making in sector planning. This activity will be developed by building on and in close partnership with the ongoing baseline initiatives in this sector. Simultaneously, a national multidisciplinary and multisectorial campaign of data recovery and gathering to feed CC-ENISA will be undertaken. Project funds will be used to bolt on existing national resources to develop and strengthen the technical capacities pertaining to GIS based climate risk management at national level in Angola.

170. In the Adaptation Alternative, the Government of Angola will use funds available to this Outcome to pilot small-scale Community based FFEWS (CBFFEWS) network in 7 selected sites to demonstrate practices to improve operational components of the FFEWS in the face of climate variability and extreme weather event. This will be used to, catalyse efforts and support to strengthen the capacity of the dissemination and response systems directly benefiting the Civil Protection provincial structure, local CBO's and NGO's as well as policy reform. All FFEWS components will be strengthened, by systematically incorporating through institutional arrangements, all available community traditional

approaches to adaptation to extreme climate variability. This will be carried out through a highly participatory community approach of the Province of Cunene Population.

Costs component 3

Co-financing:	US\$ 5,407,000
GEF allocation:	US\$ 1,822,232
Total.....	US\$ 7,229,232

171. Following feasibility assessments and stakeholder consultations conducted between May 2013 and March 2014, LDCF resources will be used to achieve the following outputs:

Output 3.1: *A CC-Environmental Information System of Angola (CC-ENISA) is established to allow systematic storage and mainstreaming of digital information to support decision making in sector planning.*

Indicative activities:

- 3.1.1 Establish and operationalize a Climate Change Environmental Information System of Angola (CC-ENISA) at Climate Change Unit-MINAMB with appropriate advanced workstations and GIS facilities to function as National CC information Portal to allow systematic storage, analyses and incorporation of climate and environmental data in the conceptualization and implementation of strategies, policies and programmes at national level
- 3.1.2 Establish partnership between MINAMB CC-ENISA (at national level) and GoCP (at Provincial level) for systematic data sharing and streamlining of digital information, to develop CC risk/vulnerability GIS based information, to support integration CC risks into national policies and plans;
- 3.1.3 Launch and support a national multidisciplinary and multisectorial campaign of data recovery and gathering to feed CC-ENISA by making use of ACMAD data recovery programme and by providing CLIMSOFT facilities for data treatment (digitalization) and quality control to partner institutions;
- 3.1.4 Establish partnerships to develop capacity for systematic GIS data handling, for the development of national Climate Change Vulnerability, flood and drought Risk Mapping, particularly for the Province of Cunene and in particular the Cuvelai Basin;
- 3.1.5 Develop relevant geospatial participatory mapping (using GIS/MIS) of vulnerability to flood and droughts, livelihoods assessment and create an online registry system of the spatial density and location of all smallholder farming communities for DRR long-term strategies and preparedness plans for Province of Cunene.

Output 3.2: *Capacity and inter-sectoral framework for mainstreaming weather and climate resilience in the Province of Cunene Master Plan is built for target communities (Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva).*

Indicative activities:

- 3.2.1 Link with Output 2.1 activities and support co-production between local communities and scientists of Climate based flood and drought risk mappings and assessments to improve the accuracy and utility of the climate risk information produced;

- 3.2.2 Convene cross-ministerial and cross sectoral meetings to agree on the information repository development and identification of current data gaps for climate risk reduction and flood and drought adaptation planning in the Province of Cunene;
- 3.2.3 Support and assist Cunene Provincial Government to develop climate change based Provincial Development Plans (CC-PDPs), based on the Vulnerability and risk mapping and assessment obtained from Outputs 2.1 and Activity 3.2.1 of the Province of Cunene;
- 3.2.4 Develop methods for integrating CC risk, adaptation planning and mainstreaming CCA into existing plans/strategies and/or establish new instrument(s) (e.g. in land-use and settlement planning guidance and regulations for flood plains) as well as a related raising awareness campaign is implemented;
- 3.2.5 Carry out identification of priority Plans/areas/sectors for CC risk (including flood and drought risk/vulnerability), and procure and hire technical advisory services to support the mainstreaming CCA measures into the National, Provincial and District disaster preparedness and management Plans particularly for the target *comunas*.

Output 3.3: *The existing dissemination/response system under the Serviço Nacional e Provincial de Protecção Civil e Bombeiros (SNPCB) is strengthened to support FFEWS.*

Indicative activities:

- 3.3.1 Develop deliver training programme for gender sensitive civil protection commanding officers, field officers and Local Disaster Risk Management Committees (LDRMC's) in the Province of Cunene to harmonise agreements and interagency protocols;
- 3.3.2 Develop and establish a FFEWS two-way communication and dissemination systems tailored to the needs of target communities using the already established Local Disaster Risk Management Committees (LDRMC) structure and providing at least 7 (two for Ondjiva) mobile SMS-Frontline technology equipment;
- 3.3.3 Strengthen Civil Protection at Provincial level communication network for FFEWS response operations and disaster information management with provision of at least 50 VHF radios;
- 3.3.4 Support Civil Protection at Provincial level in pilot communication and dissemination of disaster preparedness and response plans at local level, conduction of awareness training for vulnerable communities on adaptation responses;
- 3.3.5 Support the Provincial SPCB department to conduct regular national drills involving all actors of future FFEWS and in particular women and youth associations of target communities to test effectiveness and readiness of the system.

Output 3.4: *Community based FFEWS (CBFFEWS) network is developed in target areas to enhance and test its impact on risk reduction in sectors and population.*

Indicative activities:

- 3.4.1 Establish CBFFEWS elements at *Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva* with at least 6 (excluding Ondjiva) community managed rainfall gauges, 6 manned hydrometric rulers;
- 3.4.2 Develop capacity and make provision to install adequate technology (equipment/Energy supply [solar or wind]) in target *comunas* to strengthen FFEWS nowcast and warning dissemination service to community groups (farmers and women association);
- 3.4.3 Establish with a strong participation of women and youth a community-based communication and information sharing tool using local languages (community media: TV, local community based radios and newspapers) for climate and hazards predictions/dissemination;

- 3.4.4 Advocate with national mobile phone provider and other relevant institutions to develop community based warning dissemination systems, including toll-free mobile number and toll-free text and pictorial “sms”;
- 3.4.5 Gather lessons learnt and communities’ traditional knowledge through a participatory video and community radio shows to share successful community-based adaptation approaches for FFEWS and knowledge feeding using mechanisms such as but not limited to the UNDP Adaptation Learning Mechanism (ALM).

2.5. Key indicators, risks and assumptions

172. 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.

173. 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.

174. Assumptions underlying the project design include that:

- Stakeholders such as key government agencies including: MINAMB, INARH, IDA, INAMET, SNPCB, The Provincial Government of the Cunene Province and all decentralized water, environment, meteorology, agriculture and Civil Protection institutions remain committed to implementing baseline activities complemented by the additional interventions that the project aims to implement.
- The major implementing agents at the community level (extension workers and community workers) remain committed to the project during the project lifetime.
- Up-scaling and replication of effective adaptation measures will take place at the demonstration sites through a well-designed integration of adaptation learning into ongoing policy formulation and reviews.
- Sufficient adaptation capacities will be built during the project to ensure sustainability of project activities beyond the projects’ time horizon.
- An enabling environment is created that supports the integrated sustainable livelihoods approach to resource uses in water resources, and small-scale farming.
- National and Provincial Government commits itself to incorporate climate change adaptation into its policy documents as a matter of priority.

175. Risks to the LDCF project that were identified are summarised below (Table 5), and assigned assumptions in the Project Results Framework (see Section III).

Table 5. Summary of risks and assumptions to the LDCF project

Risk	Rating	Assumptions
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Procurement and installation of hydro-meteorological equipment, including hardware and software, is delayed because of complications with the release of funds and/or national procurement procedures.	Medium/High	<ul style="list-style-type: none"> • Effective administrative planning will be undertaken, with support from UNDP CO, which will include procuring equipment at an early stage in the project implementation phase.
Poor coordination between implementing and executing agencies.	Medium	<ul style="list-style-type: none"> • There will be a clear project management arrangements and regular interactions between the stakeholders. • Clear project management arrangements and regular interactions between the agencies.
Unavailability of requisite human resources and data	Medium	<ul style="list-style-type: none"> • The issue of the unavailability of requisite human resources will be mitigated by recruitment of international consultants who will work closely with in-country counterparts and by targeted capacity building activities. Training activities of local personnel will also be part of all aspects of the work and the relevant institutions will be encouraged to expand the staff base if it is weak in particular areas.
INAMET does not have enough capacity to tailor climate products to suit vulnerable populations in Province of Cunene and private sector needs by the end of the project.	Medium	<ul style="list-style-type: none"> • During project development, INAMET already indicated that they have some experience working with private sector representatives to understand their needs for tailored products. This project will continue to build all information production agencies to tailor services. The project foresees a strong supportive training and capacitance programme so that INAMET will acquire enough capacity to tailor climate products by the end of the project.
Capacity cannot be built on national and decentralized levels in the Cunene Province of SNPCB to assist with alert dissemination and crisis prevention	Medium	<ul style="list-style-type: none"> • SNPCB will undergo significant capacity development through this project and budgets have been allotted to training and improving their outreach and communication systems. A training programme for gender sensitive SNPCB field officers and Local Disaster Risk Management Committees (LDRMC's) will be delivered by the project. Budget includes the provision of privileged communication systems (e.g., CB radios) for all alert dissemination agencies in need. Therefore, capacity can be built on decentralized levels to implement a Standard Operating Procedure for Alert Communication.
Installed hydro-meteorological equipment fails because it is vandalised or not properly maintained.	Medium	<ul style="list-style-type: none"> • There will be awareness raising activities in target communities to highlight the importance of the installed equipment. In addition, it is expected that the equipment will be housed within a secure fence and under the responsibility of local Community Leaders and/or Government Institutions.
Climate shocks occurring during the design and implementation phase of the LDCF project result in disruptions to installed equipment and severely affect communities, prior to the EWSs being established.	Medium	<ul style="list-style-type: none"> • It is expected that disaster mitigation and response activities will be prioritized at the target communities whilst the EWS is being established
Telecommunication (SMS) communication systems used for data transmission from Automatic Weather Stations will not be robust enough (e.g., bandwidth issues or local mobile telecommunication networks) to be able to effectively contribute to EWS data sharing and real time forecast development.	Medium	<ul style="list-style-type: none"> • Costs of equipment and training will not rise dramatically during project implementation. • Technical expertise and equipment for upgrading the network is available.

Insufficient institutional support and political commitments and lack of coordination of the various key stakeholders.	Low	<ul style="list-style-type: none"> • Government is committed to integrating climate change risk and adaptation needs in development planning of Province of Cunene; • Planning will be conducted in a participatory manner to ensure that adaptation measures are appropriated by the community; • Stakeholders are committed to implement the project interventions and provide the necessary support.
Communities in target <i>Comunas</i> are not committed to cooperate and/or accept proposed adaptation measures	Low	<ul style="list-style-type: none"> • Financial, Technical and political support will be given to EDA's for training of staff and implementation of activities as planned. • Communities in target <i>Comunas</i> are willing to cooperate and adopt climate change adaptation measures. • A participatory and transparent project implementation will be established as well as adequate sensitization of the importance of the project and potential benefits from the project will minimize/eliminate this risk
Complex technical and organizational management of knowledge base that can delay project implementation	Low	<ul style="list-style-type: none"> • Activities programmed for equipment purchase and training of staff in GIS are implemented as planned. • Adequate and timely national and international support for sharing and exchange of climate change data, modelling information and other relevant data and information.

176. A complete and detailed Risk Log including those that could potentially affect the success of the project including the recommended countermeasures is presented in Annex 1.

177. The outcome indicators are designed to measure changes in the coverage, impact, sustainability and replicability of the project outcomes. The project indicators elected are as follows (Table 6):

Table 6. Outcome indicators

Indicator	Time scale and Measurement
OUTCOME 1. Enhanced capacity of national and local hydro-meteorological services, civil authorities and environmental institutions to monitor extreme weather and climate change in the Cuvelai Basin.	
Indicator 1 <i>1. A Flood Forecasting & EWS that is useful to communities developed and forecasts disseminated to target communities in Province of Cunene.</i> (baseline: 0; target: 1)	Time Frame: Mid Term and by end of Project Measured by: Field survey and PIR
OUTCOME 2. Increased resilience of smallholder farmer communities in the Basin to climate-induced risks and variabilities via access to locally-appropriate climate data and germplasm resources.	
Indicator 1 <i>1. Number of sites for in-situ characterization of climate-resilient germplasm resources (crop varieties) established and number of seed packets of characterised climate-resilient crops adopted by 5% of farmers in target communes. (baseline: 0; target 3 sites)</i>	Time Frame: By end of Project Measured by: Project monitoring and PIR.
OUTCOME 3. Local institutional capacities for coordinated, climate-resilient planning strengthened & Capacity for effective community-based climate change adaptation (including traditional knowledge practices) improved at local level.	
Indicator 1 <i>1. CC-Environmental Information System of Angola (CC-ENISA) is established, risk assessed and vulnerability maps developed for the Cunene Province and the Cuvelai in particular.</i> (baseline: 0; target 1)	Time Frame: By end of Project Measured by: PIR and Vulnerability maps developed.

Indicator 2 <i>1. Number of National or Provincial relevant plans and/or policy documents that integrate climate change flood and drought risks.</i> (baseline: 0; target 1 National and 1 Provincial)	Time Frame: By end of Project Measured by: PIR and Plans and policies developed
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2.6. Cost-effectiveness

178. For Component #1 LDCF project activities will build on existing networks, achievements and planned actions by INAMET and INARH. This will allow institutional capacity to be built cost-effectively, which will ultimately assist in planning and implementing the flood forecast early warning system. This approach of complementing existing related projects is more cost-effective than the implementation of a separate green-field 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 INAMET and INARH projects to co-produce outputs. This will promote cost sharing with these other projects, reducing overheads and enhancing cost-effectiveness.

179. Cost information was determined for the small-scale, on-the-ground adaptation measures (Component #2) as a result of the consultations undertaken during the PPG Phase and, based on this, the activities were deemed cost-effective. Where actual techniques and small-scale adaptation measures are to be identified by community members and stakeholders in the inception phase (following research into various options), cost-effectiveness will be a key factor taken into consideration. In addition, the effectiveness of these activities in increasing resilience to climate change will be tested and measured during the course of the project. This will be achieved through economic and cost-benefit analyses to ascertain whether each activity is an economically viable option given climate change conditions. The most successful activities will be prioritized for up-scaling to neighboring communities and details regarding their implementation will be disseminated widely at the workshops/training events undertaken by the project.

180. The cost-effectiveness of the proposed LDCF project's interventions are considered in further detail below.

Cost-effectiveness of FFEWS

181. The floods that hit the southern Cunene Province in Angola in 2009 were dramatic, causing widespread destruction throughout the Cuvelai Basin, with 125,000 people directly affected and 25,000 people losing their homes (as well as along the northern parts of Namibia, where 276 000 were displaced⁴³). These floods resulted in the loss of crops, houses, schools, medical centres and roads; it exacerbated a cholera outbreak in the Cunene Region in Angola and Namibia and was responsible for a direct rise in reported cases of Malaria. The floods struck again in March 2010, resulting in over 12 000 people affected by flooding in Cuvelai Basin with 10,937 people losing their livelihoods⁴⁴. These are the issues that the project addresses in Outcome 1 through the development and operationalisation of the FFEWS to minimise the impact of such extreme events on population and their livelihoods. Therefore, the project will design and implement pilot FFEWS in at least seven communes with an overall objective of

⁴³ The Kunene River Awareness Kit (RAK). Information and knowledge management tool for the Kunene River basin. <http://www.kunenerak.org/en/river/hydrology/hydrology+of+the+kunene/floods.aspx>

⁴⁴ http://jornaldeangola.sapo.ao/politica/servicos_de_proteccao_civil_e_bombeiros_prestam_apoio_de_emergencia_no_cunene

reaching a total of direct and indirect beneficiaries benefiting from community livelihood enhancement brought about by the Community based FFEWS, of approximately 400,000 people (with exception of Ondjiva the Capital) with an average investment of 21USD per household (total LCDF budget, including management cost). The tangible benefits coming from this investment per household will far outweigh the costs. The guiding principles for this FFEWS will be affordability (low cost), low-maintenance technology and sustainability (ability of the Government to cover the long-term running cost without expecting external support). Local communities and district officers will be provided with training and capacity building to operate and maintain FFEWS and associated infrastructure.

182. Quantifying the cost effectiveness of improved climate information and early warning system investments is acknowledged to be difficult, and is therefore not regularly undertaken⁴⁵. One of the difficulties is that it is often not possible to determine the economic savings of reliably avoided losses, and factors other than destruction of property and the number of deaths are generally not taken into account. This is particularly true for developing countries in Africa, where cost-benefit data and analysis of investing in improved climate monitoring and effective early warning systems are scarce.

183. In Europe, hydro-meteorological information and early warning systems – which is used to inform climate-related preparedness actions – save several hundred lives per year, avoid between Euro 460 million and Euro 2.7 billion of disaster asset losses per year, and produce between Euro 3.4 and Euro 34 billion in additional benefits per year for sectors vulnerable to climate change, including agriculture and energy⁴⁶. In developed countries in general, the benefits of improved weather services to inform severe weather warnings exceed costs by an average of more than 10 times (taken from Tsirkunov and Rogers, 2010)⁴⁷. In developing countries, there is potential for similar cost-benefits to be realised through investing in improved climate monitoring and early warnings systems. The cost of improving hydro-meteorological services and producing the required warnings elsewhere is estimated to be lower than US\$1 billion. Therefore, the average benefit-cost ratio for developing countries is between 4 and 36⁴⁸. Some of the most advanced countries in Africa—such as South Africa—spend about US\$5 million yearly preparing for natural hazards, which are estimated to cost US\$1 billion yearly⁴⁹. If forecasting research can make even a small contribution to better public decisions about mitigation of recovery costs, preparedness, and crisis management, it would justify sustaining the effort in research on climatic forecasting. Investments in early warning systems for flooding, droughts, tsunamis, and hurricanes can also help save thousands of lives, and even reduce the financial costs of disasters. There is much room for improvement in climate forecasting in Africa: the density of weather watch stations is eight times lower than the minimum level recommended by the World Meteorological Organization, and reporting rates there are the lowest in the world. Therefore, the FFEWS address both of these shortfalls by increasing the density of weather monitoring network and frequency of reporting data through national and international transmission systems. Therefore FFEWS at the scale of the Cunene Province will result in a high average benefit-cost ratio.

⁴⁵ Tsirkunov, V. and Rogers, D. 2010. Costs and benefits of early warning systems. Global Assessment report on Disaster Risk Reduction. The World Bank.

⁴⁶ Hallegatte, S. 2012. A Cost Effective Solution to Reduce Disaster Losses in Developing Countries: Hydro-Meteorological Services, Early Warning, and Evacuation. Policy Research Working paper 6058. The World Bank.

⁴⁷ Tsirkunov, V. and Rogers, D. 2010. Costs and benefits of early warning systems. Global Assessment report on Disaster Risk Reduction. The World Bank.

⁴⁸ Tsirkunov, V. and Rogers, D. 2010. Costs and benefits of early warning systems. Global Assessment report on Disaster Risk Reduction. The World Bank.

⁴⁹ Omoruyi, E M M and Ngoran, S D. 2014. The Economic Influence of Natural Disaster and Climate Change in Sub-Saharan African Economic Development. Journal of Economics and Sustainable Development, Vol.5, No.15 2014. www.iiste.org

184. Moreover 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 hydrological services; and iii) a weather and climate information online platform. This integrated approach provides a cost-effective manner of informing an extensive range of stakeholders about the FFEWS, which include government technical staff, policy-makers, restoration practitioners, scientists, university students, schoolchildren and the public.

Cost-effectiveness of CC Adaptation and Resilience initiatives for Cuvelai Basin Farming communities

185. The dominant agriculture system found probably in most of Angola, reaching roughly 90% of the households and properties, is the Small Subsistence Family Farms. These contain among the most vulnerable stakeholders of society (widows, single women, elderly, disabled, young marriages, etc.)⁵⁰. In recent years, apparently due to climate change, unfavourable rainfall resulted in more than 60% losses in average productivity for these family farmers⁵¹. The 2013 droughts in Cuvelai left about 40 to 50 percent of dried water spots in the communes of Curoca, Cahama, Namacunde, Cuanhama, Cuvelai e Ombandja affecting about 500,000 people and 2 million livestock⁵² at a cost of 6,000 tons/month⁵³ of external food assistance for these vulnerable populations. In that year alone the GoA through UNICEF needed to spend US\$ 14.3 million for emergency assistance to the Cuvelai population⁵⁴.

186. FAO forecasts⁵⁵ for cereal production in Angola (maize, sorghum, millet and milled rice) for 2005/06 was approximately 742 000 tonnes. This was down on last year's record production of about 878 000 tonnes by about 15.5 percent, but up on the 2003/04 year by 3.9 percent. Rainfall was the overriding factor determining crop yields during 2005/06. This example shows that the improved water accessibility through rehabilitation/construction of waters reservoirs (*Chimpacas, rain harvesting*), small scale irrigation infrastructure, training and drought resistant crop varieties, will potentially result in greater benefits in the long-term given the potential increase in household income thanks to the potential increase in crop yields and productivity that can be anticipated after the LDCF activities.

187. Anecdotal evidence⁵⁶ suggests that out of the 400,000 people covered by the FFEWS in Cunene province not less than 10-15% (40-60,000) farmers will benefit from the strong increase in production resulting from higher cropping intensities, cultivation of higher value crops, and diversification toward non crop activities (Outcome 2). The concerted actions under Outputs 2.1, 2.2, 2.3 and 2.4 will be developed in collaboration with the local communities and local Extension Officers in relevant EDA's. In the long run these activities will result in a significant increase of local yields and household income resulting from a modest investment. The budget for this Component has been designed along principles of cost-effectiveness. All costs for inputs, human resources, and supplies are structured in such a way so that the proposed targeted achievements of Outcome 2 will be reached with an average investment of USD 50 per community member. In addition, the surface area covering six of the communes *Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati* (excluding the capital Ondjiva) is around 25,000 km². Considering that 3.29%⁵⁷ of the total land-area in Angola is arable and the permanent cropland (% of land area) in

⁵⁰ Francisco Carranza and Jordan Treake. 2014. Land, Territorial Development and Family Farming in Angola. A holistic approach to community-based natural resource governance: The cases of Bie, Huambo, and Huila Provinces. Land and Water Division Working Paper 9. 54p.

⁵¹ MINAGRI. <http://www.minagri.gov.ao>

⁵² <http://www.agroportal.pt/x/agronoticias/2013/10/07b.htm>

⁵³ <http://portocanal.sapo.pt/noticia/8693/>

⁵⁴ <http://www.circuloangolano.com/?p=26082>

⁵⁵ FAO Global Information and Early Warning System on Food and Agriculture World Food Programme. Special Report. FAO/WFP crop and food supply assessment mission to Angola. 12 July 2006. <http://www.fao.org/docrep/009/j8081e/j8081e00.htm>

⁵⁶ Rural Development Institute 2008. "Women's Land Rights in Post-Conflict Angola."

http://www.landesia.org/wpcontent/uploads/2011/01/RDI_125_Womens_Land_Rights_in_Angola.pdf

⁵⁷ <https://www.cia.gov/library/publications/the-world-factbook/fields/2097.html>

Angola is about 0.2⁵⁸, therefore the total land area benefitting from improved livelihood enhancement against climate change impact within the Cuvelai watershed will be at least 50,000 hectares.

188. Furthermore, the adaptation measures to be piloted by the project through Community Based FFEWS, and small-scale adaptation initiatives through the Communal Centres for Agro-pastoral Resources Transformation (particularly the small-scale drought resilient vegetable farming activities and small-scale fish aquaculture production - see Output 2.4), will work as safety net to strengthen resilience of Province of Cunene communities' livelihoods to extremes of climate variability and will have multiple benefits for a wide-range of beneficiaries for a modest investment capital. Measures such as the introduction of rainwater harvesting techniques and opening/rehabilitation of traditional water reservoirs and boreholes (see Output 2.3) will be cost-effective in the longer run as it will allow communities to capitalise on episodes of increased rainfall or recharging of aquifers as a result of climate change using relatively low-cost equipment.

189. Finally, a baseline self-capacity assessment was conducted during the project preparation phase in order to guide the identification and prioritisation of stakeholder needs. Equipment and capacity-building investments were selected based on identified priorities as well as the available budget and focal areas of the LDCF project. Proposed outputs and procurements were reviewed in a representative validation workshop and revised to reflect considerations of sustainability and cost-effectiveness. Proposed outputs are considered cost-effective relative to the alternative approaches considered to address project barriers, as shown in the Table 7 below.

Table 7. Demonstration of Cost-effectiveness for each proposed Output with Alternatives Considered

OUTPUTS	Barrier Addressed	Alternatives Considered
<i>Output 1.1:7 Automatic Weather Stations (AWS) (6 fixed plus 1 mobile) at least 6 rainfall gauges complete with remote data transmission and archiving, are installed in Cuvelai Basin to support flood forecast early warning systems (FFEWS).</i>	Limited knowledge and capacity to fully assess risks posed by climate change to disaster risks in Angolan's Cuvelai River Basin	<p>Alternative 1: Only use manual stations and incorporate SMS communication services; INAMET have already one automatic station and no manual stations in the area. This automatic station will not allow sufficient data gathering to generate timely alerts. In order to gradually build their capacity with automatic stations, equipment procurement will be staggered and inoperative existing manual stations will be rehabilitated and continued to be used. Manual data readers have to be trained and spare parts acquired for the repair of existing inoperative equipment.</p> <p>Alternative 2: Acquiring more equipment to improve provincial and national coverage; this option was considered as per the feasibility studies and development plans which demanded more monitoring equipment given the surface area in need of coverage. However, as there are only 4 meteorologists at national level, this project is focusing on capacity development for service delivery (which is lacking in Angola) rather than excessive procurement. High quality targeted service delivery of FFEWS is more likely if funds are focused on building capacity with INAMET (Output 1.3). This will ensure the sustainability of continued monitoring and the use of tailored FFEWS into long-term development plans.</p> <p>Alternative 3: Use stations with cheaper sensors to decrease the cost of spare parts; if sensors do not adhere to WMO standards, WMO will not consider the station data in regional and global models. As a result, the country's data would not be assimilated to improve the regional and international forecasting models the country will exploit and</p>

⁵⁸ <http://www.tradingeconomics.com/angola/arable-land-hectares-per-person-wb-data.html>

		downscale.
Output 1.2: A hydrotelemetric monitoring system of 4 river gauging stations, 4 water level stations, are installed in Cuvelai and Miu Rivers to support flood forecasting and early warning system (FFEWS).	Limited knowledge and capacity to fully assess risks posed by climate change to disaster risks in Angolan's Cuvelai River Basin	<p>Alternative 1: Expand the hydrological monitoring network based on a cross-border watershed approach (with Namibia); however, this requires cross-border data sharing protocols, via lengthy negotiations which will not be attainable within the lifetime of the project, and more financial resources.</p> <p>Alternative 2: Acquiring more equipment to improve provincial and national coverage; this option was considered as per the feasibility studies and development plans which demanded more monitoring equipment given the watershed surface area in need of coverage. However, expansion of the hydrological monitoring network through only procurement of new Automatic and Manual Stations will imply costs and technical challenges to maintain a dramatically expanded automated monitoring system. In addition, it is unlikely to be sustainable given the limited availability of maintenance funding and suitable qualified technicians. Therefore an emphasis on rehabilitation of minimum required network, as well as procurement of new equipment and associated training, has been adopted. This project also lays a foundation for future initiatives to model hydrology in river basins by establishing good monitoring networks to build off.</p> <p>Alternative 3: Various sources of equipment could be used. However, budgets were developed based on existing models that are used in the country as well as endorsed by the relevant stakeholders. Local stakeholders indicated that they preferred to use particular models as they already have experience with these models. This is more cost-effective in the long-term. Using different models would increase the training and maintenance costs.</p>
Output 1.3: At least 50 officers from MINAMB, INAMET, Provincial government, Civil Protection, INRH, CETAC and other relevant institutions are trained to operate, maintain climate-monitoring infrastructure and assist dissemination and response mechanisms of the FFEWS.	Limited knowledge and capacity to fully assess risks posed by climate change to disaster risks in Angolan's Cuvelai River Basin	<p>Alternative 1: INAMET, INARH and Civil Protection would benefit from other capacity development programmes to be developed (through the SASSACAL programme, World Bank led Programme and others) to strengthen the human resources capacity for hydrological monitoring, forecasting and warning dissemination. However it would not produce the desired outputs within the life time of the project.</p> <p>Alternative 2: INAMET & INARH could rely solely on regional and international centers for training but this is not cost-effective because the option does not take advantage of internal forecasting expertise currently existing and the complementarity with other national initiatives in capacity building.</p> <p>Alternative 3: One-time training to save financial resources: This project will procure in a staggered manner a rational amount of stations considering human resource constraints so that the new stations can be well-integrated with existing INAMET and INARH networks and there are no continuity breaks in monitoring (i.e., problem if all resources are focused on procurement and existing stations are neglected). Budget has therefore been allotted to provide training each year as more personnel are absorbed and more equipment is procured.</p>
Output 1.4: A comprehensive Flood Forecasting & Early Warning System (FFEWS), – based on interagency harmonized agreements and international standards and protocols – are developed and warnings made accessible to Disaster Management structure in Cunene Province as well as	Limited knowledge and capacity to fully assess risks posed by climate change to disaster risks in Angolan's Cuvelai River Basin	<p>Alternative 1: If nothing is done, the current FFEWS initiatives will continue to work independently (for localized famine and flood management) and little national capacity will be built. Furthermore, no platform to formalize synergy: this is currently the case in all other EWS and CC-related projects which has led to delays in project implementation and a lack of coordination with other on-going projects.</p> <p>Alternative 1: Continue using present communication channels and procedures for issuing alerts. This would result in a poor coordination of alerts being issued. Also, there would be no standards in terms of <i>inter alia</i> protocols, content, timing and modalities of alerts. Consequently, alerts may contain insufficient information, be of poor</p>

<i>relevant public institutions to enable appropriate planning and response measures.</i>		<p>quality, not reach the proper recipients, and/or be transmitted/received too late. Have separate data portals for each agency to ensure security; however, this would prohibit the easy use of data across agencies and a potential means to share data internationally.</p> <p>Alternative 2: Rely on additional infrastructure (e.g. rehabilitated and newly installed weather stations) to improve information generation and establish a multidisciplinary Task Force (FFEWS-TF) to study/plan/propose integration of communication channels and mechanisms for delivery of EWS products. However, while the additional infrastructure allows improvements in the gathering of information, without tailoring the information may be of limited value to decision-makers in the various sectors. The decision-maker will not have access to sector-specific information that would guide planning and budgeting. This will result in sub-optimal delivery of DRR and other services. Therefore an emphasis on training of INAMET, Civil Protection & INARH to be technically skilled to develop flood forecasting, disaster management activities. This extensive capacity development will fill the gaps identified at National level and at GoPC to be able to execute, collate and process data and information of the FFEWS monitoring and dissemination components.</p>
Output 2.1: <i>Locally-appropriate climate proofed germplasm resources are accessed by regional agricultural and water technicians and amongst communities in the Cuvelai Basin.</i>	Lack of capacity of the extension network to enhance responsiveness and adaptability of subsistence agriculture in the Cuvelai Basin	<p>Alternative 1: Do nothing. Continue to use current crop varieties. However these are highly vulnerable crop varieties which will not withstand the observed climate extremes and will result in constant crop failure and reduced livelihoods of communities concerned. The project will support a coordinated action including all national institutions to make available Locally-appropriate climate proofed germplasm resources to communities in the Cunene Province.</p> <p>Alternative 2: Rely on the national programme led by the Centre for Plant Genetic Resources (CRF) who will eventually make available climate-resilient germplasm resources to communities and agricultural extension services in the long run. However, this will not take place within the lifetime of the project nor will cover the whole of the Cuvelai Basin and will be with restricted funding for <i>in-situ</i> characterization of climate-resilient crop varieties and dissemination of seed packets for subsequent multiplication. The project will establish at least three demonstration sites in farmer's plots in the Basin for <i>in-situ</i> characterization of climate-resilient crop varieties and dissemination of seed packets will cover all major communities in the Basin.</p> <p>Alternative 3: Support a partnership among the CRF, CETAC and EDA's to establish demonstration sites in farmer's plots in the Basin for <i>in-situ</i> characterization of climate-resilient crop varieties and remote dissemination of seed packets of characterised climate-resilient crops for subsequent multiplication by smallholder farmer groups/Cooperatives/Women Associations. However this will require specific training of Agriculture extension workers involved and accessibility to water. Therefore the project focus also on the training and expansion of the number existing wells and borehole network.</p>
Output 2.2: <i>Extension Services (Estações de Desenvolvimento Agrário-EDA's) are trained in climate change risks and resilience agriculture techniques to support vulnerable communities in Cuvelai Basin (Mukolongondjo, Mupa, Evale).</i>	Lack of capacity of the extension network to enhance responsiveness and adaptability of subsistence agriculture in the Cuvelai Basin	<p>Alternative 1: If nothing is done, local extension services will not be capacitated to deal with climate change impacts on the agriculture and waters resources and the current subsistence agriculture will suffer from the impacts of climate change/variability; furthermore, the various initiatives at provincial level will continue to work independently (for localized famine arising from drought and flood episodes) and little national capacity will be built. However, rural agricultural extension agents in the Province have very little knowledge of resilient farming methods and low-cost water conservation/irrigation technologies handicaps that need to be addressed if the current situation is to be improved.</p>

		<p>Alternative 2: Train Extension Services (<i>Estações de Desenvolvimento Agrário-EDA's</i>) in climate change risks and resilience agriculture techniques to support vulnerable communities in Cuvelai Basin (<i>Mukolongondjo, Mupa, Evale</i>). However, this requires coordination of various actors at provincial level and participation of the recipient extension workers and communities. The project will establish a broad partnership between IIA, GSA, CETAC and INAMET to support the Ministry of Agriculture to establish tailored agricultural extension services to master/access agricultural techniques (seed/plant resistant to drought, irrigation management) adapted to increased climate variability in Province of Cunene.</p>
<p>Output 2.3: <i>Water access and quality that mitigate climate change vulnerability are improved by piloting technologies, through partnerships with Provincial Government and INARH (e.g. Opening/rehabilitation of water reservoirs (Chimpacas), conservation measures, water harvesting, opening or remedial work on existing boreholes).</i></p>	<p>Lack of capacity of the extension network to enhance responsiveness and adaptability of subsistence agriculture in the Cuvelai Basin</p>	<p>Alternative 1: Rely solely on the Government of Cunene Province initiatives to increase the water availability sources in the rural communities of the Cuvelai Basin by installing/reconditioning boreholes and the Central Government strengthening of the water supply system of Ondjiva the Capital town. However, the number of water source available for the entire rural community in the Cuvelai Basin is still limited and these initiatives will not improve the shortness of water availability in the rural areas aggravating the declining yields due to degeneration of seeds.</p> <p>Alternative 2: Support the ongoing provincial initiatives towards the strengthening of water resources by improving water accessibility in target comunas. However, this requires an integrated approach that includes training and awareness campaign to plan for and manage threats to water supply and quality. Therefore, the project, <i>through partnerships</i> with the Government of Cunene Province, UNICEF, INARH, and local NGO's will deliver community-based education and awareness campaign on the importance of proper hygiene and water treatment in disaster response plans to build the capacity of health managers in the target <i>comunas</i> and will deploy pilot technologies not only to address the increase in water quantity through various small-scale structures but also the water quality as a source of infectious diseases.</p>
<p>Output 2.4: <i>Small-scale adaptation initiatives are set as a safety net to strengthen resilience of Province of Cunene communities' livelihoods to extremes of climate variability.</i></p>	<p>Lack of capacity of the extension network to enhance responsiveness and adaptability of subsistence agriculture in the Cuvelai Basin</p>	<p>Alternative 1: Do nothing. Communities will continue to be vulnerable to face the impacts of climate variability with no safety net mechanisms for managing risks associated with climate variability impacts on foods resources and livelihoods. Therefore, the project will support the development of small-scale adaptation initiatives.</p> <p>Alternative 2: Support the establishment of small-scale adaptation initiatives are set as a safety net to strengthen resilience of Province of Cunene communities' livelihoods to extremes of climate variability. However, the daily running and sustainability of these initiatives requires capacitance of recipient communities. Therefore, the project will promote collaboration with local EDA's support the CCART's in farmer's capacitance in installation and management of small-scale initiatives.</p>

<p>Output 3.1: A CC-Environmental Information System of Angola (CC-ENISA) is established to allow systematic storage and mainstreaming of digital information to support decision making in sector planning</p>	<p>Poor intersectoral coordination and weak policy framework to respond to change risks</p>	<p>Alternative 1: Have separate data portals for each agency to ensure security; however, this would prohibit the easy use of data across agencies and a potential means to share data internationally.</p> <p>Alternative 1: Allow decision-makers to receive their information independently through current sources. With this option, there is no central focal point for reporting information and to clarify disaster prevention strategies. Also, there would be no standards applied to the generation and packaging of information. Thus, information would not have consistency in terms of content and quality. This would lead to poor coordination of strategies and DRR activities, resulting in duplication of efforts and/or gaps in delivery of DRR services. Therefore, the project focus in establishing and operationalising a Climate Change Environmental Information System of Angola (CC-ENISA) at MINAMB to allow systematic storage and mainstreaming of digital information to support decision making in sector planning.</p> <p>Alternative 1: Rely on these additional infrastructures to improve the use of EWS/CI outputs, however, delivery of hardware is easy while service delivery is the current hurdle in Angola. Most importantly, by making EWS/CI outputs more useful to various sectors in the country through a Climate Change Environmental Information System of Angola (CC-ENISA), this pushes the Government to include stable, core budget lines for climate/weather services due to their cross-sectoral importance.</p>
<p>Output 3.2: Capacity and inter-sectoral framework for mainstreaming weather and climate resilience in the Province of Cunene Master Plan is built for target communities (Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva).</p>	<p>Poor intersectoral coordination and weak policy framework to respond to change risks</p>	<p>Alternative 1: Allow national, provincial and local policy-making and planning to continue under present <i>modus operandi</i>. This would perpetuate the current reactive approach to climate change adaptation and disaster risk management planning. This would result in poor coordination of early warning-related planning and implementation across all levels, leading to duplication of efforts and/or gaps in delivery of services (especially in localized flood, drought and extreme weather management and relief efforts). Therefore, the project will primarily facilitate the integration of climate risk management into key strategic national and provincial programmes, as well as policies related to agriculture and food security, water resources and environment.</p>
<p>Output 3.3: The existing dissemination/response system under the Serviço Nacional e Provincial de Protecção Civil e Bombeiros (SNPCB) is strengthened to support FFEWS.</p>	<p>Poor intersectoral coordination and weak policy framework to respond to change risks</p>	<p>Alternative 1: Enable each information dissemination agency to disseminate alerts directly: With this option, there is no central focal point for all NGOs/CBOs to report to for high level questions and to clarify disaster prevention strategies. Also, on the feedback chain there would be no clear contact for end-user comments/suggestions. Developing a Standard Operating Procedure (SOP), establishing Local Disaster Risk Management Committees (LDRMC) at local level and strengthening the existing dissemination/response system under the <i>Serviço Nacional e Provincial de Protecção Civil e Bombeiros</i> (SNPCB) is therefore the best mechanism for effective communication.</p>
<p>Output 3.4: Community based FFEWS (CBFFEWS) network is developed in target areas to enhance and test its impact on risk reduction in sectors and population</p>	<p>Poor intersectoral coordination and weak policy framework to respond to change risks</p>	<p>Alternative 1: Do nothing. If the locals are not informed on the utility of FFEWS, alerts will continue to be misunderstood. Also, users will continue to lack confidence in alerts if the uncertainty of forecasts is not conveyed to the general public. Furthermore Output 3.4 includes training and a public awareness campaign for women and youth a community-based associations and decentralized NGOs/CSOs to inform local populations about the potential of FFEWS to assist them in building resilience to climate/weather extremes.</p>

2.7. Sustainability

190. To sustain the LDCF project interventions beyond the project implementation period, ownership of the LDCF project by government structures at national and at provincial, primarily the National Institute of Meteorology (INAMET) and National Institute for Water Resources (INARH) is essential. Therefore, the sustainability of the project's benefits will depend on the willingness of stakeholders to adopt interventions and continue with them beyond the duration of the project lifetime, and the long-term political and financial commitment of policy-makers to provide enabling investment environments for scaling up of successful adaptation measures. Adequate technical, legal and institutional capacity and expertise (all part of adaptive capacity) is required at the national and local levels for sustainability.

191. Consequently, relevant government departments, as well as local communities, need to be involved in the design and implementation of project interventions at local level in the Province of Cunene. This participatory approach has been initiated through collaboration with national and provincial 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 at national and provincial level, such as the INAMET, Extension Services (*Estações de Desenvolvimento Agrário-EDA's*), the Civil Protection (SNPCB) that will coordinate and/or support the implementation of the LDCF project. Furthermore, local communities will be consulted during the development of Flood Forecast and Early Warning Systems in all selected pilot sites and major FFEWS 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 Angola.

192. To further strengthen within-country capacity to facilitate the development and adoption of effective adaptation measures across Angola, the project will place emphasis on employing and capacitating national consultants to assist with project interventions where possible, with international consultants being employed only where the necessary capacity is lacking in Angola. National consultants will work closely with international consultants in order to encourage knowledge sharing and improve the capacity of the national consultants. This, too, will contribute to the sustainability of project interventions. Overall, people in Angola (including the consultants, government staff and local communities) will be capacitated through the project's implementation, which will also improve the sustainability of the project beyond the project lifetime.

193. In addition, sustainability will also be improved through the facilitation of the integration of climate risk management into key strategic regional, national and local programmes as well as policies related to DRR in Angola and in particular in the Province of Cunene. This is likely to provide an enabling environment that will catalyse adaptation action. Overall, the project's activities will improve awareness regarding climate change impacts, particularly in the water sector, rural development and agriculture and food security and effective means to adapt to such impacts. In so doing, the project will make the case for the project's adaptation measures to stakeholders at all levels and thereby ensure their sustainability after the project lifetime.

194. Furthermore, the project will build upon current projects in Angola (see Section 2.3). In this way, the project will follow successful methods and avoid pitfalls experienced by previous projects. Additionally, the project will benefit from the strong network and relations established by MINAMB and Extension Services (*Estações de Desenvolvimento Agrário-EDA's*), with local communities through the ongoing

projects, which will also ensure that the project's adaptation measures are successful and that tangible benefits arise through their implementation. Such activities will remain successful beyond the project lifetime and may potentially be up-scaled to neighbouring communities. Importantly, the project was developed in close collaboration with government, community leaders as well as with community members and national-level stakeholders, in order to ensure ownership of the project's activities. This too will contribute to ensuring the sustainability of the project's activities.

2.8. Replicability

195. The project will demonstrate how investments in weather and hydrological monitoring and capacity building integrated into a Flood Forecast and Early Warning System can help the communities of Province of Cunene to be climate-resilient in terms of their wellbeing and also livelihoods options. The increased awareness of the advantages of the FFEWS will promote the desire for replication of such monitoring units strengthening the network around similar River Basin in the country. In the process of achieving this, political awareness will build up on the need for preparedness and adaptation to extreme weather events, promoting dialogue among policy-makers of the various sectors.

196. Climate risk information developed by the future Climate Change Environmental Information System of Angola (CC-ENISA) at MINAMB will be integrated into national policies and plans, particularly in DRR, rural development, water resources, agriculture and food security which are key government priority areas with a significant impact on economic growth and environmental risk reduction. This can help the establishment of regulations and development plans that can be replicated at other provinces and communities.

197. The project's work on capacity development and capacity building of GoA staff at National Institute of Meteorology (INAMET), National Institute for Water Resources (INARH), The Ministry of Agriculture Extension Services (*Estações de Desenvolvimento Agrário-EDA's*) and Civil Protection can be replicated comparatively easy through the national and provincial government's own workplan, if funds are made available through the national budget.

198. The project is being implemented also in selected communities representing the core population of the Province of Cunene. There is thus, considerable potential for widespread replication of the interventions at a larger basin scale as well as the neighbouring watersheds. Local-level stakeholders will be capacitated and involved in implementing the project's activities thereby ensuring that the project delivers tangible benefits. This will improve the likelihood of replication of such activities in additional sites, as stakeholders will be capacitated with the skills to replicate activities and will be exposed to the benefits associated with successful activities. The project will generate important documentation of studies and analyses that will be widely disseminated through workshops and existing knowledge networks. Importantly, the project will ensure that project lessons emerging from key project activities, such as rainwater harvesting, community adoption of drought, flood resistant crop varieties and small scale adaptive initiatives are documented.

199. Therefore, sharing of methodologies, results and lessons learned will be compiled and disseminated to other Communities, Districts and Provinces through the project's web-based platform CC-ENISA and associate Provincial services and through a range of communication media via the ALM and other knowledge networks. A public awareness campaign and field demonstrations to project sites will also be organized.

2.9 Stakeholder involvement plan

200. 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.

201. The draft proposal was presented to a wide range of stakeholders at a National Validation workshop in (March 2014) and their inputs were used to further develop the project design and the core of the Project Document (minutes of meeting in Annex 6). One additional mission was carried out earlier in November 2013 to the Province of Cunene by the National Consultant and Project Team to: i) establish the baseline on Communities and stakeholders vulnerability towards climate change induced extreme weather events and; to ii) find out about communities and stakeholders priorities for Flood Forecast and Early Warning/adaptation measures (Annex 5 - Field Mission Report).

202. 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 (Annex 2, Table 7). They have different roles to play in the project and the Annex 2, Table 8 indicates key stakeholders and their possible roles. National level groups will include central government, and autonomous GoA agencies like INAMET, INARH, IDA, SNPCB and GoCP. Traditional leadership, although civil is appointed through state institutions. The lead institution for all project outputs is the Ministry of Environment (MINAMB). The implementation strategy for the project is dependent on comprehensive stakeholder participation.

Gender Involvement

203. In least developed countries, women tend to have lower incomes and fewer opportunities than men do, and their capacity to adapt to the effects of climate change is therefore constrained⁵⁹. Despite their capability to innovate and lead, women have historically also been marginalised from local and national decision-making processes. It is therefore important to identify gender-sensitive strategies to ensure that women are included in measures designed to improve their resilience and capacity to adapt to climate change⁶⁰. Aggregate data shows that women comprise about 43 percent of the agricultural labour force globally and in developing countries in Sub-Saharan Africa, women make up almost 50 percent of the agricultural labour force, an increase from about 45 percent in 1980. The averages in Africa range from just over 40 percent in Southern Africa to just over 50 percent in Eastern Africa⁶¹. In Cunene Province it is estimated that woman make up 54 percent of the agricultural labour force⁶². In this pastoralist and mixed farming system, livestock play an important role in supporting women and improving their financial situation, and women are heavily engaged in the sector. The field study supporting this project (Annex 5 in the project document), that was carried out in the main *Comunas* of the Cuvelai Basin have highlighted the positive role of women in the development of activities relating to small scale farming and livestock raising, two important activities of this traditional and itinerant agriculture based on dry land cultivation and livestock which are the drivers for livelihood and food security. In all consulted *Comunas*

⁵⁹ Lambrou, Y., & Piana, G. (2006). *Gender: the missing component of the response to climate change*. Food and Agriculture Organisation, Gender and Population Division.

⁶⁰ Denton, F. (2002). Climate change vulnerability, impacts, and adaptation: Why does gender matter? *Gender & Development*, 10(2), 10–20. doi:10.1080/13552070215903

⁶¹ ESA Working Paper No. 11-02 March 2011 Agricultural Development Economics Division The Food and Agriculture Organization of the United Nations www.fao.org/economic/esa

⁶² Ministério da Agricultura e do Desenvolvimento Rural de Angola. Organização das Nações Unidas para Agricultura e Alimentação. Revisão do Sector Agrário e da Estratégia de Segurança Alimentar para Definição de Prioridades de Investimentos -TCP/ANG/2907. A mulher e o desenvolvimento rural. Working Paper nº 20. Março 2004.25p.

during December 2013 field mission (Annex 5), several farming associations operating in the visited comunas were contacted and more than 60% (e.g. 56% out of 68 in Mukolongondjo; 66/% out of 329 in Evale) of the farmers interviewed were women.

204. In the rural environment of the Cunene Province and in particular in Cuvelai Basin, the burden of traditional farming activities such as weeding, harvesting and threshing, water carrying, livestock keeping and caring for home gardens is generally left to women. However, in terms of the domestic or child-rearing sphere, there is little change from traditional gender roles. As elsewhere, women's concerns in Cunene Province are broader and related to overall family well-being (including access to water, education and health in post-disaster conditions). While women's' vulnerabilities to climate change and disaster in Cuvelai Basin are similar to those of men, they do have specific additional concerns, linked to their key roles in the society and households, for example: (i) The need for provision of water and firewood; (ii) Damage to seeds and failing of crops under drought and flooding events; and (iii) lack of access to markets and hence sale of products/ generation of cash. However, much of their interest is in communally produced crops for subsistence and cash sales in some cases, where either they share the money or go into a commercial venture together. Most women's groups have only one or two literate members, usually the Secretary and/or the Treasurer. Therefore, the specific involvement of women and gender-sensitive activities have been mainstreamed and are fully integrated in the proposed Project Document and gender equality issues will need to be considered throughout the duration of the proposed LDCF project as outlined. Activities planned by the proposed LDCF project are not limited to responding to gender differences but have been also designed to reduce gender inequality by empowering women and seeking their inputs. Aligning the project with the needs of women will increase the utility and longevity of the investments.

With this in mind, the project design was conducted so that most of the activities foreseen are gender balanced, particularly in the training and capacity-building approaches which are recommended to be gender sensitive (*Outcome 1. Output 1.3 - Indicative activities 1.3.1*). Furthermore, adaptation technologies to be deployed in the local communities, such as promoting dissemination of seed packets of climate-resilient crops for subsequent multiplication will target primarily smallholder farmer groups/Cooperatives/Women Associations. The indicator 2.1 under Outcome 2 will specifically track the percentage change in gender disaggregated household income in the 7 targeted comunas as a result of project intervention via perception based survey (VRA). Outcome 2 - Indicator 2.2. *No. of household in targeted comunas engaged in climate resilient farming methods and livelihoods* will also be gender-disaggregated.

205. In addition, community-based communication and information sharing tools using local languages (community media: TV, local community based radios and newspapers) for climate and hazards predictions/dissemination through pilot small-scale Community based FFEWS (CBFFEWS) network in 7 selected sites will be established with a strong participation of women and youth (*Outcome 3. Output 3.4 - Indicative activities 3.4.3*). This equal participation of women and men is in line with the principles underlying UNDP's gender equality strategy as well as the GEF's own guidance and standards (Mainstreaming Gender at the GEF, 2008). In addition to gender, the project will promote the requirements of other disadvantaged and more vulnerable groups including the elderly, children and disabled.

III. PROJECT RESULTS FRAMEWORK

<p>This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: Outcome 6: Strengthen national capacities to mainstream environmental protection into national development plans and programmes through a pro-poor growth perspective; Output 6.3: Increased institutional capacity for monitoring environmental trends in nation-wide scale; output 6.4: Climate change adaptation is mainstreamed into national development policies and plans</p>					
<p>Country Programme Outcome Indicators: i) Number of national policies on sustainable development; ii) Number of programmes focusing on mainstreaming environmental protection; iii) Number of programmes and policies on sustainable use of resources (Land and water); iv) Number of international environment conventions being reported/monitored</p>					
<p>Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR</p> <p>2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. Expanding access to environmental and energy services for the poor.</p>					
<p>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”.</p>					
<p>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”.</p>					
<p>Applicable SOF (e.g. GEF) Outcome Indicators:</p> <ul style="list-style-type: none"> • 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
<p>Project Objective⁶³</p> <p>To reduce the climate-related vulnerabilities facing the inhabitants of Angola’s Cuvelai River Basin through targeted investments and capacity</p>	Percentage change in vulnerability of local community to climate risks.	The vulnerability of the site is high. The baseline will be determined at project onset during the inception phase.	At mid-term 35% increase of VRA score; at end-of-project 70% of VRA score.	Gender sensitive field survey / VRA.	<p>Assumptions:</p> <ul style="list-style-type: none"> • Government is committed to integrating climate change risk and adaptation needs in development planning of Province of Cunene; • Planning will be conducted in a participatory manner to ensure that adaptation measures are appropriated by the community; • Stakeholders are committed to implement the project interventions and provide the necessary support.

⁶³Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

building.					<i>Risk:</i> Insufficient institutional support and political commitments and lack of coordination of the various key stakeholders.
Outcome 1⁶⁴ Enhanced capacity of national and local hydro-meteorological services, civil authorities and environmental institutions to monitor extreme weather and climate change in the Cuvelai Basin.	1.1A Flood Forecasting & EWS that is useful to communities developed and forecasts disseminated to target communities in Province of Cunene.	1.1Currently no Flood Forecasting & EWS established in Province of Cunene.	1.1By the end of the project a Flood Forecasting & EWS is developed and forecasts are being disseminated to target communities in Province of Cunene.	1.1Field survey and PIR	Assumptions: Costs of equipment and training will not rise dramatically during project implementation. <ul style="list-style-type: none"> • Technical expertise and equipment for upgrading the network is available. <i>Risk:</i> Telecommunication (SMS) communication systems used for data transmission from Automatic Weather Stations will not be robust enough (e.g., bandwidth issues or local mobile telecommunication networks) to be able to effectively contribute to EWS data sharing and real time forecast development.
Outcome 2 Increased resilience of smallholder farmer communities in the Basin to climate-induced risks and variabilities.	2.1 Percentage change in gender disaggregated household income in the 7 targeted comunas as a result of project intervention via perception based survey (VRA) 2.2. No. of household in targeted	2.1 N/A at present – project will undertake a gender disaggregated VRA at project onset. 2.2 Few households have access to resilient livelihood assets and methods (Score=2)	2.1 At mid-term 25% gender disaggregated increase of VRA score; By the end of the project 50% gender disaggregated increase of VRA score 2.2 Score improved to 4: By the end of the project, at least 50% of targeted households have engaged in climate resilient farming methods and livelihoods introduced/strengthened in the project.	2.1 Survey/VRA 2.2 Household surveys using an appropriately designed household livelihood asset/method index	Assumptions: <ul style="list-style-type: none"> • Financial, Technical and political support will be given to EDA's for training of staff and implementation of activities as planned. • Communities in target <i>Comunas</i> are willing to cooperate and adopt climate change adaptation measures. <i>Risk:</i> Poor coordination and weak capacity of relevant stakeholders to implement climate change adaptation measures in target <i>Comunas</i> .

⁶⁴All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

	comunas engaged in climate resilient farming methods and livelihoods				<i>Risk:</i> Communities in target <i>Comunas</i> are not committed to cooperate and/or accept proposed adaptation measures.
Outcome 3 Local institutional capacities for coordinated, climate-resilient planning strengthened & Capacity for effective community-based climate change adaptation (including traditional knowledge practices) improved at local level (equivalent to activity in ATLAS)	3.1 CC-Environmental Information System of Angola (CC-ENISA) is established, risk assessed and vulnerability maps developed for the Cunene Province and the Cuvelai in particular.	3.1 Climate Change risks have not been modelled Angola and no vulnerability maps have been developed so far for Cunene Province and the Cuvelai in particular.	3.1 By the end of the project CC-ENISA has been running Risk modelling and Vulnerability maps for the Cunene Province and the Cuvelai in particular have been developed.	3.1 Project evaluation reports (PIR) and Vulnerability maps developed.	Assumptions: <ul style="list-style-type: none"> Activities programmed for equipment purchase and training of staff in GIS are implemented as planned. Adequate and timely national and international support for sharing and exchange of climate change data, modelling information and other relevant data and information. <i>Risks:</i> Complex technical and organizational management of knowledge base that can delay project implementation.
	3.2 Number of National or Provincial relevant plans and/or policy documents that integrate climate change flood and drought risks	3.2 Currently, no plans and policies that explicitly integrate climate change flood and drought risks are in place.	3.2 By the end of the project CC flood and drought risk/vulnerability are integrated into at least one National and one Provincial disaster preparedness and management Plans.	3.2 Project evaluation reports (PIR) and Plans and policies developed.	

IV. TOTAL BUDGET AND WORKPLAN

Award ID:	00081003	Project ID(s):	00090473
Award Title:	LDCF_CC Adaptation_Cuvelai		
Business Unit:	AGO10		
Project Title:	Promoting climate-resilient development and enhanced adaptive capacity to withstand disaster risks in Angolan's Cuvelai River Basin		
PIMS no.	5166		
Implementing Partner (Executing Agency)	Ministry of Environment		

Details below need to be entered prior to DOA issuance. (Adjust according to SOF requirements)

SOF (e.g. GEF) 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: <i>Enhanced capacity of national and local hydro-meteorological services, civil authorities and environmental institutions to monitor extreme</i>	Ministry of Environment	62160	GEF LDCF	71200	International consultant	78 333	18 333	78 333	18 333	193 332	1
				72100	Contractual Services - Companies	130 000	250 000	250 000	250 000	880 000	2
				71300	Local Consultants	50 000	50 000	50 000	50 000	200 000	3
	UNDP	62160	GEF LDCF	72200	Equipment (general) and Furniture	100 000	770 000	160 000	45 000	1 075 000	4
	Ministry of Environment	62160	GEF LDCF	74200	Audio Visual and Print Production Costs	5 000	20 000	20 000	20 000	65 000	5
				75700	Training, Workshops and Conferences	72 500	586 250	586 250	100 000	1 345 000	6
				72300	Materials and Goods	-	50 000	25 000	-	75 000	7

<i>weather and climate change in the Cuvelai Basin.</i>				71400	Contractual Services - Individual	20 000	20 000	20 000	20 000	80 000	8
				71600	Travel	10 000	10 000	10 000	10 000	40 000	9
	UNDP	04000	UNDP	61300	Salary, Post Adj, Recurrent and Non-Rec Cst-IP Staff	76 667	76 667	0 000	0 000	153 334	10
				Sub-Total Outcome 1	GEF LDCF	465,833	1,774,583	1,199,583	513,333	3,953,332	
				Total Outcome 1		542,500	1,851,250	1,199,583	513,333	4,106,666	
OUTCOME 2: <i>Increased resilience of smallholder farmer communities in the Basin to climate-induced risks and variabilities.</i>	Ministry of Environment	62160	GEF LDCF	71200	International consultant	18 333	55 333	18 333	55 333	147 332	11
				72100	contractual services - companies	14 000	57 000	20 000	67 000	158 000	12
				71300	Local Consultants	13 000	117 000	116 000	112 000	358 000	13
				72300	Materials and Goods	-	115 000	120 000	35 000	270 000	14
	UNDP	62160	GEF LDCF	72600	Grants	-	150 000	-	150 000	300 000	15
	Ministry of Environment	62160	GEF LDCF	74200	Audio Visual and Print Production Costs	5 000	37 500	38 000	38 000	118 500	16
				75700	Training, Workshops and Conferences	25 000	40 000	145 000	80 000	290 000	17
				71600	Travel	10 000	10 000	10 000	10 000	40 000	18
				71400	Contractual Services - Individuel	20 000	20 000	20 000	20 000	80 000	19
	UNDP	62160	GEF LDCF	72200	Equipment (general) and Furniture	65 000	105 000	105 000	5 000	280 000	20
	UNDP	04000	UNDP	61300	Salary, Post Adj, Cst-IP Staff	76 667	76 667	0 000	0 000	153 332	21
				Sub-Total Outcome 2	GEF LDCF	170,333	706,833	592,333	572,333	2,041,833	
				Total Outcome 2		247,000	783,500	592,333	572,333	2,195,166	
OUTCOME 3: <i>Local institutional capacities for coordinated, climate-resilient planning strengthened & Capacity for</i>	Ministry of Environment	62160	GEF LDCF	71200	International consultant	18 333	18 333	18 333	18 333	73 332	22
				72100	Contractual Services - Company	90 000	50 000	65 000	115 000	320 000	23
				71300	Local Consultants	78 750	49 050	79 300	122 300	329 400	24
				72100	Contractual Services-Company	33 750	33 750	33 750	33 750	135 000	25
				72300	Materials and Goods	65 250	92 750	92 750	92 750	343 500	26

<i>effective community-based climate change adaptation (including traditional knowledge practices) improved at local level.</i>				74200	Audio Visual and Print Production Costs	5 000	10 000	10 000	40 000	65 000	27
				75700	Training, Workshops and Conferences	27 000	27 000	27 000	27 000	108 000	28
	UNDP	62160	GEF LDCF	72600	Grants	-	150 000	-	150 000	300 000	29
	Ministry of Environment	62160	GEF LDCF	71600	Travel	10 000	10 000	10 000	10 000	40 000	30
				71400	Contractual Services - Individuel	20 000	20 000	20 000	20 000	80 000	31
	UNDP	62160	GEF LDCF	72200	Equipment (general) and Furniture	7 000	7 000	7 000	7 000	28 000	32
	UNDP	04000	UNDP	61300	Salary, Post Adj Cst-IP Staff	76 666	76 666	0	0	153 334	33
				Sub-Total Outcome 3	GEF LDCF	355,083	467,883	363,133	636,133	1,822,232	
				Total Outcome 3		431,749	544,549	363,133	636,133	1,975,564	
PROJECT MANAGEMENT COSTS/UNIT	Ministry of Environment & UNDP	62160	GEF LDCF	71400	Contractual Services - Individuel	56 400	56 400	14 400	14 400	141 600	34
				71600	Travel	2 000	2 000	2 500	2 500	9 000	35
				72200	Equipment (general) and Furniture	9 000	2 000	2 000	2 000	15 000	36
				72400	Communic & Audio Visual Equip	2 274	3 000	3 000	3 000	11 274	37
				74100	Professional Services	7 000	7 000	7 000	7 000	28 000	38
				75700	Training Workshops and Conferences	2 000	2 000	2 000	2 000	8 000	39
	UNDP	62160	GEF LDCF	74599	UNDP Cost Recovery charges-bills	21 873	21 684	21 684	20 484	85 725	40
	Ministry of Environment	62160	GEF LDCF	74500	Miscellaneous	1 000	1 000	1 000	1 005	4 005	41
	UNDP	62160	GEF LDCF	71200	International Consultant	0	0	40 000	40 000	80 000	42
					Total Project Management Costs	101,547	95,084	93,584	92,389	382,604	
				Total	UNDP	<i>230,000</i>	<i>230,000</i>	<i>0</i>	<i>0</i>	<i>460,000</i>	
				Total	GEF LDCF	1,092,796	3,044,383	2,248,633	1,814,188	8,200,000	

	PROJECT TOTAL	GEF LDCF + UNDP	1,322,796	3,274,383	2,248,633	1,814,188	8,660,000	
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	Amount	Amount	Amount	Amount	Total
	Year 1	Year 2	Year 3	Year 4	
GEF	1 092 796	3 044 383	2 248 633	1 814 188	8 200 000
UNDP (Grant + Core Resources)	258 500	258 500	-	-	517 000
UNDP (In-Kind)	200 000	200 000	-	-	400 000
MINAMB - Ministry of Environment	500 000	500 000	500 000	500 000	2 000 000
National Directorate of Hydrologic Resources - Ministry of Energy and Water (MINEA)	250 000	250 000	250 000	250 000	1 000 000
Ministry of Energy and Water (MINEA) - Programme of Public Investment (PIP)	9 759 428	9 759 428	9 759 428	9 759 428	39 037 712
INAMET - National Institute of Meteorology and Geophysics.	242 073	242 073	242 073	242 073	968 292
FAO's corporate Strategic Objective 5 (SO5 - increase the resilience of livelihoods to threats and crises) (In-Kind)	400 000	400 000	400 000	400 000	1 600 000
Development Workshop Angola (Local NGO). (In-Kind)	237 500	237 500	237 500	237 500	950 000
TOTAL	12,940,297	14,891,884	13,637,634	13,203,189	54,673,004

Budg et Note	Description of cost item
1	International hydrological/Modelling specialist. International meteorological/EWS specialist. Outcome 1 - International M&E expert.
2	Assess installation sites for AWS and make arrangements (equipment housing, security, personnel) for installation and testing of remote transmission system to INAMET in Ondjiva & Luanda Forecasting Centre. Data transmission, communications and ICT.
3	National hydrological specialist. National meteorological specialist.
4	Install and test 6 Automatic Weather Stations (AWS) and at least 6 rainfall gauges complete with remote data transmission and archiving with display systems at INAMET in Ondjiva & Luanda Forecasting Centre. Procure spare 3 Automatic Weather Stations (AWS) and 3 rainfall gauges complete with remote data transmission and archiving with display systems. Procure and operationalise a mobile AWS for sensor's field calibration, integrating the Ondjiva AWS recently installed and other INAMET existing AWS

	<p>and interfacing to central data collection & storage system.</p> <p>Install and test 4 automatic river gauging stations and at least 4 manual water level (at the Cuvelai and Miu rivers) stations, complete with remote data transmission and archiving with display systems at INAMET, Civil Protection, INARH, Provincial Government and relevant municipal and communal administrations.</p> <p>Procure spare 2 automatic river gauging stations and at least 2 manual water level (at the Cuvelai and Miu rivers) stations, complete with remote data transmission and archiving.</p> <p>Installation and construction costs (including weather fencing) for 10 Met & Hydromet AWSs.</p> <p>Procure and operationalise a mobile Hydromet Automatic Station (HAS) for sensor's field calibration, integrating existing and recently installed stations by the INARH and interfacing to central data collection & storage system.</p> <p>Install high end PCs to accommodate high volume handling and satellite dish with appropriate low noise block-down-converter (or LNB).</p> <p>In case telecommunication operators (UNITEL or MOVICEL) are not identified in the locations for AWS installation acquire and install 6 VHF-U systems and/or Advanced powerful Walky Talky systems (50km range or plus via transmitters) using open UHF radio frequencies for data transfer.</p> <p>Telecommunications infrastructure including computers, computer servers and software, radiotelephones, portable telephones, GSM/GPRS/GSM/GPRS modems and other equipment for internet access.</p> <p>VHF-U systems and/or Advanced powerful Walky Talky systems using open UHF radio frequencies;</p> <p>Stabilise power at 10 AWSs through the provision of dry cells, upgrading solar panels, and batteries</p> <p>Procure equipment (hardware and software) and ensure connectivity (internet modems and access) for 16 modern forecasting workstations to support INAMET at Ondjiva and Luanda and synoptic stations.</p> <p>Buy data rescue and digitization equipment for INAMET, MINAMB and INARH archives.</p> <p>Communication Facility Radio Transceiver and supporting two way radios.</p> <p>Vehicles (including motorcycles) for technical hydro-meteorological staff for field visits and other project activities related to ensuring the effective operation and maintenance of all equipment installed.</p>
5	Editing, printing and publishing protocols, handbooks, policy and information briefs, and/or guidelines on climate change adaptation, hydro-meteorological data and early warning systems.
6	<p>Carry out meteorological/hydrological training programme of 5-10 potential candidates amongst the most experienced Meteorological Technicians with Maths & Physics advanced studies for a 12 months; \$500 000.</p> <p>Carry out operational hydrological modelling and sector tailored hydrological forecasting techniques and information packaging for Early Warning System of 5-10 potential candidates amongst the most experienced Meteorological Technicians with Maths & Physics advanced studies for a 12 months; \$500 000.</p> <p>Provide in-service capacity programme in downscale forecast techniques and sector tailored weather forecasting and information packaging for all INAMET meteorologists and INARH Hydrologists (20-30 staff members);\$100000.</p> <p>Provide in-service capacity programme for at least 2 INARH technicians in operating modelling software and flood risk warning development (2months);@\$25000ea.</p> <p>Facilitate in-service capacity programme for at least 20 Civil Protection officers in Cunene Province and MINAMB officers to be trained as managers of the Flood Forecasting and Early Warning issuing, dissemination and response actions; \$50000.</p> <p>Facilitate in-service capacity programme for at least 20 Provincial government officers from the following sectors: water, IT & Communications, Environment, Planning and Disaster Management Sectors and MINAMB officers to be trained in Climate Change/Variability and management of Flood Forecast and Early Warning System dissemination and response operations; @\$50000ea.</p>

	Facilitate 2 trainers to conduct training (5 days) for decision makers in the Cunene Province to use Agromet information and seasonal food security forecast for Early Warning System planning and responses. @25000. Provide in-country national technical hydrometeorological operation and maintenance training (2 weeks). @25000. conduct training of up to 15 weather observers at (Mukolongondjo, Mupa, Evale, Nheone, Namacunde, Cubati, and Ondjiva) observation sites @\$50000ea Host a National Inception workshop. @35000
7	Material for colour coded signs for alerts – advisories, watches and warnings. Renewal/purchase of hydrological modelling licenses (e.g the MIKE 11/BASIN, MIKE FLOOD WATCH (2) and USGS Geo-spatial flood forecasting models).
8	Project manager (@ \$5 000/month) costs under Component 1.
9	Travel cost associated with activity implementation under Component 1.
10	Technical Adviser (P3-full time) costs under Component 1.
11	International Climate Change Rural Extension expert. Outcome 2 - International M&E expert.
12	GIS/Mapping.
13	National livelihood expert. National climate change rural extension expert. National expert to: identify local varieties, collection of local germplasm from the Basin Communities for characterization. Dissemination of seed packets of characterized climate-resilient crops for subsequent multiplication by smallholder farmer's groups/cooperatives/women association. CRF, CETAC and EDAs to establish at least three demonstration sites in farmer's plots in the Basin for in-situ characterization of climate-resilient crops National rural and livelihood economist.
14	Material to set up communal centres for agro-pastoral resources transformation. Material for the establishment of small-scale artisanal craft and pottery industry.
15	Engagement of local NGOs and CBOs for Output 2.3, on the basis of a proposal in response to a specific call for proposals. This will involve the launching of a call for proposals, the training of NGOs/CBOs and grant-making.
16	Editing, printing and publishing protocols, handbooks, policy and information briefs and/or guidelines on climate change adaptation, hydro-meteorological and early warning systems.
17	Training workshops on small-scale adaptation initiatives.
18	Travel cost associated with activity implementation under Component 2.
19	Project manager (@ \$5 000/month) costs under Component 2.
20	Vehicles (including motorcycles) for technical support on extension services and livelihoods activities. Equipment needed for the Communal Centres for Agro-pastoral resources Transformation and small-scale adaptation initiatives. Computer workstations/laptops (including internet connection) in the Cunene Province Management and Technical Unit.
21	Technical Adviser (P3-full time) costs under Component 2.
22	Outcome 3 - International M&E expert.

23	<p>Data collection and/or VRA activities, including travelling and field support teams, for target comunas in order to characterise the vulnerability hotspots in a participatory manner.</p> <p>GIS/mapping and data recovery, gathering and planning GIS systems to feed CC-ENISA.</p> <p>Develop community based warning dissemination systems, including toll-free mobile number and toll-free text and pictorial sms.</p> <p>Develop a network of institutions active in climate change adaptation to collate experiences for systematic collection of documentation of community traditional approaches to adaptation to extreme climate variability.</p> <p>Conducted en project household surveys in target communities to understand the social and economic cost and benefits of using FFEWS based advisories and warnings for climate change risk management in agriculture and water management.</p>
24	<p>National data collection and /or VRA expert for target comunas in order to characterise the vulnerability hotspots in a participatory manner.</p> <p>National adaptation, early warning system and disaster management consultant to support SNPCB in pilot communication and dissemination of disaster preparedness and response plans at local level, conduction of awareness training for vulnerable communities on adaptation responses.</p> <p>Regional focal points for target comunas.</p>
25	<p>Establish partnerships with INAMET and relevant institutions for exchange of data and development of online environmental advisory service for sectorial use</p> <p>Co/production between local communities and scientists of climate based flood and drought risk mappings and assessments to improve the accuracy and utility of the climate risk information produced.</p> <p>Support and assist GoC to develop climate change based provincial development plans, based on the vulnerability and risks mapping and assessment obtained from Output 2.1.</p> <p>Carry out identification of priority areas/sectors for cc risks, adaptation planning and mainstreaming CCA measures at national and provincial levels.</p> <p>Procure and hire technical advisory services to support the integration of cc flood and drought risk/vulnerability information into the national, provincial and district disaster preparedness and management plan.</p> <p>Carry out needs assessment of provincial delegation of SNPCB communication network to strengthen warning dissemination capacity including radio and SMS-based system.</p>
26	<p>Advanced workstations and GIS facilities to function as National CC information portal.</p> <p>Acquire and install GIS supporting equipment to allow systematic data sharing and streamlining of digital information between MINAMB CC-ENISA and GoC to develop CC risk /vulnerability GIS based information, to support integration CC risk into national policies and plans</p> <p>Establish and operationalise SNPCB local disaster risk management committees structure at target comunas to support warning dissemination and response</p> <p>Acquire and operationalise at least 7 mobile satellite sms-front line technology equipment including airtime to establish a FFEWS two-way communication and dissemination system tailored to the needs of target communities</p> <p>Acquire and operationalise at least 50 VHF radios to strengthen SNPCB communication network for FFEWS response.</p> <p>4 hotlines/call centre established at national and provincial level.</p> <p>15 smartphones for comuna/community champions to improve risk management communications between locality, comuna, province and national structures.</p>
27	<p>Protocols, handbooks, policy and information briefs and/or guidelines.</p> <p>Project lessons learnt and communities' traditional knowledge widely shared with local partners, international agencies, scientific community and transborder Namibian Cuvelai communities through mechanisms such as, but not limited to, the UNDP Adaptation Learning Mechanism (ALM).</p>

28	Capacity development for systematic GIS data handling, for the development of national climate change vulnerability, flood and drought risk mapping, particularly for the Cuvelai basin. Provincial SPCB department to train local disaster risk management committees (LDRMC) and conduct regular national drills involving all actors of future FFEWS and in particular women and youth associations of target communities to test effectiveness and readiness of the system. Training of provincial personnel on mainstreaming climate change adaptation. MINAMB and GoC personnel (2) trained to calibrate and upgrade in the target comunas the climate risk and vulnerability sector-specific maps produced.
29	Engagement of local NGOs and CBOs for Output 3.4 on the basis of a proposal in response to a specific call for proposals. This will involve the launching of a call for proposals, the training of NGOs/CBOs and grant-making.
30	Travel cost associated with activity implementation under Component 3.
31	Project manager (@ \$5 000/month) costs under Component 3.
32	Vehicles for focal points in the target communities to develop and facilitate disaster management project activities related to the effective operation and maintenance of all equipment installed and delivery of climate change adaptation measures. Computer workstations & laptops (including internet connection).
33	Technical Adviser (P3-full time) costs under Component 3.
34	Financial assistant (@3,500) (2 years) and administrative officer (@1,200).
35	Travelling Expenses.
36	Office equipment.
37	Communication cost (internet, cell phone, etc.).
38	Audit, translation services, advertisement, etc.
39	Project Board meetings.
40	UNDP Cost Recovery charges-bills. (Direct project costs)
41	Miscellaneous expenses.
42	Mid-term review and final evaluation.

V. MANAGEMENT ARRANGEMENTS

5.1 Overview

206. Implementation, execution and coordination of the Project will be carried out as described below. In brief, several activities are envisaged including the convening of a National Project Board, chaired by the Minister of Environment. This is to be supplemented through the appointment of a National Project Director supported by the Project Management Unit (which mainly includes the appointment of a national Project Manager, a national Finance Manager and international Technical Advisor).

207. The project will be implemented over a period of 4 years. The project will be nationally implemented (NIM) by the Ministry of Environment (MINAMB) with UNDP Country Office support, in line with the Standard Basic Assistance Agreement (SBAA of 18 February, 1977)⁶⁵ and the UNDP Country Programme Action Plan (CPAP 2009-2013 of 14 May, 2009) signed between the UNDP and the Government of Angola.

5.2 Implementing Partner

208. The MINAMB is the Implementing Partner of the project. It will provide overall leadership for the project in close collaboration with the Ministry of Energy and Water (National Institute of Water Resources), the Ministry of Interior (Civil Protection), the Government of the Cunene Province and the National Institute for Meteorologist (INAMET).

209. The MINAMB will have the responsibility for achieving the project goal and objectives. MINAMB will designate a senior official to act as the National Project Director. The National Project Director has the authority to administer the project on a day-to-day basis on behalf of MINAMB, within the conditions laid down by the Project Board (PB) and in line with UNDP Policies and Procedures. The National Project Director'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. The National Project Director will liaise and work closely with all partner institutions to link the project with complementary national programs and initiatives. The National Project Director is accountable for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. For this project, the National Project Director will be the Director of the Climate Change Cabinet, Ministry of Environment. The National Project Director will ensure coordination among actors/other projects during the implementation of the project, through two technical commissions created for this purpose (described below). The MINAMB will also indicate an alternate that will act as NPD in absence of him/her to ensure continuity.

5.3 Implementing Arrangements

⁶⁵ In particular, Decision 2005/1 of 28 January, 2005 of UNDPs Executive Board approved the new *Financial Regulations and Rules* and along with them the new definitions of 'execution' and 'implementation'.

210. The Project implementing agency MINAMB will have full responsibility under the NIM arrangements to ensure accountability, transparency, timely implementation, management and achievement of results. UNDP will have responsibility for overseeing the implementation of the project.

211. A Project Board shall be established to provide guidance and support for the smooth implementation of the project with membership drawn from the key stakeholder institutions. The role and responsibilities of the Board are spelt out below.

212. The PD will ensure a continued cohesion between the project and the mandate of the MINAMB and provide additional linkages and interactions with high level policy components within the Government. In this way, the MINAMB – the lead agency will be in a good position to assume responsibility and follow up on, supervise and coordinate the contributions from stakeholders.

213. The day- to- day management of the project shall be entrusted to the Project Management Unit (PMU) which will be accountable to the National Project Director and Board for the performance of the project. The project team will be partially based in Luanda and partially based in Cunene to be able to properly cover local as well as central level needs. The Unit will be manned by a fulltime staff complement comprising a Project Manager, Finance Manager, Project Assistant, financed from the LDCF grant and a Technical Advisor financed from UNDP TRAC contribution.

a. The day-to-day administration and implementation of the project will be carried out by the National Project Manager. The PM, who will be delegated (or recruited by MINAMB using national rules and regulations and ensuring international standards on recruitment processes) on full-time basis to the project implementation, will take guided by the Project Director. The PM will be based in Cunene in order to facilitate smooth implementation in the target area. The PM is accountable to the National Project Director for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds.

The PM will produce Annual Work and Budget Plans (AWP&ABP) with support from project team, to be approved by the PB at the end/beginning of each year. These plans will provide the basis for allocating resources to planned activities. Once the PB approves the Annual Work Plan, this will be sent to the UNDP Regional Technical Advisor for Climate Change at the GEF Regional Coordinating Unit (RCU) for clearance with respect to GEF funds. Once the Annual Working Plan and Budget is cleared by the UNDP GEF Regional Coordinating Unit, GEF funds will be thereafter released. The PM, with support from the project team, will further produce quarterly progress and financial reports and Annual Progress Reports (APR) for review by the PB, or any other reports at the request of the PB. These reports will summarize the progress made by the project versus the expected results, explain any significant variances, detail the necessary adjustments and be the main reporting mechanism for monitoring project activities.

b. A national Project Assistant will be hired to directly support the PM on administrative issues. She/he will be based in Cunene.

c. An international Technical Advisor-TA (P3) will be recruited by UNDP and she/he will be based in Luanda, with often field missions to Cunene. This TA will be an expert on Adaptation and will provide technical support to the project and to the Climate Change Cabinet (CCG) in related issues. The TA will also support the CCG in the GEF/UNDP/UNEP project entitled “Angola: Addressing Urgent Coastal Adaptation Needs and Capacity Gaps” (GEF ID: 5230) on a cost-sharing basis.

d. Due to the complexity of the project, a Finance Manager will be recruited by UNDP to financially support and capacitate the CCG on financial issues. This Finance Associate will also support the CCG in the GEF/UNDP/UNEP project entitled “Angola: Addressing Urgent Coastal Adaptation Needs and Capacity Gaps” (GEF ID: 5230) on a cost-sharing basis.

e. Driver (based in Luanda – recruited by MINAMB)

214. The terms of reference for such personnel are set out in Annex 9.

215. The Project Implementation Support Team (PIST) comprising experts (both national and international) who will be contracted to perform specific tasks as required by the project will support the Project Management Unit.

216. Overall responsibility for Project Implementation will rest with the PMU whilst individual site intervention will be supported by the relevant government technical agencies such as INAMET in the case of meteorological stations or National Institute for Water Resources in the case of gauging stations. The representatives of these technical agencies shall form the Project Support Team (PST) in order to provide technical advice and guidance to the PMU. The PST shall also include traditional rulers as representatives of local communities.

217. Project assurance: The UNDP (Country Office and UNDP-GEF unit) will monitor the project’s implementation and achievement of the project outcomes and outputs, and ensure the proper use of UNDP/GEF funds.

218. As requested by the Government of Angola, the UNDP Country Office will provide the following support services for the implementation of this project, and recover the actual direct and indirect costs incurred by the Country Office in delivering such services as stipulated in the Letter of Agreement (LOA) between the Government of Angola and UNDP (refer annex) and following the Universal Prices List:

- Payments, disbursements and other financial transactions
- Recruitment of staff, project personnel, and consultants
- Procurement of services and equipment, including disposals
- Organization of training activities, conferences, and workshops, including fellowships
- Travel authorization, Government clearances ticketing, and travel arrangements
- Shipment, custom clearance, and vehicle registration

219. All relevant project staff will be trained by UNDP during the early implementation phase on administrative issues, financial matters, procurement etc. This will contribute to strengthening the administration and financial management capacities of the project implementation partners.

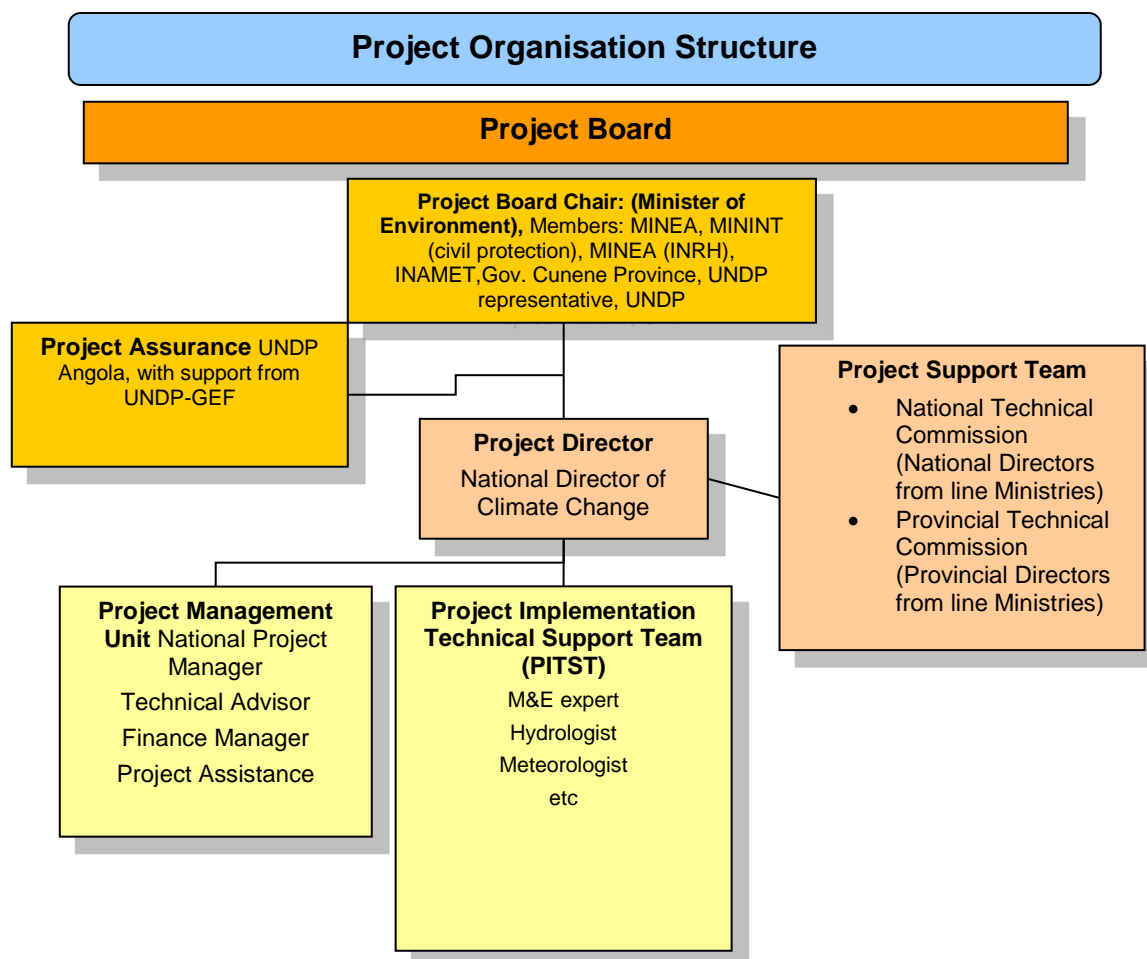
5.4 Project Board

Role of the Project Board

219. The Project Board is the group responsible for making by consensus management decisions for a project when guidance is required by the Project Manager, including recommendation for UNDP/Implementing Partner approval of project plans and revisions. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance to standards that shall ensure best value to money, fairness, integrity transparency and effective international competition. Project reviews by this group are made at designated decision points during the running of a project, or as necessary when raised by the Project Manager. This group is consulted by the Project Manager for decisions when project management tolerances (normally in terms of time and budget) have been exceeded.

220. The Project Board approves project annual work plan (AWP), and authorizes any major deviation from the agreed work plan. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems between the project and external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities.

Figure 3. Proposed Project Management Structure



221. To avoid duplication of current structures, the *Comissão Nacional de Alterações Climáticas e Biodiversidade* will act as the Project Board (PB) for this project. The Government of the Cunene Province and the UNDP will be invited to this *Comissão* in those sessions related to the project. It is the highest coordination and decision-making body. The Project Board will ensure that the project remains on course to deliver the desired outcomes of the required quality. It will also ensure strategic coordination among different projects and actors. The *Comissão Nacional de Alterações Climáticas e Biodiversidade*, the PB, is chaired by the Minister of Environment and includes Ministers from Ministry of Interior (Civil Protection), Ministry of Energy and Water, INAMET. In those sessions of the *Comissão Nacional de Alterações Climáticas e Biodiversidade* in which the project were into the agenda, the Governor of the Cunene Province, Responsible Parties and the UNDP Resident Representative will be invited.

222. The PB's constitution will be reviewed and recommended for approval during the Local Project Appraisal Committee (LPAC66) meeting. Representatives of other stakeholder groups may be included in the PB, as considered appropriate and necessary.

223. The PB will meet at least twice per annum (more often if required).

⁶⁶Refers to a UNDP procedural and minuted meeting which allows the Resident Representative to sign off on a Project Document.

224. Specific Roles of the Project Board

- a) The Board shall set strategic direction, reinforce government leadership of the program and coordinates all interventions;
- b) Provide guidance and agree on possible countermeasures/management actions to address specific risks;
- c) Agree on Project Manager's tolerances in the Annual Work Plan (prior to approval by UNDP) and quarterly plans when required;
- d) Conduct regular meetings to review the Project Progress and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to the approved Annual Work Plan;
- e) Provide ad-hoc direction and advice for exception situations when project manager's tolerances are exceeded;
- f) Review and approve all activities that are supported by the program based on the program objectives, work plan and availability of funding;
- g) Provide technical advice to create synergy and uniformity between program supported activities and policy;
- h) Guide and support program delivery at sectoral level;
- i) Provide support in resource mobilization to support program funding gaps;
- j) Monitoring and evaluation of program activities through periodic meetings and occasional site visits;
- k) Receive reports on all activities supported by the program to serve as an additional basis to assess and monitor the program performance and delivery.

5.5 Project Support Team

Technical Commissions

225. Due to the nature of the project, to be implemented at two levels, national and local, two Technical Commissions will be created: one at national level (composed by National Directors of Ministries/Institutions involved) and another at local level (composed by Provincial Directors of Ministries involved). Detail composition of these Commissions will be presented/approved at the LPAC meeting.

Contractors

226. The implementation of the components of the project will be supported by contractors, selected according to UNDP procurement rules.

Responsible Parties

227. The Government Implementing Partner may contract other entities, defined as Responsible Parties (RP), to undertake specific project tasks through a process of competitive bidding. However, if the Responsible Party is another government institution, Inter Governmental Organisation or a United Nations agency, competitive bidding will not be necessary and direct contracting will be applied. Confirmation of direct contracting will

need to comply with criteria, such as comparative advantage, timing, budgeting and quality. If direct contracting criteria cannot be met the activity will be open to competitive bidding.

228. As indicated in the Project document, in addition to its role as a GEF IA, , based on the request from the MINAMB, UNDP CO will be a RP for the following tasks:

- a. Procurement of goods and equipment for the project;
- b. Recruitment process of project staff (international technical advisor and national financial manager) as well as HR management for these project staff;
- c. Recruitment process of auditors and follow-up;
- d. Recruitment process of evaluators and follow-up.

229. Some outputs/specific activities will be implemented by responsible parties other than the MINAMB/UNDP, taking into consideration add-value criteria. These responsible parties will be confirmed at the LPAC meeting and a specific agreement will be issued accordingly.

5.6 Financial procedures

230. The financial arrangements and procedures for the project are governed by the UNDP rules and regulations for National Implementation Modality (NIM)⁶⁷, with Country Office support on specific tasks, such as procurement of equipment or recruitment of key project staff.

231. Full UNDP cost-recovery policy (based on actual costs) will be applied to those recruitments, procurement process and services requested by MINAMB to UNDP. For more details see Annex 7 (request from MINAMB for UNDP services). UNDP and MINAMP will enter into a Letter of Agreement for the provision of these services.

232. Given the NIM scenario that applies in Angola, the major part of financial transactions will be conducted through direct payment requests made by MINAMB. Some funds will be transfer to the MINAMB/Government of Cunene, as Advance of Funds, for the day-to-day functioning of the project. The National Project Manager, with support from the project team, will prepare Request for Direct Payments and Request for Advance of Funds, that will be signed by the National Project Director (or alternate) to be sent to UNDP CO.

⁶⁷ There are two scenarios of NIM: (a) Full national implementation, in which national implementing partners directly assume the responsibility for the related output (or outputs) and carry out all activities towards the achievement of these outputs; and (b) National implementation, in which the national implementing partner assumes full responsibility for the related output(s) but where, at the request of the government, UNDP as a responsible party undertakes specific and clearly defined activities for the implementing partner.

VI. MONITORING FRAMEWORK AND EVALUATION

233. 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.

234. **Project start:** A Project Inception Workshop will be held within the first 4 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.

235. 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 Project Steering Committee (PSC) meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first PSC meeting should be held within the first 12 months following the inception workshop.

236. 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.

237. **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 logs will be used to monitor issues, lessons learned. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

217. **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

218. **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.

219. **Mid-term of project cycle:** The project will undergo an independent Mid-Term Review at the mid-point of project implementation. 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.

220. **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).

221. **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.

222. 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.

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

Table 8. Project Monitoring and Evaluation

Type of M&E activity	Responsible Parties	Indicative Budget US\$ <i>Excluding project team staff time</i>	Time frame
Baseline study	<ul style="list-style-type: none"> M&E expert 	10,000	Within first two months of project start up
Inception Workshop and Report	<ul style="list-style-type: none"> Project Manager M&E expert 	5,000	Within first four months of project start up
Measurement of Means of Verification of project results.	<ul style="list-style-type: none"> M&E expert oversight by PM 	15,000	<p>To be finalized in Inception Phase and Workshop</p> <p>Start, mid and end of project (during evaluation cycle) and annually when required.</p>
Measurement of Means of Verification for Project Progress on output and implementation	<ul style="list-style-type: none"> M&E expert oversight by Project Manager 	20,000	<p>To be determined as part of the Annual Work Plan's preparation.</p> <p>Annually prior to ARR/PIR and to the definition of annual work plans</p>
ARR/PIR	<ul style="list-style-type: none"> Project manager (MEE) PIU UNDP CO UNDP RTA UNDP EEG 	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> Project manager and team Financial assistant M&E expert 	None	Quarterly
Mid-term Review	<ul style="list-style-type: none"> External Consultants (i.e. 	30,000	At the mid-point of

	evaluation team)		project implementation.
Terminal Evaluation	<ul style="list-style-type: none"> External Consultants (i.e. evaluation team) 	40,000	At least three months before the end of project implementation
Audit	<ul style="list-style-type: none"> UNDP CO Project manager Financial assistant 	Indicative cost per year: 3,000 (12,000 total)	Yearly
Visits to field sites and BtOR	<ul style="list-style-type: none"> UNDP CO UNDP RCU (as appropriate) Government representatives M&E expert 	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\$ 132,000- this is the sum of above figures. (+/- 5% of total GEF budget)	

VII.LEGAL CONTEXT

224. This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA [or other appropriate governing agreement] and all CPAP provisions apply to this document.

225. Consistent with the Article III of the Standard Basic Assistance Agreement, 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.

226. The implementing partner shall:

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

227. 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.

228. 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.

VIII. Annexes