

**Empowering
Women Groups to
Build Resilience to
Climate Impacts in
the Province of
Cunene in
South West
Angola (CREW
ANGOLA)
Pre-Feasibility Study**

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**Sahara and Sahel
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**Ajuda de
Desenvolvimento de
povo para povo Angola**



**Humana People to
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Acronyms

ADPP	Portuguese acronym for <i>Ajuda de Desenvolvimento de Povo para Povo</i> – People to People Development Support
AF	Adaptation Fund
AFS	Agroforestry Systems
BAU	Business as usual
CA	Conservation Agriculture
CAAP	Climate Adaptation Action Plan
CBFiM	Community-Based Fire Management
CBO	Community-Based Organization
CCAC	Climate Change Action Centres
CHW	Community Health Worker
CORB	Cubango-Okavango River Basin
CRA	Climate-Resilient Agriculture
CRIDF	Climate-Resilient Infrastructure Development Facility
CSO	Civil Society Organization
CVA	Climate Vulnerability Assessment
DAPP	Development Aid from People to People
DRR	Disaster Risk Reduction
DSS	Decision Support System
EC	European Commission
EIA	Environmental Impact Assessment
EOA	Ecological Organic Agriculture
ESP	Environmental and Social Policy
ESMP	Environmental and Social Management Plan
CREW	Full proposal – <i>Empowering Women Groups to Build Resilience to Climate Impacts in the Province of Cunene in South West Angola</i>
FAO	UN Food and Agriculture Organization
FO	Farmer Organization
FI	Farming Instructor

FFS	Farmer Field Schools
FRESAN	Portuguese acronym for EC project – <i>Strengthening Resilience, Food and Nutrition Security in Angola</i>
GAM	Global Acute Malnutrition
GEF	Global Environment Facility
GHG	Green House Gas
GoA	Government of Angola
GoN	Government of Namibia
GSP	Green School Programme
HH	Household
IDREA	Inquérito de Despesas, Receitas e Emprego em Angola
IE	Implementing Entity
ICRISAT	The International Crops Research Institute for the Semi-Arid Tropics
IDA	Portuguese acronym for the Institute of Agrarian Development
IFAD	International Fund for Agricultural Development
IGA	Income Generating Activity
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resource Management
KAP	Knowledge, Attitude, Practices
MASL	Metres above sea level
MASFAMU	Ministry of Social Action, Family and Women’s Affairs
MAF	Ministry of Agriculture and Forestry
MCTE	Ministry of Culture, Tourism and the Environment
MINEA	Ministry of Energy and Water
MoED	Ministry of Education
MoH	Ministry of Health
MUAC	Medium Upper Arm Circumference
NAP	National Adaptation Plan
NTFP	Non-Timber Forest Products
O&M	Operation and Maintenance
OSS	Sahara and Sahel Observatory

PAVACC	Participatory Analysis of Vulnerability and Adaptation to Climate Change
PDNA	Post-Disaster Needs Assessment
PMU	Project Management Unit
PO	Producer Organization
PSC	Project Steering Committee
RIE	Regional Implementing Entity
RPSC	Regional Project Steering Committee
SADC	Southern Africa Development Community
SLWM	Sustainable Land and Water Management
SLM	Sustainable Land Management
TTC	Teacher Training College
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environment Programme
WB	World Bank
WPC	Water Point Committee
WUA	Water User Association

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1. Introduction



Map 1: Angola (Landsat, 2023)

This pre-feasibility study has been developed to support the design of the proposed Green Climate Fund (GCF) Simplified Approval Process (SAP) project: Empowering Women's Groups to Build Resilience to Climate Impacts in Cunene (EWRCC), Southwest Angola through the GCF Project Preparation Facility (PPF). The Sahara and Sahel Observatory (OSS) is the Accredited Entity (AE) (which is a regional Direct Access Entity – DAE) and will manage the project, with the ADPP (a national NGO with considerable presence and over 30+ years of experience in Angola) as an Executing Entity (EE) of the different components.

The primary objective of this study is to assess the factors supporting the relevance and effectiveness of the project's design, with a focus on technical design, cost and benefit analysis, social and environmental impacts, legal and regulatory environments. Since the project is gender-transformative and women-centered in design, the pre-feasibility study will explore the national gender context, and zoom in to the gendered barriers and status quo in Cunene, with a focus on the agricultural sector in Southwest Angola.

The present study has been carried out over the period of July – September 2023 (see Annex A: Consultation Process). The study also bases itself on a previous feasibility study, conducted by the OSS and ADPP between July – August 2021 (see Annex B: Methodology – July 2021).

This pre-feasibility study, like the preceding study, integrates the gender equality aspect as a cross-cutting issue, highlighting gender disaggregated data in the baseline analysis and indicators, identifying differentiated adaptation needs and capacities for men and women, as well as key considerations for opportunities which have high potential to close the gender gap and foster gender transformative actions in the project location and beyond. Therefore, gender equality is an integral dimension of the project's design and proposed paradigm shift, implementation arrangements, monitoring and evaluation.

This project has the following components:

- **Component 1:** Strengthening the adaptive capacity and knowledge management through gender-transformative climate risk reduction
- **Component 2:** Enhanced water security and climate resilience through integrated water resource management
- **Component 3:** Diversified livelihoods and climate resilience of most vulnerable people and communities through resilient agroecology and microenterprise development

The overall objective of the project is to build climate-resilience in targeted rural communities in all six municipalities in Cunene, Angola. The project will apply a gender-transformative approach¹, integrating the key, climate-vulnerable sectors of agriculture, environment, water, and nutrition, with a focus on enabling factors, through investing in financial literacy, improved farming technologies and education.

The specific objectives of the project are:

- To empower women and youth in playing an active role in climate change adaptation at the local level;
- To enhance the resilience of communities to climate change risk, with focus on women's groups; and
- To reduce the vulnerability of women, their families and communities to water, food and nutrition insecurity.

The methodology used to develop this pre-feasibility is described below:

The methodology employed in this pre-feasibility study combined literature reviews and direct consultations with stakeholders. Initially, a primary literature review of relevant documents was carried out, followed by a secondary review to incorporate additional literature identified from stakeholder consultations.

Consultants carried out an in-depth desktop review, gathering information from various actors in the climate and development sectors. This analysis focused on topics such as climate change in south-west Angola, climate vulnerability of communities in Cunene, and other projects related to the EWRCC.

To ensure a holistic and reliable view, extensive field consultations were held with stakeholders in Cunene province. Starting with a gap analysis of previous interactions to discern the main topics, at the national level, the dialogue encompassed key governmental parties and National Designated Authority (NDA). On a more regional and local level, the consultation included Civil Society Organizations (CSOs), Non-Governmental Organizations (NGOs), representatives of groups in situations of vulnerability, such as women and young people, as well as community and provincial

¹ The term "gender-transformative" refers to UN Women's definition: "Transforming unequal gender relations to promote shared power, control of resources, decision-making, and support for women's empowerment".

leaders from Cunene. The study used a mixed-methods approach during the field consultations, varying between face-to-face meetings, focus groups and individual interviews. These consultations allowed not only for richer data collection, but also for a deeper understanding of local nuances and the specific needs of communities in Cunene. In summary, the combination of literature review and intensive field consultations provided a robust and contextualized understanding of the region, ensuring that the pre-feasibility study was well aligned with the objectives and precepts of the EWRCC, and responded to the needs of beneficiaries, as well as policy priorities of the Angolan government.

2. Country Profile and Regional Context for the CREW Project

2.1 Overview: Angola

The Republic of Angola is situated on the west coast of Central Africa, spanning latitudes 4°22' to 18°2'S and longitudes 11°41' to 24°2'W. It is one of the largest countries on the continent, covering an area of approximately 12,467,00km². With a long coastline and a central plateau, running through the interior of southern Africa, Angola borders Namibia, Botswana, Zambia, the Republic of Congo and the Democratic Republic of Congo. In 2022, Angola's population reached over 33.08 million.²

The country experiences a range of climates, from humid tropical to dry tropical. The climate in Angola is influenced by several factors, including its geographic location near the south Atlantic Ocean, the topography characterized by a central plateau, the Benguela cold-water current, and the movement of the Intertropical Convergence Zone (ITCZ), which is where the northern and southern air masses meet. Given these factors, climate conditions differ noticeably from north to south along the coast and the west-central plateau: for example, the northeastern region receives the highest amount of rainfall, while precipitation decreases towards the south and the west.

Angola, despite being classified as a middle-income country, faces significant internal disparities between urban and rural areas. This is because it is heavily reliant on oil-based economic growth with limited diversification. According to the World Bank, oil production has declined from a peak of 1.9 million barrels per day (mbpd) in 2008 to 1.2 mbpd in 2022 and is likely to continue to decline gradually in the coming decades, as low-cost reserves are exhausted and global decarbonization trends reduce new investment.³

The country's focus on resource extraction has led to an underdeveloped agriculture sector, resulting in Angola relying on food imports (it is net food importer). This dependence on external sources puts vulnerable populations, particularly in rural contexts, at a heightened risk of climate-related shocks and market fluctuations. Unfortunately, rural development and crop and livestock production require consistent investments (which have not been met) – leaving many Angolans, particularly women

² World Bank 2023

³ World Bank 2022a

and other vulnerable groups, trapped in a cycle of poverty without adequate access to agricultural extension services and social support.

Recent history

Under Portuguese colonial rule, Angola saw the emergence of nationalist movements in the 1960s, especially the People's Movement for the Liberation of Angola (MPLA), National Front for the Liberation of Angola (FNLA) and National Union for the Total Independence of Angola (UNITA). These ideologically varied movements sought independence from the colonial yoke. The path towards independence was accelerated by the Carnation Revolution in Portugal in 1974, resulting in Angola's independence on 11 November 1975. However, the newly won independence was quickly overshadowed by the outbreak of the Angolan Civil War.⁴

The MPLA, supported by Cuba and the Soviet Union, and UNITA, with support from the US and South Africa, became the main adversaries in this conflict, which lasted from 1975 to 2002. Control over the country's valuable resources, such as oil and diamonds, intensified the rivalry.⁵ The conflict resulted in enormous human and material damage. It is estimated that around half a million Angolans lost their lives. In addition, millions were displaced and the country's economy infrastructure, including schools, roads and hospitals, suffered significant damage.⁶

The Angolan Civil War came to an end with the signing of the Luena Peace Accords in 2002.⁷ Angola subsequently embarked on a process of democratization. Elections were held in 2008, 2012, 2017 and 2022, marking significant steps in the country's transition to democratic governance.

Demography

In 2014 (which is the latest available census information, as Angola prepares for 2024 census data collection), the country's resident population was estimated at around 25.8 million. Of these, 48% were male, representing approximately 12.5 million people, and 52% are female, totaling around 13.3 million. There is a clear predominance of women: every 100 women, there are 94 men. This trend is more pronounced in some regions, such as Cunene province, where the ratio drops to 88 men for every 100 women. On the other hand, the province of Lunda Norte stands out for its inverted demographics, with 106 men for every 100 women.⁸

In rural areas, the figures reveal the population's deep connection to activities linked to the primary sector, accounting for 44.2% of the labour force. The youthfulness of the population is striking, with an average age of just 20.6 years. In addition, there is a significant representation of young people, with 47.3 % aged between 0 and 14. This demographic dynamic implies challenges and opportunities for the country's economic and social development, especially in rural areas, where issues such as education,

⁴ James 2011

⁵ Westad 2005

⁶ World Peace Foundation 2015

⁷ Finda 2011

⁸ INE 2016b

access to health and employment opportunities are crucial for sustainable and equitable growth.⁹

In 2024, Angola will conduct its second census since 1975. According to projections by Angola's National Statistics Institute, the country is expected to have a population of 35,121,734 people. This estimate and the next census are fundamental to understanding the country's population evolution and will help shape public policies, especially in rural areas where the youth of the population, with an average age of 20.6 years, and the high participation in the primary sector, representing 44.2% of the labour force, are striking characteristics.¹⁰

Political and institutional arrangements

Angola's administration is divided into three branches: the Executive Branch, the Legislative Branch and the Judicial Branch. The executive branch is headed by the President of the Republic, who is the head of state and the commander-in-chief of the armed forces. The President is elected by direct and indirect universal suffrage for a five-year term. The ruling party, MPLA, won the elections on 24 August 2022, securing a second term for President João Lourenço.

Legislative power is exercised by the Parliament, which is composed of 220 Members of Parliament elected by direct and indirect universal suffrage for a five-year term. The Parliament has the power to make laws, approve the state budget and scrutinize the government. The judiciary is exercised by the Supreme Court of Justice, which is the highest judicial body. The Supreme Court of Justice is composed of 21 judges appointed by the President of the Republic for a ten-year term.¹¹

Angola's administration is also divided into 18 provinces, which are the political-administrative units of the country. Each province is governed by a governor, who is appointed by the President of the Republic. The provinces are divided into municipalities, which are the second-level administrative units. Each municipality is governed by a municipal administrator, who is appointed by the governor of the province. Municipalities are divided into parishes (*freguesia* in Portuguese), which are the third-level administrative units. Each *freguesia* is governed by a *freguesia* administrator, who is appointed by the municipal administrator.¹²

Angola is currently in the process of updating the power-sharing and institutional arrangements from the national to the regional level.¹³ In 2021, the Angolan president opened a public consultation process (Presidential Decree 104/21) on the alteration of the political-administrative division of five provinces, namely Cuando Cubango, Lunda Norte, Moxico, Malanje, and Uíge. The first three of these are geographically large but have small populations. Because of the allocation of 5 parliamentary seats per province, the new proposal will further shift the political weight of individual voters toward more remote regions of the country and away from the high-density urbanised areas. The consultation with citizens included the definition of the number of new provinces resulting from the change in the political-administrative division of municipalities, the

⁹ INE 2016b

¹⁰ INE 2016a

¹¹ Republic of Angola 2010

¹² Republic of Angola n.d.

¹³ OECD/UCLG 2022

establishment of border landmarks between provinces, the naming of provinces, as well as the definition of provincial capitals. In 2020, the National School of Administration and Public Policy (ENAPP) was established as the Single Recruiting Entity of Staff of the Central Administration of the State. ENAPP will manage the conduct of public tenders for the admission of employees to the Public Administration. The government intends to ensure the depoliticisation of appointments and introduce objectivity and impartiality into the public procurement of civil servants (Presidential Decree N 207/20).

The implementation of autarquias locais will not only affect the way in which local government bodies are formed but also how they function. Indeed, the main administrators of the autarquias locais, including members of the council assembly, chamber, and president, will no longer be politically appointed by members of the central government but locally elected by the people.

Post-war economy

Angola's economic circumstances have been linked to global demand for oil, causing volatile growth and leaving the country with high levels of poverty and inequality. The economy relies heavily on the oil sector, which accounted for 1.4% GDP growth in 2022. However, economic diversification has been difficult, especially considering that oil production is declining and global decarbonization is looming.¹⁴

With a high poverty rate linked to a lack of good quality jobs and high urban and youth unemployment (exceeding 38% and 65% respectively)¹⁵, Angola is facing a number of challenges. Approximately 80% of jobs are informal and half are in the primary sector, often subsistence labour¹⁶. On the other hand, there have been some improvements in the Angolan economy. Reforms over the past five years have helped improve macroeconomic management and public sector governance. The country has adopted a more flexible exchange rate regime, granted autonomy to the central bank, implemented a sound monetary policy and promoted fiscal consolidation. In addition, laws were introduced to enable greater private-sector participation in the economy¹⁷.

In 2022, GDP growth accelerated to an estimated 3.5% (from 1.1% in 2021)¹⁸, the first time since 2014 that it has outpaced population growth. This was due to a small recovery in oil production and high oil revenues. Growth was also seen in non-oil sectors, with agriculture and fisheries growing by almost 7% and the services sector recovering to pre-COVID-19 levels.¹⁹ Inflation fell rapidly, allowing the Central Bank to relax monetary policy moderately. The inflation rate fell from 27% in December 2021 to 13.9% in December 2022, the lowest rate since 2015. The need for economic diversification and investment in human capital are priority focus areas for Angola.²⁰ Due to its high poverty rate and rapidly growing population, Angola is prioritising investments in health and

¹⁴ World Bank 2023

¹⁵ INE 2022

¹⁶ INE 2022

¹⁷ World Bank 2023

¹⁸ IMF 2023

¹⁹ PwC 2023

²⁰ Republic of Angola 2023

education. Angola's economy has shown signs of improvement, but much remains to be done.

Further, inadequate infrastructure poses a barrier to economic growth in the country, and ultimately to climate resilience as well. Just 17% of categorized and urban roads are paved, and by the end of the civil war, over 70% of the country's road network had significantly deteriorated. This deterioration of the road network creates a significant challenge in rural areas where road density is low, there is a shortage of feeder roads, and bridges are lacking. The insufficient transportation infrastructure also hinders the country's ability to foster regional trade and discourages neighboring nations from utilizing the country's ports more extensively. To address these issues, the government has committed to substantial public spending on increasing power production to meet the growing demand. An inadequate and inconsistent power supply restricts private sector growth, as many businesses are forced to adopt a system of self-generation.

Education

When assessing the educational panorama, there is a marked difference between urban and rural areas. In rural areas, few adults have formal education beyond primary school. The literacy rate for adults in these areas is 54% for men and 40% for women, indicating a notable gender disparity. In the municipality of Cuanhama, these rates are slightly higher. However, only 5% of people over the age of 18 in rural areas have completed secondary education and 16% primary education up to the sixth grade. Low education in rural areas is attributed to parents' reluctance to send children to school, the lack of adequate school infrastructure and migration in search of better opportunities after a certain educational stage.

In urban areas, educational opportunities are expanded due to the greater availability of resources. Of young people aged between 7 and 11, the government estimates that roughly 2 million children are out of school.²¹ The majority of young people in this age group, 81.5%, currently attend school, with a rate of 88.6% in urban areas and 69.0% in rural areas. When analysing the school attendance rate, 76% of the population is enrolled in primary education. This rate is higher in urban areas, at 83.6%, compared to 63.5% in rural areas. However, in secondary education, the rates drop to 15.4% in cycle I and 8.3% in cycle II²².

Furthermore, 65.6% of the population aged 15 and over is literate. This rate rises to 79.4% in urban areas and falls to 41.1% in rural areas. There is also a considerable distinction between men, with a rate of 80.0%, and women, 53.0%. In the 15 to 24 age group, the literacy rate reaches 76.9%. Only 234,676 individuals aged 24 and over have completed tertiary education, reflecting the persistent challenges in access to tertiary education in Angola²³.

While the education infrastructure and system primarily face the challenge of low quality and investments, secondary and Technical and Vocational Education and Training (TVET) schools are primarily hindered by restricted accessibility.²⁴ This is a key issue as the recent expansion of public education has had limited impact on improving the educational opportunities for adults who missed out on schooling during their youth.

²¹ Agenzia Fides 2022

²² INE 2016b

²³ INE 2016b

²⁴ World Bank 2018

Approximately 35% of women and 30% of men have received education only up to the primary school level. The level of education attained is closely linked to one's participation in paid employment, underscoring the importance of investing in education to enhance employment prospects, and improve overall outcomes for Angola's economy.

Health and WASH

There are several challenges facing Angola's healthcare system, according to the World Bank Systematic Country Diagnostic.²⁵ including a shortage of trained healthcare professionals, low public health spending, and insufficient investment in water and sanitation infrastructure. Angola has a limited number of healthcare workers, with only 1 physician, less than 23 healthcare workers, and 63 nurses per 10,000 people. This scarcity is particularly acute in rural areas, where 85% of healthcare workers are concentrated. The quality of healthcare services is affected by inadequate training and education. Additionally, public health expenditure in Angola has been decreasing and has been on a downward trend since the 2010s, and in 2020 1.3% went into public health spending.²⁶ Furthermore, the lack of access to improved water, sanitation, and hygiene services has serious public health implications, leading to waterborne diseases and child stunting. Nationally, only 41% of the population has access to basic or improved drinking water services, with 63% in urban areas and 24% in rural areas. Similarly, only 39% of the population has access to improved sanitation, with 62% in urban areas and 21% in rural areas.

Respiratory ailments, water-borne diseases (WBDs, such as diarrhea) and vector-borne diseases (VBDs, such as malaria) are the most frequent health problems, and climate change is likely impacting and exacerbating the incidence rates. Many cases of diarrhea and cholera are linked to the widespread use of unsafe drinking water, which is linked to more frequent and intense droughts. While there are many health facilities, people in certain areas lack easy access to health services. As malaria and malnutrition are common in rural areas, medical aid is unreachable in regions of Huila and Benguela as the nearest health facility is situated miles away. It has been noted that a resident of Huila, Mr Luciana, travelled up to two hours to get to the nearest health post for his child²⁷. This can have dire consequences for those who seek medical aid immediately.

Traditionally, women shoulder the primary responsibility for unpaid caregiving, including tending to the sick, elderly, and children, yet this vital work often remains underappreciated²⁸. Despite the predominance of women, particularly in nursing roles, in the health workforce, decision-making positions are typically occupied by men, limiting the system's responsiveness to women's needs and priorities²⁹. According to the UN Women database³⁰, women in Angola, particularly those of reproductive age (15-49 years), often encounter obstacles concerning their sexual and reproductive health rights. Only 29.8% had their need for family planning met with modern methods in 2016³¹.

²⁵ Ibid.

²⁶ IMF, 2023

²⁷ ReliefWeb 2023

²⁸ Charnes 2019

²⁹ World Health Organization 2019

³⁰ UN Women 2023

³¹ UN Women 2023

Furthermore, the country's health statistics reveal several gender-based disparities. Maternal mortality ratio stands at 241 per 100,000 live births, while merely 49.6% of births are attended by skilled health personnel. The under-five mortality rate is higher for boys (80.4 per 1000 live births) compared to girls (68.7 per 1000 live births), and the infant mortality rate, although high for both sexes, is also higher for boys. Concerning HIV, women are almost twice as likely to contract the virus, with a rate of 1.11 per 1000 uninfected population, compared to 0.57 for men³².

The situation is further exacerbated by the growing impact of climate change on public health. While life expectancy has improved significantly in recent decades, severe droughts and other climate-related events are causing widespread food insecurity, disease, and child mortality. Notably, these climate-induced health risks disproportionately affect specific sectors of the population, underscoring the need for an inclusive and gender-sensitive approach to health service delivery and climate resilience planning. The country's health infrastructure, particularly in rural areas, is insufficient and at risk of suffering from climate change. With the existing ratio of health facilities to a population estimated at 0.5 per 10,000 people in 2010 and only 24% of the rural population having access to a public health facility within two kilometers, compared to 63% of the urban population, there is a critical need to upgrade health facilities to improve coverage and climate resilience³³.

Water is a critical resource and contaminated water leads to debilitating illnesses, such as typhoid fever, diarrhea, or even death from cholera, dysentery or gastro-enteritis. Access to safe drinking water in rural areas is only available to 15% of the population. There is a particular concern in Southern Cunene where so many people rely on water in shallow aquifers, which often dry up when rainfall is low or during periods of drought. Very few alternative sources of water are available to make up for shortages under such conditions.

Most households use several sources of water. Nearby, temporary natural sources are often used preferentially following rain. These include rainwater collection, and surface water in *chanas* and seasonal channels. Rivers are also important sources, but only the river Cunene and certain stretches of the Cuvelai and Tchimpolo rivers provide water throughout the year. Once supplies from natural surface water sources dry up, people rely very largely on traditional wells and water reservoirs (*chimpacas*).

A DW/USAID survey in 2015³⁴ indicated in order of frequency, traditional wells, rainwater, earth dams, rivers, ponds and *chanas*, lakes and seasonal channels, hand pumps and taps were the sources of water reported most often. According to international health standards, water provided through pipes or from taps, tanks and hand pumps from covered wells and boreholes is normally regarded as safe to drink. By contrast, water in all surface sources and traditional wells is easily contaminated and not safe for human consumption. Only 15% of all the households surveyed reported using piped or pumped supplies of safe water. In total, 72% of all homes reported that they do not treat water for drinking.

Most water supplied at public water points is pumped from deep, covered wells or boreholes. Solar pumps are widely used on large installations, while hand wheels and

³² UN Women 2023

³³ World Bank 2022a

³⁴ Calunga et al. 2015

pumps are used where the water supply is modest. Many boreholes are not used because the water is too salty or brackish to drink. There is a pipeline carrying water from the Cunene River at Xangongo, where it undergoes treatment before transfer to the population of Ondjiva as potable water.

According to a study developed by the World Bank on Angola's WASH sector³⁵, approximately half of all households, whether headed by men or women, have access to basic drinking water sources. In addition, about 31% of all households rely on unimproved water sources, and this is independent of the gender of the household head. In situations where households have no connection to the water network, women and girls end up being responsible for fetching water, which occurs in approximately 72% of cases. This pattern remains relatively constant in both urban and rural areas. Regarding sanitation and hygiene, male- and female-headed households have fairly similar levels of access. Around 68% of male-headed households and 63% of female-headed households have access to at least limited sanitation. In addition, around 40% of male-headed households and 38% of female-headed households have access to basic hygiene³⁶.

2.2 Project Area: Cunene

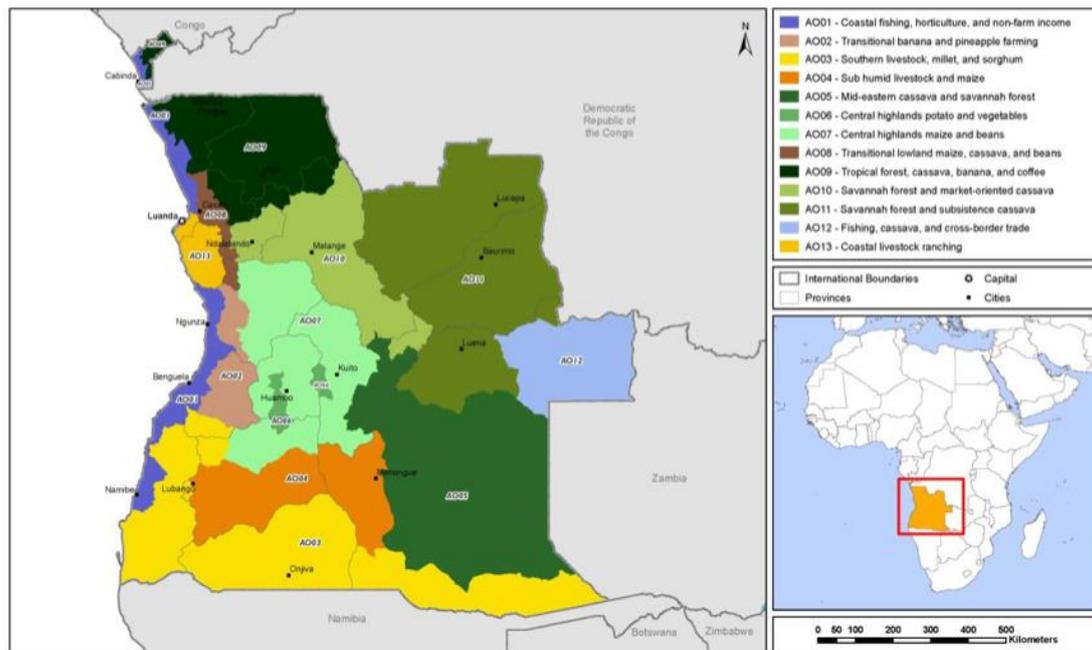
Geography and weather patterns

The province of Cunene is located in Southwest Angola, and is characterized by a dry tropical climate, with semi-desert conditions and unimodal, low and variable rainfall pattern, with average rainfall of 250-600 mm/year³⁷. The average annual temperatures are variable, increasing from north to south, with temperatures ranging from maximum average high of 31-36°C, and average minimum low of 11-23°C. Cunene is located in the Southern Livestock, Millet and Sorghum Zone of Angola (AO03) as shown in Map 2 below. This zone mainly lies in the southern part of Angola within the arid and semi-arid agro-ecological zone. Its topography is generally prairie like flatland. The vegetation is characterized by desert, savannah grass and woodlands. It is sparsely populated with about 12.5 people per square kilometer (National Population Census, 2014).

³⁵ Lombana Cordoba et al. 2021

³⁶ Lombana Cordoba et al. 2021

³⁷ World Weather Online 2023



Map 2: Livelihood Zones in Angola (Cunene AO03)

In Cunene, the altitude decreases from 1,400 m.a.s.l in the Northeast to 800 m.a.s.l in the Southwest.³⁸ Rainfall also decreases from the Northeast average of level of 800-850 mm per annum to the average of 350-400 mm in the Southwest. Rainfall in the North is also less variable from year to year than in the Southwest, with a coefficient of variation of 20-25% compared to 30-35% in the Southwest. As a result, farmers living in the North of the Basin receive more rain more reliably than those in the Southwest. Rainfall variability from one year to the next is generally high, with the Southern part of Cunene being frequently afflicted by drought and flooding. In the same way, the soils have different agricultural aptitudes in the different parts of the Province, the Northeast being the most suitable area for agriculture. There are two typical seasons: the rainy season, which runs from November to March, with April and October considered as months of transition; and, the cool, dry season, which extends from May to August, with the months of June and July as the coldest months of the year.

There are significant changes in rainfall within each season. Little rain falls at the start in October and November, and later at the end of the season in April. In between, the highest rainfall episodes can occur anytime but are most frequent in January, February and March. The ideal weather conditions during austral summers are when precipitation patterns being good quantities of rainfall at short intervals, thus providing an even and adequate supply of water to the soil for crops and other plants. Air temperatures are then moderate, with sufficient warmth to encourage growth, but limiting the blistering heat that usually leads to high rates of evaporation and wilting. The northern areas of the Southwest, such as Cuvelai, usually get rain earlier and quite often have heavy rains in December. Rains in the east also start slightly earlier than in the west, on average. Rainfall thus varies in many ways: across the Basin from north to south in volume and reliability; within the season from low falls at the start, to higher falls in the middle, and to lower falls at the end; and from season to season.

³⁸ Mapa topográfico Cunene, altitude, relevo n.d.

Rates of evaporation are highest in September and October, when there is little moisture in the air, temperatures are high, and winds can be strong. Much surface water is then lost to the atmosphere, but evaporation has little impact on rainfed food production because crops have yet to be planted. The high temperatures at this time do however quite considerably affect irrigated crops, such as tomatoes. In some years drought prevails because there is too little rain, while flooding may occur in other years when there are too many heavy falls of rain. The frequency and severity of water shortages and flooding vary a great deal, not only from year to year, but also from one part of the Basin to another, and from month to month.

Topography and soils of the Cuvelai Basin

The eastern part of Cunene province includes part of the Cuvelai river basin, an endorheic transboundary river basin shared between Angola and Namibia (see Map 3). The Cuvelai Basin covers most of Cunene province and continues into Namibia and is located between the Cunene River and the Cubango River. The highest areas in the Basin are in the north from where the landscape drops gently to the South. The Cuvelai Basin is like a very shallow bowl, with its margins at somewhat higher altitudes than those at its center. This topographical feature then lets water flow into the lowest central-southern parts of the Cuvelai, and none of the waterflows exit out of the Basin. Much of the Cuvelai landscape is flat, so that the gradients of most drainage lines seldom drop more than half a meter per kilometer. As a result, water normally flows very slowly, often extending across broad fronts which may cover large areas with shallow water. Once the Cuvelai reaches the flat plains in the central part of the basin, it transforms into a braided river, splitting into a large number of ephemeral channels and pans (“*chanas*”) that converge and diverge and that flood seasonally, separated by slightly elevated islands. This makes the area susceptible to periodic flooding as well as drought.

Regional biodiversity

Cunene has a national park at Mupa (outside of the proposed project area). The province has medium diversity of fauna, with wildlife found in the existing reserves. The vegetation of the province is characterized by dense dry forest and savannah with shrubs and trees in the North and savannah with bushes, woods and forests in the Southern region. Cunene comprises forest cover types that are dominated by "miombo" woodlands and composed primarily of trees of the legume family. Both the amount of annual precipitation and density of tree cover decrease as one travels from north to south. Where active human settlements are located, recent tree cutting has occurred in patches of land, either due to forest conversion to agriculture or to the activities of charcoal producers. The tree species are in principle able to regenerate, but due to frequent burning, the trees do not have time to fully grow. The more valuable tree species take 60 years to reach the desired size for exploration. There is a need for proper and sustainable management interventions for forests.



Map 3: Cuvelai Basin (source: Estimating flooding extent - A. Awadallah, D. Tabet [2015])³⁹

It is within the large area of *chanas* that most people reside. The majority of people live where in the areas characterized by cambisols and calcisols.⁴⁰ This is due to the availability of these relatively fertile soils, which were formed by the mixing of water- and wind-borne sediments over long periods. These arable soils are on higher ground than the *chanas*. The *chanas*, themselves, have clay soils that are too salty and dense, and often waterlogged for crop cultivation, while the broad areas to the east and north of the belt of *chanas* are covered by wind borne sands, which have few nutrients and little capacity to hold water. The *chana* belt is also attractive to people due to the presence of fresh water trapped underground, but close enough to the surface to be harvested in hand-dug wells. There are other types of soils in the region: luvisols, which are also comparatively fertile, and ferralsols, which are less suited to farming because their nutrients have been leached by rainfall. The poorest soils in the region are arenosols (psamment – sandy, uncompacted) laid down by wind patterns.

³⁹ Awadallah & Tabet 2015

⁴⁰ FAO n.d.



Figure 1: A *chana* or *anhara* in Angola (Source: Carlos Loureiro).⁴¹

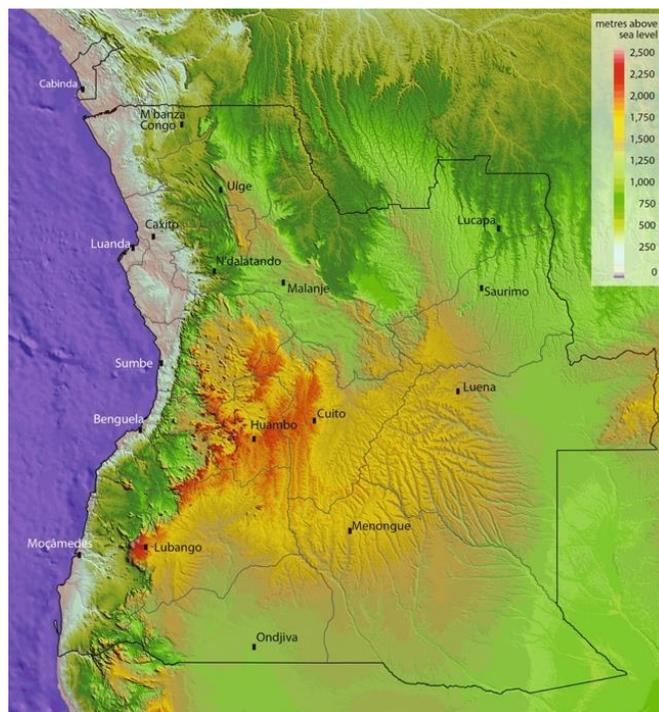


Figure 2: Topography of Angola, indicating provincial boundaries and capitals. The coastal lowlands, western escarpments, central highlands and plateaus, and the major drainage basins of the Cuanza, Congo and Zambezi rivers are clearly revealed.⁴²

⁴¹ A Matéria do Tempo n.d.

⁴² Huntley 2019

Provincial administration and demography

The province is divided administratively into 6 municipalities and 20 communes as shown below:



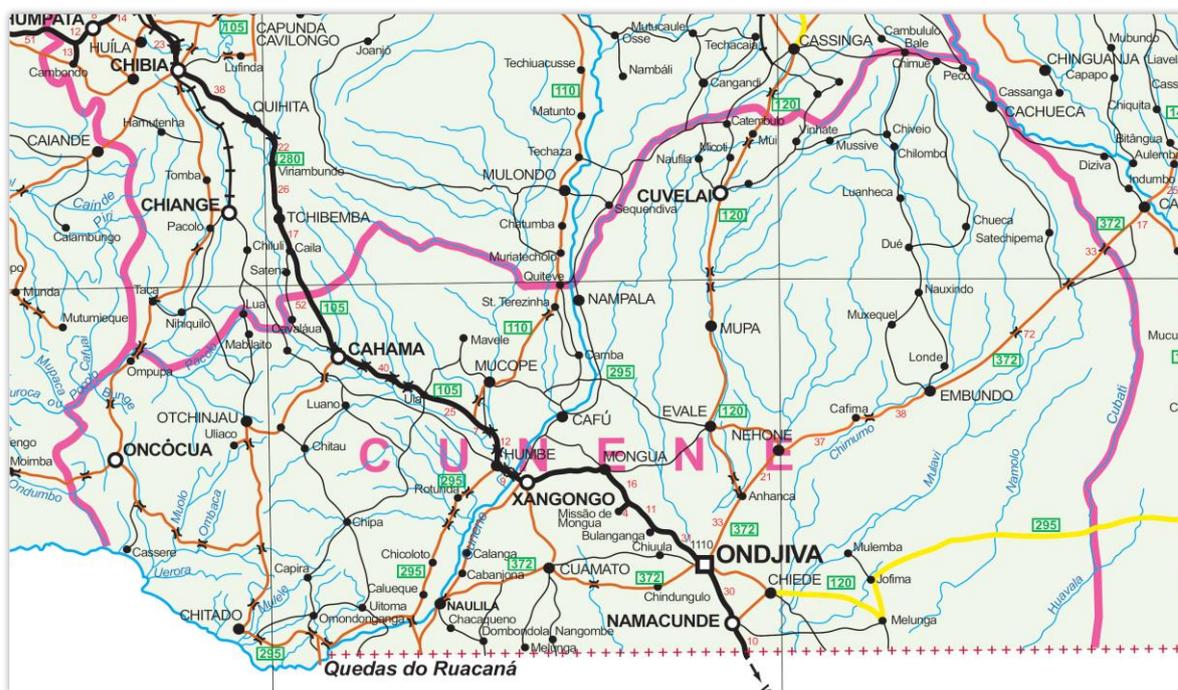
Map 4: 6 municipalities and 20 communes of Cunene, Angola

The distribution of urban and rural localities in the six municipalities of Cunene Province are shown in Table 1 and the major rivers and road system is shown in

Map 5. This reflects the fact that the majority of the Angolan population (79%) live in rural areas, and connectivity (in terms of infrastructure or natural endowment), particularly from Cunene, affects the economic performance as well as socioeconomic vulnerabilities of the population.

Table 1: Distribution of Urban and Rural Localities (6 municipalities of Cunene)

Municipalities	Comunas	Localities		
		Urban	Rural	Total
Cunana	20	46	904	950
Kuanhama	5	15	177	192
Ombandja	5	15	195	210
Kuvelal	4	4	99	102
Curoca (EX Oncocua)	2	0	96	96
Namacunde	2	8	156	164
Cahama	2	4	21	95



Map 5: Road and river network of Cunene, Angola

The 2014 census counted the number of people in each municipality as shown in Table 2. Alongside, population projections from the National Institute of Statistics is shown. There were 1,194,495 people projected for 2020/2023.

Table 2: Population by Municipality in Cunene, Angola

Municipality	Population (2014)	Projected Population 2020	Projected Population 2023
Cahama	70,061	84,527	92,830
Cuanhama	374,529	451,809	496,169
Curoca	41,087	49,577	54,450
Cuvelai	57,398	69,240	76,038
Namacunde	142,047	171,459	188,339
Ombadja	304,964	367,882	403,998
Total	990,087	1,194,495	1,311,824

People are largely concentrated in the center of the Cuvelai Basin, particularly from Mupa to Santa Clara and between Cafima and Ondjiva. These are the western areas of Namacunde and Cuanhama municipalities and the Southern area of Ombadja municipality. Of all the provinces in Angola, Cunene has far fewer males than females, with a female population of 53% of the total population. The ratio between males and females was particularly skewed in rural homes where there are only 86 males per 100 females. The ratio was slightly more balanced in Cunene’s urban areas: 92 males versus 100 females. This disparity can still be attributed to the war and its side effects, such as

the emigration of young men to avoid military conscription, and potentially, the unfortunate loss of male lives during conflicts⁴³.

The Southern chanas and Eastern sands of the Cuvalei basin are largely inhabited by the Oshiwambo people of the Ombadja, Evake, and Kwanyama tribal groups. The Northern zone in contrast is inhabited by the Muhand, Ngangela or Chokwe groups. The most commonly spoken languages are Portuguese (28%) and two thirds of the population speak one of three native languages: Kwanyama (48%); Nyaneca (8%) and Muhumbi (13%), according to official Angolan statistics.

Household data and status, livelihoods and agriculture in the region

From the results of the e Inquérito de Despesas, Receitas e Emprego em Angola (IDREA) 2018-2019 household survey, rural households had an average size of 6.2 people. Male-headed (MHHs) families were 51%, and 49% of families were female-headed (FHHs). Women have limited access to productive resources but are involved in the cultivation of crops, mainly millet (covering about 80% of crops per household), sorghum and cowpeas. While women play a crucial role in the production and value chains, their contributions are consistently undervalued. Culturally, women's economic contribution in general to the household (HH) economy is undervalued, which constrains a HH's economic diversification.⁴⁴

Cunene, despite the progress that has been made since the end of the civil war in 2002, remains one of provinces with the highest poverty rates in Angola. The southern region of Angola is a largely agro-pastoral zone where local communities are engaged in rain-fed subsistence crop farming (pearl millet and sorghum) and livestock production. The principal livelihood is in the sector of agriculture and forestry (64%). Other livelihoods include: fishing and trade, and sources of income are depended from household to household, as discussed above.⁴⁵

With the prevalence of rain-fed agriculture, and limited water infrastructure, increasing water scarcity significantly contributes to food insecurity, serious health problems such as outbreaks of cholera, high levels of malnutrition among children 0-5 years (current severe/moderate acute malnutrition levels of 15%) and very low household incomes.⁴⁶ The province is also subject to periodic flooding along the margins of the rivers in the Cuvalei Basin.

Families in Cunene derive considerable resilience from their relations with neighbors, with other families and the traditional leader (*soba*) in their communities, and friends and relatives further afield. These connections provide social capital as well as an informal, social safety network. Families with considerable social capital have an advantage to absorb shocks (extreme weather events, climate change). This can take many forms: neighbors may share food, labour and animal traction for example, young men may find temporary employment with a family member in Namibia, or money to buy food can be borrowed from a close friend.

⁴³ Pehrsson 2000

⁴⁴ European Union 2015

⁴⁵ Mendelsohn & Mendelsohn 2018

⁴⁶ UNDP 2022

One cereal predominates as the staple crop in South Cunene: pearl millet (*massango*). Almost every household grows *massango* and with few exceptions, each farmer gives considerably more field space to *massango*, than all other crops combined. This is because *massango* is the grain crop that grows best in sandy soils and where rainfall is relatively low.

Sorghum (*massambala*) is usually grown by most households on more moisture retentive soils at the lowest levels of a household's fields. Its grain is mostly used to produce beverages and some food. All households produce a variety of other crops. Cowpea and various kinds of squash are the most abundant and widely grown, followed by peanuts, sweet potatoes, *bambara* groundnuts and some vegetables such as cabbage, tomatoes, onions and spinach. Fruit trees such as pawpaw, mango and guava are more evident to a limited extent in the Northern Zone. Maize is also grown, mainly for sweet corn, particularly in the Northern Zone where rainfall is higher and more reliable. The Chana and Eastern Sands zones have many indigenous trees which provide fruits, oil and liquor: marulas, bird plums, jackal berry trees, mangetti and buffalo thorns.

Crop production and agriculture in Cunene faces several challenges. The risks of failure are high and yields are normally low, with a high dependence on natural precipitation cycles (which are now impacted by climate change). For example, the average yield of pearl millet is about 300 kilograms per hectare, which is among the lowest for this crop in the world. Farming, as an economic activity and source of livelihood, is therefore a low-input / low-output system. Pearl millet and other farm produce are very largely used for domestic consumption. Food is only sold under exceptional circumstances, when there are special needs for income, some surplus is available to be sold and where there is reasonable access to markets.

Pearl millet and sorghum crop failures, or even poor yields, have dire consequences on food security in the region, and often lead to humanitarian crises. It was the complete failure of these crops and a lack of drinking water during droughts that caused devastating famines in the past, some of which led to the deaths of tens of thousands of people in the region. Pests often limit crop production, as well. Locust attacks can be severe as they were in 2021 and other insects such as spider mites are also problematic for irrigated crops.

A DW/USAID (2015) household survey⁸ collected information on the length of time that food stocks lasted in normal years, and how long they lasted after the 2013 drought. The differences were substantial. A total of 86% of households estimated that their harvests would last longer than 10 months in normal years – roughly until the time that they would harvest their next season's crops. Following the 2013 drought, however, 81% reported that their harvests would be exhausted within six months – roughly half the time that reserves are normally available.

The limited availability of labor has a substantial impact on crop production, which requires ploughing, planting, weeding and harvesting. All are demanding tasks and should be completed quickly and at the right time, failing which production will be low. As a result of outmigration, many families have few able-bodied members to help with the tasks needed in the fields, and most households do not have the resources to hire labor.

Except for the very poorest families, all rural households have some livestock. Most households keep a variety of animals: chickens to eat and sell, pigs to eat, donkeys to transport goods, goats to eat and occasionally sell, and cattle which produce some milk and draught power. The possession of so many livestock by so many people would

suggest far greater food security, if they sold more animals, especially cattle. However, cattle, and to some extent goats, are generally not for sale. Only when their owners have a particular need for cash are one or two animals sent to market. Cattle are largely kept as capital security and savings, and so people are probably reluctant to dispose of savings in an environment where calamities are to be expected.

In terms of cross-border trade, vehicles use the road that leads to the major border crossing from Angola to Namibia at Santa Clara. The southern provinces of Namibe and Cunene have no maize or beans, therefore, supplies flow in from Northern Huila province. Imports of food commodities and other goods from South Africa enter Angola through the Santa Clara crossing and follow the main road to Luanda through the Southwest of Cunene.

3. Climate Change Profile

3.1 Summary of climate change impacts

The following table (Table 3) summarizes the projections for temperature and precipitation, which will determine the climate change impacts in Angola and the Cunene region.

Table 3: Summary table for precipitation and temperature projections in Angola by 2050

Climate indicator	Projections
Temperature	<ul style="list-style-type: none"> The average global temperature of the earth's surface is likely to exceed, by the end of the 21st century, 1.5° C with respect to baseline registered in the 1850-1900 period. Under RCP4.5 scenario⁴⁷ mean temperatures are projected to increase between 1° C and 2°C from near to mid- term future. Under RCP8.5 scenario⁴⁸ mean temperatures are projected to increase between 1° and 3°C from the near-to mid-term future. The number of days in which temperature exceeds 30°C is projected to increase, on average, by between 60 and 90d in the south of the country over the near and mid-term future
Precipitation	<ul style="list-style-type: none"> Projected changes in mean annual total precipitation are less uniform A decrease in average annual rainfall in the south of Angola is expected. In monthly terms, a decrease in precipitation is expected in the driest months, extending the dry season to the months of April and October. The maximum daily precipitation is expected to increase.

Table 4 below summarizes climate change hazards, impacts, vulnerability, and potential adaptation measures in Angola, based on the climate projections.

⁴⁷ Representative Concentration Pathway (RCP) are scenarios that include the time series of emissions and concentrations of the full suite of greenhouse gas, as well as land use/land cover. They are the basis for the climate predictions and projections presented in the Intergovernmental Panel on Climate Change reports. RCP4.5 scenario assumes low to moderate future emissions level and the introduction of strict climate policies. See: <https://climateinformation.org/data-variables/what-do-different-rcps-mean/>

⁴⁸ RCP8.5 assume very high future emissions level; CO₂ emissions will be three times higher than the present and there will be hardly any implementation of climate policies.

Table 4. Summary table for climate change impact and proposed adaptation measures in the project

Climate Change Impact	Description of impact	Potential Adaptation Measures
Increase in frequency and intensity of droughts and reduced water availability	Projected increase in temperatures, combined with a decrease in average annual rainfall will have an impact on the number and intensity of droughts in the region of Cunene. As of now, observed local climate trends show an increase in the frequency and length of droughts, which has a direct impact on the already low water availability in the region.	<p>Implementation of small-scale infrastructure investments and irrigation schemes</p> <p>Improve management of water resources</p> <p>Increase awareness and technical capacity of women and youth on climate change risks, impacts and adaptation measures</p>
Crop failure, decreased crop yields and shorter growing season due to more frequent and intense droughts	If future climate trends are confirmed, more frequent and intense droughts will lead to a reduction of agricultural production, which will directly impact local livelihoods and food security due to the low levels of adaptation capacity and high vulnerability of communities in the Cunene region.	<p>Use of drought tolerant crops and varieties</p> <p>Implementation of small-scale infrastructure investments and irrigation schemes</p> <p>Implementation of climate-smart agriculture small infrastructure and adoption of climate-smart crop and fodder varieties</p> <p>Promotion of off-farm income sources and livelihoods diversification</p> <p>Increase awareness and technical capacity of women and youth on climate change risks, impacts and adaptation measures</p>

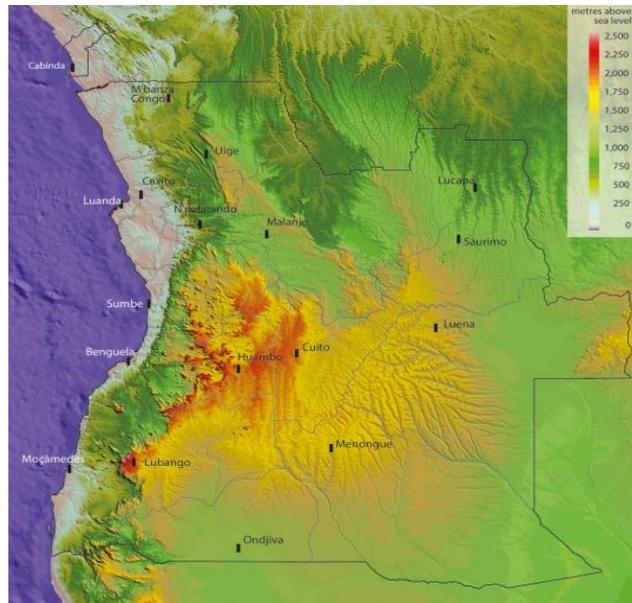
3.2 General geographic and climatic overview

Situated on the southwest coast of Africa, Angola is located between parallels 4° 22' and 18° 02' South latitude and 11° 41' and 24° 05' East longitude. It is bordered on the west by 1600 km of arid coastline along the Atlantic Ocean; to the north, by the rainforest and savannah ecosystems of the Republic of Congo and the Democratic Republic of Congo (DRC); to the east, by the savannah and rainforest ecosystems of the DRC and Zambia; and, through arid forests, savannahs and desert along the 1200 km of its southern border with Namibia. Angola is divided into 18 provinces (Bengo, Benguela, Bié, Cabinda, Cuando Cubango, Cuanza Norte, Cuanza-Sul, Cunene, Huambo, Huila, Luanda, Lunda-Norte, Lunda-Sul, Malanje, Moxico, Namibe, Uíge, and Zaire). Cabinda is an exclave that is separated from the rest of Angola by a narrow strip of territory that belongs to the Democratic Republic of the Congo.

Figure 3 illustrates the general topography of Angola, where the coastal plains are clearly distinguished and located below 200 m in altitude and whose width varies between 10 and 150 km, representing 5% of the country's land area; the western escarpments stagger towards the highlands with mountains rising to 1000 m (23% of the territory of the country) as well as an extensive inland plateau of 1000 to 1500 m (65% of territory

of the country). Seven percent of the country's territory is located above 1500 m, reaching its highest point, 2620 m, on Morro do Moco, located in the province of Huambo⁴⁹.

Figure 3. Angola's topography



The southern province of Cunene, the project's target location, borders the province of Huíla to the north, the Republic of Namibia to the south, the province of Namibe to the west and the province of Cuando-Cubango to the east. It has a total area of about 87,000 km², occupying about 7.0% of the national territory. The province of Cunene is part of the Baixo Cunene unit, that descends from 1400 m from the Old Plateau to the border with Namibia at 1000 m. According to the 2014 Census⁵⁰, the province of Cunene has 990,087 inhabitants, which is the equivalent to 3.8% of the total population of Angola. The province ranks eighth in terms of population, with a population density of 11.1 inhabitants/km²⁵¹ and is one of the least populated regions of Angola.

The climate in the region is semi-desert, tropical dry; megathermal, with irregular rainfall not exceeding 600 mm per year. The average annual temperature is 23°C, with large daily temperature variations. The climate is strongly seasonal, with a hot and humid season (October to May) and a cold season (June to September). The highest concentration of rainfall falls between the months of December to April with large irregularities in their distribution. Cunene is one of the provinces in Angola most affected by recurrent droughts and floods, and it has suffered from the adverse impacts of the El Niño and La Niña phenomena over the years. A severe drought between 2015 and 2016 resulting from the El Niño impacted the food security of households in the region⁵².

⁴⁹ Huntley 2019

⁵⁰ INE 2016

⁵¹ INE 2016

⁵² OCHA 2017

Angola has abundant water resources and there is no shortage of surface or groundwater resources, although there are regional and seasonal differences in availability. The southern region, for example, has limited surface water and is dependent on groundwater resources. The country has nine major river basins that drain into west-central Africa's major river systems, including the Congo, Zambezi and Kwanza rivers. The Cubango River originates in the central highlands of Angola and flows through the Okavango Delta in Botswana, a wetland of global importance. The total volume of internal annual renewable water resources is 148 cubic kilometers⁵³. Agriculture in the country accounts for 86% of water use, followed by domestic use (9%) and industry (2%)⁵⁴.

In most parts of the country, precipitation from June to September is very close to or equal to zero, also generating very little or no runoff in these months. In the southernmost coastal basins, there is only some drainage from February to April, leaving the rivers virtually dry for the remaining months of the year. This situation does not occur in the Cunene, Cuvelai, Cubango and Cuando rivers, which are permanent rivers, due to the flows generated upstream; however, the tributaries of these rivers in the downstream sections are dry for most of the year.

Temperature

In Angola, there are numerous atmospheric, oceanic and even topographical forces that originate different climatic conditions. As the country is located in the intertropical and subtropical zone, which extends from near the equator to near the Tropic of Capricorn, along 14 degrees of latitude, there is a general decrease in incoming solar radiation and consequently in the average annual temperatures recorded from North to South. This latitudinal decrease in the average annual temperature is illustrated by the data from the stations located in the Northwest and Northeast (Cabinda: 24.7 °C; Dundo: 24.6 °C) which are relatively hotter, when compared with the stations located in the Southwest and Southeast (Moçâmedes: 20.0 °C; Cuangar: 20.7 °C).

On the other hand, temperature is influenced by altitude, as can be illustrated by data obtained from locations below the Chela escarpment to the highest meteorological stations in the country: namely, Chongoroi: altitude 818 m has an average annual temperature of 23, 1 °C; Jau: altitude 1700 m - average annual temperature of 18.0 °C; and finally Humpata Zootécnica: altitude 2300 m has an average annual temperature of 14.6 °C.

Precipitation

Precipitation is influenced by the atmospheric systems that dominate Central and Southern Africa. Around the globe and near the equator, a band of low pressures where the trade winds from the northern and southern hemispheres converge create strong convective activity that generates the intense storms that characterize the intertropical region. Known as the Intertropical Convergence Zone (ITCZ), this band moves

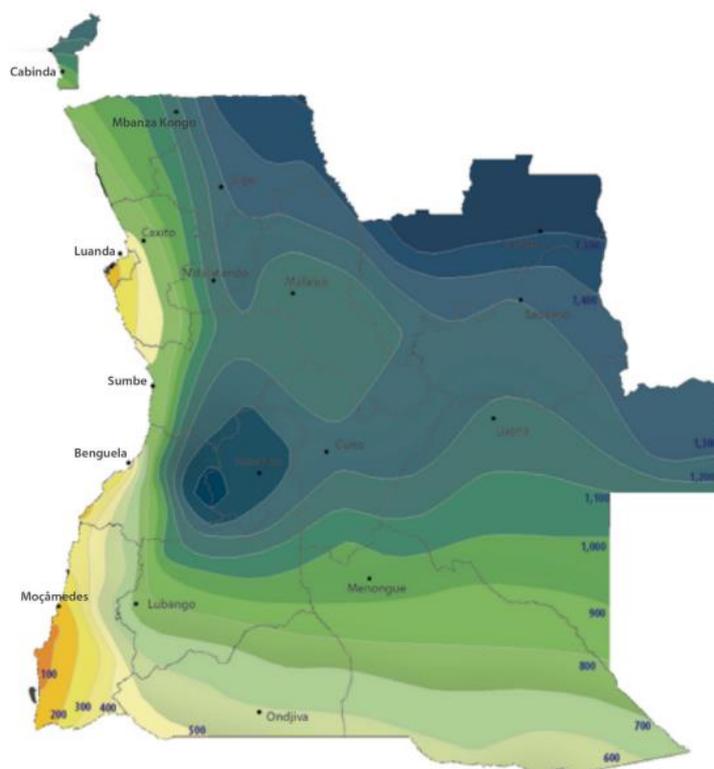
⁵³ World Bank 2020

⁵⁴ Neto & ACADIR-Angola 2009

southwards over Angola during the warm season, and then returns northwards towards the equator as the cold season approaches. The rainy season triggered by the ITCZ runs through the North of Angola since the beginning of the hot season, reaching the South at the end of this season. Some meteorological stations in northern Angola normally record two peaks of precipitation, at the beginning and the end of the hot season, often with a brief drier period in the middle of this season (known as a *pequeno cacimbo*).

Figure 4 summarizes the distribution of average annual precipitation in Angola. As mentioned above, altitude and seasonality determine temperature conditions. However, in the coastal strip of Angola there is an anomaly in this general rule, especially in the extreme south, due to the influence of the thermal inversion created by the cold Benguela current. The Benguela current also results in an increasing precipitation gradient from south to north and from west to east. Precipitation gradients are locally accentuated by the orographic influence of the escarpment and mountain ranges.

Figure 4. Average precipitation in Angola



The northern region of Angola is typical of the Köppen tropical humid savannah group (Aw), the plateau is typical of the temperate mesothermal group (Cw), and the southwest and coastal plain are typical of the dry desert and semi-desert group (Bsh, Bwh). The average annual precipitation and the average temperature of the hottest and coldest months illustrate some of the climatic characteristics of the Köppen regions (Table 5).

Table 5. Representative climate data, according to the Köppen climate classification system (data from Silveira, 1967)⁵⁵

⁵⁵ The highlighted row shows the station closer to the project's target area within the Cunene province.

Köppen group	Station	Altitude M	Precipitation mm	Hottest month average °C	Average coldest month °C
Aw	Belize	245	1612	26,7	22,2
Aw	Saurimo	1081	1355	23,8	20,3
Bsh	Ondjiva	1150	577	26,4	16,7
Bsh	Cuangar	1050	596	24,6	15,0
Bsh'	Chitido	1000	405	27,4	19,2
Bsh'	Luanda	44	405	27,0	20,1
Bwh	Moçâmedes	44	37	24,2	15,5
Bwh	Tômbua	4	12	24,2	14,5
Bwh'	Benguela	7	184	26,3	18,0
Bwh'	Caraculo	440	123	26,4	17,2
Cwa	Menongue	1348	965	23,4	14,5
Cwa	Luena	1328	1182	22,7	17,0
Cwb	Huambo	1700	1210	20,6	15,7
Cwb	Lubango	1760	802	20,7	15,3

3.3 Observed climate trends

Temperature

Temperature observations show that Angola has warmed significantly in recent decades. Evidence from multiple datasets show that recent observed warming is robust in the country (see Figure 5). On average, the mean annual temperature has increased by 1.4°C at a rate of 0.2°C per decade since 1951⁵⁶. The country's Second National Communication to the UNFCCC⁵⁷ presents findings indicating that the minimum and maximum temperatures have increased between 1901 and 2009, with fastest warming periods occurring after 1970. The analysis shows that the highest observed maximum temperatures started to rise at a statistically significant rate of 0.85°C, indicating that the frequency of warm years is increasing.

The 2021 Nationally Determined Contribution of Angola⁵⁸ corroborates with the above observed temperature increasing trend. Data shows that between 1960 and 2006 there has been an increase in the surface temperature of between 0.33 and 1.50°C per decade in the area where the Angolan territory is located. There was a higher observed increase during the cold season, 0.47°C, than in the hot season, 0.22°C, per decade. The daily observations of temperature show significant increases in trends of hottest days in all seasons, with the exception of the months of December, January and February. Data has shown that between 1960 and 2003, Angola has experienced an additional 13.4% of hot days and 18.2% of hot nights per annum, with the rate of increase being higher between the months of September, October and November.⁵⁹

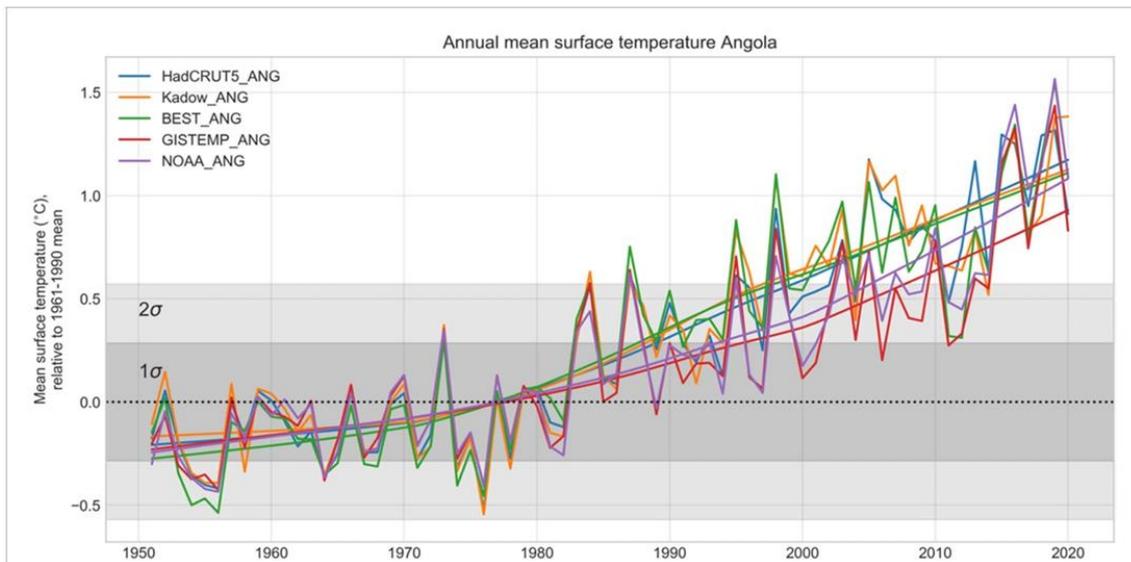
⁵⁶ Pinto et al. 2023

⁵⁷ Republic of Angola 2021b

⁵⁸ Republic of Angola 2021a

⁵⁹ McSweeney et al. 2010

Figure 5. Annual mean temperature variability over Angola from each observed dataset; shaded area shows one and two standard deviations over the period 1961-1990. Straight line is smoothed with a LOWESS filter⁶⁰



From analysing the spatial distribution of mean air temperature variability, it is noticeable that warming is greater in the southern region of Angola⁶¹. The distribution of average annual temperatures for the province of Cunene, whose location is close to the Humpata-Zootécnica meteorological station, between 1990 and 2022 is shown in Figure 6. It shows average annual temperatures between 23° and 24°C over the last 30 years with minimum peaks of 21.7°C and 21.8°C in 2011 and 2008 respectively, and maximum peaks of 25°C and 24.9°C in 2019 and 2023 respectively, pointing towards an increasing trend in average annual temperature for the coming decades.

Figure 6. Annual average temperatures for Ondjiva⁶², 1990 to 2023⁶³



⁶⁰ Pinto et al. 2023

⁶¹ Republic of Angola 2021b

⁶² Capital of Cunene province

⁶³ Developed based on data from meteorological stations in Angola

Precipitation

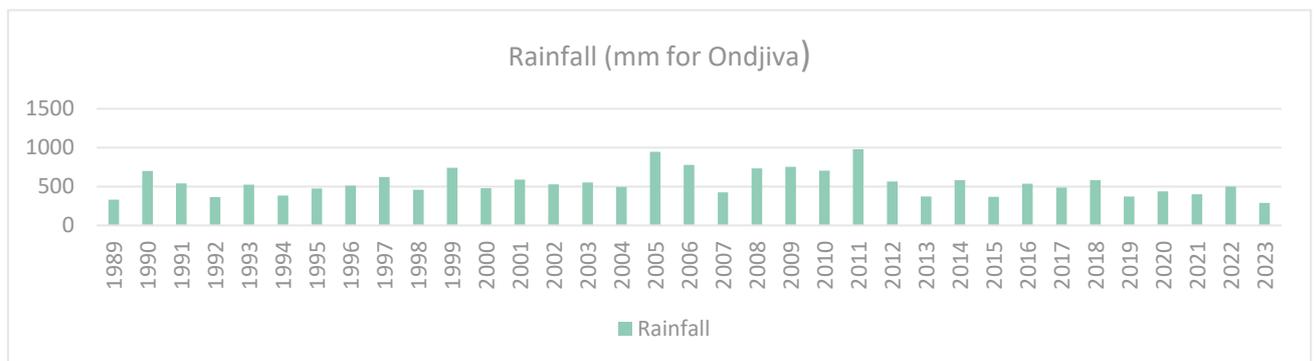
Precipitation data is spatially limited in Angola, but historical trends show that the mean annual rainfall decreased at an average rate of about 2 mm per month (2.4%) per decade between 1960 and 2006⁶⁴. The decrease was higher in the months of March, April and May, reaching 5mm per month, per decade⁶⁵. According to Angola’s Second National Communication, although the annual rainfall level does not vary significantly, studies show that there has been an increase in the number and the intensity of rainfall events. Figure 7 presents the observed seasonal precipitation in the country from 1901 until 2020.

Figure 7: Observed seasonal precipitation⁶⁶

	1991-2020				1961-1990				1931-1960				1901-1930			
Units: mm	DJF	MAM	JJA	SON												
Country: Angola	311.51	309.88	5.68	248.64	313.53	322.75	5.82	249.80	311.21	326.20	4.79	244.72	313.94	313.14	5.32	235.44
Highest: Uige	270.52	508.87	15.16	433.62	270.90	514.94	17.32	407.44	244.72	523.13	13.29	393.57	278.21	498.24	15.17	375.30
Lowest: Namibe	120.12	157.92	1.85	63.74	120.21	161.78	1.11	62.99	120.85	179.72	0.40	58.07	107.81	142.84	1.32	53.27

Figure 8 presents the accumulated precipitation per year in Ondjiva during the last three decades. From 1989 to 2022 the amount of rainfall was generally between 289 mm and 800 mm with two peaks of 945 mm and 979.3 mm in 2005 and 2011, respectively.

Figure 8: Accumulated precipitation in mm for Ondjiva, 1989 to 2023



The monthly variability in average rainfall for Ondjiva is shown in Figure 9, with a unimodal pattern of rainfall from October to April. Figure 10 shows the seasonal variability that has existed over the past 10 years with severe flooding in 2011, and

⁶⁴ McSweeney et al. 2010

⁶⁵ McSweeney et al. 2010.

⁶⁶ World Bank 2023

drought for the past four years. Rainfall over the period 2018 to 2021 has been low and poorly distributed spatially and temporally, leading to a four-year chronic drought.

Figure 9: Maximum, Average and Minimum Precipitation for Ondjiva, 2010 to 2020

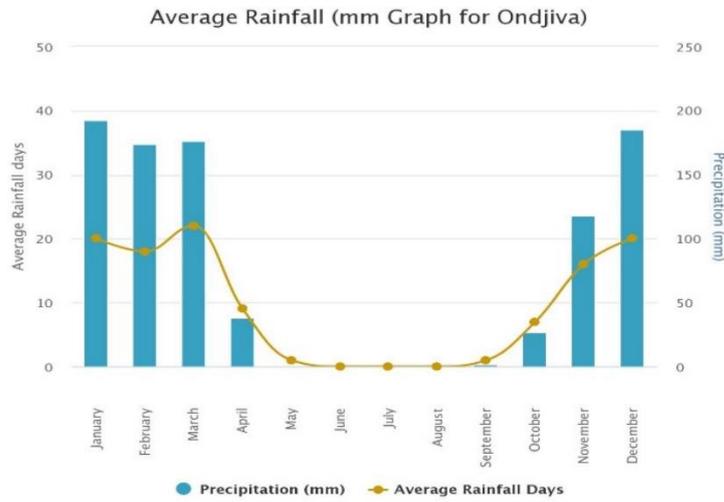
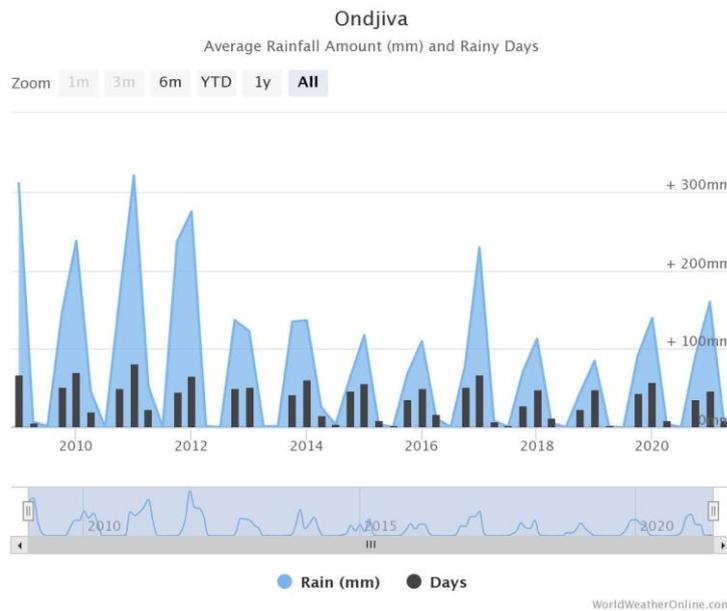


Figure 10: Seasonal variability in Rainfall for Ondjiva over the past 10 years



Droughts

Due to its geographic location, Angola is sensitive to drought events. Statistical analysis shows that 2013 was the driest year in the country so far, followed by 2012, 2014 and 1978⁶⁷. Table 6 shows that the number of drought events have significantly increased between 2011 and 2016, in comparison to previous decades since 1961. Droughts have had an extremely harsh impact on people living in the Cunene, in terms of affecting

⁶⁷ Republic of Angola 2021b

people's food and water security⁶⁸. Table 7 shows records of 19 severe droughts, and their length, in the region over the past 202 years. It can be seen that not only the frequency but also the duration of droughts has increased over the past decades.

Table 6: Distribution of drought events by decade⁶⁹

Period	Drought Moderate	Drought	Extreme Drought	Total
1961 - 1970	4	0	0	4
1971 - 1980	12	3	3	18
1981- 1990	13	7	3	27
1991- 2000	14	4	5	23
2001 - 2010	16	5	1	21
2011 - 2016	14	13	13	40

Table 7: Records of 19 severe droughts over the past 202 years in Cunene Province⁷⁰

Drought years	Length of drought (years)
1819–1822	4
1872–1875	4
1877–1880	4
1893–1897	5
1904–1905	2
1907–1908	2
1912–1916	5
1924	1
1927–1933	7
1939–1942	4
1944–1947	4
1952–1953	2
1955–1956	2
1958–1961	4
1972–1973	2
1981–1982	2
1994–1995	2
2013–2016	4
2018-2021	4

3.4 Future climate trends

In general, all climate models project that Angola will experience increased temperatures, more extreme weather events, an expansion of arid and semi-arid regions,

⁶⁸ Calunga et al. 2015

⁶⁹ Republic of Angola 2021b

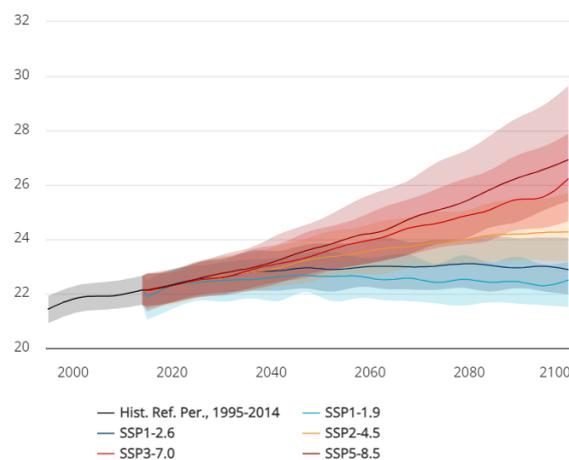
⁷⁰ Calunga et al. 2015

seasonal shifts in rainfall, localized floods, increased wildfires, sea level rise, increased rainfall in the northern parts of the country, changes in river flows and changes in sea and surface water body temperatures over the coming 100 years⁷¹. Existing climate-related hazards such as drought and floods are likely to become more frequent and severe, particularly in the southern regions.⁷²

Temperature

According to the IPCC's latest Assessment Report, continued greenhouse gas emissions will lead to increase global warming, which is likely to reach 1.5° C even under the very low GHG emission scenario, and every increment will intensify multiple and concurrent hazards⁷³. The South-western region of the SADC Region, including the Southern part of Angola, is marked as a climate change hotspot by the IPCC SR1.5, indicating increased evapotranspiration caused by the higher temperatures, a significant decrease in precipitation of 10-20%, and increases in the number of consecutive dry days.⁷⁴

Figure 11. Projected mean temperature Angola (Ref. Period: 1995-2014), Multi-Model Ensemble⁷⁵



In Angola, there is high model agreement that temperatures are projected to increase in the future⁷⁶. Mean temperatures are projected to increase everywhere in the country in all scenarios analysed.

⁷¹ Republic of Angola 2012

⁷² ACIDI & University of Cape Town 2016

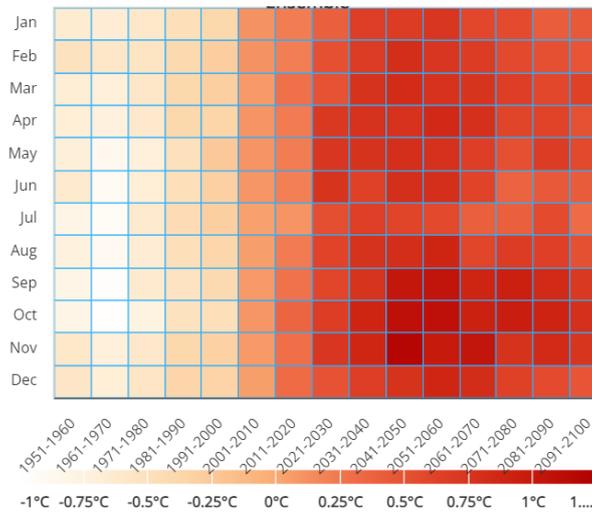
⁷³ Calvin et al. 2023

⁷⁴ IPCC 2022

⁷⁵ World Bank 2023

⁷⁶ Pinto et al. 2023

Figure 12. Projected mean temperature anomaly Angola; (Ref. Period: 1995-2014), SSP1-1.9, Multi-Model Ensemble



The projections were calculated using the period between 1995-2014 as a historical reference. Under RCP4.5, mean temperatures are projected to increase between 1°C and 2°C from near to mid-term future, while under RCP8.5 scenario, projected increase reaches between 1° and 3°C (see Figure 13). Data from the Climate Information website also shows that many models agree on the annual mean temperature increase for the area covering the location of Ondjiva, Cuanhama, Cunene (-17.07, 15.73) under RCP4.5 and 8.5 scenarios (see Figure 14 and Figure 15).

Figure 13. The multimodel mean of temporally averaged changes in mean annual temperature (TG,(a)), number of days with maximum temperature above 30°C (SU30,(b)), the annual maximum temperature (TXx,(c) hottest day) and the annual minimum temperature (TNn,(d)

coldest night) over the time period 2020–2040 and 2040–2060 displayed as differences (in°C) relative to the reference period (1981–2010) for RCP45 (top) and RCP85 (bottom)

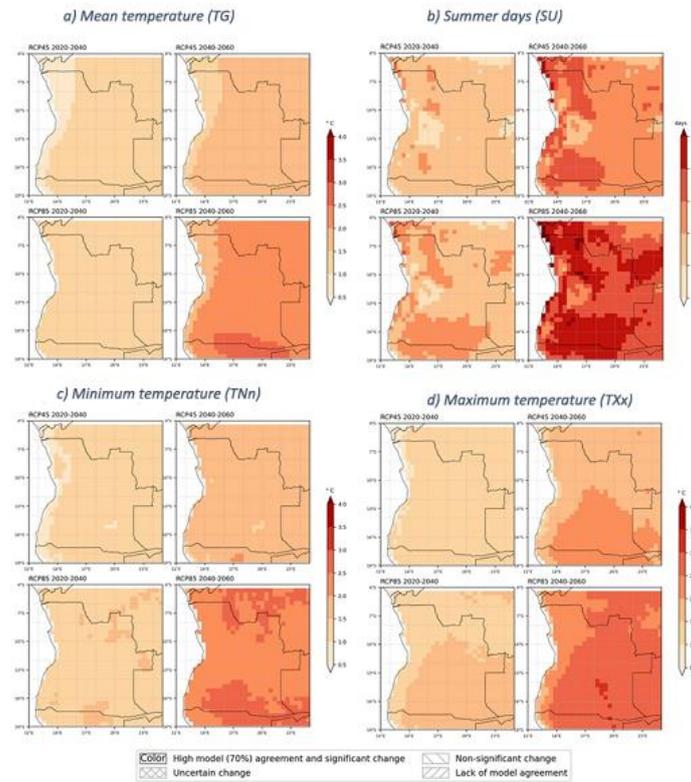


Figure 14. Temperature (annual mean) – Change compared to historical period (1981-2010) – RCP4.5

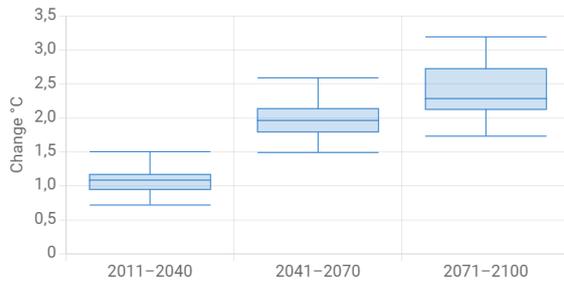
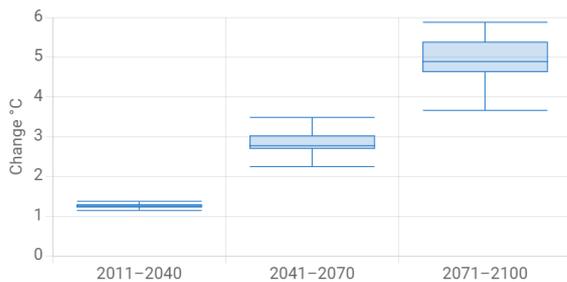
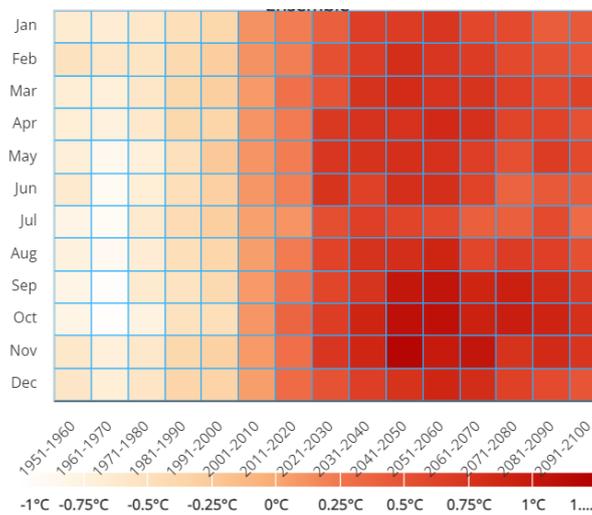


Figure 15. Temperature (annual mean) – Change compared to historical period (1981-2010) – RCP8.5



Besides annual mean temperature, data also projects an increase in the number of hot days (in which temperature exceeds 30°C) by between 60 and 90 days per annum in the south of Angola, as well as a decrease in the frequency of days and nights that are considered 'cold' in the current climate. Following the same trend, monthly temperature is also projected to increase in the country (see Table 8). The temperature of hottest months of October and November, for example, are projected to increase by 2.1°-2.4°C, relative to the historical average of 24°C. Overall, increasing temperatures will likely result in severe impacts on the agricultural sector, as these will contribute to reduced rainfall and increase water stress. and Figure 12 show the projection of average temperatures up to 2100, with an expected increase of 2°C every twenty years.

Figure 12. Projected mean temperature anomaly Angola; (Ref. Period: 1995-2014), SSP1-1.9, Multi-Model Ensemble⁷⁷



The projections were calculated using the period between 1995-2014 as a historical reference. Under RCP4.5, mean temperatures are projected to increase between 1°C and 2°C from near to mid-term future, while under RCP8.5 scenario, projected increase reaches between 1° and 3°C⁷⁸ (see Figure 13). Data from the Climate Information website also shows that many models agree on the annual mean temperature increase for the area covering the location of Ondjiva, Cuanhama, Cunene (-17.07, 15.73) under RCP4.5 and 8.5 scenarios⁷⁹ (see Figure 14 and Figure 15).

Figure 13. The multimodel mean of temporally averaged changes in mean annual temperature (TG,(a)), number of days with maximum temperature above 30°C (SU30,(b)), the annual maximum temperature (TXx,(c) hottest day) and the annual minimum temperature (TNn,(d))

⁷⁷ World Bank 2023

⁷⁸ Pinto et al. 2023

⁷⁹ GCF et al. 2023

coldest night) over the time period 2020–2040 and 2040–2060 displayed as differences (in °C) relative to the reference period (1981–2010) for RCP45 (top) and RCP85 (bottom)

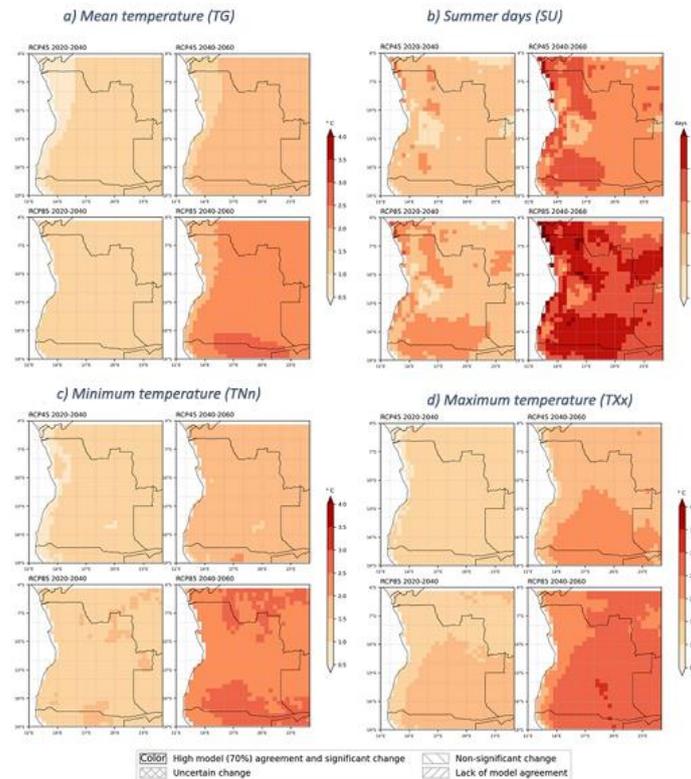
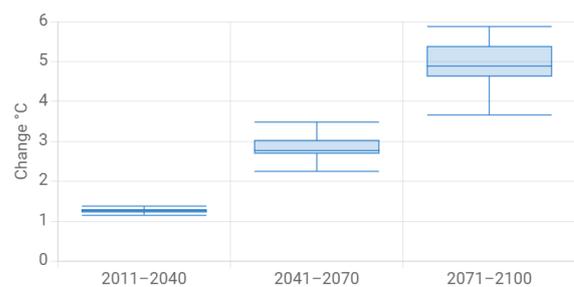
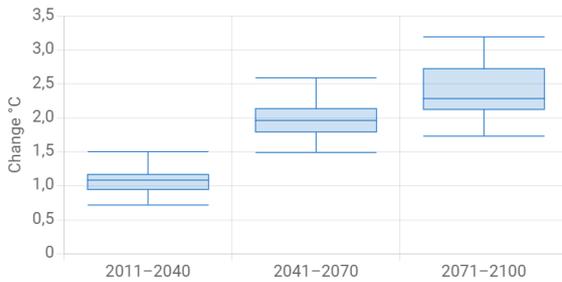


Figure 14. Temperature (annual mean) – Change compared to historical period (1981-2010) – RCP4.5⁸¹

Figure 15. Temperature (annual mean) – Change compared to historical period (1981-2010) – RCP8.5⁸²



Besides annual mean temperature, data also projects an increase in the number of hot days (in which temperature exceeds 30°C) by between 60 and 90 days per annum in the south of Angola⁸³, as well as a decrease in the frequency of days and nights that are considered ‘cold’ in the current climate⁸⁴. Following the same trend, monthly temperature

⁸⁰ Pinto et al. 2023

⁸¹ GCF et al. 2023

⁸² GCF et al. 2023

⁸³ Pinto et al. 2023

⁸⁴ McSweeney et al. 2010

is also projected to increase in the country (see Table 8). The temperature of hottest months of October and November, for example, are projected to increase by 2.1°-2.4°C, relative to the historical average of 24°C⁸⁵. Overall, increasing temperatures will likely result in severe impacts on the agricultural sector, as these will contribute to reduced rainfall and increase water stress.

Table 8. Projected influence of climate change on mean monthly temperature (°c) in Angola at historical and mid-century periods, and monthly anomalies between the two time periods⁸⁶

Tmean (°C)	MONTH											
	J	F	M	A	M	J	J	A	S	O	N	D
Historical	23.5	23.5	23.5	23.2	21.7	19.7	19.3	21.3	23.4	24.4	24.0	23.5
Future	25.3	25.3	25.4	25.1	23.9	21.8	21.5	23.4	25.7	26.7	26.1	25.5
Anomaly	1.8	1.8	1.9	2.0	2.2	2.1	2.2	2.1	2.3	2.4	2.1	1.9

Historical temperature based on the average of the period 1980-2010 and projected mid-century temperature for the period 2040-2069. Anomalies are defined as the total change between Historical and Mid-Century projections

Precipitation

Although there is an overall model agreement on the temperature trends in Angola, projected changes in precipitation patterns are less uniform. However, even though rainfall models for precipitation projections in Angola may vary, there is broad agreement that rainfall levels will decrease in the future, with a stronger decrease in the southern part of the country⁸⁷. As with temperature, changes in precipitation will not occur uniformly throughout the country because localized factors such as geography and vegetative cover exert a strong influence.

The frequency and intensity of high-precipitation events is likely to increase with increasing temperature, elevating the risk of flooding and other damaging events such as landslides. Associated with an increased risk of extreme precipitation is an increase in the risk of land drying and drought. Although somewhat counterintuitive, this is due to the fact that warming accelerates land surface drying while also increasing the water-holding capacity of the atmosphere. The result is more intense and heavy episodic rainfall events interspersed with longer relatively dry periods.

Figure 16 and Figure 17 present the analysis developed by Pinto et al. (2023) about the projected changes in annual total precipitation on days with at least 1mm of precipitation (PRCTOT) and in mean seasonal total precipitation (PRCPTOT) in Angola. The data shows that PRCTOT is projected to decrease, but it will not change much between the different RCP scenarios. More definite projected changes are evident at seasonal

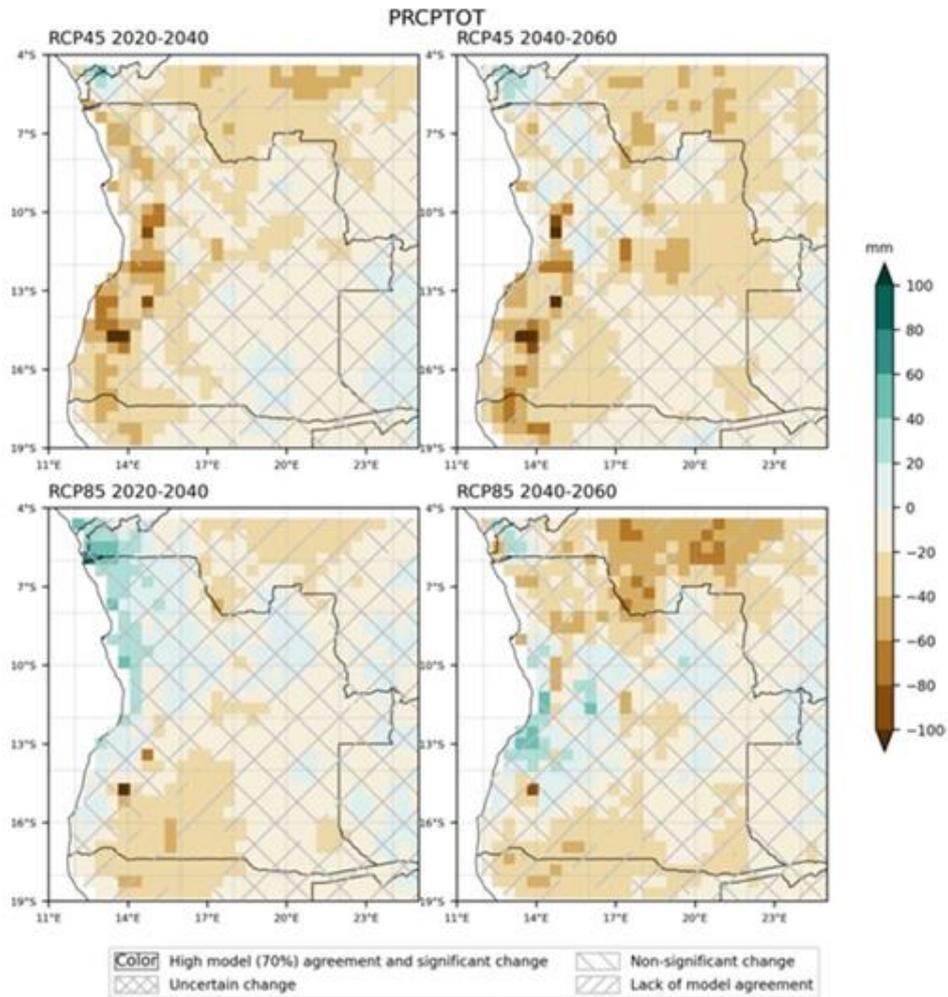
⁸⁵ Hunter et al. 2020

⁸⁶ Hunter et al. 2020

⁸⁷ USAID 2018

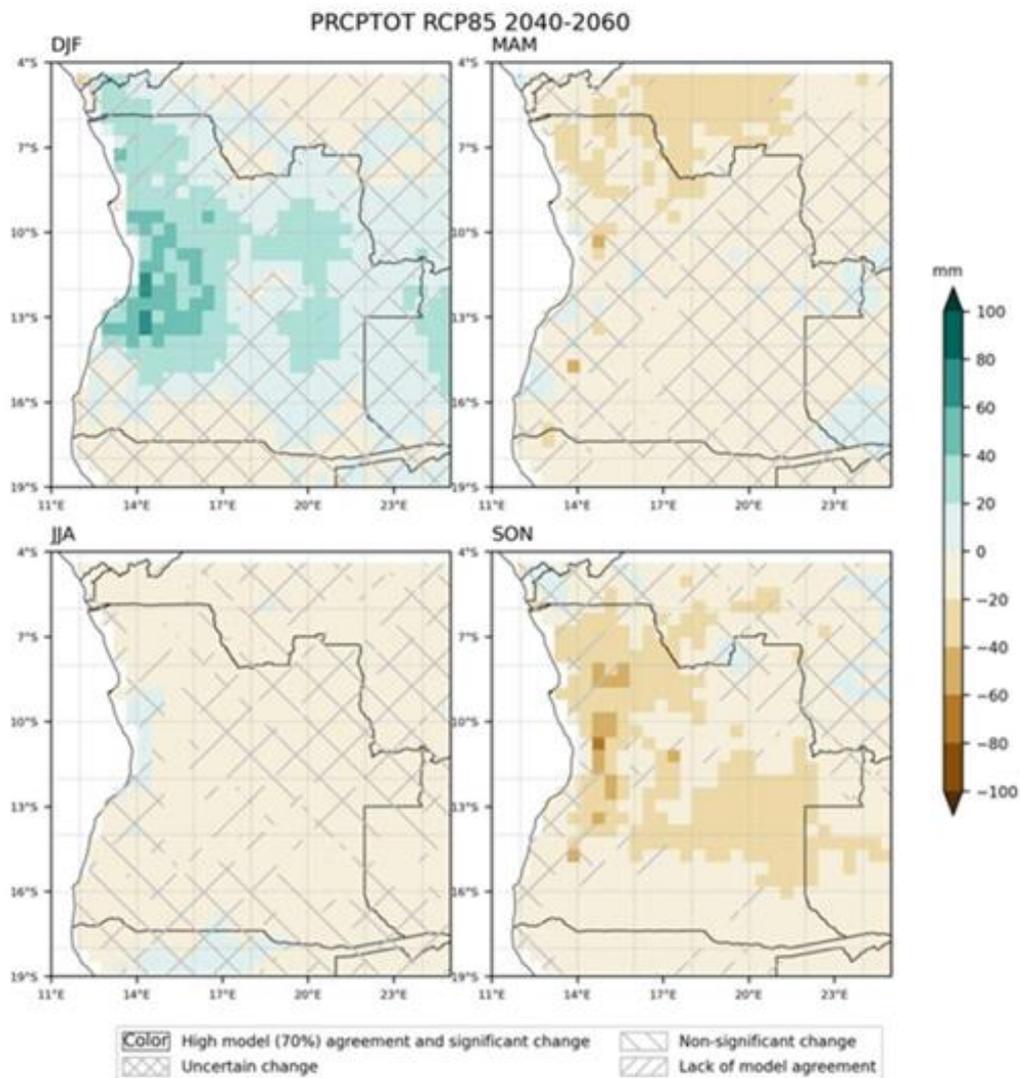
timescales under RCP8.5, with projected reductions of mean seasonal precipitation during the periods between September-November and March-May.

Figure 16. The multimodel mean of temporally averaged changes in mean annual total precipitation (PRCPTOT) over the time period 2020–2040 and 2040–2060 displayed as differences (inmm) relative to the reference period (1981–2010) for RCP4.5 (top) and RCP8.5 (bottom) (Data: CORDEX44).⁸⁸



⁸⁸ Pinto et al. 2023

Figure 17. The multimodel mean of temporally averaged changes in mean seasonal total precipitation (PRCPTOT) over the time period 2040–2060 displayed as differences (inmm) relative to the reference period (1981–2010) for RCP8.5. (Data: CORDEX44).



Corroborating with the analysis above, Figure 18⁸⁹ shows the anomalies (%) of annual precipitation according to each Regional Climate Model (RCM) for three time periods (2011-2040, 2041-2070 and 2071-2100). In general, a slight decrease in precipitation is projected by the four RCMs throughout the 21st century. The decrease in precipitation will be higher for the south of the country, in Baixo Cunene and Cuvelai. In contrast, the projections for the central coastal region (for example, the Centro-Oeste unit) show a slow increase in precipitation (see Figure 19). The central-southern region of Angola, in particular Cunene region shows marked decrease in precipitation. The same conclusions on the projected rainfall are presented in Angola's Second National Communication (see Figure 20) The predicted changes in mean monthly precipitation from the historical baseline to the mid- century (2050) future for Cunene are shown in Table 9 .

⁸⁹ Carvalho et al. 2017

Figure 18. Mean anomaly of precipitation for the three time periods and two RCPs based on the RCMs ensemble⁹⁰

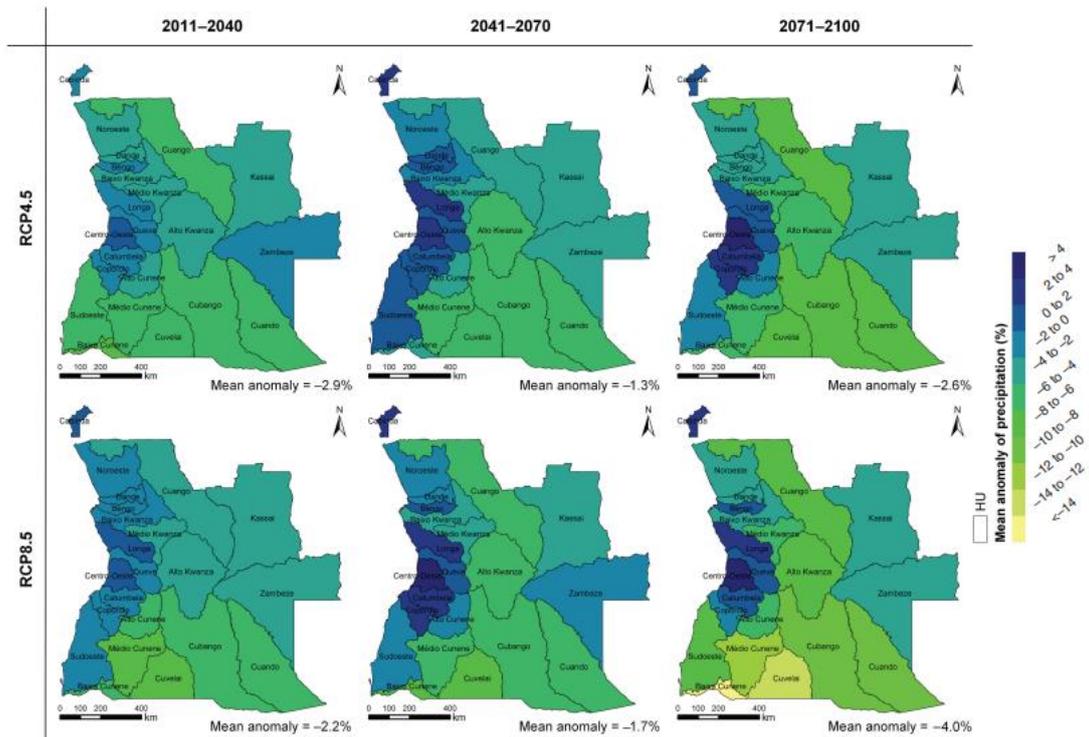
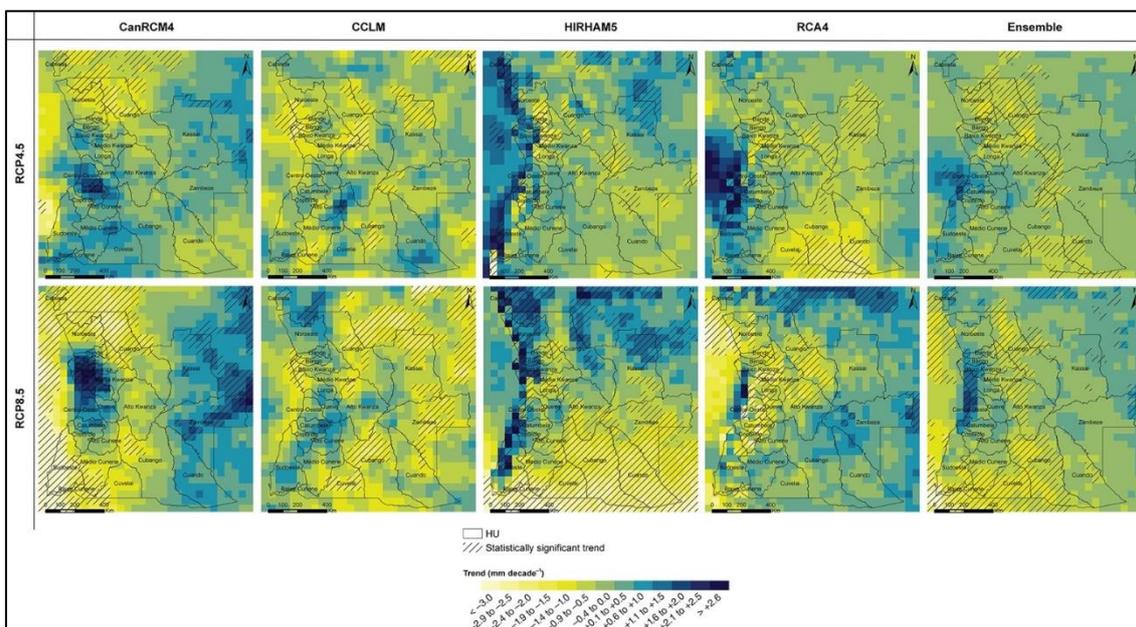


Figure 19. Annual mean precipitation anomaly trends for the period 2011–2100 for four RCMs and the RCMs ensemble, under two RCPs



⁹⁰ Carvalho et al. 2017

Figure 20. Delta change projection for average annual rainfall for the period 2021-2050 and 2051-2080⁹¹

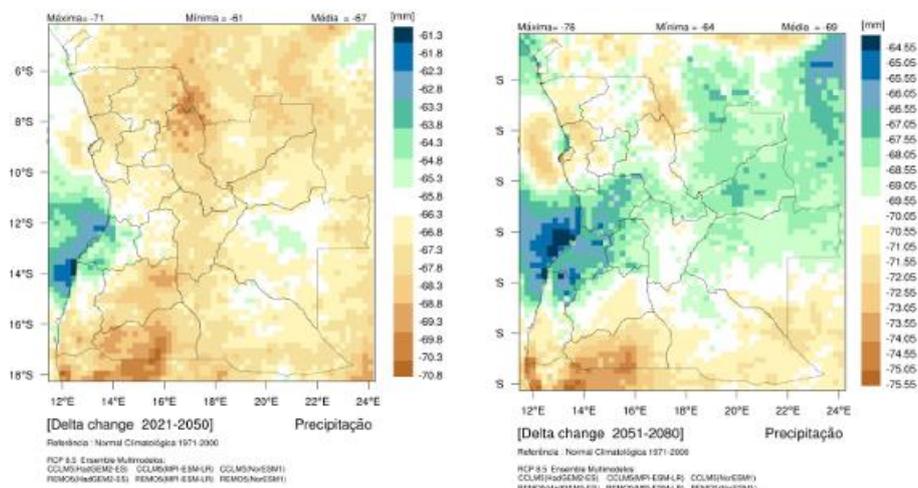


Table 9. Projected influence of climate change on mean monthly precipitation (mm/month) in Cunene at historical and mid-century periods, and monthly anomalies between the two time periods⁹²

MM/MONTH	MONTH												TOTAL
	J	F	M	A	M	J	J	A	S	O	N	D	
Historical	105	116	110	36	2	1	0	0	2	19	49	81	520
Future	93	103	93	29	1	0	0	0	1	9	37	70	435
Anomaly	-12	-13	-17	-7	-1	0	0	0	-1	-10	-12	-12	-83

For the province of Cunene, total rainfall at the onset of the rainy season in the months of October and November is predicted to be reduced from 19 to 9 mm/month and 49 to 37 mm/month, respectively. This is a total reduction of rainfall over the period of the start of the planting season of 22 mm.

Further reductions in monthly precipitation are predicted for the summer rainy season months from December to March ranging from 12 to 17 mm/month (total reduction of 54 mm over the four-month period). The overall effect of these reductions on monthly precipitation throughout the rainy season is projected to reduce the total annual rainfall from 520 mm/season to 435 mm/season, a reduction of 83 mm (16%).

⁹¹ Republic of Angola 2021b

⁹² Historical precipitation based on the average of the period 1980-2010, and projected Mid-Century precipitation for the period 2040-2069. Anomalies are defined as the total change between Historical and Mid-Century projections. Province-level summaries of predicted monthly changes in precipitation can be found in the supplementary Appendix).

In the period of 2021-2050 rainfall loss in Angola should vary between 61 and 71 mm/year, with Cunene province being the most affected. In the period of 2051- 2080, the projections point to a loss of rainfall between 64 and 76 mm/year, with the province of Cunene also being the most affected. On the other hand, beyond the projected reductions, rainfall should also change patterns, as the temperature increase should increase the frequency of convective cloud formation which normally causes torrential rainfall that can induce the highest occurrence of floods. Still in the same vein, the combined effect of rising temperatures and falling rainfall could intensify drought episodes.

Droughts

Climate change is very likely to bring stronger droughts throughout the 21st century, which will affect both human and environmental systems (e.g., water availability and wildfire potentials). Incidence of droughts analysed using the Standardized Precipitation Index (SPI) shows the frequency of magnitude of drought, though as recently reported by the IPCC it is often difficult to predict⁹³.

Figure 21 shows the number of events and the mean magnitude of droughts under two RCP's computed from SPI-6 and SPI-12⁹⁴. It shows that the number and magnitude of the droughts gradually increase over the 21st century. At a national level, the frequency of drought events generally remains constant, but there is a pronounced impact on the magnitude of drought, which, under RCP8.5, can double in magnitude by the end of 21st century. An analysis of drought impact by hydrological units across Angola showed that, except for one hydrological unit, all showed an increase in number of droughts. Droughts are particularly exacerbated in the south of the country. The magnitude of droughts is also predicted to increase in the 21st century. The frequency of droughts is greater in Cunene, Medio Cunene and Cuvelai hydrological units.

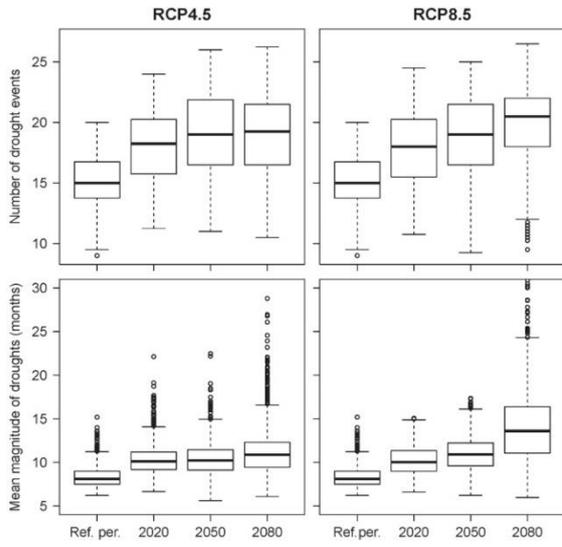
The analysis presented by Pinto et al (2023). shows that projections by individual models encompass possible increases in frequency of droughts years. CORDEX projections, for example, indicate a strong increase in drought, particularly in the south of Angola, where the province of Cunene is located (see Figure 22).

Figure 21. Number of events and mean magnitude of droughts for different time periods, according to two RCPs, computed from SPI-6 and SPI-12, and based on the RCMs ensemble⁹⁵.

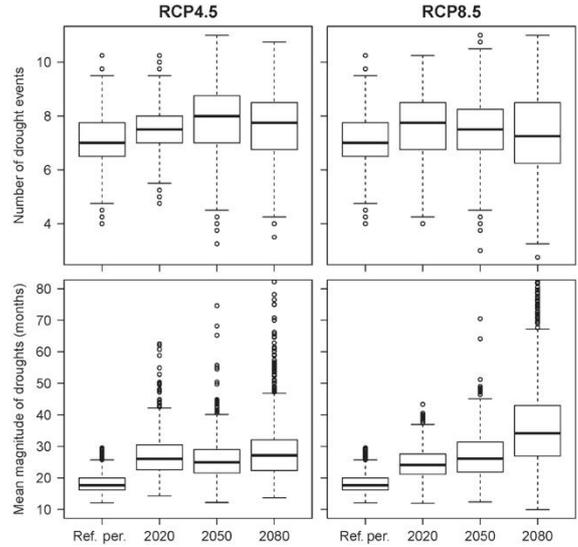
⁹³ Moore III et al. 2018

⁹⁴ Standardized Precipitation Index for 6 months (SPI-6) and 12 months (SPI-12) time period.

⁹⁵ Carvalho et al. 2017

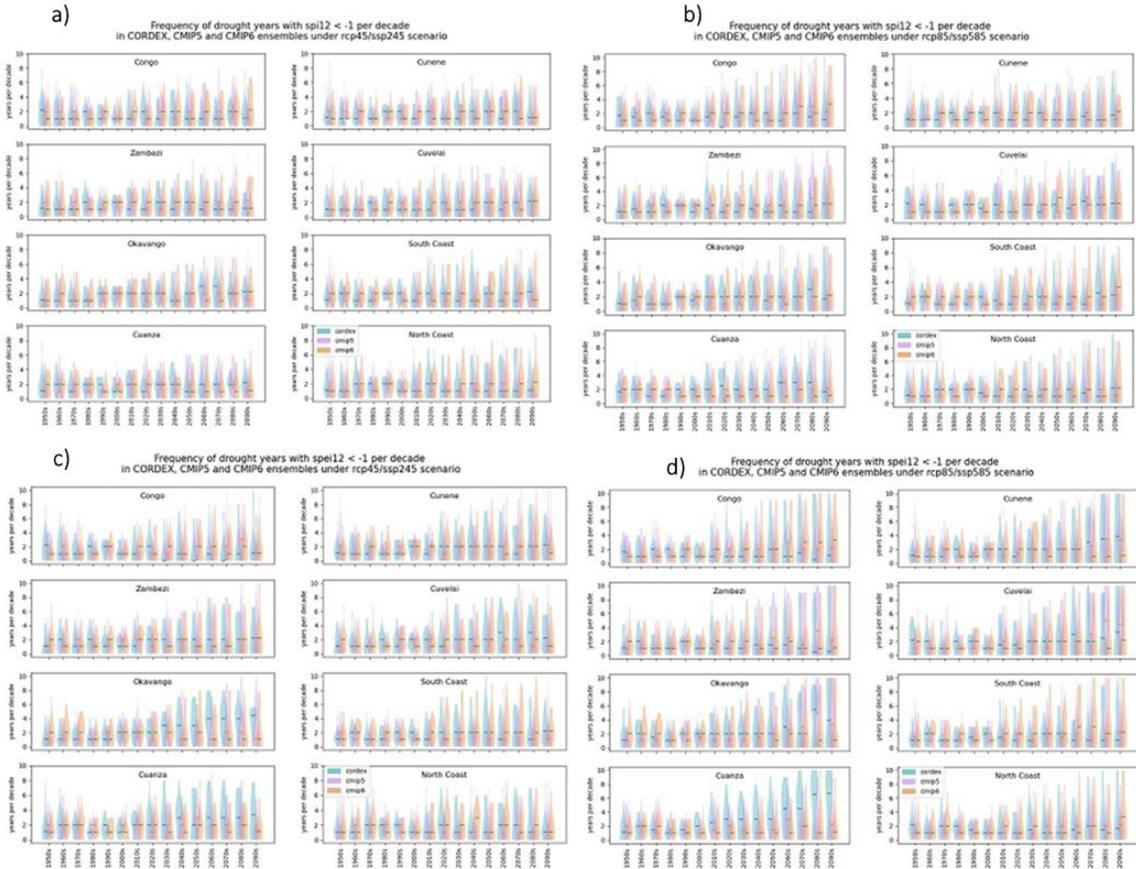


a. SPI-6



b. SPI-12

Figure 22. Frequency of droughts (count of years per decade) identified as SPI12 (a) and (b) and SPEI12 (c) and (d) in October (beginning of wet season) of less than -1, in each of the basins, in historical simulations and projections under RCP4.5/SSP245 (a) and RCP8.5/SSP585 scenario (b)⁹⁶



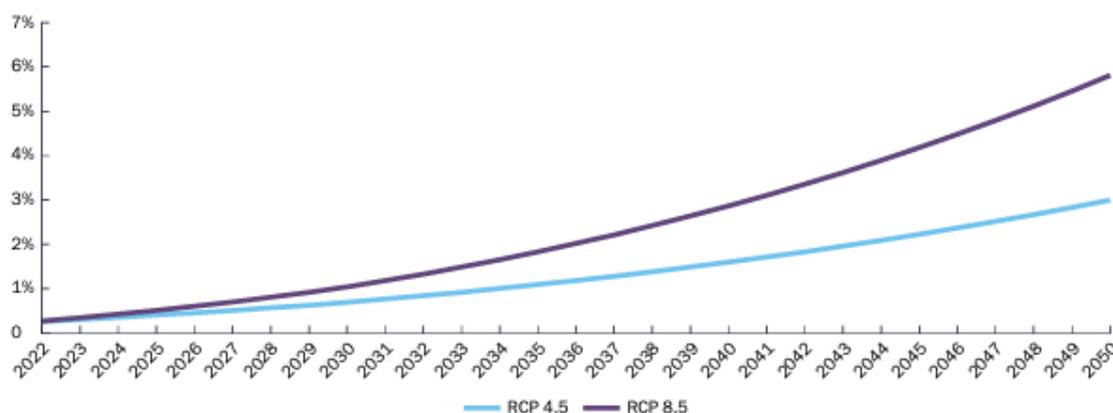
⁹⁶ Pinto et al. 2023

3.5 Climate change impacts, risks and vulnerabilities

The high climate change vulnerability score and low readiness score of Angola places the country in the upper-left quadrant of the ND-GAIN Matrix⁹⁷ (37.9) where it is ranked 159 out of 181 countries⁹⁸. According to the ND-GAIN matrix, Angola is the 41st most vulnerable country and the 171st most ready country, out of a total of 192 countries assessed by ND-GAIN⁹⁹. This means that the country has a great need for investment and innovations to improve adaptation capacity, with recent extreme weather events demonstrating a great urgency for action. Moreover, the Germanwatch's Global Climate Risk Index ranks Angola as the 23rd highest risk country out of 180 countries analysed in 2021¹⁰⁰. And UNICEF classifies Angola as the 10th highest risk country out of 163 countries for the impact of climate change on children¹⁰¹.

As observed in the sections above, Angola has been experiencing changes in temperature and precipitation, which are expected to worsen in future projections. These climatic changes will likely bring stronger and more frequent droughts throughout the century, with an impact on water resources, agricultural productivity, and the potential for forest fires. Economic modelling shows that, without adaptation measures, the projected climate change impacts could reduce Angola's GDP by 3 to 6% by 2050 (see Figure 23)., with agricultural productivity decreasing by 7% by 2050, under RCP8.5¹⁰². The following subsections will present more information on climate change impacts in the main sectors related to the proposed project.

Figure 23. Projected loss of GDP due to climate change impacts under RCP4.5 and 8.5¹⁰³



Climate change impacts on agriculture and food security

The Angolan economy has been hit hard by the impact of climate change expressed as prolonged drought, damaging flash floods, forest fires, reduced crop production and reduced water resources.

⁹⁷ The ND-GAIN Matrix illustrates the comparative resilience of countries. Countries in the upper-left quadrant have a high level of vulnerability and a low level of readiness, which means both a great need for investments and innovation to improve readiness and great urgency for adaptation action.

⁹⁸ University of Notre Dame 2023

⁹⁹ University of Notre Dame 2023

¹⁰⁰ Eckstein et al. 2021

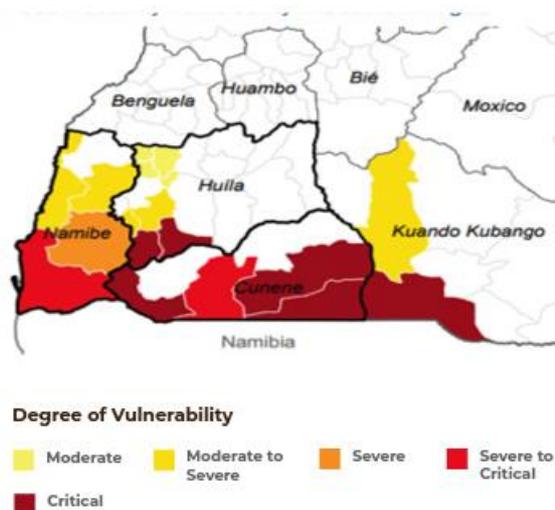
¹⁰¹ UNICEF 2021

¹⁰² World Bank 2022

¹⁰³ World Bank 2022

Certain sectors of the economy, e.g. the agricultural sector, are extremely vulnerable to impacts resulting from the extreme climate events which can pose not only serious livelihood and direct health risks but can also affect the economic potential and national food security, especially in the southern region (see Figure 24).

Figure 24. Food insecurity vulnerability in southern Angola¹⁰⁴



Source: CNPC, 2016

The agricultural sector in Angola has been growing over the last few years, and the climate factor is essential for its activities. Rainfall dependency for most staple crops, combined with unsustainable land use practices and prevalent soil erosion will lead to the increased vulnerability of the agricultural systems in the country, leading to significant impact on rural livelihoods. The lack of water resulting from lower and poorly distributed annual rainfall seriously affects rainfed agricultural practices and also affects irrigation due to a lower water table with concomitant difficulties for irrigation. A decrease in the rainfall trend and increase in temperature could provoke a climatic deficit with serious consequences for agriculture production, which would place most of the population in a state of severe food insecurity. According to the National Commission for Civil Protection (CNPC), it is predicted that food insecurity could soon affect around 43% of the population in Angola¹⁰⁵.

The overall effect of increased temperatures is likely to result in complex impacts on the agricultural sector, particularly when considered in combination with the predicted decreases and delayed timing of rainfall. The large increases in temperature (2.1–2.4°C) in the months of September–November, as shown in Table 8 above, will increase water demand for crops and evapotranspiration losses of water from agricultural soils, coinciding with the reduced rainfall predicted for the same months. This effect is likely to lead to the increases risks of crop failure as a result of inadequate or erratic rainfall during the establishment of rainfed crops.

Furthermore, the increased average temperatures are likely to include increased frequency or severity of heat waves and unusually hot days, further contributing to evapotranspirative losses of water and crop stress. A possible additional effect of the increase in winter temperatures may be to decrease the feasibility and productivity of irrigated agriculture during the dry, cooler winter. Increased winter temperatures may result in hot conditions that do not favour off-season irrigated

¹⁰⁴ SADRI 2021

¹⁰⁵ Republic of Angola 2017

horticultural production such as tomatoes and the production of crops such as *Phaseolus vulgaris* beans.

Taken cumulatively over the entire growing season, the combination of reduced rainfall and increased temperatures are likely to reduce agricultural production, either as a result of decreased yield or outright crop failure, particularly in the case of heat- and drought-sensitive crops such as maize. According to projections, compared to current climate conditions, the average annual loss in the agriculture sector in Angola for the period between 2051 to 2100, considering the RCP8.5 scenario, will reach 744 million USD, due to the increase in droughts¹⁰⁶. Recent studies have projected that climate change impact will result in a reduction of 30% in the yield of maize and wheat in southern Africa by 2030¹⁰⁷. The province of Cunene is expected to lose 3,300 tonnes of sorghum production and undergo a -18.5% decline in suitable area due to the impacts of climate change by 2050 (see Table 10)¹⁰⁸. The province is likely to require extensive support to manage the projected impacts.

Table 10. Predicted climate change impacts on production of agricultural crops in Cunene¹⁰⁹

Crop	Production Area		Annual Production		Predicted Impacts (Cunene Region)			
	Total (Ha)	% National Total	Total (Tonnes)	% National Total	% Change production per capita	Total change per person (kg)	Total change production per household (kg)	Total Change production per province (tonnes)
Beans	4,875	0.5	2,046	0.5	-58	-1	-6	-1,177
Cassava	4,109	0.2	26,644	0.2	Unsuitable for cultivation			
Groundnut	1,6559	0.5	1,211	0.5	-53	-1	-3	-646
Maize	16,628	0.4	12,766	0.4	Unsuitable for cultivation			
Sorghum	56,231	12.4	11,974	12.4	-28	-3	-18	-3,322

Climate change impacts on water sector

The country has experienced a recurrent cycle of episodes of droughts and extreme floods that have been affecting the southern regions with greater incidence. The impacts of these recent extreme weather events, with a devastating impact on several municipalities in Huíla, Namibe and Cunene, demonstrate Angola's vulnerability and exposure to climate variability. Besides the impacts on agricultural production and food security, climate change impacts and the increase frequency and intensity of droughts will also impact the water sector in Angola. Some of these impacts include

¹⁰⁶ SADRI 2021

¹⁰⁷ USAID 2012

¹⁰⁸ Hunter et al. 2020

¹⁰⁹ Hunter, R., Crespo, O., Coldrey, K., Cronin, K., New, M. 2020. Research Highlights – Climate Change and Future Crop Suitability in Angola. University of Cape Town, South Africa, undertaken in support of Adaptation for Smallholder Agriculture Programme' (ASAP) Phase 2. International Fund for Agricultural Development (IFAD), Rome.

encroaching desertification; decline of available water for human consumption, animals and irrigation; contaminated water resulting in outbreaks of cholera and diarrhoeal disease.

The alterations in rainfall, temperature and hydrology will affect rainfed farming in marginal environments and water availability for irrigation. The Government of Angola (GoA) and international donors have made some investment in boreholes, surface water and irrigation schemes. However, in the limited areas where irrigation is practicable, the majority of farming families still have no access to irrigation equipment. According to data from the United Nations Development Program (UNDP), at the end of 2015, 80% of the country's water catchment holes stopped working and the reservoirs dried up, as a result of a significant decrease in water reserves of the country, after 4 consecutive years of extreme drought episodes¹¹⁰.

The impact of prolonged drought on the environment, generally in the affected provinces of Angola, is rapidly accelerating deforestation, land degradation and depleting vital water resources, especially in Cunene. The fertility of soils is declining and water supplies are increasingly failing. The effect of climate change has put increased pressure on underground water reserves and farming systems. In turn, these conditions contribute to raising the level of future risks, namely desertification and the potential increase in floods due to soil erosion, thus increasing the level of vulnerability of local populations.

Consequently, the drought strategy will have to reverse the response mechanisms that contribute to environmental degradation, in turn supporting more sustainable alternative income options, promoting sustainable management of natural resources and agricultural practices, and even adopting alternatives that contribute to reduce the risk of future catastrophes. It will be important to intensify strategies for adapting to climate change, as it is important to take into account that in this region it is expected that droughts will not only become more frequent, but also more severe.

Climate change gendered impacts

Traditionally in Angola, women’s responsibility in the rural household includes all aspects of daily family subsistence, including the production of food crops, horticultural crops and small livestock. Women also are responsible for the conservation, processing, and preparation of food; the sale of food produced to procure basic family consumer goods; the collection of firewood and water; and caring for children, the elderly and ill household members. Moreover, women have an unequal dependence and access to land, water, resources and productive assets, as well as have limited mobility and decision-making power.

All these factors contribute to women being disproportionately affected by climate change. In a scenario where water and other resources will be scarcer due to climate-induced drought and change in rainfall patterns, women will have their time and level of effort required to collect, secure, distribute and store these resources negatively impacted. Table 11 summarizes some of the potential effect of climate change impacts on women.

Table 11: Climate change impacts and potential effect on women

Climate Change Impacts	Effect on women
Increased drought and water shortage	Women and girls in developing countries are often the primary collectors, users and managers of water. Decreases in water availability will jeopardize their families’ livelihoods, increase their workload, and have secondary effects such as lower school

¹¹⁰ CNPC 2016

	<p>enrolment figures or less opportunity to engage in income-generating activities.</p> <p>As typically women and girls are responsible for water-related tasks in rural areas of Angola, water shortage contributes indirectly to the high adolescent girl school drop out rate in the country¹¹¹.</p>
Increased extreme weather events	A sample of 141 countries over the period 1981–2002 found that natural disasters (and their subsequent impact) kill more women than men on average or kill women at an earlier age than men; Extreme weather events tend to generate an increase in gender-based violence.
Loss of species	Women may often rely on crop diversity to accommodate climate variations, but permanent temperature change will reduce agro-biodiversity and traditional medicine options, potentially affecting food security and health
Decreased crop production	Rural women, in particular, are responsible for half of the world's food production and produce from 60 to 80 percent of the food in most developing countries. Decreased productivity results, among others, in an increased labour burden for women.

3.6 Climate change adaptation rationale

Scientific data and analysis of the observed and future climate trends shows that, without any further action and support, climate change will have an increasing negative impact in Angola, especially on the most vulnerable population of the Cunene region. The impacts of increasing temperatures and changes in precipitation will include reduced agricultural production, reduction of available water for human consumption, animals and irrigation, increasing desertification and worsening of food security and child malnutrition. These impacts will consequently affect the already low levels of human and economic development in the region, exacerbating the population's vulnerability.

Small-scale subsistence farmers and pastoralists remain extremely vulnerable to climate-induced effects. The abilities of these communities, and especially of their most vulnerable groups, e.g. women and youth, to cope with droughts have been greatly weakened over the years due to the aggravated impacts of such events, which have become more frequent as well as more severe. As a result, communities have no alternative options but to resort to overexploitation of natural resources using unsustainable methods.

The projected future rise in the severity of climate change impacts will thus result in a direct impact on the local communities, as well as the ecosystems they rely on, exacerbating existing development and sustainability challenges. Therefore, there is an urgent need to strengthen the adaptive capacity of Cunene's most vulnerable population, especially women, and improve their resilience to deal with

¹¹¹ World Bank 2023

climate change impacts. As drought was one of the main climate hazards identified in the region, the proposed project will focus its interventions on strategies to support the local most vulnerable communities to cope and adapt to its impacts. The interventions were defined based on local baseline studies, stakeholder consultations and best practices of similar interventions.

4. Vulnerability Assessment: Agriculture and Gender

4.1 Overview

Angola's performance on indices

HDI: The Human Development Index, or HDI, is a metric compiled by the United Nations Development Programme and used to quantify a country's "average achievement in three basic dimensions of human development: a long and healthy life, knowledge, and a decent standard of living." Angola ranks scores 0.586, which puts it among medium tier countries. However, the region of Cunene experiences low HDI, as it scores 0.519.

MPI: The global Multidimensional Poverty Index (MPI) measures acute multidimensional poverty across more than 100 developing countries. It does so by measuring each person's overlapping deprivations across 10 indicators in three equally weighted dimensions: health, education and standard of living. The most recent survey data that were publicly available for Angola's MPI estimation refer to 2015/2016.

Based on these estimates, 51.1% of the population in Angola (17,633 thousand people in 2021) is multidimensionally poor while an additional 15.5% is classified as vulnerable to multidimensional poverty (5,363 thousand people in 2021).¹¹² The intensity of deprivations in Angola, which is the average deprivation score among people living in multidimensional poverty, is 55.3%. The MPI value, which is the share of the population that is multidimensionally poor adjusted by the intensity of the deprivations, is 0.282. In comparison, Senegal and Zambia have MPI values of 0.263 and 0.232, respectively. The table below compares multidimensional poverty with monetary poverty measured by the percentage of the population living below 2017 PPP US\$2.15 per day. It shows that monetary poverty only tells part of the story. The headcount or incidence of multidimensional poverty is 20% points higher than the incidence of monetary poverty. This implies that individuals living above the monetary poverty line may still suffer deprivations in health, education and/or standard of living. The table also shows the percentage of Angola's population that lives in severe multidimensional poverty. The contributions of deprivations in each dimension to overall poverty complete a comprehensive picture of people living in multidimensional poverty. Figures for Senegal and Zambia are also shown in the table for comparison.

¹¹² UNDP 2023

Table 12: Comparison between multidimensional and monetary poverty in Angola, Senegal and Zambia

	Survey year	MPI value	Head-count (%)	Intensity of deprivations (%)	Population share (%)			Contribution of deprivation in dimension to overall multidimensional poverty (%)		
					Vulnerable to multidimensional poverty	In severe multidimensional poverty	Below income poverty line	Health	Education	Standard of living
Angola	2015/2016	0.282	51.1	55.3	15.5	32.5	31.1	21.2	32.1	46.8
Senegal	2019	0.263	50.8	51.7	18.2	27.7	9.3	20.7	48.4	30.9
Zambia	2018	0.232	47.9	48.4	23.9	21.0	61.4	21.5	25.0	53.5
Sub-Saharan Africa	-	0.262	49.5	52.9	18.6	27.9	37.4	20.6	29.6	49.8

GDI: In the 2014 HDR, HDRO introduced a new measure, the Gender Development Index, based on the sex-disaggregated Human Development Index, defined as a ratio of the female to the male HDI. The GDI measures gender inequalities in achievement in three basic dimensions of human development: health (measured by female and male life expectancy at birth), education (measured by female and male expected years of schooling for children and mean years for adults aged 25 years and older) and command over economic resources (measured by female and male estimated GNI per capita). Country groups are based on absolute deviation from gender parity in HDI. This means that the grouping takes into consideration inequality in favour of men or women equally. The GDI is calculated for 166 countries. The 2018 female HDI value for Angola is 0.546 in contrast with 0.605 for males, resulting in a GDI value of 0.902, placing it into Group 4.¹¹³

GII: The Gender Inequality Index reflects gender-based disadvantage in three dimensions—reproductive health, empowerment and the labour market—for as many countries as data of reasonable quality allow. It shows the loss in potential human development due to inequality between female and male achievements in these dimensions. It ranges from 0, where women and men fare equally, to 1, where one gender fares as poorly as possible in all measured dimensions. Angola's score is 0.720, implying high levels of inequality between men and women.

¹¹³ UNDP 2019

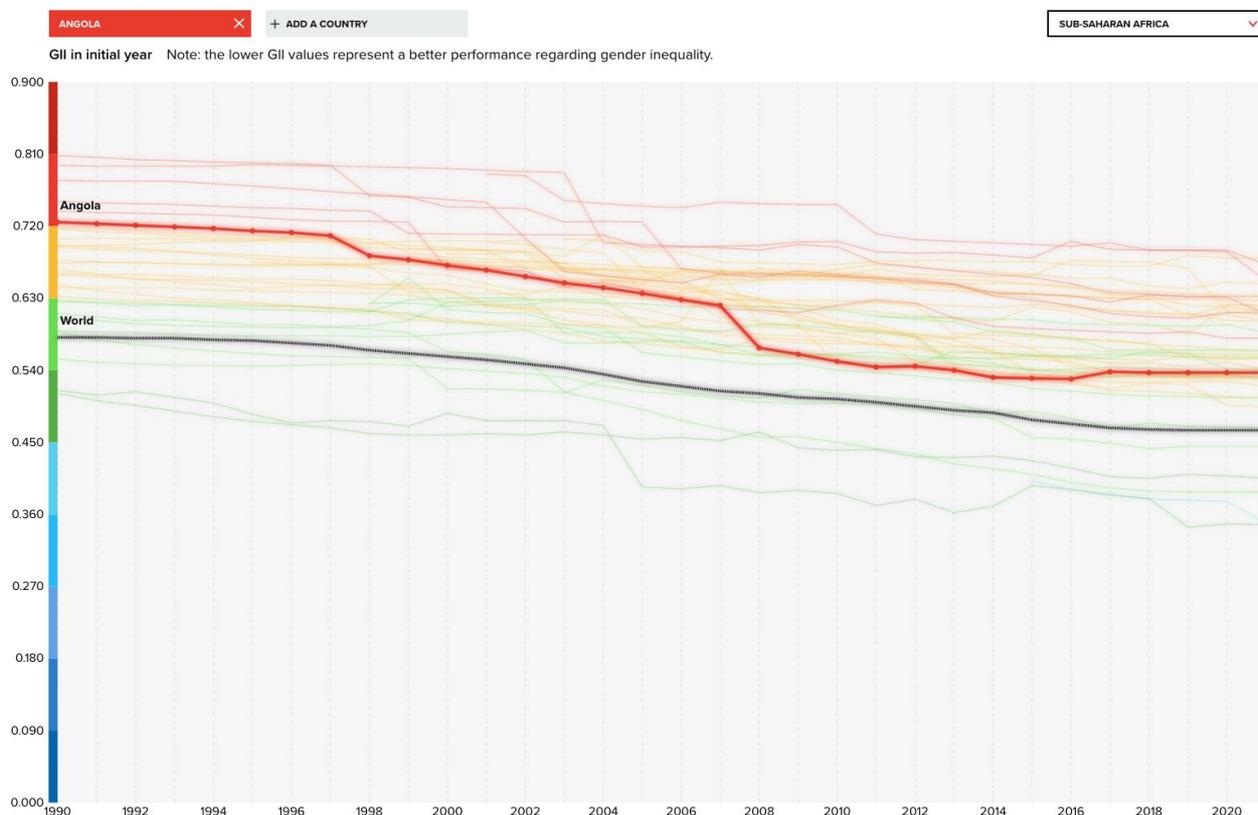


Figure 25. Angola's GII from 1990 to 2020

National status of agriculture, food and nutrition security

Agriculture contributes 9.5% of Angola's 121.4 billion dollars in GDP. The country's agricultural potential is vast, as its diverse ecology can support a wide variety of crops and animals. Around two thirds of the population depend on agriculture for food, income and employment, with women providing most of the labor. Although the country has the potential to grow a diverse range of crops and animals, only 10 % of its 58 million hectares of arable land are in use.¹¹⁴

Family farming plays a predominant role in Angola's agricultural landscape. Family farms make up 91.5% of the cultivated area, 91.1% of the harvested area, and 82.5% of the total volume of agricultural products produced. Looking back, before the outbreak of the civil war between 1975 and 2002, Angola was known as a major exporter of products such as coffee, sisal, sugar cane, bananas and cotton. It was also self-sufficient in most foodstuffs, with the exception of wheat. Unfortunately, the conflict significantly disrupted the country's agricultural production and caused the displacement of millions of people, a legacy that is still being felt. Today, more than half of the food consumed in Angola is imported.¹¹⁵

Additionally, current reporting indicates that 1.58 million people are facing acute food insecurity in southwestern Angola.¹¹⁶ Various factors like recurring droughts, poor harvests, loss of livelihoods and livestock, and surging food prices are intensifying this crisis. Moreover, inadequate access to safe water and sanitation in southern rural communities perpetuates malnutrition cycles. Furthermore, a general rise in food prices is restricting households' purchasing power.

¹¹⁴ IFAD 2023; USDA 2023

¹¹⁵ USDA 2023

¹¹⁶ IPC 2022

Consequently, food insecurity and undernutrition are major public health concerns in Angola, influenced by factors like poverty, limited dietary diversity, poor sanitation and hygiene conditions, and gender inequality. In terms of global indicators, Angola ranks 148 out of 191 countries on the 2021 Human Development Index and 98 out of 121 countries on the 2022 Global Hunger Index.¹¹⁷

4.2 Gendered trends in agriculture relevant to the project design

Subsistence agriculture and time poverty

In rural Angola, gender roles define the responsibilities of men and women distinctly. Research by the African Development Bank¹¹⁸ found that: in the agricultural sector, it is observed that both men and women dedicate substantial time to farm and off-farm work. Men largely handle commercial agriculture, cattle rearing, fishing, and specific tasks like timber and mining operations.¹¹⁹ They are pivotal in land preparation, mechanization, and irrigation.¹²⁰ On average, men work around 5 hours per day on the farm and 3 hours per day off-farm, while women contribute approximately 6 hours daily to farm work and 2.5 hours to off-farm activities. Additionally, women in rural areas shoulder the responsibility of unpaid, household work. It has been estimated that women spend approximately 14 hours a day on household and economic activities if they are married, and 15 hours a day if they are single. These numbers underscore the significant amount of time and effort that women invest in meeting household needs. During times of conflict or war, women have historically maintained traditional agricultural practices, even when extension services and access to agricultural resources were limited. They continue to play a crucial role in ensuring household food security and are predominantly engaged in food crop production. Unfortunately, the consequences of war have negatively impacted food crop production, leading to serious household food insecurity, but also creating an entry point for adaptation investments.

Women primarily tend to subsistence crops such as legumes and cassava, and partake in selling produce in markets.¹²¹ They are entrusted with crucial household chores, from child-rearing and food preparation to essential agricultural tasks, like tillage and harvest.¹²² However, their work, crucial as it is, often remains under or unpaid, leading to women seeking supplemental income through selling garden vegetables and forest products.¹²³ It can be posited that women in rural Angola face time poverty¹²⁴: an individual is time poor if he/she is working long hours and is also monetary poor, or would fall into monetary poverty if he/she were to reduce his/her working hours below a given time poverty line. Thus, being time poor results from the combination of two conditions, which are both present in the rural, Angolan context. Despite progressive legal frameworks, many women are denied land ownership rights, adhering instead to traditional customs (explored below). In Angolan households, the intersection of gender roles, time poverty and unpaid care work significantly affects women. These women are burdened with the bulk of unpaid care work due to traditional gender norms, which leads to a state of time poverty where they do not have enough time for leisure, education or paid work.¹²⁵ Despite being important contributors to the economy, women's roles are

¹¹⁷ IFRC 2022

¹¹⁸ AfDB 2008

¹¹⁹ Amnesty International 2019; IFAD 2018

¹²⁰ Ibid.

¹²¹ Ibid.

¹²² Ibid.

¹²³ IFAD 2018

¹²⁴ World Bank Group 2013

¹²⁵ United Nations 2017

typically undervalued. This, together with their limited access to productive resources, reduces the potential for economic diversification of households¹²⁶. Angola's socio-economic landscape, marked by poverty, gender inequality and high dependence on subsistence agriculture and informal work, exacerbates this situation. Women, especially in rural areas, are involved in a variety of unpaid tasks, from caring for children and the elderly to performing household chores and manual labor.¹²⁷ This substantial burden of unpaid work restricts their opportunities for education, formal employment and leisure, further entrenching them in a state of time poverty and limiting their socioeconomic advancement.¹²⁸

Assets, land and tenure rights, marital property and inheritance

Most rural households have thatched roofs, the remainder have corrugated iron roofs. By contrast, many homes in urban settlements are shacks with corrugated iron roofs, and walls of corrugated iron or clay blocks. The great majority of rural households have walls constructed from mud and sticks. In Cunene, A small number of homes in the *chanas* area have walls of corrugated iron or mud blocks. Most rural homes are also fenced, either immediately around the house or around each farmstead, which consists of the house, livestock holding pens, fields and areas of grazing or fallow land. Brush and poles are mainly used for fencing.

In Angola, all land belongs to the State who determines its final use and destination. In order to preserve the rights of the rural communities, the land law takes into account the customary land use (residential, traditional shifting agriculture and transhumant grazing, forestry, access to water and communication ways). In terms of State ownership, agricultural land is regulated against a private right basis, while natural resources form part of the public right. The law foresees that land for private agricultural investment would be regulated through perpetual land use right transfers of ownership sold by auction from the State to private undertakers. The objective of sound exploitation must be evident for every initiative. Should community land be expropriated for public use, just compensation must occur. Conceded land must be used for its agreed purpose otherwise right will be dispossessed. Land use rights are transmissible subject to the same conditions they were originally conceded for.

In the rural areas like Cunene, a system prevails in that village territories under the leadership of a single *soba* (village leader) are defined according to their needs, taking into consideration the availability of cultivable land for all families under shifting cultivation practices, with allowances being made for pasture (for cattle) and firewood needs. All land tenure matters are dealt with following the rules and regulations foreseen in the law and the principles of the existing customary system apply. Specifically, village territories are administered under the leadership of the *sobas*¹²⁹ (at Ombala¹³⁰ level) and of the *seculos*¹³¹ (at village level). These are generally defined according to the needs of the families, taking into consideration the availability of cultivable land for all families, with allowances being made for non-cultivation needs (grazing land, firewood, etc.).

Overall, farm sizes attributed to each family are determined by labour capacity, ownership in terms of draught animals, while account is also taken of the fertility of the land. According to customs. the

¹²⁶ Domínguez-Serrano 2012; Oxfam International 2020

¹²⁷ Domínguez-Serrano 2012; Oxfam International 2020

¹²⁸ Domínguez-Serrano 2012; Oxfam International 2020

¹²⁹ The "sobas" in Angola are traditional leaders, performing administrative and judicial functions in rural communities, acting as guardians of local traditions and mediating disputes. Although their political relevance has diminished with modernisation, they maintain a crucial role in linking communities and the government.

¹³⁰ "Ombalas" in Angola refer to ancient villages or fortified settlements, often associated with the residence of traditional leaders or sobas.

¹³¹ "Seculos" are traditional leaders, often considered intermediaries between the people and the government authorities. They play a crucial role in maintaining local traditions and customs and are respected in their communities.

conceded area should not be larger by one third of that which is in the working capacity of the undertaker and of his family. Plot sizes per family are determined by the availability of labour and draught animals and the fertility of the land.

In Angola, land tenure practices are heavily influenced by gendered, customary norms, which frequently disadvantage women in terms of property ownership. Particularly in rural regions, women's rights to land ownership are predominantly acquired through marital affiliations. These rights are further complicated by factors such as a woman's reproductive ability and marital status, meaning that under certain circumstances, like infertility, divorce, or widowhood, a woman's claim to land can be significantly diminished.¹³²

A USAID pilot study finds that¹³³: significant disparities exist between the legal framework and traditional customs concerning women's access to land, especially in Angola. Statutory laws offer women certain land access rights that customary practices often do not recognize. For example, the Angolan Constitution guarantees property rights regardless of gender. However, customary norms seldom permit women to inherit land from their birth families. While the Family Code contains provisions safeguarding widows and divorcees from losing land rights, in practice, divorced and separated women are typically expected to return to their birth families. Widows occasionally retain temporary rights to their husband's land as custodians for their children. Still, they may also face eviction, with any rights they receive being seen as a matter of goodwill from the local leader (soba) and in-laws rather than inherent rights. Access to land for a widow's children is often contingent on factors such as the age of the children (particularly sons) at the time of their father's death and their acceptance by the in-laws. Married women without children, particularly sons, and those in polygynous relationships, whether childless or with children, are at risk of being left without access to their husband's or parental land. It's important to note that variations exist between families concerning whether widows can retain access to their husband's land. These differences may hinge on factors such as the widow's age, whether she has children, and the age of the children. Customary practices also differ between rural and peri-urban areas. In peri-urban regions, women in polygynous relationships may find themselves in a more vulnerable situation due to smaller landholdings, and husbands may not provide farm land and housing for each wife. Moreover, awareness of statutory laws is limited at the local level in both rural and peri-urban areas. Most women and men, including traditional leaders (sobas) and local administrators, are often unaware of statutory laws protecting women's land and property rights. Consequently, women typically do not anticipate inheriting land and seldom pursue legal action in cases of non-inheritance or eviction following divorce or widowhood, adhering to customary practices instead.

Labour force participation, livelihoods and financial inclusion

Labour force participation in Angola displays near-parity: 74.9% women, as compared to 79% men in the working population age bracket participate in the Angolan economy. However, the figures diverge when controlled for sectors and formality of work arrangements. Wage and salaried workers include only 26.3% women, as compared to 41.7% men. Yet, the women are over-represented as the figures for the employment in agriculture metric show – 65.7% as compared to 51.6%. This speaks to broader trends within the economy, where agriculture is feminized. Women are the backbone of Angolan agriculture, leading nearly a third of agricultural households and accounting for 70% of subsistence farming.¹³⁴ This higher female participation rate in agriculture can be associated with sociocultural norms and contribute to the time poverty that women experience, as agricultural tasks often overlap with domestic responsibilities.

¹³² UNCTAD 2013

¹³³ USAID 2007

¹³⁴ World Bank 2022b

However, their significant contribution is continually hampered by significant barriers. They often have limited access to essential productive resources like high-cost seeds, fertilizers, and modern machinery, which are critical for enhancing productivity. Furthermore, due to factors such as traditional gender roles, lower literacy rates, and mobility constraints, women find agricultural extension services, a vital source of information and support, largely inaccessible.

Most households in Angola have at least one source of cash income, and most rural families have cattle or goats and a plough. Significant numbers of the households have telephones, radios, some building materials bought with cash, and a person who speaks Portuguese. Few homes have any mode of transport (bicycle or motorcycle), a source of electrical power (generator or solar power) or access to safe water. Rural households in the North tend to be better off than those in the South. Having certain possessions makes life easier and adds resilience. To some degree or another, each asset can be expected to reduce vulnerability or increase resilience, therefore, the possession of a few more assets and services would make households less vulnerable to the impact of climate change.

In certain cases, people are attracted to markets and jobs in urban areas and across the border in Namibia. People wanting to sell homemade beverage or a small animal will walk for days to access markets and then use the sale proceeds to buy household necessities. Limited income is obtained from the majority of farming activities. Off-farm sources of income from jobs, businesses, remittances, and pensions and other social grants are most important for cash security when available. Some families live in rural farmsteads, but their incomes come from elsewhere. Significant levels of disposable income, or cash access within households give people security and considerable resilience against the effects of floods and droughts, and determine levels of resilience against climate change.

As an alternative or complement to subsistence agriculture, trading and the provision of services are options for households close to urban areas. People are attracted to this way of living because it offers opportunities to be cash secure, permitting the purchase of food as well as clothes, medicine, telephones and taxi fares. There are a variety of jobs and commodities that generate cash income. Most incomes are earned sporadically depending on when, for example, temporary jobs are available, households have particular needs for incomes, or certain items could be sold, such as fish, wild fruits or mopane worms. Few homes have a regular income. Income earners have employment as public servants, informal businesses, and work as labourers. Hunting and fishing are also activities that can generate cash income.

To understand the financial inclusion scenario, it is important to look at Angola's banking system. Angola currently has a total of 1,845 bank branches, of which 55 are located in the province of Cunene, distributed between Cahama, Cuanhama, Curoca, Cuvelai, Namacunde and Ombadja. The banking system is characterized by the presence of twenty-five banks authorized to operate in national territory, including Banco Angolano de Investimentos S.A., Banco Comercial Angolano S.A., Bank of China, among others.¹³⁵ The comprehensive data from FinScope Angola 2022 Consumer Survey Report paints a clear picture of the banking and financial landscape in Angola, there is a distinct gender disparity when it comes to financial access. Nationally, while 44% of men have bank accounts, only 29% of women enjoy the same privilege. As of 2014, only 22.3% of women in Angola had a financial account, compared to 36.1% of men. This gender gap in account ownership (13.8%) exceeds the average for Sub-Saharan Africa (11.5%)¹³⁶. This discrepancy is further emphasized by the significant number of women who are completely excluded from financial services – 60% compared to 46% of men.¹³⁷ When we delve into specifics like the combination of banking and mobile money usage, only 29% of the women are included in the 36% of adult Angolans who utilize these

¹³⁵ ABANC 2023

¹³⁶ Demirgüç-Kunt et al. 2018

¹³⁷ National Bank of Angola 2023

services. This translates to the fact that a sizable 64% of the adult population doesn't possess any transaction account, and out of this number, women represent a staggering 58%.¹³⁸

Further emphasizing the financial barriers women face, a substantial 76% of the population doesn't save. For the 24% who do, there's a noticeable reliance on informal mechanisms. These can range from keeping money at home to other non-institutionalized savings methods, reflecting a possible lack of trust or access to formal financial institutions. Insurance, another pivotal financial service, sees women lagging behind as well. Only 4% of women have some form of insurance, in contrast to 6% of men.¹³⁹

Focusing on Cunene, the financial scenario appears even more challenging. A mere 11% of Cunene's population has access to banking facilities. When it comes to utilizing mobile payment services, which can be seen as an indicator of digital financial inclusion, only 1% of Cunene's inhabitants have adopted this method.¹⁴⁰ Many of these women survive by producing goods for sale in the city's markets. Their economic situation is aggravated by historical uprisings, which include displacement and clashes. Together with limited access to vital resources such as healthcare, education and land rights, these factors create a challenging picture. Post-conflict social structures often see women juggling the roles of primary sources of income while managing domestic chores, which restricts their chances in the organized sector¹⁴¹. In essence, the financial resources (and financial literacy) - an important type of non-physical asset - are far less accessible to women, which can influence their ability to improve their homes or invest in other productive assets. Therefore, while evaluating assets, it is essential to consider gender perspectives and strive for equality.

4.3 Climate change and gendered vulnerability in Cunene Province

Particularities in Cunene Province and transboundary region

Temperature and evapotranspiration

The South-western region of the SADC Region, including the Southern part of Angola, is marked as a climate change hotspot by the IPCC SR1.5, indicating increased evapotranspiration caused by the higher temperatures. The province of Cunene is located in Southwest Angola, and is characterized by having a dry tropical climate, with semi-desert conditions. Currently, Cunene's yearly temperature is 26.58°C (79.84°F) and it is 2.21% higher than Angola's average¹⁴². The annual maximum temperature is around 30.99°C (87.78°F) whilst the annual minimum temperature in the region is 18.79°C (65.82°F)¹⁴³. The warmest month for Cunene is November having experienced an average temperature of 35.71°C (96.28°F) which is above the maximum temperature normally experienced in the region¹⁴⁴. This statistic contrasts to what Cunene experienced three years ago which was an estimated average of 32.7°C (90.86°F)¹⁴⁵. Within three years, the maximum temperature concerning

¹³⁸ Ibid.

¹³⁹ Ibid.

¹⁴⁰ Ibid.

¹⁴¹ GEF & CI 2021

¹⁴² Weather and Climate 2023

¹⁴³ Ibid.

¹⁴⁴ Ibid.

¹⁴⁵ Ibid.

the warmest month of the year has increased by 3°C. This consequentially would affect crop growth, precipitation cycles, intensify agricultural droughts, thus threatening food security of Cunene.

Precipitation

The Cunene Province frequently experiences droughts as well as flooding (depending on the precipitation variation in the different seasons), which impacts the population and communities' limited resource base, and adaptation options. As many residents of Cunene work within the agriculture and crop production sector, they have a very high dependence on the natural precipitation cycles, yet, with the increase in GHG levels, precipitation patterns are becoming more anomalous and bizarre. The region faces low and variable rainfall patterns, with average rainfall of 250-600 mm/year¹⁴⁶ and experiences roughly 70.9 days of rainfall a year.¹⁴⁷ It has been recorded that December is the wettest month in the region with an average precipitation levels of 92.64mm¹⁴⁸. It is clear that the irregularity of precipitation levels significantly effect agricultural cultivation. In one case, the average yield of pearl millet is about 300 kilograms per hectare, which is among the lowest for this crop in the world. Poor yields have dire consequences of food security within the province and in turn would increase poverty and malnutrition levels, especially within vulnerable groups such as children, the elderly and women, who already have limited resources and support.

Extreme events

In general, all climate models project that Angola will experience increased temperatures, more extreme weather events, an expansion of arid and semi-arid regions, seasonal shifts in rainfall, localized floods, increased wildfires, sea level rise, increased rainfall in the northern parts of the country, changes in river flows and changes in sea and surface water body temperatures over the coming 100 years¹⁴⁹. Existing climate-related hazards such as drought and floods are likely to become more frequent and severe, particularly in the southern regions¹⁵⁰.

The World Bank estimates the drought's economic impact at \$749 million US dollars. Compounding this, Angola has faced an economic downturn since 2014, further exacerbated by the COVID-19 pandemic, low crop yields, rising food prices, and climatic adversities like decreased rainfall and increasing pest infestations. For instance, a recent locust outbreak in Dukama threatens the current season's crops.¹⁵¹

A 2022 drought vulnerability study spotlighted water availability in several provinces. Notably, 12 of the 16 severely affected communes are in Cunene Province. An estimated 1.2 million people are grappling with water scarcity, impacting their sanitation and hygiene conditions. Many consume water from unsafe sources, and a vast majority lack access to proper sanitation. Predictions suggest this water crisis, especially in southern provinces, is likely to persist, potentially leading to over 50% decreases in water resources for South Coast Provinces.¹⁵²

Livestock production has also suffered. Widespread animal deaths have been reported over the past three years due to factors like lack of fodder, diseases, and the 2020 foot and mouth outbreak. This has spurred the migration of Angolans, especially pastoralists, into neighboring Namibia in search of grazing lands.¹⁵³ Because of this, smallholder farmers' livelihoods are affected as it not only puts

¹⁴⁶ World Weather Online 2023

¹⁴⁷ Weather and Climate 2023

¹⁴⁸ Ibid.

¹⁴⁹ Republic of Angola 2012

¹⁵⁰ ACDI & University of Cape Town 2016

¹⁵¹ Serrat-Capdevila et al. 2022

¹⁵² IFRC 2022

¹⁵³ Ibid.

them in a vulnerable position, financially, but also physically as their health and many others would suffer due to an insufficient diet.

Children's health remains a significant concern. In 2022, projections estimate that 400,000 children will be acutely malnourished. Some provinces already exceed emergency malnutrition thresholds. An analysis in Southern Angola's 10 municipalities reveals that 114,000 children under five could suffer acute malnutrition. However, therapeutic feeding supplies are critically low.¹⁵⁴

Overview (Angola)

The high climate change vulnerability score and low readiness score of Angola places the country in the upper-left quadrant of the ND-GAIN Matrix¹⁵⁵ (37.9) where it is ranked 159 out of 181¹⁵⁶ countries. According to the ND-GAIN matrix, Angola is the 41st most vulnerable country and the 171st most ready country, out of a total of 192 countries assessed by ND-GAIN¹⁵⁷. This means that the country has a great need for investment and innovations to improve adaptation capacity, with recent extreme weather events demonstrating a great urgency for action. Moreover, the Germanwatch's Global Climate Risk Index ranks Angola as the 23rd highest risk country out of 180 countries analyzed in 2021¹⁵⁸. And UNICEF classifies Angola as the 10th highest risk country out of 163 countries for the impact of climate change on children¹⁵⁹.

Deep dive (Cunene)

The southern province of Cunene, the project's target location, borders the province of Huíla to the north, the Republic of Namibia to the south, the province of Namibe to the west and the province of Cuando-Cubango to the east. It has a total area of about 87,000 km², occupying about 7.0% of the national territory. The province of Cunene is part of the Baixo Cunene unit, that descends from 1400 m from the Old Plateau to the border with Namibia at 1000 m. According to the 2014 Census¹⁶⁰, the province of Cunene has 990,087 inhabitants, which is the equivalent to 3.8% of the total population of Angola. The province ranks eighth in terms of population, with a population density of 11.1 inhabitants/km²¹⁶¹ and is one of the least populated regions of Angola.

The climate in the region is megathermal, with irregular rainfall not exceeding 600 mm per year. The average annual temperature is 23°C, with large daily temperature variations. The climate is strongly seasonal, with a hot and humid season (October to May) and a cold season (June to September). The highest concentration of rainfall falls between the months of December to April with large irregularities in their distribution. Cunene is one of the provinces in Angola most affected by recurrent droughts and floods, and it has suffered from the adverse impacts of the El Niño and La Niña phenomena over the years. A severe drought between 2015 and 2016 resulting from the El Niño impacted the food security of households in the region¹⁶².

¹⁵⁴ Ibid.

¹⁵⁵ The ND-GAIN Matrix illustrates the comparative resilience of countries. Countries in the upper-left quadrant have a high level of vulnerability and a low level of readiness, which means both a great need for investments and innovation to improve readiness and great urgency for adaptation action.

¹⁵⁶ University of Notre Dame 2023

¹⁵⁷ Ibid.

¹⁵⁸ Eckstein et al. 2021

¹⁵⁹ UNICEF 2021

¹⁶⁰ INE 2016

¹⁶¹ Ibid.

¹⁶² OCHA 2017

Current status of crops

The agricultural sector in Angola has been growing over the last few years, and the climate factor is essential for its activities. There is a subsequent decrease in crop yield and a shorter growing season due to increase and more frequent droughts in the region, combined with unsustainable land use practices and prevalent soil erosion. With the increase in frequency, there will be an agricultural production decline which will directly impact local livelihoods and food security due to the low levels of adaptation capacity and high vulnerability of communities in the Cunene region. Additionally, with the increase in water demand for crops to survive in the warm months (September-November) and with the evapotranspiration losses of water from agricultural soils, coinciding with the reduced rainfall predicted for the same months, this is likely to lead to the increases risks of crop failure as a result of inadequate or erratic rainfall during the establishment of rainfed crops.

In order to adapt to these consequences, there has to be an implementation of small-scale infrastructure investments and irrigation schemes that enable drought tolerant crops and varieties to flourish to cope with the ever-changing climate. There should also be an implementation of climate-smart agriculture and small infrastructure and adoption of climate-smart crop and fodder varieties. There should be an increase in awareness and technical capacity of women and youth on climate change risks and impacts to the agriculture sector. Women in particular bear the responsibility in the rural household to carry out daily family subsistences, including the production of food crops, horticultural crops and small livestock.

Impacts of climate change

The social impacts of drought in Angola represent the accumulated results of the effects in the various sectors, experienced on a daily basis by the affected populations. The experience of drought consequences is not uniform. Population sub-groups are exposed differently to the risks of drought, have different capacities to face it, and experience the impacts in different ways. A proper understanding of social impacts requires an analysis of the ways in which drought affects livelihoods, the ways in which people respond to it, and the consequences of these responses. Given the different roles of women and men within society, the impacts of climate change are also gendered.

The issue of gender refers to the existing differences between men and women, differences that are biological in character, but resulting from the socialization process. This concept describes the set of qualities and behaviors that societies expect from men and women, forming their social identity. The absence of a “gender” dimension in sectoral policies and, consequently, in plans, programs and actions/projects, places women at a disadvantage in relation to men, not least because they already constitute the fringe of the population with fewer opportunities for education and employment. This causes horizontal occupational segregation, which consists of the concentration of women in the lowest professional levels, being therefore poorly paid, as well as the concentration of women in the informal market, in low-income activities. In addition, there are cultural issues, which are still deeply rooted in everyday life, with women being deprived of autonomy and decision-making power within their families and communities.

In rural areas, the poverty rate is higher, there is less access to health, education, electricity, gas, water, transport. The more difficult living conditions are more seriously reflected in women, with higher fertility and neonatal mortality rates and greater lack of prenatal care. Gender disparities also increase in these areas, as participation in political and economic life is still overwhelmingly male. Although women are in the majority in rural associations and cooperatives, most of the time they play secondary roles: they remain silent and are not organized to participate.

In terms of agricultural production, women also refer to the lack of access to inputs, credit and training and public investment, which makes it difficult to increase the productivity of family farming. The lack of identification documents also makes it difficult for rural women to access microcredit programs. Those who still do not have personal documents sometimes resort to a man/partner as an intermediary. Stories have been reported of women in this situation who end up paying a “commission” to whoever served as an intermediary.

Besides that, the impacts on livelihoods due to long-term droughts have led to forced displacement, especially of men¹⁶³. The absence of the heads of family leave women and girls not only with the responsibility of taking care of the households, but also vulnerable to a gender-based violence.

4.4 GBV and SEAH

Gender-based violence (GBV) remains a serious problem in Angola. Despite multiple normative and legal instruments already available, many challenges remain in the fight against GBV in the country, both in society's appreciation of the need to combat it and the government's commitment to decisive action for its elimination. Prevalence data on different forms of GBV, particularly against women show that:¹⁶⁴

- Lifetime Physical and/or Sexual Intimate Partner Violence: **34.8%**
- Physical and/or Sexual Intimate Partner Violence in the last 12 months: **25.9%**
- Lifetime Non-Partner Sexual Violence: **Official National Statistics Not Available**
- Child Marriage: **30.3%**

The most recent Multiple Indicator and Health Survey (2017) reports that 32% of Angolan women have suffered physical violence since the age of 15; 8% will be victims of sexual violence at some point in their lives; and 34% have been victims of physical or sexual violence perpetrated by their husbands or partners.

According to a 2022 survey, GBV tops the list of women's-rights issues that Angolans say the government and society must address: 23% of the respondents identified it as the most important matter of women's rights to be addressed, followed next by "unequal access to education" (18%) and "Unequal opportunities or pay in the workplace" (17%). 62% of Angolans say violence against women and girls is a common phenomenon, with 27% identifying it as "very common" in their community. While 69% of citizens say it is "never" justified for a man to use physical force to discipline his wife, 20% consider it "sometimes" or 9% - "always" justified. The view that men are never justified in physically disciplining their wives is more common among urbanites (76%) than their rural counterparts (55%), and grows significantly with respondents' education level, ranging from 58% of those with no formal schooling to 83% of those with post-secondary qualifications.

As a whole, rejection of GBV is in fact higher among the most educated citizens (83%), urban residents (76%), and women (73%). About half (49%) of Angolans consider it "somewhat likely" or "very likely" that a woman who reports GBV will be criticized, harassed, or shamed by members of the community. Nonetheless, a majority (59%) of citizens believe that the police are likely to take reports of GBV seriously. Two-thirds (67%) of Angolans say domestic violence should be treated as a criminal matter, rather than a private matter to be resolved within the family.

Cunene specific-information

In Cunene, as in Angola overall, GBV remains a concern. The GBV issues are particularly related to domestic violence. Cunene, like the rest of Angola, has also faced post-conflict challenges which contribute to violence and insecurity. Food shortages caused by droughts and the destruction of the communities' way of life aggravate the already existing gender imbalances and the relatively high rates of violence they suffer daily. Many try to turn around and take on jobs traditionally occupied by

¹⁶³ MMC 2023

¹⁶⁴ Un Women 2022

men, such as producing and selling charcoal. Others migrate to Namibia and nearby towns in search of food. In their strength, they make easy and fragile targets for sexual exploitation.¹⁶⁵

5. Legal, Policy and Institutional Landscape

5.1 Alignments and synergies with Angola's national legal and political landscape

Angola's Initial National Communication (INC, 2012)¹⁶⁶ to the UNFCCC highlights the country's vulnerability to climate change in terms of its economy, population, and ecosystems. Various factors contribute to this vulnerability, including the region's highly variable climate, population growth heavily reliant on climate-sensitive natural resource-based sectors like agriculture, subsistence fishing, rangelands, pressures on biodiversity, and rain-fed agriculture. Additionally, high levels of poverty, lack of income, and limited employment opportunities further exacerbate the situation.

Angola's Second National Communication¹⁶⁷ reiterates the concerns highlighted in the initial report and underscores the intensifying risks of water scarcity, fire damage, permafrost degradation and food instability, which especially affect low-income countries like Angola. It calls for an urgent, participatory and country-driven approach to assess the impacts of climate change and develop appropriate adaptation measures.

At the regional level, Angola's contribution/policy operationalization aligns with the Southern Africa Development Community (SADC)'s policy paper on climate change and the SADC climate change adaptation strategy for the water sector. These frameworks emphasize climate resilience, food security, and efficient water management.

Table 13: Alignment and synergies with Angola's legal framework and policies

Strategy / Policy	Alignment / Synergy from the proposed CREW Project:
Nationally Determined Contribution of Angola, May 2021 ¹⁶⁸	Priorities include agriculture and food security: increased agricultural yields, soil erosion control, diversification to less climate sensitive crops, locally adapted seed varieties and water harvesting systems are all included in the CREW.
Second National Communication, 2021 ¹⁶⁹	Priorities encompass climate adaptation in Angola's agricultural sector: active stakeholder involvement, gender considerations, and sustainable development approaches are all highlighted in both documents.
National Water Plan 2017 ¹⁷⁰	Outlines sustainable guidelines and strategies for water resources management in Angola by focusing on integrated water resources planning, strengthening research and development, modernizing the institutional, legal, and regulatory framework, and fostering public and private partnerships.

¹⁶⁵ UNFPA Angola 2021

¹⁶⁶ Republic of Angola 2012

¹⁶⁷ Republic of Angola 2021b

¹⁶⁸ Republic of Angola 2021a

¹⁶⁹ Republic of Angola 2021b

¹⁷⁰ Republic of Angola 2017

National Strategy for Climate Change 2018-2030 ¹⁷¹	Adaptation Strategies to drought and flooding include: Drought-specific investments, with Cunene as one of the priority zones – the target area of CREW. Priority Initiatives for Adaptation, among others: A1. Sustainable Agriculture; A2. Sustainable Food consumption; A7. Drought Risk Management; which are all addressed.
Strategy of Long-term Development for Angola 2025 ¹⁷²	Reduce poverty and social inequality, and to widen in a sustainable way the productivity of regions subject to drought. The policy is underlining the relevance of adaptation and resilience to climate change, as currently experienced and projections expected to be experienced by rural communities. This is aligned to proposed interventions, addressing these challenges.
National Development Plan for the Agriculture Sector 2018-2022 ¹⁷³	<p>The corresponding strategic objectives are:</p> <ul style="list-style-type: none"> ● Satisfy the population's food needs; ● Increase the contribution of the agricultural sector to growth and diversification of the economy; ● Meeting the needs of producers; ● Expanding agricultural production to meet the country's needs and for export; ● Support sustainable development of family and business agriculture; ● Improve the productive capacity and infrastructure of the agrarian sector; ● Attract, retain, value and develop the staff of the Sector. <p>This Policy is aligned to the project interventions, with special emphasis on food security, diversification, supportive technologies and skills development</p>
National Adaptation Programme of Action, 2011 ¹⁷⁴	<p>Main objectives of the NAPA, 2011 are: to enhance adaptive capacities; to facilitate capacity building for the preparation of adaptation activities. Among the 15 priority responses are:</p> <ul style="list-style-type: none"> ● Promote SLM practices for increased agricultural yields; ● Soil erosion control through organic methods; ● Diversify crops to less climate sensitive cultures; and, ● Locally available adapted seed varieties. <p>These priorities are integral to the design of the project.</p>
Integrated Programme for Local Development and the Fight Against Poverty - 2018 ¹⁷⁵	<p>The programme has a focus on:</p> <ul style="list-style-type: none"> ● Vulnerability Alleviation: Addressing the needs and enhancing the well-being of vulnerable populations. ● Local Empowerment: Building capacities and capabilities of local communities to tackle their unique challenges. ● Integrated Development: Holistic approach to ensure that various development activities complement and reinforce each other. ● Community Participation: Encouraging and ensuring active community involvement in planning and execution of initiatives. ● Inclusive Production: Ensuring everyone, especially the marginalized and vulnerable, are included in economic activities and benefits. ● Municipal-level Intervention: Targeting municipalities as the primary units for developmental projects and activities. ● All important aspects considered in the activities of this project.

¹⁷¹ Republic of Angola 2017

¹⁷² Republic of Angola 2007

¹⁷³ Republic of Angola 2018

¹⁷⁴ Republic of Angola 2011

¹⁷⁵ Programa Integrado de Desenvolvimento Local e Combate à Pobreza 2018 2018

The project will ensure alignment with the following legislation that inform environment-related invests:

- Decree 5/98 of 19 June Law of Bases for the Environment;
- Decree 117/20 of 22 April on Evaluation of Environmental Impacts;
- Decree 59/07 of 13 July on Environmental Licencing;
- Decree 1/10 of 01 March on June Environment Auditing;
- Decree 92/12 of 01 March on Terms of Reference for the Elaboration of Environmental Impact Studies.

Alignment with Angola's NDC

The first Intended Nationally Determined Contribution (iNDC) of Angola was submitted to the UNFCCC in 2015. Five years later and following the ratification of the Paris Agreement in November 2020, Angola submitted an updated NDC, setting targets to contribute to the achievement of the PA goals and meet the country compromises in climate change policy.

The CREW project represents a concrete initiative to help Angola achieve the objectives outlined in its NDC. Firstly, one of the critical sectors identified in the NDC is agriculture, and the CREW focuses precisely on strengthening climate resilience in this sector, especially in south-west Angola. This country is susceptible to climate variations, making it a priority area for interventions.

The EWRCC's women-centred approach is strategic and reflects the need identified by the NDC to adopt an inclusive perspective in the fight against climate change. Women, who are often responsible for subsistence farming and water management in rural communities, are key agents for climate change adaptation and mitigation. By empowering these women, the CREW not only promotes gender equity, but also empowers a significant portion of the population to act proactively in response to climate change.

In addition, the CREW also incorporates educational and training components. By investing in financial literacy, improved agricultural technologies and education, the project not only offers short-term solutions, but also lays the foundations for long-term transformation, helping communities to adapt and thrive in a changing climate. These initiatives align directly with Angola's Sustainable Development Goals and the National Development Plan mentioned in the NDC.

Finally, by focusing on building resilience in specific communities, such as those in Cunene, the CREW creates a model that can be studied, adapted and replicated in other parts of Angola. This is crucial for a vast and diverse country like Angola, where adaptation strategies may need to be adjusted according to regional particularities.

In short, the CREW not only complements the NDC targets, but also provides a tangible and actionable roadmap for achieving a significant part of these targets, demonstrating the practical synergy between local project planning and broader national objectives.

The Nationally Determined Contribution of Angola (NDC), Republic of Angola, May 2021¹⁷⁶ states as follows:

Facing climate change is the greatest global environmental challenge in the present. Developing countries are particularly vulnerable to the impacts of climate change because they are highly dependent on natural resources and have limited capacity to respond to these impacts. At the 21st Conference of the Parties (COP21) in 2015, the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Paris Agreement [45]. This is a historic agreement, the first global legal framework binding the responsibilities of all Parties in joint efforts to combat climate change. The implementation of each Party's responsibilities for climate change response is primarily reflected through the Intended Nationally Determined Contribution (INDC), that Angola submitted in the same year as Paris Agreement was adopted (2015). In August 2020 the Paris Agreement and

¹⁷⁶ Republic of Angola 2021a

Doha Amendment Ratification were formally approved by the Government of Angola. In November 2020, Angola ratified the Paris Agreement to UNFCCC.

In accordance with Decision 1/CP.21 of COP21, Parties were requested to communicate or update the NDC by 2020, Angola reviewed and updated its NDC to be submitted to the UNFCCC Secretariat in 2020 based on the actual country context.

Angola is committed to take part in the aspiration set at International level to fight against climate change, thus contributing to global efforts to reduce greenhouse gas (GHG) emissions. For this, Angola's Nationally Determined Contribution (NDC) encompasses for Mitigation and Adaptation purposes both unconditional and conditional measures for the reduction of GHG emissions and adaptation of its territory and population to the adverse impacts of climate change. An "unconditional contribution" is what Angola could implement without any conditions and based on their own resources and capabilities. A "conditional contribution" is one that Angola would undertake if international means of support are provided, or other conditions are met.

The Business-As-Usual (BAU) scenario considered for this NDC was developed using 2015 as the base year and provides projections for up to 2025. Angola plans to reduce GHG emissions up to 14% by 2025 as compared to the base year (unconditionally). The baseline corresponds to the most recent National GHG Inventory (2015), and accounts for 99.99 million tonnes of CO₂e. The emissions under the BAU scenario are estimated to be 103.9 million tonnes of CO₂e in 2020 and 108.5 million tonnes of CO₂e in 2025.

The adaptation component identifies strategic measures in key sectors in order to improve adaptive capacity, enhance resilience, and reduce risks caused by climate change, thus contributes to the achievement of the country's Sustainable Development Goals (SDGs) and National Development Plan objectives.

The 2020 NDC reflects the feedback from stakeholders and is fully aligned with the development vision of the government. Angola adopted an all-inclusive process of engaging relevant stakeholders through bilateral consultations. In reviewing the 2015 Intended Nationally Determined Contribution (iNDC), the government organized bilateral meetings, conducted during 2020-2021, in order to identify and discuss relevant measures to achieve the proposed target, responding to the main priorities of the country.

Adaptation alignment of the proposed CREW Project

The Paris Agreement states that one of its aims is to increase "the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development" (Article 2). It also established the global goal of "enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change" (Article 7). In this context, Angola recognizes the importance of adaptation in strengthening domestic resilience to the impacts of climate change and has decided to include adaptation in the NDC.

In addition, to outlining conditional and unconditional mitigation contributions, the NDC will contribute to the global target of adaptation, reducing vulnerability, strengthening resilience and increasing the country's adaptive capacity in order to protect ecosystems, people, livelihoods and strategic sustainable development and economic investment, taking into account the urgent and immediate needs of the country, based on the best science available and national context. Climate change requires farmers to adapt to new agronomic practices such as conservation agriculture, growing of drought tolerant crops, precision agriculture (which in turn also requires a better access to input for seeds and fertilizers) and agro-forestry amongst others in order to improve productivity.

In the National Climate Change Adaptation Programme of Action (NAPA) 2011, the government identifies a series of barriers to addressing the issue of climate change, with focus on the lack of material and financial resources, lack of technical capacity including a lack of scientific data, limited

human capital and weak institutional coordination. All project activities are also aligned with the drought-related recommendations as charted in the Post Disaster Needs Assessment (PDNA), 2012-2016 and with the draft National Strategy for Climate Change Republic of Angola 2018-2030, August 2017 (principally in the areas of; M8 Low carbon agriculture, M9 Management of Forestry and other land use, A1 Sustainable agriculture, A7 Management of drought risk, A8 Management of flooding risk, A10 Prevention and monitoring of tropical diseases); the National Adaptation Programme of Action under the UNFCCC, 2011; and the National Strategy for Climate Change 2020-2035. The proposal also contributes to the Angola Strategy for Long Term Development 2025 as demonstrated in Table 13 above.

Alignments and synergies with Angola's international treaties and national/provincial gender policy frameworks

International Gender Treaties Signed by Angola:

- Convention on the Elimination of All Forms of Discrimination against Women (CEDAW): The CREW project puts women at the centre of its approach, especially by empowering women's groups to build resilience against climate impacts in Cunene. This initiative aligns with CEDAW's mission by promoting an inclusive and gender-focused response to climate change, ensuring that women not only participate in, but also lead adaptation and mitigation efforts.
- Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol): The CREW recognises and tackles the gender-specific barriers that women face in relation to climate change. By empowering women in areas such as agriculture, the environment, water and nutrition, the project promotes not only sustainable development, but also women's right to actively participate in solving environmental challenges - a clear resonance with the principles of the Maputo Protocol.
- Beijing Declaration and Platform for Action: The project not only places women as the main beneficiaries, but also promotes their active participation in decisions relating to climate and development. This inclusion and focus on the role of women in climate resilience issues resonates deeply with the Beijing Declaration's vision of having women as equal partners in decision-making at all levels.

National Gender Policies in Angola:

- National Policy for Gender Equality and Equity, outlined by Presidential Decree 222/13, is directly related to the EWRCC. This policy forms the basis of the EWRCC's efforts to ensure that climate responses are equitable and that women are leaders in these efforts.
- The Executive Plan to Combat Domestic Violence (Presidential Decree No. 26/13) and the Regulation of the Law against Domestic Violence (Presidential Decree No. 124/13), in addressing domestic violence, underline Angola's commitment to protecting and empowering women. Women's integrity and well-being are essential for their effective participation in environmental management and climate resilience, central pillars of the EWRCC.
- Law 30/11 on Micro, Small and Medium-sized Enterprises resonates with the EWRCC, particularly emphasizing the facilitation of sustainable enterprises helmed by women, thus strengthening the scaffolding of a women-centric green economy.
- National Support Programme for Rural Women (Presidential Decree No. 138/12), which emphasises support for rural women, is of particular relevance to EWRCC. Rural women are on the front line of climate change impacts and play a key role in natural resource management and sustainable agriculture.
- Action Plan for Resolution 1325 on Women, Peace and Security (Presidential Decree No. 143/17) emphasises the role of women in peace and security and reaffirms the importance of approaches that integrate both gender issues and environmental challenges. By

encouraging women's participation in environmental management, the CREW aligns itself with the fundamental role of women in peacebuilding and community resilience.

- The National Gender Indicator System Development Plan, developed by UNPD and the Government of Angola, aims to strengthen Angola's statistical capacity in relation to gender equality, addressing gaps in the collection and analysis of gender data. In synergy with the EWRCC, which focuses on empowering women in Cunene, Angola, to face climate impacts, both projects are aligned in promoting gender equality, with the former providing essential data to inform and improve initiatives such as the latter, which is centred on practical resilience actions.

5.2 Alignments and synergies with Cunene's provincial legal and political landscape

According to the Cunene Provincial Development Plan 2018-2022, the following are the stated weaknesses and threats for the development of the province:

Limitations/Gaps:

- Limited water availability in most areas, acting as a constraint for crop cultivation and livestock.
- Insufficient pasture resources.
- Inadequate technological advancements in agricultural and animal production.
- Low levels of animal healthcare.
- Underdeveloped infrastructure for slaughter, processing, and transformation of agricultural and animal products.
- Specific regions experiencing heavy animal overload and overgrazing.
- Irregular patterns of high-intensity rainfall followed by prolonged drought periods.
- Financially constrained agricultural sector, reduced investment capacity, limited private sector participation in agricultural investment, and inadequate credit support for family and commercial farming.
- Lack of livestock vaccination programs.
- Limited foreign exchange reserves for importing equipment and agricultural inputs.

Risks/Threats:

- Specific regions facing heavy animal overload and overgrazing.
- Erratic patterns of high-intensity rainfall alternating with prolonged drought periods.
- Financial challenges in the agricultural sector, including reduced investment capacity, limited private sector involvement in agricultural investment, and inadequate credit support for family and commercial farming.
- Absence of livestock vaccination programs.

The structuring priorities presented in the Provincial Development Plan are to revitalize and develop Cunene's productive potential, in particular livestock, agriculture, forestry, agro-industry, extractive industries, the logistical support network and complementary activities:

- Support livestock and family farm production, by strengthening rural extension services, strengthening community organization, improving soil fertility conditions, animal health levels and conditions of access to water to support productive activities;
- Ensuring access to land through the application of the land tenure legal framework in force in a quick and less costly manner, creating conditions for investment by the business sector and access to credit in the family sector;

- Promote the integration of the livestock, agricultural and forestry sectors in effective value chains, through support for the installation of agro-industries and forestry industries, and access to credit;
- Promote the potential of exploitation of fish and beekeeping resources in the Province, supporting artisanal fishing and the improvement and expansion of honey production by the family and cooperative sector;
- Promote the development of the Province's tourism sector, in particular nature and cultural tourism, creating essential basic conditions, valuing and disseminating the Province's tourist values and supporting private and public initiatives that contribute to this development;
- Promote the full use and correct management of surface and underground water resources in the Province, through projects and actions that enable a better knowledge of these resources and their use in water supply to populations, in support of agriculture and family livestock and in the expansion of irrigated areas and in flood and flood control.

The Cunene Province Development Plan and the CREW Project are aligned in several key areas. Firstly, Cunene's emphasis on improving the population's access to quality health services and education is complemented by Component 1 of the EWRCC, which focuses on strengthening capacity to raise awareness about climate change and food and nutrition security. This educational approach, which takes climate change and food security into account, enhances Cunene's health and education goals.

In the agricultural domain, while Cunene aims to develop agriculture and livestock as pillars of agro-industry growth, the EWRCC, through its Component 2, aims to scale up climate resilient agriculture. This alignment ensures that the agricultural practices adopted are not only productive, but also sustainable in the face of climate change.

The EWRCC's gender transformative approach, which empowers women to adapt to climate change, resonates deeply with Cunene's focus on directly supporting the most vulnerable populations. This dual focus ensures that historically marginalised groups, especially women, are at the centre of development efforts. In water resource management, the CREW aims to reduce the vulnerability of communities to water insecurity. This objective aligns with the Cunene Development Plan's emphasis on effective water resource management, considering the importance of water to the region.

Both plans emphasise economic development and education. While Cunene seeks to expand the labour market and combat hunger and poverty, the CREW highlights investment in financial literacy and improved agricultural technologies. This convergence indicates a holistic approach to raising the standard of living of communities.

Finally, given Cunene's vulnerability to climate variations, the EWRCC, in seeking to build climate resilience, directly addresses the environmental challenges highlighted by Cunene, such as irregular rainfall patterns and periods of drought.

5.3 Institutional landscape in Cunene and Angola

Partnerships and collaboration between ADPP and the Government of Angola: The project design phase was informed by stakeholder consultations with public institutions at national and provincial level, civil society, and communities, additional to originating from the long-term experiences and on the ground presence of ADPP. The CREW will operate in close partnership with the following Ministries of the Government of Angola:

- the Ministry of Culture, Tourism and the Environment (GCF NDA);
- the Ministry of Agriculture and Forests;
- the Ministry of Energy and Water;
- the Ministry of Education; and,

- the Ministry of Social Action, Family and Women's Affairs.

These partnerships will be defined through a signed Memorandum of Understanding that will take place at the start of the project. The CREW will also work in close collaboration with the Ministry of Territory and the Ministry of Health.

The respective sub-national counterparts in Cunene Province were consulted as indicated below:

The Ministry of Agriculture and Forestry

- The Provincial Department of the Institute of Agrarian Development (IDA)
- Provincial Department of Agriculture and Forestry
- The Provincial Department of the Institute of Veterinary Services (ISV)
- The Provincial Department of the Institute of Forestry Development (IDF)

Ministry of Education

- Provincial Department of Education

Ministry of Energy and Water

- Provincial Department of Water

Ministry of Territory

- Provincial Department of Civil Protection
- Five municipality administrations.

Ministry of Culture, Tourism and the Environment

- Provincial Department of Culture, Tourism and the Environment

During implementation, the ADPP, under the auspices of the MoE, will lead execution with roles and responsibilities clearly defined for the EE's staff and all partners. The main execution partners will be: the MoE and provincial representation for environmental issues; the IDA and its municipality representation (EDAs) for extension activities; the Provincial Department of Agriculture and Forestry in support of agricultural activities; the Provincial Department of Energy and Water in support of water-related activities; the Provincial Department of Civil Protection for response to natural disasters and emergencies; the Provincial Department of Social Action, Family and Women's Affairs for gender equality issues and the Provincial Department of Education will select schools to take part, certify green schools and work on possibilities for education for children who drop out. The main local NGOs and CBOs in the province with competency in the agriculture and environmental sectors will gain financing to implement mini-projects as part of the CCACs.

This proposal has the full support of the Ministry of the Environment through discussions, input and the presentation of a Portuguese translation of the concept to the Minister of the Environment for approval prior to submission to GCF. The governmental endorsement and participation at the National and Provincial levels together with the operational documentation of the project incorporating "lessons learned" should ensure replicability to other Southern Provinces of Angola with similar issues relating to climate change. The sustainable use of the environment is recognized as a fundamental dimension of sustainable development

ADPP Collaboration with the Ministry of Education and the Ministry of the Family and the Promotion of Women

ADPP Angola has enjoyed a close and fruitful collaboration with the Angola Ministry of Education since 1986 with the establishment of a rural technical school in Caxito, followed by Children's Schools in Luanda and Huambo and, in 1995, the first ADPP Teacher Training School in Huambo. Working towards the shared goal of quality education at all levels, this collaboration has entailed the approval and incorporation of ADPP-managed schools into the state system, the supply of and employment of teachers, the development of specialized programs and projects within the ambit of education and the elaboration of accompanying manuals. ADPP and the Ministry of Education have signed two separate memoranda to increase the number of ADPP-run teacher training schools and ADPP-run polytechnic schools throughout the country.

Among recent examples is a pilot STEM project, launched in 2017 and aimed at contributing to the national goal of improving the level and skills of the country's workforce within the fields of Science, Technology, Engineering and Mathematics by providing specialist training for in-service teachers at four lower secondary schools and for pre-service teachers at five teacher training schools. ADPP Angola joined forces with a working group from INFQE (National Institute for Teacher Training) to produce a manual for teachers and create plans for pedagogical sessions for primary schools and for lower secondary schools. For primary schools there are six mathematics sessions, six natural science sessions and eight cross-discipline sessions, while secondary schools have five sessions each for mathematics, physics and chemistry and a further five cross-discipline themes. Participating teachers received training to act as instructors for their colleagues, practical experiments and low-budget kits were created and open days held to raise awareness about the project.

The teacher training schools involved are ADPP Luanda, Dom Bosco, António Jacinto, Garcia Neto and Luanda while the lower secondary schools are ADPP's polytechnics in Ramiro, Cazenga and Zango together with Lower Secondary School 2068 in Ramiro. Plans have been elaborated for subsequent phases of the project.

ADPP polytechnics (EPP from the Angolan *Escolas Polivalentes e Profissionais*), of which there are currently eight in Angola, are schools offering lower secondary academic and vocational courses and were established in collaboration with the Angolan Ministry of Education. The educational program and vocational curricula at these schools were created together with the MED and launched in 2011. Nine professions have been approved by the relevant ministries and the MED itself. Fashion, Textile & Design, developed in 2016 and being taught at EPP Caxito, is the most recent of the courses to be integrated into the official MED course overview.

ADPP Teacher Training Schools, of which there are 15 in 14 provinces, work alongside the Ministry of Education, provincial and municipal education departments to enhance educational standards, reach rural and often remote populations, provide literacy training for adults, promote gender equity, teach health, disease prevention and nutrition and contribute to community development. Pedagogical sessions for in-service teachers is a key component.

Pre-service teacher training is over three years, during which students complete the national curriculum and state exams developed for primary teachers. They learn by doing, by travelling, by experiencing social, economic and educational needs and by seeking solutions through practical actions. These actions include lessons and activities to tackle the spread of HIV/AIDS, to raise awareness about tuberculosis, to prevent malaria, to improve sexual and reproductive health, to increase school attendance and completion rates among girls, to ensure healthy eating, to provide safe water and adequate sanitation and to reduce the risk of traffic accidents. ADPP has elaborated manuals, in collaboration with the Ministries of Health, Education, Transport and the Family, both for use in specific programs as well as for broader diffusion. They include manuals for teaching about HIV/AIDS, TB, and Water & Sanitation for programs supported by USAID; sexual and reproductive health with support from UNFPA; malaria with support from USAID/PMI; gender with support from the Norwegian Embassy in Angola; nutrition in connection with a USDA/JAM project; road safety in primary schools in Luanda, sponsored by Chevron; and literacy for farmers as part of a MOSAP project.

Pedagogical advancement is furthered by the Ministry's support of Pedagogical Sessions for in-service teachers, which contribute to the overall aim of improving education. The course of 40 sessions equips thousands of teachers with few or no formal qualifications with the knowledge, tools and skills to transform their lessons, the learning of their pupils and their own concept of teaching.

40 Pedagogical Sessions formed part of the Education for All in Lunda Sul 2015-2018 project and 40 Primary Schools Showing the Way in Luanda and Kwanza Sul, 2011-2014, both financed by the EU and with the close involvement of the Ministry of Education.

On the subject of literacy, ADPP has been collaborating with the Ministry of Education and the Ministry of the Family and the Promotion of Women on literacy projects since 2008, reaching hundreds of thousands of people in mostly rural communities and winning a National Literacy Prize in 2014 for campaigns to reduce illiteracy in the country. In addition to specific campaigns such as the literacy component as part of Education for All in Lunda Sul, financed by the EU, ADPP works on a daily basis to improve basic reading and writing skills through projects implemented by students at all ADPP teacher training schools. These usually take the form of adult education classes when the students are in their third and final year, which they spend in long-term teaching practice in rural communities.

All the above-mentioned activities are supported by the Ministry of Education. Officials at all levels are frequent visitors to ADPP educational establishments, whether on special occasions such as graduation ceremonies, displays and talks about achievements, for regular inspections or to attend meetings during which pedagogical ideas are discussed.

6. Barrier Analysis and Proposed Paradigm Shift

6.1 Project barriers

As presented in the sections above, the impacts of climate change will escalate the frequency and severity of extreme weather events in the region of Cunene, especially droughts. More frequent, intense and unpredictable droughts will continue to exacerbate the already vulnerable situation of local communities, mainly impacting the most vulnerable, especially women, and leading to humanitarian crisis. Therefore, it is imperative to prioritize the development of climate resilience in Cunene through strategic investments in water resource management, climate resilient agriculture and diversified livelihoods.

The effectiveness and sustainability of these investments, however, are likely to interact with existing barriers in the Angolan context, and with those particular to the region of Cunene. This sub-section presents a barrier analysis that was developed with the aim of:

- **Effective planning:** Identifying barriers allowed project designers to anticipate and account for potential challenges during the project design phase. It helped the development of robust strategies and mitigation measures to address these barriers proactively.
- **Resource allocation:** By understanding the barriers, the project can allocate resources effectively to address the specific challenges that may arise. This ensures that resources are utilized efficiently and in a targeted manner.
- **Stakeholder engagement:** Barrier analysis involves engaging with various stakeholders to gather insights and perspectives. This participatory approach helps foster collaboration, understand diverse viewpoints, and build consensus, leading to more inclusive and effective climate projects.
- **Risk management:** Identifying barriers helps project teams assess and manage risks more effectively. By understanding the potential challenges and obstacles, they can develop contingency plans and risk mitigation strategies to minimize the negative impacts on project outcomes.

- Iterative improvement: Barrier analysis provides a learning opportunity for ongoing project monitoring and evaluation. It helps identify areas for improvement and informs adaptive management strategies, enabling projects to become more efficient and successful over time.

Knowledge and Technical Barriers

a) Limited knowledge and awareness about climate change impacts and climate adaptation measures at the community level

Communities in rural areas face several challenges in accessing information about climate change and its impacts in the Cunene province, and therefore have limited awareness about its consequences and how to better deal with it. Due to the limited knowledge and awareness, natural resources and ecosystems are degraded due to, for example, over exploitation of resources, which exacerbates the climate impacts on ecosystem goods and services as well as human livelihoods' vulnerability to climate change. Unsustainable practices such as poor cropping and tillage techniques and poor forestry and livestock management exacerbate the environmental degradation, leading to consequences such as vegetation, forestry and soil nutrient loss which also lead to soil instability and loss of fertility. Degradation of natural resources, therefore, further increases poverty, often leading to the implementation of negative coping strategies by the local population.

Local technical staff, communities and farmer organizations (FOs) have limited knowledge of and skills in applying short and long-term climate adaptation measures to soil and water management practices and technologies. The traditional knowledge on which communities and FOs depended for agricultural and water management is fast becoming insufficient in the context of climate change and increased vulnerability of livelihoods. Practical guidance on adopting innovative practices for adapting livelihoods and agricultural development based on climate forecasts from government institutions to local communities is also limited. Consequently, communities have insufficient capacity to adopt and implement effective climate adaptation practices. This limited access to knowledge, training, and appropriate technologies hinders the development and implementation of adaptive measures for climate-resilient agriculture initiatives.

b) Farmer organizations (FOs) and smallholder farmers, especially women, have insufficient technical capacities to design and implement integrated climate resilient solutions to improve local livelihoods, welfare and access markets

Smallholder farmers, especially women and youth, are not included in the FOs of the region and are often underrepresented in the market and do not elicit benefits to support climate resilient livelihoods. Farmers are affected by the lack of information on market prices, and more specifically on increased prices fluctuations caused by climate variables. The lack of farmers associations and solidarity groups impedes their equitable participation in markets and trading at fair prices. Where such organizations exist, they often lack organizational capacity, entrepreneurship development skills, access to finance services (e.g. loans, grants) and engagement with the private sector.

There is untapped investment potential for all value chain actors, due to the loose, fragmented and informal structure of farmer organizations and value chains, whose actors, both producers and processors, have relatively weak collective bargaining power, while the margins on the added value are often not paid. Farmer organizations are potentially crucial for two reasons:

- with effective local networking they can share, learn and innovate for climate adaptation;

- with effective organization they can act as aggregators, in order to better obtain finance, access markets and benefit from higher prices in output markets and lower prices from input markets.

According to the consultations at the community level conducted during the funding proposal development, one of the key priorities of the project should be to strengthen the technical capacity of local institutions to implement climate adaptation interventions. The interventions mentioned during the interviews included education, technical training, climate planning, natural resource management approaches and effective communication, among others.

Institutional Barriers

c) Limited institutional capacity at the national and local level to facilitate the knowledge management and apply climate adaptation best practices

Besides the limited knowledge and technical capacity related to climate change adaptation at the community level in Cunene, there is also limited institutional capacity at national and local level for facilitating the creation and sharing of knowledge about the best practices and strategies related to climate adaptation, land and water management that can benefit the local context. Although there is an effort from the national government to disseminate climate adaptation and build capacity at the local, provincial and national levels, the gap in terms of knowledge management in the country persists. In Cunene, there is no local or provincial knowledge management mechanism that extracts lessons learned from recent interventions to integrate into a complete package of technologies for the restoration, improvement, and maintenance of farms and ecosystems.

As the government in Angola is decentralized, local level of governance and administration is the best opportunity to involve citizens into the decision-making process. This was highlighted during the stakeholder consultations, where the importance of involving local institutions, including local administrations and traditional authorities, to promote an effective ownership of the project at the local level was mentioned during the discussions.

Financial and Economic Barrier

d) Limited offer of financial resources to support the implementation of climate adaptation measures and/or diversify livelihoods at the community level

The majority of financial institutions in Angola suffer from a diffused lack of expertise and long-term experience in agricultural lending in general, and lending to smallholder farmers and farmer organizations in particular. There is lack of institutional capacity to assess business opportunities for specific products and value chains, and the consequent lack of interest in developing specialized financial products and services tailored to the needs of these chains' actors, resulting in a very limited supply of financial products. The available products show basic features that are similar to non- agricultural ones (short terms, fixed repayment terms, no grace period), with higher costs reflecting the transaction costs that are inherent to rural finance.

Traditionally, smallholder farmers have managed their assets, building on local knowledge and generally using their own resources to operate and manage water supply and invest in agricultural inputs and tools. However, the cumulative deterioration resulting from increasing climate-related shocks has reduced productivity, impoverished, and decapitalized smallholder farmers. Long-term investment capital is needed for smallholder farmers to invest in climate resilient agricultural systems. Community organizations and, in particular, FOs do not have the capacity to identify costs, plan and invest adequately in innovative climate resilient land and soil management

technologies. There is a complete absence of agricultural risk finance products such as emergency agricultural loans and insurance. Where government investments are leveraged, the investment is not sustained due to lack of financial capacity to bear the incremental costs of addressing the severity of climate shocks on small-scale infrastructure.

Social and cultural barrier

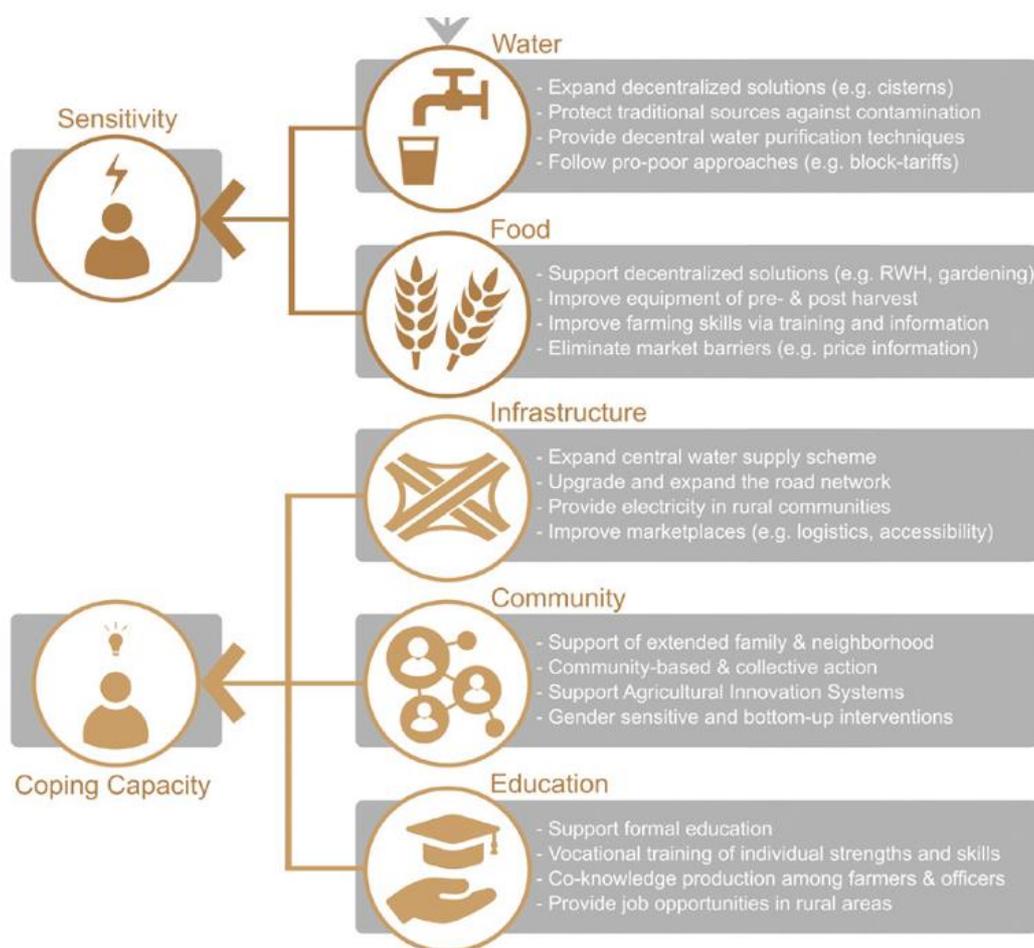
e) Gender stereotypes and inequality lead to women's increased climate vulnerability in the Cunene region.

As detailed in sub-section 4.2, gender stereotypes define different responsibilities for men and women, especially in the rural context in Angola, which leads to a different level of vulnerability to climate change. Traditional gender roles and attitudes towards women in rural Cunene mean that women have limited control over assets and decision making at the household, community and FO level. This weakens their adaptive capacity and makes them more vulnerable to shocks and stresses linked to climate change. Women's involvement in certain livelihoods is also limited by gender relations, which limits the ability of women to take up certain off-farm livelihoods.

6.2 Project Design

The diagram below shows examples of interventions that should be considered to reduce the population's sensitivity and increase its coping capacity, specifically in the case of droughts. The project's design took into account these proposed fields of action and the local context, as well the time and budget constraints to propose a series of activities that will contribute to the final objective of reducing sensitivity and enhancing coping capacity of local communities.

Based on the scientific evidence, baseline analysis and stakeholder consultations, the proposed project design was developed to address the identified barriers, build climate-resilience and increase adaptive capacity of the most vulnerable rural communities in Cunene, with a focus on women. This will be achieved through three integrated components that will deliver a paradigm shift through mutually supporting outputs that bring sustainable climate adaptation results to the project target locations.

Figure 26: Proposed fields of action to reduce household sensitivity and to enhance coping capacities¹⁷⁷

The three project components are:

Component 1: Strengthened adaptive capacity and knowledge management through gender-transformative climate risk reduction.

One of the main barriers identified during project design was the local communities and key stakeholders' limited knowledge of and technical capacity to implement climate adaptation measures. The limited capacity is one of the main factors contributing to the region's high level of climate change vulnerability. Therefore, the activities under component 1 will be focused on addressing the knowledge and technical barriers identified, while at the same time contributing to address the institutional and cultural ones. OSS and ADPP will work with women's groups, farmer organizations, civil society organizations, local and national government, to increase the rural population's awareness of climate change and the implementation of adaptation measures that offer high impact and a paradigm shift.

To achieve that, firstly the project will work through the establishment and operationalization of Climate Change Action Centers (CCACs) in each municipality part of the project. The CCACs will be used as a place for the dissemination of "adaptation best practices". Different trainings and awareness campaigns will be offered to the local communities within the CCACs, including basic literacy and numeracy campaigns, training on nutrition, market access and gender mainstreaming. Farmers will benefit from capacity building and training on techniques to manage the challenge of

¹⁷⁷ ResearchGate 2019

delayed or unreliable rainfall at the onset of the rainy season – for example, strategies to stagger planting times over an extended period, techniques such as conservation agriculture to improve the water holding capacity of soils, and increased access and ability to use seasonal weather forecasts. In the case of legumes, the potential risk of the negative impacts of climate change on beans can partly be offset by promoting the adoption of determinate, short season cowpea cultivars which are predicted to remain relatively resilient to the changing climate.

Component 2: Enhanced water security and climate resilience through integrated water resource management.

Water resources are already scarce in the Cunene region, and the situation will become worse with the predicted impacts of climate change. The traditional knowledge on which communities and FOs depended for agricultural and water management is fast becoming insufficient in the context of climate change and increased vulnerability of livelihoods. Therefore, an integrated water resource management approach is needed to enhance the communities' water security and climate resilience to cope with the impacts already underway.

In line with the Cunene Province's latest development plan, under Component 2, the project will support the improvement of water resources management. This will be done the establishment of small-scale irrigation schemes at the community level. In order to maintain the project's special focus on women, the activities defined to achieve this output will also have a focus on women. Selected water point committee leaders will be women, and they will be provided with training and capacity building related to water resources management. The water committees led by women will serve for better management and conservation of water resources, its related infrastructure and the messaging around the safe use of water, ensuring the sustainability of the project after its completion.

Component 3: Diversified livelihoods and climate resilience of most vulnerable people and communities through resilient agroecology and microenterprise development.

Another important factor that contributes to the local community's high levels of climate vulnerability is the limited adaptive capacity. The livelihood of most people in Cunene is highly dependent on the natural resources and agriculture, which are already being impacted by climate change. The project aims to shift the prevailing reliance on degraded and vulnerable land, which is incapable of sustaining livelihoods, towards a climate-resilient landscape that offers diversified development opportunities for smallholder farmers. Given the predicted reduction in the growing season and increased rainfall variability, the project proposes the widespread adoption of short-cycle varieties of pearl millet and other drought-resistant crops, along with climate-smart agricultural practices. This approach aims to enhance household food production by mitigating the effects of climate change.

Additionally, the project will promote improved storage systems to ensure an adequate food supply for human consumption and animal feed during lean drought periods, while also building carry-over stocks from better years. This strategy will also guarantee sufficient seed availability for subsequent planting, considering the uncertainty surrounding successful harvests. By increasing small animal production, diversifying income sources beyond farming, and small-scale irrigation systems (component 2) for horticultural production, the project will further enhance resilience to climate change. Access to veterinary services and quarantine measures will safeguard investments in small animal pass-on schemes.

The improved availability of staple cereals, legumes and vegetables resulting from the activities of component 3, supported by nutritional and hygiene education provided under the activities of component 1 will have an important impact on health, food and water security. This will contribute to reducing the current levels of child malnutrition in a sustainable manner. Improved availability of food combined with nutritional/hygiene education will protect the first critical 1,000 days of a child's life securing the ability of children to grow, learn and thrive in the future.

Climate assessment of agriculture and agri-food systems in Cunene indicate that important staple crops are predicted to experience a significant decrease in production in a business-as-usual scenario. Consequently, initiatives related to climate change adaptation, food security and enhanced agricultural production include careful consideration of strategies to increase the resilience of households that rely on these crops are critical for the region. With a later start and shorter growing season combined with greater variability in the amount and frequency of rainfall; the introduction of short season varieties is an imperative. In tandem with specific strategies to safeguard the production of traditional staples, it is important to develop broader measures to diversify agricultural income and food production, including development of irrigation infrastructure and the strengthening of value chains.

6.3 Paradigm shift proposed to respond to barriers and needs in Cunene

One of the primary constraints to Angola's future food and water security will be the reliability and volume of seasonal rainfall, caused by droughts. The erratic precipitation patterns influenced by climate change, leading to droughts in Cunene mean that access to irrigation is considered one of the few strategies to maintain the food security of crop-farming households, with considerable investment needed to update and upgrade the limited irrigation infrastructure and water points available. In addition to supporting basic food security, Angola's potential for production of various high-value horticultural crops can be unlocked through improved access to reliable irrigation equipment. Irrespective of priorities related to promotion of irrigation, many areas are characterized by an urgent need to invest in infrastructure for water management to supply fresh water for irrigation, livestock and human use.

The project focuses on addressing the vulnerabilities specific to Cunene province caused by climate change, particularly the recurring challenges of droughts. This hazard, which is naturally induced but intensified as a climate change impact, has severe implications for food and water security, disease prevalence, and child malnutrition. The focus on the South Angola geographical area is key, because in towns like Lubango and Namibe have rural populations up to half a million to a million, respectively.¹⁷⁸ The region is also benefiting from a US\$ 200 million investment of the Government of Angola in the construction of 100 kilometers of water channels supplied by water pumped from the river Cunene, which will make water available for irrigation for the local communities.

The devolution of irrigation schemes and investments in the region to community-based management structures requires sustained support and capacity-building to ensure that correct operation and maintenance systems are ensured. To tackle these issues, the project adopts an integrated approach that centers on empowering women and enhancing the resilience of vulnerable rural communities.

Further, the project paradigm focuses on the promotion of climate-resilient agriculture practices, livelihood diversification, and improved land use. The project is closely aligned with Angola's climate change and gender policies and contributes to multiple Sustainable Development Goals (SDGs). It also aligns with the findings of the Post Disaster Needs Assessment for Cunene from 2012-16. Many of the proposed interventions have been implemented to a limited extent within the context of emergency response to natural disasters or have proven cost-effective in other southern provinces of Angola, e.g., short season crop varieties, pass-on loan scheme for small animals and small-scale irrigation.

¹⁷⁸ World Population Review 2023

The integration of the multi-sector interventions will create a synergy to strengthen climate resilience of vulnerable communities in the project's target municipalities. By the end of the project, the municipality Climate Change Action Centers (CCACs) and the Farmers Organizations (FOs) will be available to promote community to community learning (C2C) and ensure scale up/replication to attract further funding by international donors through local NGOs in other regions of the province and in the neighboring drought affected provinces (Southern Huila, Benguela, Namibe and Cuando Cubango).

A summary linking the barriers to climate change adaptation in Cunene to the proposed solutions is shown in the table below.

Table 14: Barriers (to climate change adaptation) and Solutions (proposed by the project)

Output	Activities	Barrier addressed
Output 1.1 Enhanced capacities for natural resources management and climate risk reduction with improved gender equity.	Activity 1.1.1 Establish and operationalise six women-led Climate Change Action Centers (CCACs)	Gender stereotypes and inequality leads to women's increased climate vulnerability in the Cunene region
	Activity 1.1.2 Raise awareness of local communities on climate risks for Sustainable Land and Water Management (SLWM) practices, and livelihood aspects	Limited knowledge and awareness about climate change impacts and climate adaptation measures at the community level Farmer organizations (FOs) and smallholder farmers, especially women, have insufficient technical capacities to design and implement integrated climate resilient solutions to improve local livelihoods, welfare and access markets
Output 1.2 Knowledge management and applied learning about climate risks is enhanced at national level	Activity 1.2.1 Provide training and capacity building of provincial and national-level entities on mainstreaming of climate risks and gender transformative adaptation measures	Gender stereotypes and inequality leads to women's increased climate vulnerability in the Cunene region
	Activity 1.2.2 Peer-to-peer learning/Systemization of knowledge/Coordination among existing projects	Limited knowledge and awareness about climate change impacts and climate adaptation measures at the community level Farmer organizations (FOs) and smallholder farmers, especially women, have insufficient technical capacities to design and implement integrated climate resilient solutions to improve local livelihoods, welfare and access markets
		Limited institutional capacity at the national and local level to facilitate the knowledge management and apply climate adaptation best practices
Output 2.1 Improved management of	Activity 2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and potability interventions	Limited knowledge and awareness about climate change impacts and climate adaptation measures at the community level Farmer organizations (FOs) and smallholder farmers, especially women, have insufficient

Output	Activities	Barrier addressed
water resources at the local level	Activity 2.1.2 Establishment of Small-scale irrigation schemes at the community level	technical capacities to design and implement integrated climate resilient solutions to improve local livelihoods, welfare and access markets
Output 3.1 Adapted climate-resilient agriculture (CRA) measures for improved food security	Activity 3.1.1 Pilot and promote the adoption of Agro-Silvo-Pastoral Practices	Limited knowledge and awareness about climate change impacts and climate adaptation measures at the community level
	Activity 3.1.2 Implementation of small-scale adaptive infrastructure and capacity building for CRA	Farmer organizations (FOs) and smallholder farmers, especially women, have insufficient technical capacities to design and implement integrated climate resilient solutions to improve local livelihoods, welfare and access markets
Output 3.2 Diversified Income Generating Activities (IGAs) to increase community resilience against CC impacts	Activity 3.2.1 Facilitate IGAs for the communities livelihood diversification	Limited offer of financial resources to support the implementation of climate adaptation measures and/or diversify livelihoods at the community level

The tables below describe this project outputs and activities’ alignment with the agriculture and food security pathway and the four pillars of the GCF strategic plan. The same has been done for the water security sector.

Table 15. Alignment with GCF Strategic Plan – Agriculture and food security sector

Sector	Alignment with GCF Strategic Plan			
Agriculture and Food Security	Transformational planning & programming	Catalyzing climate Innovation	Mobilizing finance at scale	Coalitions & knowledge to scale up success
Pathway 1: Promoting resilient agroecology	<p>Enhanced capacities for natural resources management and climate risk reduction with improved gender equity. (Output 1.1):</p> <ul style="list-style-type: none"> Activity 1.1.2: Raise awareness of local communities on climate risks for SLWM practices, and livelihood aspects 	<p>Adapted climate-resilient agriculture (CRA) measures for improved food security (Output 3.1):</p> <ul style="list-style-type: none"> Activity 3.1.1 Pilot and promote the adoption of Agro-Silvo-Pastoral Practices Activity 3.1.2 Implementation of small-scale adaptive infrastructure and capacity building for CRA 	<p>Diversified income generating activities (IGAs) to increase community resilience against climate change impacts (Output 3.2)</p> <ul style="list-style-type: none"> Activity 3.2.1 Facilitate IGAs for the communities livelihood diversification 	<p>Knowledge management and applied learning about climate risks is enhanced at national level (Output 1.2):</p> <ul style="list-style-type: none"> Activity 1.2.1 Provide training and capacity building of provincial and national-level entities on mainstreaming of climate risks and gender transformative

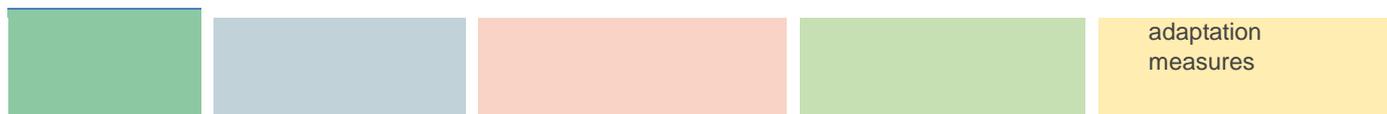
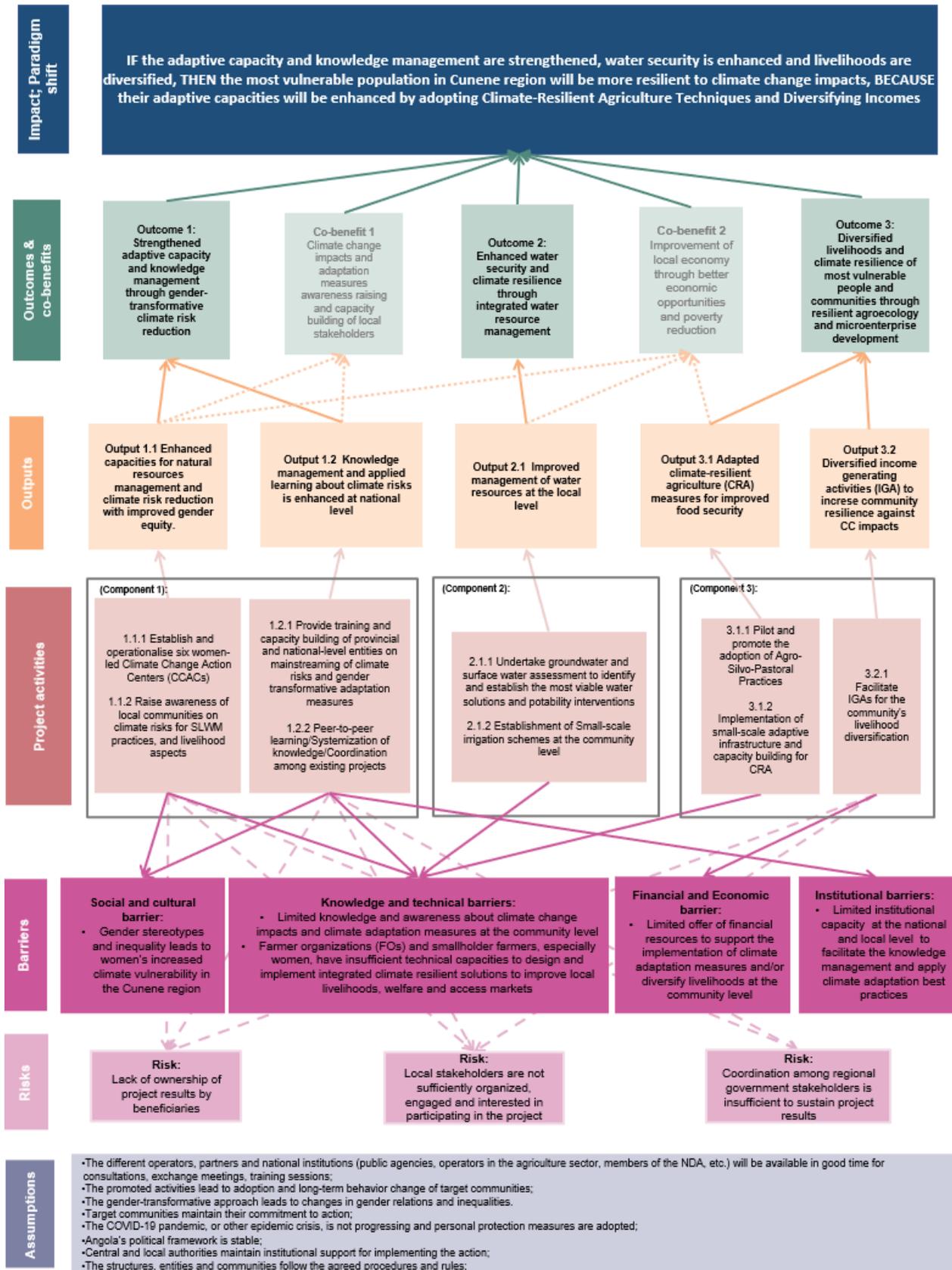


Table 16. Alignment with GCF Strategic Plan – Water security sector

Sector	Alignment with GCF Strategic Plan			
Water Security	Transformational planning & programming	Catalyzing climate Innovation	Mobilizing finance at scale	Coalitions & knowledge to scale up success
Pathway 2: Strengthen integrated water resources management	Improved management of water resources at the local level (Output 2.1): <ul style="list-style-type: none"> Activity 2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and potability interventions Activity 2.1.2 Establishment of Small-scale irrigation schemes at the community level 	Improved management of water resources at the local level (Output 2.1): <ul style="list-style-type: none"> Activity 2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and potability interventions Activity 2.1.2 Establishment of Small-scale irrigation schemes at the community level 		Knowledge management and applied learning about climate risks is enhanced at national level (Output 1.2): <ul style="list-style-type: none"> Activity 1.2.1 Provide training and capacity building of provincial and national-level entities on mainstreaming of climate risks and gender transformative adaptation measures

6.4 Responsiveness to GCF Investment Criteria and Theory of Change

The Theory of Change is shown schematically below:



The following sub-section below demonstrates the project's responsiveness to the GCF investment criteria:

Innovation

The project will ensure the resilience of smallholder farmers by targeting the land and forest ecosystems and the prevalent management practices of these systems with adaptive agro-forestry, water and soil management practices and technologies. Activities and technologies identified through rigorous feasibility analysis in this study have been designed and selected to build resilience in the landscape to sustain agro-ecological systems and livelihoods and increase their capacity to be more adaptive to climate threats and variability, in particular drought. The introduction of short cycle, well adapted crop varieties together with climate smart agriculture will increase the resilience of the agriculture sector by ensuring water catchment capacity is maximized. The broad-based introduction of short season varieties of pearl millet and other crops combined with climate-smart agricultural practices will increase household food production in the face of lower and more variable rainfall. Combined with improved storage systems, there will be more food available for human consumption and for animal feed. This will improve carry-over stocks from relatively good years to lean drought periods. It will also guarantee more seed to make repeat plantings in the face of variable rainfall and uncertainty over which plantings will result in a successful harvest.

The increased production of small animals, non-farm sources of income and the use of solar powered irrigation systems for horticultural production will further improve resilience to climate change. The improved availability of staple cereals, legumes and vegetables supported by nutritional and hygiene education will have an important positive impact on health, food and water security. This will contribute to reduce the levels of child malnutrition during the first 1,000 days of life and consequently the ability of children to grow, learn and thrive. To address the barriers and implement a holistic, sustainable solution for smallholder farmers, the areas of activity chosen are all of high impact potential.

Enabling Environment

The CCACs and Green Schools Programme together with partnership with the government at the provincial and municipality levels will bring a new dimension to create an enabling environment in Cunene. The involvement of government officials, women networks, and youth will create a critical mass to promote adaptation to climate change in both the short and long terms.

The adaptation impact is reflected by the total number of 120,000 direct beneficiaries of the most vulnerable people and communities who will benefit from capacity building in climate resilient development. There will also be 180,000 indirect beneficiaries, totaling 300,000 beneficiaries. They will benefit from improved health, well-being and food and water security through improved agricultural practices, enhanced and diversified livelihoods, and increased awareness and capacities to manage climate change risks and variability.

It is expected that the lives of children will be saved over the life of the project due to reduced disease and malnutrition provoked by drought and/or flooding (target to be determined during the baseline survey) and that gender-related barriers will be reduced. The lives saved is based on likely reduced outbreaks of cholera and severe acute malnutrition affecting children 0-5 years over the five-year period. The FFS, short season varieties, climate-resilient agriculture and small animal loan schemes will impact a total of 20,000 farming families (120,000 people).

Resilience means having more than one option: it is essential to plan for redundancies and storage buffers. The recommendation is to strengthen community-level organization through Water Point Committees and training in the protection and management of water points, operation and maintenance of water points, as well as water supply, sanitation, and hygiene (WASH), to protect water sources, water use, and contribute in the fight against the stunting of children.

Behavior Change:

The cross-cutting issues are ecosystems, gender equality and the involvement of children and young people. Environmental education will be included in the school curriculum as well as the promotion through the CCACs and Green Schools Programme.

The project will address gender barriers that limit the potential of climate change adaptation, while the empowerment of women will leverage a transformational change in unlocking adaptive capacities of communities, which allows for long-term paradigm shift in approaches that address climate change risks and vulnerabilities. This will be achieved via raising awareness and building an understanding of the importance of gender-inclusive climate adaptation. It will involve educating stakeholders, including community members, local authorities, and organizations, about the significance of addressing gender disparities and promoting women's involvement in climate resilience efforts.

The strengthening of formal smallholder farmer organizations and informal solidarity groups will allow for the dissemination of climate change resilience best practices, loan schemes and improved entrepreneurial activity in agricultural and non-agricultural value chains. They are created with the aim of helping their members share knowledge and experience; engage in policy advocacy; secure tenure to forest, land and other natural resources; improve forest-and-farm management; expand markets; build enterprises; and increase income and well-being.

The partnership with national and local governments, the Green Schools Programme and the CCACs will ensure ongoing strengthening of knowledge, collective learning and the capacity for ongoing education for behavior-change to adapt to climate change.

Scalability and Replicability:

The involvement of all key government and civil society players and increased awareness of climate change among the beneficiaries and their households will allow for the scaling up and replication of CC resilient actions in geographical areas outside of the targeted communities. The potential for knowledge and learning is high through the involvement of a variety of stakeholders, including for youth in particular through the FFS and the school education system. Community to Community learning – C2C in the final phase of the project will result in a natural process of replication as neighboring communities appreciate the impact of the CREW interventions in adapting to climate change.

The following concrete interventions in particular, lend themselves to scalability and replicability by demonstrating their efficacy to rural communities, provincial and municipality government, NGOs and the private sector:

- Seed multiplication of improved short cycle crop varieties;
- Conservation agriculture best practices;
- Small animal loan schemes;
- Solar powered irrigation schemes;
- Improved on farm storage systems;
- Women solidarity groups and microenterprise development;
- Green schools and environmental education.

The GCF grant will allow for transforming farming systems to be climate-proofed, notably resilient towards hotter and drier conditions, both by improved cropping systems and diversified agriculture; and by non-agriculture-based livelihoods. The other approaches seek to strengthen rural communities' and FO awareness and understanding of climate change, its impacts and adaptation, and enhancing ownership of adaptation interventions and plans to strengthen vulnerable food insecure households under conditions of increasing climate induced droughts.

Additionality:

Table 17: BAU v. Additionality of the proposed project

Input/Activity	Business as Usual (BAU)	Additionality (provided by the project)
Climate Change Action Centres (CCACs)	These hubs at the municipality level do not currently exist and access to information on CC will continue to be extremely limited.	CCACs in each municipality will have the full involvement of the local administration and are strategically positioned to provide information, capacity building and training on climate change. Their outreach with capacity building programmes with young people and women's networks supported by radio will increase CC awareness among over 200,000 people and remove the current isolation of rural populations. Women will become leaders in promoting resilience to CC.
Knowledge management, improved awareness and technical skills	Very limited and isolated skills and knowledge transfer among rural communities; limited opportunities for capacity building of key resource people; few generic awareness campaigns.	Skills and knowledge transfer programmes designed and implemented, reaching a wide variety of actors. Large numbers of people acquire new skills and knowledge; province-wide targeted awareness campaigns; women are empowered as leaders for CC resilience.
Nursery propagation of tree species of economic value and tree planting	Zero to limited initiative for investing in, or financing of tree cultivation initiatives, both for individuals or communities; limited public or private finance to stimulate tree-based value chain development; community nurseries largely absent.	Incentive schemes are implemented for individuals, households, communities and enterprises; seedling production by IDF with rehabilitated, fully operational strategically located facilities. Tree planting will take place in conjunction with and to complement the GoA large scale water transfer schemes from the river Cunene and Cuvelai. Species will have economic value to impact livelihoods.
Conservation – Climate Smart Agriculture	Only promoted in either funded projects or the occasional isolated farmer, not reaching smallholder farmers.	Demonstration plots and projects catalyze adoption of practices; wide availability of tree saplings encourages individuals, communities, groups and enterprises to invest in tree cultivation; All existing community forestry and conservation initiatives have continuous access to saplings;
Water safety and security for rural communities and irrigation schemes for horticultural production	Irrigation from rivers by smallholder farmers is very limited through lack of access to irrigation equipment and inputs. Despite water transfer from the river Cunene, it is not clear to the extent that	The provision of solar powered pumps, tubing for water distribution and improved access to input/output markets will improve food and cash security. For a relatively small investment, complementarity with the GoA financed water transfer schemes will improve access to water for human and animal consumption and for irrigation up to 3 kilometers from the main channels.

	women smallholder farmers will be able to benefit from this.	
Introduction of fuel saving stoves and training in improved natural resource management	Rural consumption of wood for construction, fuel and charcoal production is high with one of the highest rates of deforestation in Sub Saharan Africa.	Households will have an incentive to significantly reduce current rates of deforestation and desertification.
Gender inequality	Women are seriously disadvantaged in terms of access to productive resources, land inheritance and subject to violence particularly following natural disasters. Little is being done to address these issues.	The project will address gender equality and the empowerment of women as a cross cutting issue with particular attention to crop production techniques, seed multiplication, access to markets, irrigated horticultural production, small animal loan schemes, microenterprise development and fuel saving stoves. Community awareness campaigns will address the issue of gender-based violence. This will be achieved through needs Assessment and Community Engagement, including: <ul style="list-style-type: none"> • Conducting a needs assessment to understand the specific GBV risks and challenges. • Engaging with affected communities, including women and girls, to ensure their voices and experiences are incorporated into campaign planning.
Nutrition and Health	The government and NGOs are working in these sectors but more needs to be done	CREW initiatives to build resilience to climate change particularly in areas benefitting from water transfer will integrate health and nutrition education into women led community awareness campaigns in a cost-effective manner.
Diversification of income from off-farm sources and women's savings groups, including entrepreneurship and loan systems for small animals and seeds.	Women have poor access to resources, knowledge and the basic principles of small-scale business and trading.	Women will be empowered to add value to rural products and engage in non-farm enterprises to generate household income and improve food and cash security. Village banking schemes and business support will ensure the sustainability.

Access to short season drought resilient crops	Although IDA and NGOs have to some extent introduced short cycle varieties as an emergency response, there is still a predominance of traditional, long season varieties of pearl millet and sorghum.	The multiplication of short season varieties of pearl millet is essential to the strategy to increase crop production. It will also create the capability within the province for out of season seed multiplication to facilitate an emergency response to natural disasters.
Improved on-farm storage	Current storage practices result in significant losses of around 30%.	With increased production of small grains, it is essential to reduce storage loss by promoting improved on farm storage infrastructures and grain treatment. This will also ensure carry over food stocks as a coping mechanism against drought induced poor harvests.
Green Schools Programme and environmental education	Currently there is a limited number of schools with access to water for irrigation. Even the schools with water will continue without the inputs required for school gardens. Teaching about the environment and CC will continue to be limited.	The project will improve school access to water and where feasible establish school gardens. Children will learn how to cultivate vegetables and use produce to the benefit of their families. The planned changes to the school curriculum will increase understanding of environmental issues and climate change, in particular for a new generation of Angolans.

Efficiency and Effectiveness:

Taking into account the co-financing, the cost of implementation for the direct beneficiaries of the project is US\$ 91 per person over the five-year period or US\$ 18 per person per annum or if indirect beneficiaries are included US\$ 7 per person per annum. This is a reflection of the efficiency and efficacy of the selected interventions and chosen implementation methodologies. Over the past 32 years ADPP has, together with other partners, developed “best practices” for project management, high impact interventions for rural development and methodologies for sustainable community development, building on existing community structures and through participatory methodologies. During full proposal, cost-efficiencies will be explored, particularly synergies with other projects and programs, and studies will be undertaken to ascertain how the developed models could be upscaled further and expanded through utilizing micro-finance or other financial systems.

Additionally, the effectiveness of Conservation Agriculture (CA), as argued by the CGIAR Agricultural research centers¹⁷⁹, will be through the use of proven methodologies for behaviour change and practical demonstrations. Effectiveness will be measured by the number of hectares with adopted techniques and the improvement in crop yields and household food security.

Knowledge Management, Applied Learning and Community of Practice:

The proposed project will operate throughout the province but focuses on the South and South West (Caroca, Ombadja and Cuanhama municipalities) Angola, where there is a relatively high population density and most risk from the impacts of climate change (both drought and flooding). This region is also where current investment by the GoA and ADPP in water infrastructure offers the greatest

¹⁷⁹ Richards et al. 2014

potential for the development of high impact, complementary actions and synergies to create adaption to climate change.

Many of the proposed interventions have been implemented within the context of emergency response to natural disasters or have proven cost effective in other southern provinces of Angola e.g. short season crop varieties, pass on loan scheme for small animals and small-scale irrigation. The integration of the multi-sector interventions will result in a synergistic effect to strengthen resilience to climate change. By the end of the project the municipality CCACs and the Farmers Clubs/Associations will be available to promote community to community learning (C2C) and replication by the GoA and international donors through local NGOs in other regions of the province and in the neighboring drought affected provinces (Southern Huila, Benguela, Namibe and Cuando Cubango). There will be close cooperation in terms of sharing experiences and lessons learned, with the neighboring Adaption Fund ADSWAC project in Cuando Cubango in the South East of Angola.

7. Technical Assessment of Project Interventions

7.1 Activities of the proposed project

The project's **overall objective** is to build climate-resilience and increase adaptive capacity in targeted rural communities in the six municipalities of the province of Cunene. This objective will be achieved through three interlinked components:

Component 1: Strengthening the adaptive capacity and knowledge management of vulnerable communities through gender-transformative climate risk reduction.

Component 2: Enhancement of water security and climate resilience

Component 3: Diversification of livelihoods of vulnerable communities

Outcome 1: Strengthening the adaptive capacity and knowledge management of vulnerable communities through gender-transformative climate risk reduction (GCF ARA1 & 2)

Under this Outcome, the project targets existing limited awareness and knowledge of climate change, its impacts and appropriate adaptation options as well as of capacities for the reduction of risks and increased resilience of the most vulnerable rural people and communities in the Cunene Province of Angola. A gender-transformative approach will be undertaken to empower women to be at the center of community adaptation efforts and resilience building. This, which will be supported by enhanced institutional capacities, will be achieved by increasing the enabling capacities for women to improve livelihoods, water and food security and nutrition and health, as specific gender barriers that currently hinder women's access to knowledge, capacity building opportunities, decision-making power and resources are addressed. Youth will also be promoted as key actors for climate change adaptation and risk reduction under this Outcome.

Enhanced capacities for natural resource management (Output 1.1), in combination with Enhanced knowledge management and applied learning about climate risks (Output 1.2) will lead to strengthened adaptive capacity and knowledge management (Outcome 1). By targeting gender-transformative approaches and specific activities, the project addresses social and cultural barriers faced especially by women. Knowledge and institutional barriers are directly targeted by the project activities. Strengthened capacity and knowledge management to address climate-risks will also contribute to the success and the sustainability of activities related to improving access to water (Outcome 2), and related to climate-resilient agricultural systems and livelihoods (Outcome 3).

By strengthening the adaptive capacity and knowledge management and the contribution thereof to improve water security and food security, the project contributes to GCF Adaptation Result Areas (ARAs) 1 and 2. By applying a gender-transformative lens and approach, the project delivers strong gender co-benefits, while strengthening these specific capacities and knowledge management also delivers various co-benefits in sustainable development (improved environmental management and improved socio-economic conditions, among others).

As such, the project will contribute to a fundamental change, where the most vulnerable become effective agents of change to promote best practices for climate change adaptation and resilience optimization, as knowledge is adequately managed.

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The project will have a strong focus on community-based activities, including awareness raising and capacity building, through a variety of community-based organizations, structures and institutions. As such, under this component, the organizations and individuals that will be engaged, are depicted in the table below. A description of their involvement follows in the activity descriptions below.

Total Project	Per Municipality, on average ^{180,181}
6 CCACs	1 CCAC
60 Jangos	10 Jangos
6 Municipal Technical Working Groups (150 people)	1 Municipal Technical Working Group (25 people)
30 (new) Women Groups	5 (new) Women Groups
120 primary schools (240 teachers) and 12 Environment Clubs	20 primary Schools (40 teachers) and 2 Environment Clubs
840 Climate Change Champions	140 CC Champions
80,000 Community Members directly benefiting	On average 13,333 Community Members directly benefiting

This Outcome will contribute to GCF adaptation result areas “Most vulnerable people and communities” (ARA 1) and “Health, well-being, food and water security” (ARA 2).

Output 1.1: Enhanced capacities for natural resources management and climate risk reduction with improved gender equity at the local level.

This output mobilizes women, youth and children across the province to increase awareness of the challenges that climate change presents to their communities and to disseminate information on what can be done to respond to these challenges and increase resilience. The inclusion of representatives of various municipal and provincial departments in community activities will also contribute to overall increased awareness in Cunene. Building on previous experiences (funded by Adaptation Fund) , the activities under this component will operate through establishing and operationalizing women-led Climate Change Action Centers (CCACs), out of which capacity building and training activities will be coordinated and implemented. Broad-based outreach will include community sensitization campaigns to disseminate knowledge and raise awareness at the sub-national level, targeting gender-based inequity related to climate change. A Green Schools Program (GSP) and Environmental Clubs will also be established to reach young people, increasing their awareness and capacity to become agents of change.

Capacities for addressing climate risks (Output 1.1) will be enhanced sustainably through operationalized CCACs (A1.1.1) and the activities organized by them (A1.1.2). With a focus on strengthening community-based and locally-led Centres and groups (CCACs and CCAC Jangos, women groups, youth clubs) who will lead activities at the community, the project addresses knowledge barriers directly, while empowering women and youth as key actors in adaptation. attitudes and practices in the longer term. The table below depicts the adaptation relevance of the activities under Output 1.1.

¹⁸⁰ Some municipalities may have more participants and others less, depending on population density and on other activities already being conducted in the areas. The table provides a simplified overview of the scope of people benefiting.

¹⁸¹ Full details of how many groups, schools and individuals reached per municipality are defined in the PFS, and will be further updated during the baseline study and project inception.

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Table 18. Adaptation relevance of activities under Output 1.1

Output 1.1 – Enhanced capacities for natural resources management and climate risk reduction with improved gender equity	
Activity	Adaptation Relevance
<i>A1.1.1 Establish and operationalize six women-led Climate Change Action Centers (CCACs).</i>	Addresses inadequate capacities of local authorities to reach all people with CC information enhance the local capacities toward more adaptation and adaptation options for increased resilience. Establishes permanent structures for well-informed locally-led adaptation.
<i>A1.1.2 Raise awareness of local communities on climate risks for sustainable land and water management (SLWM) practices, and livelihood aspects.</i>	Address limited knowledge and awareness on environment protection, climate change and risks, and adaptation options for increased resilience. Support women and women groups to lead and scale up climate actions and advocate for climate policies at all levels of governance by building capacity and addressing specific gender inequalities and barriers that inhibit women's ability to fully participate in such actions. Institutionalize climate action in schools and support young people to become active contributors in local climate action.

- Activity 1.1.1. Establish and operationalize six women-led Climate Change Action Centers (CCACs).
- Activity 1.1.1 Establish and operationalize six women-led Climate Change Action Centers (CCACs): the project will establish a total of six Climate Change Action Centers (CCACs), one in each of the target municipalities, to serve as a central point for all target communities in awareness raising and capacity building. The CCACs will be long-term structures that will continue working to address climate change issues and resilience beyond the lifespan of this project and coordinate activities with a variety of CBOs, including women groups, youth groups, schools and farmer organizations. In addition of the 6 CCACs, and because of the project area being vast and the population being very spread out, a total of 60 Jangos (traditional community meetings spaces in Angola) will be established using local materials and hand power to further to reach project target areas to serve not only similar purpose as the main CCACs but also allowing the farmers to meet and share acquired knowledge and experience. In order to achieve this; the project will implement the following sub-activities:
 - Establish at least 30 new women groups and 12 youth environment clubs: Firstly, the project will identify and map existing women and youth groups, as well as schools, within the target area. Based on this mapping, the project will establish at least 30 new women groups and 12 youth environment clubs, distributed over the 6 municipalities according to population density and additionality to existing initiatives. The 30 Women Groups, which will tentatively consist of a total of 900 people (30 per group on average)
 - Establish and operationalize 6 CCACs and 60 Jangos: This activity also includes the physical establishment, operationalization and maintenance of the CCACs and the Jangos, constructed with local materials to the extent possible in order to generate no negative environmental impact, as well as equipping them. The identification of these locations will be conducted together with the local authorities, once funding is secured.

Deliverables under this activity are: (i) 6 CCACs established and operationalized; (ii) 60 Jangos established and operationalized; (iii) at least 30 new women groups and 12 youth environment clubs established.

In order to do the above, the project will conduct the following:

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Establish at least 30 new women groups and 12 youth environment clubs: Firstly, the project will identify and map existing women and youth groups, as well as schools, within the target area. Based on this mapping, the project will establish at least 30 new women groups and 12 youth environment clubs (the latter under A1.1.2), distributed over the 6 municipalities according to population density and additionality to existing initiatives. The 30 Women Groups, which will tentatively consist of a total of 900 people (30 per group on average), will have a primary objective of enhancing the involvement of women in water resource management and climate resilience initiatives. Contrary to what the term “Women Group’ may imply, about 20-30% of the members will be male. Based on the EE’s experiences and best practices, excluding marginalized men and focusing solely on empowering women may alienate some men, resulting in negative consequences, such as low participation and increased gender-based violence (GBV). Care will be taken to ensure that male participants do not automatically assume leadership roles and that local communities fully understand why empowering women will directly benefit families and communities. Including men will help strengthen the whole family unit and increase the number of women directly empowered. The Women Groups will serve as the platform for raising awareness and knowledge on climate change issues and on addressing gender barriers (A1.1.2).

The initial criteria for the identification of the women groups (in relation to outcome 2 and 3) will include the following: availability and suitability of land with absence of any land tenure conflict issues; and potential to improve food security. The EE will facilitate the access for women groups to opportunities for irrigated horticulture in the following targeted geographical areas: 80 kilometers along the Cunene River border, 100 kilometers along the new Cunene water transfer system (max. 0.5 km on either side), 80 kilometers along the Cuvelai River. In addition, in communities farther away from these water sources, the project will establish alternative infrastructure for access to water, as described below, under Activity 2.2.1. selection of the local communities and beneficiaries from the project will be based on criteria developed based on the outcomes of the baseline and Capacity Needs Assessment (A1.2.1) and in collaboration with the different stakeholders at local level. The validation of these selection criteria of beneficiaries will involve all the relevant local stakeholders and the project steering committee members.

Establish and operationalize 6 CCACs and 60 Jangos: This activity also includes the physical establishment, operationalization and maintenance of the CCACs and the Jangos, constructed with local materials to the extent possible in order to generate no negative environmental impact, as well as equipping them. The identification of these locations will be conducted together with the local authorities, once funding is secured. Provision will be made to start out the project with temporary structures (e.g., rent of offices) until the Centres are being developed, so that other project activities are not hindered by the establishment process. The project will be responsible for equipping the CCACs with knowledge and training materials, as indicated in A1.2.1, providing a reference community library. The CCACs will act as resource centers for the municipalities, containing books, manuals, posters, leaflets and information on model gardens, irrigation systems, firewood saving stoves, rainwater harvesting, water purification, seed banks, and

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other locally appropriate climate-resilient technologies, as well as more general information on CC and CC adaptation planning. Each of the six CCACs will also have a model plot established for CRA practices. Until the CCACs are established, the project will find temporary solutions for the CCAC-managed activities to get started, by renting office spaces or establishing temporary spaces (containers, or other small structures).

The CCACs will be closely integrated with all project activities, coordinating climate actions in the municipality and serving as a central meeting place, also for other climate and environment related activities by local governments and other stakeholders such as NGOs, development partners and CBOs. The CCACs will hold quarterly meetings of each Municipal Technical Working Group and of the Provincial Technical Working Group (see A1.2.2), including representatives from government institutions, traditional leaders, and other relevant NGOs. The CCACs may provide office space for local authorities to use, as relevant, and in relation to the scope of the project activities. As such, the CCACs will have a very high potential for knowledge dissemination and learning, in particular in relation to the Farmer Field Schools and the Green School Program, which is key to project's exit strategy. CCACs will also serve as a space that will allow for greater participation of communities in local decision-making, further improving the enabling environment for resilience building in Cunene. The project will ensure that the local administrations assume joint responsibility at an executive/institutional level, including nominating a focal point to support the project- recruited CCAC managers, with a view to integrating the operation of the CCACs into their task package in the long term. Most of the Jangos will be managed by the women's groups and their communities as these structures are related to the FFS.

The EE will be responsible for the execution of this activity, including identification of existing groups, establishment of new women groups and CCACs and Jangos. They will also be responsible for the operationalization of the CCACs, including capacity building and acquisition of necessary equipment. The EE will work in close consultation and collaboration with local government authorities and existing technical working groups at provincial and municipal level. At community-level, the EE will work together with the sobas and their communities. The CCACs will be manned by a CCAC Leader and a CCAC Administrator, and will be used by other staff from local authorities and the EE for the purpose of the project. The CCAC staff will benefit of institutional capacity building sessions in relation to the management and reporting on the activities at the CCAC level. Procurement will be led by the EE, in accordance with the AE's procurement rules and the stipulation of those in the AE's AMA with GCF.

- Activity 1.1.2. Raise awareness of local communities on climate risks for SLWM practices, and livelihood aspects.

This activity will raise awareness and build the capacity of key local champions, communities including the women groups and youth environment clubs for the widespread promotion of SLWM practices and climate risk reduction, and serves as well for addressing specific gender barriers such as literacy, land tenure and nutrition and health. Materials developed under A1.2.1 will serve to increase

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knowledge about CC adaptation and resilience building options, and about environmental protection, using gender-transformative messages to foster the empowerment and leadership of women in climate action. The following topics, among others, will be incorporated into the materials as relevant: promotion of existing laws and regulation on environment protection; forest conservation and tree species diversity; appropriate harvesting of wood for local use and alternatives available; benefits of fuel saving stoves; CRA practices, water resources management, re- and afforestation and sustainable land and water practices; alternative income generating activities (IGAs).

Deliverables under this activity are: (i) 840 Women mobilized, trained and acting as CC Champions in their respective communities; (ii) 30 Women groups (900 people) trained in project-relevant topics and activities that address structural gender barriers (literacy, nutrition, land tenure); (iii) 120 Schools and 12 Environment Clubs reached by the Green School Program.

As such, the activity will include the following:

Training of CC Champions: A program will be developed with the objective to mobilize key stakeholders at the local level to understand the issues the project is trying to tackle, forming a network of climate change champions to raise awareness and build the capacity of additional community members. The training will consist of a one-week course in each of the six target municipalities, with champions from local communities and including: technicians from the IDA and IDF extension network, leaders of Farmer Field Schools and Organizations. This will be followed by one day per quarter of follow up training. The champions will also be invited to participate in and organize relevant project activities. A total of 840 champions (70% women) will be trained by the project – approximately 35 champions per municipality (6) per year, in years 2-5 of the project. The criteria for the selection of the champions are:

- a) that participants be a member of one of the three mentioned groups,
- b) commit to fully participate in the corresponding training and
- c) commit to raise awareness and build the capacity of additional community members through the project activities and beyond.

The champions will hold Open Day events in their respective municipalities as part of their training. At every event, champions will first raise awareness, using the most suitable method of communication for the community, then facilitate a round of discussions to formulate concrete action steps that can be taken by the communities to sustainably manage local natural resources and reduce the impacts of climate risks, engendering a community spirit for change and improved resilience to climate change. Across the 6 municipalities, a total of 96 Open Day events will be held, reaching a total of approximately 40020,000 people.

Capacity Building of 30 Women Groups: This activity also aims to address fundamental barriers to women's adaptation to climate change by building the capacities of 30 Women Groups (900 participants) (A1.1.1). Women are recognized as effective communicators in rural areas and key to identifying priority interventions for their communities. The project will therefore seek to secure

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women's access to decision-making, leadership skills and governance through capacity building and affirmative action in the organizations of Farmer Field Schools, CBOs, CCACs and other community-based structures. Participatory discussions will be held on how gender power dynamics affect decision-making and how a mind shift can help find solutions that support climate-resilient livelihoods. Leadership roles and the importance of the participation of women in advocacy and influence of policy for climate resilience at all levels of governance will be emphasized and supported throughout the activity, in addition to the promotion of protection against GBV, especially following a natural disaster when vulnerability increases. Specifically, the trainings under this activity will raise awareness and build capacities within topics of (a) community land tenure rights and inheritance, (b) nutrition and health, , and (c) other project-relevant topics, such as sustainable land and water management and the adoption fuel savings cooking stoves.

450 Women Groups members will be trained in each year, years 2 and 3 of the project, 100 will participate in each of the municipalities of Ombadja, Cuvelai and Cuanhama, and 50 in Namacunde, Cahama and Curoca. Leaders of Women Groups, at the community level, with potential to become leaders in scaling up climate action will be encouraged to disseminate information and train additional women. As such, it is estimated that an additional 9,000 people will be reached (10 people per group member).

The topics of the trainings will include more detailed trainings on the following:

Land tenure and inheritance: The defense of community rights is a growing issue for all members of communities in the province of Cunene and essential in order to guarantee stable, long-term access to vital natural resources such as water, pastures, forest, fish and horticulture, for livelihood security. Land rights issues in Cunene are characterized by growing land pressure due to recent agriculture-related projects, limited availability of land suitable for agricultural use due to climate change and its impacts, coexistence of pastoral and agrarian systems and related conflicts, and gender inequality in relation to land ownership. The project will ensure that participating communities and local authorities have the knowledge, tools and workspaces to exercise the rights of rural communities in the access of land titles and the prevention/management of related conflicts, also in relation to inheritance rights. Additionally, and simultaneously, the project will place a special focus on the sensitization of communities in terms of gender aspects within the topic of land rights and inheritance, to strengthen the overall rights of women and their empowerment. The access point to the communities will be the farmers' and women organizations already participating in the project, sobas and existing local structures. Additionally, the project will follow up on ongoing and finalized processes throughout the municipalities, previously carried out by the EE, ADPP, and CODESPA through the project 'Right to Land in Cunene Province' (Direito à Terra na Província do Cunene (DITERCU) in Portuguese), for best practices and lessons learned, and where needed to provide support to finalize those processes.

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- Nutrition and health: Mothers and other community members will receive trainings in improved practices of nutrition and health, as well as food security, including the nutritional value of locally occurring foodstuffs, improved feeding practices for infants and milk treatment practices. This will increase the ability of women to tackle scarce water supplies and poor diets, and will provide a platform for social development linked to climate change capacity building. Synergies will be created as nutrition and health education influences how income is utilized, and agricultural diversification prioritized. The EE will oversee implementation, in collaboration with the Ministry of Social Action, Family and Promotion of Women (MASFAMU) and Ministry of Health. The training of women to improve practices for nutrition, hygiene, water purification and food security will complement increased staple cereal and vegetable production. In the face of cultural norms and myths, work is still required to promote behavioral change with regard to community development issues such as the use of mosquito nets, infant nutrition/feeding practices and home economics. Therefore, mothers and other community members will receive training in the nutritional value of locally occurring foodstuffs and improving feeding practices for infants. Good practices will be promoted in relation to the safe consumption and water and milk treatment practices, this will include information on gastrointestinal diseases present in untreated water and milk, ways of treating these liquids and adequate intake of both. This activity is fully aligned and mutually supportive of the activities in Output 3.2. It will create synergies with them by influencing the way in which increased income is utilized within the household and by improving health for increased agricultural productivity. The expected impact of nutritional education and diversified agricultural production on children during the first 1,000 days of life will ensure that the cognitive abilities of children are not impaired by malnutrition in the future. The activities under this outcome will influence knowledge, attitudes and practices in the longer term. These is a strong focus on youth and children as agents of change in the future.
- Literacy: Integrated with knowledge about resilience to climate change and leadership, literacy campaigns will directly strengthen the capacities of women in the targeted areas. Basic literacy and numeracy campaigns will be aimed at strengthening women's capacities – better educated women can improve their farming practices (use manuals, leaflets, ask for help etc), manage stock and finances and improve their entrepreneurial abilities. They are better able to take care of their own and their family health, understand the importance of children getting an education, and so on. Educated women also have more self-confidence, and can become more active citizens. The process of gaining land rights and many other issues are facilitated by women becoming literate. Basic literacy and numeracy education are a key component for women's empowerment and will support targeted beneficiaries beyond the scope of the proposed project. The literacy campaigns will follow the national government's plans, including systems and modules. A total of 2,000 people (70% women, considering the gender-based argument provided above), comprising the most

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vulnerable in communities, will receive training in literacy . To achieve this, the project will train 30 literacy teachers and 3 supervisors during years 2-4. The literacy teachers and supervisors will be contracted to carry out the modules during the same years, for a total period of 31 months.

Environment Clubs and the Green School Program: In addition to the work with the champions and the Women Groups, the project will also work with climate change awareness through the education system. The establishment of a Green Schools Program will provide climate change awareness lessons for children and young people to become agents of change for risk reduction and adaptation in the target area. The Green Schools Program will target 120 primary schools in Cunene (60 in years 2 and 3, 60 in years 4 and 5) as it is the most cost-effective way to reach the highest number of students and communities. Two teachers from each primary school, totaling 240 teachers, as well as trainee teachers from the ADPP teacher training school in Cunene, will be trained to implement the Green Schools Program. The Green Schools Program will cover the following main areas of activity: learning about the environment in general and climate change in particular, including tree planting and how to operate small school gardens (related to A3.1.1); maintaining a clean and healthy environment at the schools; holding open days for the community on locally relevant topics. As a fundamental approach, the activity will be gender-balanced, training students as agents of change and including girls as leaders of environmental activities. In addition to the GSP at primary schools, 12 Environment Clubs will be established to involve older children and youth in community environment activities – one club per Municipality during each of the two cycles of teachers' training for the Green School Program, coordinating activities between all 10 schools in each Municipality during each cycle. Each of the schools will receive a kit with educational materials, as well as small weather measurement kits for learning about the weather and climate change. The schools and students will be involved in tree planting actions (A3.1.1), and will have visits to the demonstration plots (A3.1.2), where FFSs members will, under the guidance of the project, pass on simple knowledge of CRA and natural resource management to the student Club members.

Awareness raising and trainings on Sustainable Land and Water Management (SWLM): Through this activity, the activity teams with the NPMU will coordinate activities with the local authorities and communities to implement awareness-raising and training on climate risk to Sustainable Land and Water Management. The EE in partnership with the Institute of Forest Development (IDF) and the Provincial Department of the Environment will explain the existing environmental laws and regulation to the population in Cunene Province. Trainings will be delivered using a language easy to understand and gender transformative. This will include the use of local dialects to enhance communities' ability to adapt to CC impacts and actively contribute to resilient, water-efficient agricultural practices (promoted under Outcome 2 and 3). The project will raise awareness about the importance of adopting SLWM practices and techniques, as relevant to the activities of this project. By building a cadre of trained and well-informed individuals and fostering community awareness, the project seeks to create a sustainable and empowered foundation for addressing land and water challenges in Cunene

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The training materials to be developed under activity (A.1.2.1) will be used to raise awareness and change mentality about the environment and for improved management of natural resources will include the following: The importance of forest preservation and value of different tree species; Selective harvesting of quick growing trees and preservation of the more valuable species; Harvesting of branches instead of whole trees; Preservation of young and immature trees; Avoidance of burning; Opportunities for generation of cash income as alternatives to charcoal production; Planting of mango, citrus, guava and local indigenous fruit trees (four for every tree harvested); During ground clearance, smallholder farmers will be encouraged to preserve trees and fast-growing species such as the maboqueiro (*Strichnos spinosa*); Use of iron and mud blocks for house construction instead of wood; Use of barbed wire for fencing to economize wood; Fuel saving stoves; Awareness of the value of fire breaks; Combating desertification of lands, particularly in Curoca and Ombanja municipalities; More efficient use of organic manure and compost and increase of the area under cultivation to increase small grain production and food stocks.

ADPP, as the EE, will be responsible for implementation of the trainings, in consultation with the Ministry of Environment, the MASFAMU, and other technical experts. The EE will likewise be responsible for execution of the Open Day events. All training sessions under this activity, guided by a gender expert, will be organized out of the CCACs (A1.1.1), and will provide support to beneficiaries throughout the lifespan of the project. At the community-level, the project will mobilize Community Instructors to coordinate and conduct activities with the communities. Staff from the local authorities will be included in the training sessions where relevant, both as trainers and participants.

Output 1.2: Knowledge management and applied learning about climate risks is enhanced at provincial and national level.

In the pursuit of robust institutional capacity building and knowledge management at the provincial and national level, the project addresses critical areas of focus that encompass mainstreaming climate risks and implementing gender-transformative adaptation measures. These endeavors center on enhancing the capacities of provincial and national-level entities, effectively equipping them with the knowledge and tools needed to incorporate climate risk considerations and gender-responsive strategies into their decision-making processes. Concurrently, the project promotes peer-to-peer learning and systemization of knowledge to facilitate efficient knowledge sharing and coordination among existing projects. Through training, cross-institutional exchanges, and knowledge-sharing platforms, the project aspires to create a network of informed, adept stakeholders capable of driving coordinated efforts and maximizing the effectiveness of climate adaptation initiatives, ultimately advancing the resilience of the local communities in the targeted area.

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Table 19. Adaptation Relevance of activities under Output 1.2

Output 1.2 - Knowledge management and applied learning about climate risks is enhanced at national level	
Activity	Adaptation Relevance
<i>A1.2.1 Provide training and capacity building of provincial and national-level entities on mainstreaming of climate risks and gender transformative adaptation measures.</i>	Address limited capacity, knowledge and materials, on environment protection, climate change and risks, and adaptation options for increased resilience. Address limited institutional capacities to address gender issues.
<i>A1.2.2 Peer-to-peer learning/ Systemization of knowledge/ Coordination among existing projects.</i>	Address limited availability of materials and experiences regarding project activities that aim to increase adaptation to climate change; manage knowledge adequately, ensuring that indigenous knowledge is accentuated and highlighting best practices and lessons learned.

- Activity 1.2.1 Provide training and capacity building of provincial and national-level entities on mainstreaming of climate risks and gender transformative adaptation measures.

This activity is centered on enhancing the capacities of provincial and national-level entities to effectively integrate climate risk considerations and implement gender-responsive adaptation measures. To do so effectively, the activity will include baseline, KAP and capacity assessments, development of appropriate materials, and capacity building sessions for various actors at national, Provincial, and local level.

Deliverables under this activity are: (i) Baseline Study, KAP surveys and Capacity Needs Assessment are conducted; (ii) Training and sensitization materials for the project are developed; (iii) Extension workers from government and local government as well as project “Activity team” are capacitated in project-relevant knowledge and skills; (iv) Government officials at national-level have participated in capacity building on climate change and gender topics.

The activity will include:

Baseline Study, KAP Study and Capacity Assessment: A baseline study and Knowledge, Attitudes, and Practices/Perceptions (KAP) survey and Capacity Needs Assessment will bear conducted in the first year. These assessments delve into the community's understanding, attitudes, and practices related to climate change, gender dynamics, and relevant aspects. The data gathered in these studies plays a critical role in guiding decision-making throughout the project's lifespan. These assessments run in parallel with capacity assessments, which focus on systematically evaluating the knowledge and skills of project stakeholders, ranging from local community members to provincial-level entities. The primary aim is to identify capacity gaps and opportunities, enabling tailored capacity-building initiatives. Additionally, another survey will be carried out at the end of the project to help assess the project outputs and evaluation of the project impacts within the intervention area. Upon project conclusion, a comprehensive Final Report will be produced to summarize the achievements and insights gained during the implementation period.

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Develop training and communication materials: The EE will lead the development of new materials with input from relevant institutions at national or provincial level for the successful implementation of project activities. This will include consultations with relevant stakeholders and stocktaking of existing materials and experiences, including traditional knowledge and practices.

The EE will coordinate with local authorities to make use of fitting materials already designed and available, from government initiatives or other organizations. Where materials are lacking for the successful implementation of activities and achievement of project objectives, the EE will coordinate with relevant local authorities for the development of these materials.

Table 20. Materials to be used within the scope of the project

Material
Training manuals and sensitization materials for SLWM and climate change risk reduction (A1.1.2)
Technical manual and materials for O&M of structures established under the project
Training manuals to address specific gender barriers and build the leadership capacities of women (A1.1.2)
CCR material, including posters, pamphlets, etc. (A1.2.1)
Teachers' manual and student action booklets for Green Schools Program (A1.1.2)
Sensitization and training manuals for Environmental Clubs (A1.1.2)
Knowledge dissemination material (A1.2.2)
Sensitization materials and technical manuals on improved varieties of drought tolerant crops, seed multiplication, harvesting and storage (also of cereals) (A3.1.1)
Technical manual and materials for training of Farmer Field Schools (A3.1.2)
Technical manual on seeds banks and nurseries (A3.1.2)
Sensitization materials and technical manuals on ecosystem services and sustainable management techniques (A3.1.1)
Training manuals on entrepreneurship for a local seed industry (A3.2.1)
Sensitization materials on diversification of farming and veterinary services (A3.1.1)
Technical manual on irrigation schemes (A2.2.2)
Sensitization materials and training manuals on off-farm diversification of income and microenterprise development (A3.2.1)

The EE will lead the development of new materials with input from relevant institutions at national or provincial level for the successful implementation of project activities. This will include consultations with relevant stakeholders and stocktaking of existing materials and experiences, including traditional knowledge and practices. Consultants and technicians will be recruited as necessary and appointed according to the specializations required for the materials, corresponding to clearly defined ToRs. A gender expert will review all materials to assure their gender-responsiveness and incorporate a gender-transformative approach. Representatives and/or technicians from other ministries or institutions may be invited to participate in the validation of materials.

Capacity building of government extensionists and project "Activity team": Over 5 years, the project focuses on targeted training of extensionists from government departments, and the activity team in each municipality of the project area. The content encompasses techniques for identifying and assessing climate-related risks to food and water security. This includes understanding the local climate context, recognizing vulnerabilities, and learning how to design and implement adaptive strategies to mitigate these risks. Workshops will cover vital topics such as sustainable crop management, efficient irrigation, soil conservation, and

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responsible livestock care. Interactive sessions, guided by specialists, will encourage practical learning. This activity will equip the government extension agents and Activity team with the knowledge and skills needed to help farmers and communities adapt to climate change and its impact on agriculture and water resources. Training will be delivered through a combination of classroom sessions, field visits, practical exercises, and opportunities for peer learning and knowledge sharing. It will be adapted to the specific needs of extension agents/Activity team and the local context, enabling them to effectively support farmers and communities in building climate-resilient food and water security systems.

Capacity building of national institutions: Although national institutions in Angola already have capacity on climate change topics, the interconnection with gender issues is still not mainstreamed within the institutions. Therefore, the project will work with Ministries and other institutions at the national level (MINAMB, MASFAMU, MoAF, and others) to promote training and capacity building on gender and climate change, with the goal of promoting mainstreaming, scaling-up and sustainability of project activities. This will take place at both national level and at provincial level in Cunene. Participants will learn how gender dynamics are intertwined with climate impacts, with a specific focus on understanding how climate change affects women and men differently. The content covers gender-responsive strategies for climate adaptation, promoting inclusive and effective climate policies. Participants will gain insights into how to integrate gender considerations into climate initiatives and policies.

The EE will be responsible for the execution of this activity, under supervision of the AE which will provide the necessary technical expertise if needed to build capacities adequately. The Provincial Technical Working Group will be engaged in the validation of project materials, and the relevant line ministries (MINAMB, MASFAMU, MoAF – IDF and IDA) will be engaged for the trainings for officials, technicians and extension workers.

- Activity 1.2.2 Peer-to-peer learning/Systemization of knowledge/Coordination among existing projects.

This activity will ensure that all training and communication materials needed to successfully carry out capacity building and awareness raising activities are available and ready for use in a timely manner. The activity will also serve to ensure coordination among existing and ongoing projects, and it will also encompass the project M&E and the dissemination of best practices and lessons learned, at national and subnational levels. Training and knowledge materials will be directed to serve the objectives of the project in gender-transformative CCR, integrating agriculture, water, environment, education, nutrition and health and business development. M&E will secure adequate generation of knowledge.

Deliverables under this activity are: (i) a communication strategy developed and implemented, including a community radio program; (ii) Coordination with ongoing projects through quarterly technical working group meetings at the municipal and Provincial level; (iii) Project participants have participated in exchange visits; (iv) Two national-level and two provisional level dissemination workshops conducted.

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Develop and implement a communication Strategy: A communication strategy will be developed during project inception phase, with the aim to provide improved quality of data and information on climate change resilience in Angola, and to create a space for key stakeholders to learn, teach, discuss and share best practices and lessons learned. As part of the M&E system, information will be continuously collected and assessed, under the supervision of the project M&E Officer.

Coordination with ongoing projects: The EE and its project staff will work in close collaboration with the provincial and municipal technical working groups (meeting at the CCACs). These are existing groups in most places, consisting of national institutions and their local representation, technicians from different ministries, coordinators of NGOs and other development partners.

Facilitate experiential learning visits: The project will facilitate exchange visits within the scope of the project, bringing women groups, FFS and other community members to visit other project sites. As such, project participants will be learning from others, and be inspired by good examples from other groups or communities. These exchange visits will be facilitated by the EE project staff that is working directly with the communities.

Organize dissemination Workshops: Once information and knowledge are collected and generated, it will be disseminated to key stakeholders at provincial and national level through workshops. Two workshops (mid-term and project end) with 100 participants each will be held at provincial level, and two at the national level (mid-term and project end) with 50 participants each.

Additionally, information will be disseminated to the wider public through traditional and social media. Synergies will be sought with other initiatives in the country. To this effect, a Communication Officer will be recruited to ensure knowledge dissemination as well as the implementation of the communication strategy and action plan. The target audience includes stakeholders in the education, environment and agriculture sectors, the private sector, CSOs and CBOs. By using wider outreach media, such as radio broadcasting, and social media, it can be estimated that the general information will reach a broad cross section of adult people nationwide in Angola. Through the network of the AE in Africa and the EE in Southern Africa, the project will facilitate the sharing of information in the African region through messaging, website publications, and hosting of webinars. Lessons learned and best practices will likewise be shared in international events. In addition, short theatre pieces and songs may also be developed by the trained champions in A1.1.2 for the capacity building of communities in improved natural resources management and climate risk reduction, whenever deemed necessary or appropriate to adequately communicate the intended messages to the communities during Open Day events.

In addition, also included in the communication strategy, the project will use radio programmes for spreading knowledge and awareness on the project-relevant topics such as climate change, climate resilience, adaptation and all the technical aspects thereof, as promoted by this project. For the development of the radio programs and spots, a technical committee with representation from the EE, IDF, IDA and the Provincial Department of the Environment will define the content of

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the radio programs and spots to be developed and then aired on the Ondjiva antenna of National Radio of Angola (RNA). A script writer will develop the technical themes identified by the technical committee, who will also review the final script. Recordings of the programs will take place in the RNA studios and in communities. Messages will be delivered using a gender-responsive language that is easy to understand and that will be translated into four languages, including Portuguese and the native languages Cuanhama and Nhaneca-Humbi.

The EE will be the responsible for the execution of this activity, including day-to-day management of M&E, executing the communication strategy; coordination with ongoing projects, systematization and dissemination of knowledge and lessons learned. The AE will provide technical oversight, and will contribute to dissemination of project results and lessons learned through its networks.

Outcome 2: Enhanced water security and climate resilience through integrated water resource management (ARA 2)

Within the context of Cunene Province, a region heavily impacted by climate change with heightened water scarcity and erratic precipitation patterns, the project's commitment to enhancing water security through integrated water resource management becomes particularly pertinent. The Province faces significant challenges related to the sustainability and resilience of local water infrastructure. Climate-induced shifts have placed stress on water sources, affecting both the quality and quantity of water available. In response to these specific local needs, the project aims to establish small-scale water infrastructure, and build the capacity for integrated water resource management, taking into account the region's unique environmental conditions. Furthermore, this initiative adopts a gender-sensitive and youth-inclusive approach, with a focus on empowering these demographic groups to assume central roles in the management and upkeep of local water infrastructure, ensuring its sustainability in the face of climatic uncertainties. By enhancing water security and resilience through a comprehensive and locally tailored strategy, the project endeavors to fortify Cunene Province's water infrastructure to effectively address the challenges posed by climate change.

This Outcome will contribute to GCF adaptation result area "Health, well-being, food and water security" (ARA 2) and the GCF Sectoral Area "Water Security".

Output 2.1: Improved management of water resources at the local level.

In the landscape of Cunene, where climate change has introduced heightened variability in precipitation patterns and prolonged droughts, updating and validating groundwater and surface water assessments and the establishment of small-scale water infrastructure and irrigation schemes at the community level emerge as pivotal strategies, resonating with the Province's pressing needs. Groundwater and surface water assessments provide a critical response to managing water resources in the face of increasing climate unpredictability. These assessments not only identify sustainable water solutions but also address the imperative of

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potability interventions, ensuring the safety and health of local communities in a time when water quality can be jeopardized by climate-induced challenges. Moreover, the establishment of small-scale irrigation schemes is instrumental in bolstering the adaptive capacity of Cunene's communities. This approach is vital for preserving food security and fostering stable income sources for rural households. Furthermore, the community-level implementation of these irrigation schemes aligns with the principles of climate-resilient agriculture and sustains local agricultural practices (addressed under Outcome 3). The adaptation relevance of activities under Output 2.1 are depicted in the table below.

Table 21. Adaptation Relevance of activities under Output 2.1

Output 2.1 – Improved management of water resources at the local level	
Activity	Adaptation Relevance
<i>A2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and potability interventions.</i>	Crucial to safeguard community health, especially in times when water quality may be compromised due to climatic variations. Contributes to long-term water resource resilience and community well-being in drought-prone areas.
<i>A2.1.2 Establishment of small-scale irrigation schemes at the community level.</i>	Empower communities to adapt by reducing reliance on rain-fed agriculture, which is under threat due to climate change. Contributes to enhancing food security and provides a stable source of food and income for rural households, mitigating the impact of prolonged droughts and unpredictable weather patterns.

- Activity 2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and potability interventions.

This activity presents an important opportunity to create developmental synergies with the GoA's investment in two irrigation canals from the river Cunene. The construction of the water transfer system from the Cunene River into the areas of Cuamato and Namacunde was completed in April 2023 (see Figure below), and agreements are in place with local water departments so that farmers' groups can tap off water from the canals for irrigation. Many of the rivers in Cunene, including the Cuvelai, stop running during the dry season, and irrigation becomes limited from July to November. Another GoA project diverting water from the river Cubango to the river Cuvelai is expected to take place during lifespan of the program, but is yet to be initialized. The canals open up a major opportunity for all year irrigation in parts of the target area, from Cafu, throughout the Ombadja Municipality and towards Namacunde in the South.

To address increasing water scarcity, the project will establish locally-appropriate small-scale water infrastructure. To do so, it will first identify the most viable water solutions and potability interventions by undertaking/validating groundwater and surface water assessments. Assessments that have been recently carried out by the Provincial government will be analysed by the project together with the local authorities and with expert hydrologists. This activity will focus on overall coordination with other major development players in the province, principally

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UNDP, UNICEF, EC FRESAN implementing NGOs and the Government of Angola to avoid replication. Based on the assessments and the analysis thereof, which will include site visits by local authorities, consultations with communities, EE staff and water specialists, the project will identify and establish the water solutions. The water infrastructure set up will serve for establishing irrigation schemes (A2.2.2), drinking troughs for livestock, rainwater storage, and where possible water points for drinking water and sanitation facilities.

Deliverables under this activity are: (i) 200 appropriate sites identified for small-scale water infrastructure; (ii) 200 small-scale infrastructures for water are established and operational (an estimated 120 from channels, and 80 artisanal systems); (iii) 120 drinking troughs for animals are established; (iv) Water Point Committees in 120 communities are trained and equipped.

The activity will include the following:

Identification of most viable water solutions: In preparation for addressing the escalating water scarcity, the project will conduct thorough assessments to identify locally-appropriate small-scale water infrastructure solutions. These assessments will involve the validation of groundwater and surface water conditions, leveraging data recently gathered by the Provincial government. The project will collaborate closely with local authorities, and will mobilize experts such as hydrologists to analyze the assessments. Site visits by local authorities, consultations with communities, environmental experts and/or engineers, as well as water specialists, will be an integral to the identification process.

The process of identifying the most viable water solutions prioritizes gender-responsive and participatory approaches, building upon assessments previously conducted by other non-governmental organizations (NGOs) in collaboration with the government. Leveraging on existing data and partnerships, the methodology will integrate scientific assessments, community engagement, local knowledge, with a gender lens. The methodology encompasses the following main steps:

- Update of Existing Assessments: The project will meticulously gathers data and reports from previous hydrological surveys and studies conducted by NGOs and government agencies in the target area. This collation of existing information will serves as a foundation, providing valuable insights into the region's hydrological landscape and water availability. Furthermore, the project will conducts a gender analysis of these assessments to identify gender-specific water access challenges and community roles. By examining existing data through a gender lens, the project gains a deeper understanding of the diverse needs and realities of both women and men in the target communities. Through this comprehensive review, the project will lays the groundwork for informed decision-making and the design of targeted interventions aimed at fostering equitable and sustainable water access for all community members.
- Local and traditional Knowledge Integration: within this step a specific focus on integrating local knowledge, particularly gender-sensitive traditional ecological knowledge and indigenous water management practices, into

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the assessment process. This will be achieved through participatory stakeholder consultations applying an FPIC process, the project will actively engage with women and men in the community to capture and validate this knowledge.

Building upon the insights gained from these assessments, the project will strategically establish irrigation schemes, drinking troughs for livestock, rainwater storage, and, where needed, water points for drinking water and sanitation facilities. This comprehensive approach ensures that the selected water solutions are not only viable but also tailored to the specific needs and conditions of the target regions. This will ensure that the traditional knowledge and the innovative water solutions will be integrated and owned by communities taking into account technology transfer aspects.

Establish water channels: This pivotal initiative involves the establishment of small channels to access water from the newly constructed canals for the creation of small-scale irrigation systems (A2.2.2). An estimated 120 small channels for these plots are intended to be established by the project fostering the engagement of both women and men in horticultural production. While advancing agricultural productivity, this activity also recognizes the critical importance of addressing security aspects related to the establishment of these water channels. The project will engage with local stakeholders, including traditional authorities and local community leaders who will be actively involved in the planning and implementation processes, ensuring that their perspectives and concerns are taken into account. In instances where the establishment of water channels traverses private land or involves accessing water infrastructure managed by local authorities, the project will proactively engage with landowners and relevant stakeholders. This engagement may entail obtaining consent from landowners for the passage of channels or negotiating mutually beneficial agreements, such as providing compensation or extending project benefits to affected landowners. This collaborative approach seeks to promote community ownership and ensure that the benefits of the project are shared equitably among direct and indirect community members.

Furthermore, the project will collaborate closely with government authorities, particularly the Water Department of the Ministry of Agriculture and Fisheries (MoAF), to address any regulatory or legal considerations related to the establishment of water channels. This collaboration will ensure compliance with existing laws and regulations while facilitating access to essential water resources for agricultural purposes. By prioritizing community engagement and addressing security aspects related to land access and ownership, the project aims to build trust and foster positive relationships with local stakeholders. This approach not only ensures the successful implementation of water channel infrastructure but also lays the foundation for sustainable agricultural development and resilience-building in the target region.

Enhance water access for more in-land communities: In recognition of the challenges faced by inland communities located beyond the reach of existing water canals, the project is dedicated to devising tailored solutions that align with local

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assessments and community needs. Understanding the importance of leveraging existing data and insights gathered from assessments conducted in collaboration with local stakeholders, the project embarks on a comprehensive approach to address water access disparities. Through a participatory process involving close collaboration with local authorities, community leaders, and experts, the project identifies suitable alternative water infrastructure options tailored to each community's specific circumstances. Drawing from the wealth of knowledge derived from participatory stakeholder consultations and gender-sensitive mapping exercises, the project prioritizes solutions that resonate with the aspirations and priorities of the community members. The proposed alternative infrastructure options may include the construction of artisanal wells, the renovation or improvement of traditional "chimpacas," the installation of boreholes, and the construction of small-scale community dams. These solutions will be carefully selected based on factors such as geographical considerations, hydrological feasibility, and community preferences.

It is estimated that approximately 80 of these alternative water infrastructure projects will be established, supplementing the existing water supply infrastructure and bringing the total number of water infrastructures to 200. To ensure the sustainability of these initiatives and promote community ownership, the project will support communities in the development of these infrastructures through a cash-for-work system. This approach not only provides employment opportunities for community members but also fosters a sense of ownership and responsibility for the newly established water infrastructure. By integrating local assessments and community needs into the planning and implementation of water solutions, the project seeks to foster sustainable water access and empower inland communities in accessing water.

Furthermore, in communities and plots where livestock, particularly cattle, represents a major livelihood activity, the project will prioritize the establishment of drinking troughs for livestock alongside existing water sources such as "chimpacas." These drinking troughs will be strategically located near horticulture production sites and individual fields of Farmer Field School (FFS) members to ensure convenient access for both livestock and agricultural activities. By enhancing water access through the establishment of alternative infrastructure and providing essential amenities such as drinking troughs for livestock, the project aims to improve the resilience and livelihoods of inland communities, empowering them to thrive in the face of water scarcity challenges.

Build capacities of water point committees: The activity will also provide training in community-based management of water points, including where to access corresponding technical assistance and how to contact suppliers of essential replacement spare parts for the water points in relation to Activity 2.1.2. Training will further include management of water after collection and the basic principles of WASH. During the process of design and installation of small-scale water infrastructure, existing water point committees and interested community members will be actively involved, to gain knowledge and experience in the establishment of new systems, maintenance and repair. Where no community-level water point committee exists, one will be established, to be led by women. A water

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management kit will be provided to each existing or established water point committee (200) to ensure the successfulness and sustainability of the intervention. The kits will include a water quality test kit, small supply of spare parts, tool kits to carry out basic maintenance, and record keeping materials as well as water and sanitation (WATSAN) materials. In addition to the water quality test kits provided to the committees, the project will also procure 6 Portable Water Testing Kits, to be used by the CCACs for regular monitoring of water quality. WASH messaging will include water demand management, safe storage and use of water, water purification techniques, good hygiene and effective sanitation practices, promoting behavior change. Considering the context, the importance of managing water demand will be emphasized. The project will also promote the creation of a revolving fund in communities for maintenance and repairs, as per MoGeCA, the official water governance policy of Angola, which is based on a model of community management of water systems. Two representatives from each of the 200 water points, totaling 400 people, will participate in the training. Individuals will receive 10 days of training annually over a period of 3 years, totaling 30 days of training.

Dissemination of water fetching low-cost systems: In water-stressed regions, women face disproportionate burdens due to the time-intensive task of water collection, spending an alarming 8 to 10 hours daily on this essential but arduous endeavor. This reality underscores the urgent need for innovative solutions that not only address immediate water access challenges but also empower women and enhance community resilience in the face of climate change impacts. The introduction of low-cost water fetching systems, inspired by hippo rollers/wheels, represents a transformative approach to mitigating the adverse effects of water scarcity on women's lives. The hippo rollers/wheels known in other parts of Africa, will need to be adapted to the local context (sandy soils with a lot of stones) to make it effective and useful. These innovative devices, characterized by their simplicity and effectiveness, offer a practical solution to the challenges of water collection in remote and underserved communities. By significantly reducing the time and effort required for water collection, these low-cost technologies unlock opportunities for women to engage in productive activities, pursue education, and contribute to community development initiatives. Beyond mere convenience, the adoption of hippo rollers/wheels fosters gender equality, women's empowerment, and community resilience by redistributing the burden of water collection and empowering women to participate more actively in decision-making processes. Moreover, the localized production and utilization of hippo rollers/wheels present economic opportunities for communities, contributing to sustainable livelihoods and fostering local entrepreneurship. By equipping communities with the knowledge and skills to manufacture and maintain these devices, the project not only enhances water access but also promotes self-sufficiency and community ownership of the technology. In essence, the dissemination of low-cost water fetching systems underscores the intersectionality of climate change adaptation, gender empowerment, and community resilience. By addressing the immediate needs of water-stressed communities while empowering women to lead more productive and fulfilling lives, these innovative solutions exemplify a holistic approach to climate change adaptation.

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The EE will lead the implementation of this activity and will work in close collaboration with the MoAF and its extension team, and its water department. Through the Provincial Technical Working Group, the project will coordinate with other projects operating in Cunene Province to ensure synergies and avoid duplication of efforts. Procurement will be led by the EE, in accordance with the AE's procurement rules and the stipulation of those in the AE's AMA with GCF. The EE will coordinate with local authorities, traditional authorities and existing local producer associations to facilitate access to river-adjacent plots that are not properly used. Based on this, competitive quotations for supply will be requested from National Angolan suppliers, preferably with representation in Lubango or other nearby commercial centers, which would facilitate repeat purchase, the process of importation and ensure the availability of spare parts for sustainability of the irrigation systems.

- Activity 2.1.2 Establishment of small-scale irrigation schemes at the community level.

Based on the identification of sites and the channels established (A2.12.1), the project will establish four basic solar powered systems for gravity fed furrow irrigation as depicted in the table below. These systems will be applied in different sites as appropriate, taking into account topographic, social and economic factors. The proposed project will minimize the disadvantages by ensuring long term access to spare parts and technical assistance.

Deliverables under this activity are: (i) 200 small-scale irrigation systems are established and operational; (ii) water management plans and O&M protocols updated (iii) farmers are trained in O&M of irrigation systems.

Establish small-scale irrigation schemes: In response to escalating drought severity and concurrent government initiatives, there arises a pressing need and opportunity to bolster food production through irrigated horticulture. Acknowledging the time constraints faced by women in agricultural activities and the geographical challenges posed by distant rivers, the project underscores the adoption of a rotation system for irrigation. This approach not only optimizes efficiency but also enables better pest and disease management, fostering sustainable agricultural practices. To ensure maximum impact and cost-effectiveness, the project embarks on a comprehensive evaluation to identify optimal locations for irrigation schemes. Criteria for site selection encompass diverse factors, including land suitability with minimal land tenure conflicts, cohesive organization of farmers, and potential to enhance food security within the targeted communities. Through this rigorous evaluation process, the project prioritizes the establishment of irrigation schemes in areas where they can yield the highest positive impact. The project focuses on facilitating access to irrigated horticulture opportunities in specific geographical regions, including 80 kilometres along the Cunene River border, 100 kilometres along the new Cunene water transfer system (within a maximum distance of 0.5 kilometres on either side), and 80 kilometres along the Cuvelai River. Furthermore, in communities situated farther from these water sources, alternative infrastructure for water access will be established, as outlined in Activity 2.1.1, with due consideration for the needs of the traditional population. A key aspect of this

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initiative involves the establishment of 200 small-scale irrigation schemes, led and managed by local farmers. These schemes will be tailored to meet the specific needs and preferences of the communities, with a strong emphasis on sustainability and ownership. Various irrigation systems, including hand-powered pumps and other traditional technologies, will be deployed based on assessments conducted within Activity 2.1.1, ensuring efficient water management and agricultural productivity.

Through the establishment of small-scale irrigation schemes, the project aims to empower local communities, including women and youth, to enhance food production and resilience to climate-related challenges. By leveraging innovative approaches and community participation, the project seeks to create sustainable pathways to improve food security and livelihoods in the targeted areas.

The table below describe the different types of irrigation systems proposed to be deployed by the project based on the assessment done under (A2.1.1) this list could will be updated according to the community needs.

Table 22. Types of irrigation systems to be deployed

Irrigation System	Where and how
<i>Solar-powered pumps to move water from rivers</i>	Mainly move water from the Cunene and Cuvelai Rivers to reservoirs and adjacent gravity fed irrigation systems, which requires the capability to cope with fluctuating and low levels of river water up to 400 meters distant from the actual irrigation schemes
<i>Mini water pumping stations located on the river water transfer canals</i>	Move water to water tanks for distribution to communities and gravity fed irrigation systems up to three kilometres distant from the main canal
<i>Small-scale solar handheld pumps</i>	Pump water directly from water courses and reservoirs to irrigate crops (can be adopted by individual farmers, being more affordable than other systems)
<i>Tricycle mounted solar pumping system and/or treadle pumps</i>	System mounted on a tricycle, which can be taken to water sources on an as-needed basis with associated distribution tubing

Operate irrigation systems by farmers: In addition to their crucial involvement in the installation phase of irrigation systems, farmers will be equipped with essential knowledge and skills to effectively operate and manage the newly established infrastructure. Recognizing the pivotal role of capacity building in ensuring the long-term sustainability of irrigation systems, the project prioritizes comprehensive training sessions facilitated by the EE.

These training sessions are designed to impart participants with proficiency in various aspects of irrigation system management, including operation, maintenance, and overall system management. Participants will gain hands-on experience and theoretical understanding through practical demonstrations, interactive sessions, and engaging workshops led by experienced trainers.

To ensure widespread participation and knowledge dissemination, two representatives from each irrigation system beneficiaries will be selected to attend

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the training sessions. This inclusive approach aims to empower a diverse range of community members, including women, men, and youth, with the necessary skills to effectively manage irrigation systems. Over three years, individuals will benefit from ongoing trainings, with each participant receiving three days of intensive training annually. This structured approach allows for continuous learning and skill enhancement, enabling participants to develop a deep understanding of irrigation system operation and management practices. By investing in the training and capacity building of farmers, the project aims to foster a culture of knowledge sharing and empowerment within the community.

In addition to technical training, the project recognizes the importance of addressing social dynamics and potential conflicts that may arise within the community context. Therefore, the training content will be tailored to the local context, taking into consideration specific agricultural practices, water sources, and historical and social dynamics. Participants will receive training on conflict management strategies, enabling them to effectively navigate and resolve conflicts related to water resource management in a collaborative and constructive manner.

Assess and update the water management plans and O&M protocols: The activity will involve conducting a thorough review of the current water management plans, and O&M protocols in each municipality. The key tasks within this sub-activity will include engaging with stakeholders, including local communities, water authorities, and relevant government agencies, to gather input and insights on the effectiveness and shortcomings of the existing plans and protocols. The water management plans assessment and update will be conducted following several steps: (i) Collecting updated data on water usage patterns, population growth, climate considerations, and any changes in water sources or infrastructure; (ii) Ensuring that the existing plans and protocols align with current legal and regulatory requirements related to water management; (iii) Seeking input from the local communities to understand their specific needs, concerns, and suggestions for improvement; (iv) Conducting a risk assessment to identify potential challenges and vulnerabilities in the existing water management system; (v) assessing the training needs of individuals involved in water management, including community members, water committee members, and maintenance personnel; (vi) Revising and updating O&M protocols to incorporate best practices, address identified risks, and ensure the sustainable operation of water infrastructure; (vii) Establishing a robust monitoring and evaluation framework to track the performance of the updated water management plans and protocols over time; (viii) Clearly documenting the updated plans, manuals, and protocols and communicate the changes to all relevant stakeholders. This may involve the development of user-friendly materials and conducting awareness campaigns; providing support during the initial implementation of the updated plans, including training sessions, on-site assistance, and troubleshooting and; establishing a feedback mechanism to continuously gather input from stakeholders and make adjustments to the plans and protocols as needed.

O&M trainings: Building upon the findings of the comprehensive needs assessment conducted in the previous sub-task, this phase focuses on the development and delivery of customized O&M training modules tailored to the

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specific needs and challenges identified within the target communities. Recognizing the critical role of effective O&M practices in ensuring the long-term sustainability of infrastructure, the project adopts a holistic approach to training that encompasses various key aspects. The O&M training modules will be adapted to provide participants with a deep understanding of the importance of O&M in ensuring the sustainability of the infrastructures, emphasizing the crucial role it plays in maximizing the lifespan and functionality of water infrastructure. Moreover, the training sessions will underscore the significance of efficient irrigation practices in agriculture, highlighting water conservation techniques and methods to optimize water usage for enhanced agricultural productivity. Through practical demonstrations and interactive sessions, participants will be equipped with the necessary skills to implement sustainable water management practices in their agricultural activities.

The EE will lead the implementation of this activity and will work in close collaboration with the MoAF and its extension team, and its water department. Consultants will be recruited as necessary for the establishment of irrigation systems. Through the Provincial Technical Working Group, the project will coordinate with other projects operating in Cunene Province to ensure synergies and avoid duplication of efforts. Procurement will be led by the EE, in accordance with the AE's procurement rules and the stipulation of those in the AE's AMA with GCF. The EE will coordinate with local authorities, traditional authorities and existing local producer associations to facilitate access to river-adjacent plots that are not properly used. Based on this, competitive quotations for supply will be requested from National Angolan suppliers, preferably with representation in Lubango or other nearby commercial centers, which would facilitate repeat purchase, the process of importation and ensure the availability of spare parts for sustainability of the irrigation systems.

Outcome 3: Diversified livelihoods and climate resilience of most vulnerable people and communities through resilient agroecology and microenterprise development (ARA 1 & 2)

This Outcome targets adaptation of rural livelihoods to the identified climate impacts, by (1) promoting wide-scale adoption of climate-resilient agricultural (CRA) practices through demonstration plots, introducing and multiplication of adapted seed varieties, promoting a local climate-resilient seed industry, storage systems; and improving ecosystem resilience and services through sustainable and gender-transformative forest management and tree cultivation actions. This will be accompanied by (2) diversifying production and sources of income through the promotion of climate-resilient livelihoods such as short-cycle animal husbandry, and the facilitation of micro-grants to women groups for new climate-resilient IGAs, in addition to the integration of project activities with other initiatives.

Livelihoods and climate resilience of rural communities in Cunene will be diversified and improved (Outcome 3), by promoting the adoption of climate-resilient agricultural systems (Output 3.1), which will include the promotion of locally-appropriate agro-silvo-pastoral systems and making related investments,

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and by facilitating diversified Income Generating Activities (IGAs) (Output 3.2) through supporting the operationalization of women- and youth-led micro-enterprises. Activities under this outcome will also be strengthened by improved water access for agriculture (Outcome 2), and by improved knowledge and capacity to address climate risks (Outcome 1).

By diversifying and strengthening climate-resilience of livelihoods, and thereby improving food security, the project directly contributes to the GCF result areas ARA1 and ARA2. Although not specifically targeted, some of the sub-activities (tree cultivation, afforestation, cookstoves) also contribute to ARA4 on ecosystems. In addition to those direct contributions to the GCF result areas, the activities under this component deliver various co-benefits in terms of gender, environment and socio-economic improvements.

in the table below. A description of their involvement follows in the activity descriptions below.

Total Project	Per Municipality, on average ^{182,183}
6 CCACs (overseeing project activities, including close monitoring of six tree nurseries and two seed multiplication schemes)	1 CCAC
120 FFS with 3,000 member farmers	20 FFS with 500 member farmers
200 horticulture production sites	Will be based on the ground and surface water assessment as well as a developed selection criteria agreed on with the different stakeholders to select these areas as described in the sub activity below
30 micro-enterprises (members are also participants in the FFS and Women Groups (Component 1))	5 micro-enterprises (members are also participants in the FFS and Women Groups (Component 1))
30,000 Community Members directly benefiting	On average 5,000 Community Members directly benefiting

This Outcome responds to GCF adaptation result areas: “Most vulnerable people and communities”, “Health and well-being, and food and water security” (GCF ARA 1, 2) and to the GCF Sectoral Area “Agriculture and Food Security”.

Output 3.1 Adapted climate-resilient agriculture (CRA) measures for improved food security.

The promotion of CRA practices and the introduction of appropriate technologies and practices will contribute to long-term resilience to the impacts of CC, and reduced vulnerability to drought, pests, disease and other climate-related shocks. Equally, when CRA practices are widely adopted, it will increase productivity, food and nutrition security, and higher incomes for rural communities that mainly rely on agriculture for livelihoods. As such, the project will support the transitioning of local food systems towards being more climate-resilient and adapted to new and upcoming climatic conditions. By integrating agricultural, livestock and tree cultivation and addressing them as one system, the project equally promotes circular economy principles, including principles of: circularity in food systems, promoting resource efficiency, waste reduction, and integration of productions. In addition, by applying and promoting these circular principles as well as by promoting post-harvest improvements such as improved storage and processing (Output 3.2), the project

¹⁸² Some municipalities may have more participants and others less, depending on population density and on other activities already being conducted in the areas. The table provides a simplified overview of the scope of people benefiting.

¹⁸³ Full details of how many groups, schools and individuals reached per municipality are defined in the PFS, and will be further updated during the baseline study and project inception.

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will significantly contribute to a reduction in food losses. The project will focus on building the capacities of smallholder farmers and support systems. Training programs on CRA practices and circular economy concepts will empower farmers with the knowledge and skills needed to adapt to changing environmental conditions and maximize resource efficiency. Additionally, structural investments in infrastructure, such as water harvesting systems or post-harvest storage improvements, will provide the necessary foundation for long-term resilience building within rural farming communities. Through collaborative efforts and stakeholder engagement, the project aims to catalyze a holistic transition towards sustainable, climate-resilient, and circular food systems, ensuring the well-being of both people and planet.

To achieve adapted climate-resilient agricultural systems for improved food security (Output 3.1), the project will build capacities of smallholder farmers and support systems such as FFS and extension services, and it will provide structural investments (A3.1.2). In combination with promoting the adoption of agro-silvo-pastoral practices and systems (A3.1.1) the project will establish and strengthen the framework for long-term resilience building of the rural farming communities. Knowledge and technical barriers are directly addressed by these activities, whereas the focus on empowering women farmers contributes to addressing social and cultural barriers, especially experienced by women.

Table 23. Adaptation Relevance of activities under Output 3.1

Output 3.1 - Adapted climate-resilient agriculture (CRA) measures for improved food security	
Activity	Adaptation Relevance
<i>A3.1.1 Pilot and promote the adoption of Agro-Silvo-Pastoral Practices</i>	Addresses reducing yields resulting from CC impacts, non-adapted farming systems and sub-optimal agricultural productivity. Addresses the inadequate and insufficient availability of quality and adapted seeds. Addresses the inadequate knowledge, capacities or examples for locally-appropriate CRA practices and technologies.
<i>A3.1.2 Implementation of small-scale adaptive infrastructure and capacity building for CRA</i>	Addresses reducing yields resulting from CC impacts, non-adapted farming systems and sub-optimal agricultural productivity. Addresses overexploitation and misuse of natural resources, which results in degrading ecosystem services (water, food, firewood and timber, etc.), which are further exacerbated by climate change impacts.

- Activity 3.1.1 Pilot and promote the adoption of Agro-Silvo-Pastoral Practices.

This activity will promote the adoption of climate-resilient Agro-Silvo-Pastoral Practices, Agro-Silvo-Pastoral Practices involve integrated farming systems that combine agriculture, forestry, and animal husbandry. This holistic approach optimizes interactions among crops, trees, and livestock, promoting benefits like improved soil fertility, water retention, and diversified production. As such, the project will include the introduction of climate resilient varieties of drought-resilient crops, introduction of drought-tolerant fodder crops, it will strengthen veterinary services, establish nurseries for fodder crops and trees, and introduce and promote fuel saving cookstoves. Promotion will happen through the farmers' organizations such as the FFS (A3.1.2) and the respective model plots, and through extension services provided both by local government and the project.

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Deliverables under this activity are: (i) 3,000 farmers have increased access to climate resilient seed and crop varieties, including for fodder; (ii) communities and pastoralists access to veterinary services is improved; (iii) tree six nurseries are established and strengthened (the Provincial IDF Nursery, 6 community nurseries) (iv) 240,000 trees are planted; (v) 18,000 artisanal fuel-saving stoves are introduced.

The activity will include the following:

Promote climate resilient crop varieties: The project will promote the wide-spread adoption of climate resilient seed and crop varieties, which are more drought-tolerant and are locally appropriate. As such, it will introduce and promote crops with improved and adapted germplasm (not hybrid or genetically modified organisms (GMO)) and varieties that are commercially available. The critical issue is not only tolerance to drought but crop varieties that are short season and reduce the risk of crop failure or low yields from variable rainfall. With delays in the onset of rains, such varieties also allow later planting for the crop to complete its cycle before the end of the rainy season. It is therefore important to increase the availability of seeds of these varieties for improved planting strategies. More efficient sowing techniques and agricultural practices promoted under Activity 3.1.2 will improve the return on limited seed stocks. The table below depicts the indicative list of the crops that will be disseminated under the project activities and this will be further elaborated during the first phase of the project and based on the community and different stakeholders' consultations with the support of the IDF.

Table 24. Relevance of introduced crops

Seed / Crop	Relevance in Cunene under a climate change scenario
<i>Yellow flint OPV maize</i>	Drought-tolerant and heat-resistant varieties like Yellow Flint OPV maize can help mitigate the impact of reduced water availability and higher temperatures. These varieties are designed to withstand harsh conditions while providing a stable source of nutrition.
<i>Pigeon Pea</i>	Has a relatively deep root system, making it more resilient to drought conditions. Can also be intercropped with other crops such as Maize, optimizing land use and nitrogen-fixing properties of pigeon peas.
<i>Dry Beans</i>	Introducing drought-resistant varieties can help ensure a steady supply of food even in conditions of water scarcity. Their relatively short growth cycle allows them to be cultivated in a variety of seasons.
<i>Cassava</i>	Cassava is a highly resilient root crop that can tolerate drought and poor soils. Diversifying cassava varieties can help increase resilience against climate uncertainties.
<i>Sweet Potato</i>	Sweet potatoes are a versatile crop that can thrive in marginal soils and with limited water. They are a rich source of vitamins and minerals, making them valuable for enhancing local nutrition.
<i>Pear Millet and Sorghum</i>	Both are well-suited to hot and dry conditions, require less water compared to traditional crops like maize and rice, making them excellent choices for adaptation to changing climate patterns.
<i>Cowpea</i>	Cowpea is a drought-tolerant legume that can fix nitrogen in the soil, enriching its fertility. It provides protein for diets and can be grown alongside other crops.
<i>Bambara groundnut</i>	Bambara groundnut is a hardy legume that can grow in poor soils and challenging environments.

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<i>Groundnut</i>	Groundnuts have deep taproots that can access water from deeper soil layers, which is beneficial during drought periods.
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Introduce drought-resistant fodder crops: The project will promote the adoption and production of drought-resistant fodder crops. The focus will be on native crops that are adapted to the local environment, and thus well-suited to thrive in arid and water-scarce conditions. Examples of such native drought-resistant fodder crops may include species like African Bitter Vetch (*Vicia pseudocracca*), a leguminous plant well-adapted to dry climates, Palma forrageira/Cochineal Cactus (*Opuntia cochenillifera*), which is valuable due to its drought resistance, nutritional value for both livestock and human and soil erosion control capabilities, and African Feather Grass (*Chloris virgata*), known for its resilience in arid regions. The introduction of these native drought-resistant fodder crops not only enhances livestock feed availability during dry spells but also promotes the conservation of local biodiversity. This contributes to increased livestock sustainability and food security, ultimately strengthening the resilience of local communities in the face of a changing climate.

Promote agroforestry, tree cultivation and afforestation: the project will strengthen the local ecosystems, through multiple strategic actions, which encompasses the enhancement of the IDF Nursery with essential infrastructure and supplies, establishing community-based nurseries, equip farmers with skills for effective nursery management, promote afforestation and reforestation efforts, and introduce improved cookstoves for reduction of firewood consumption. As such, the project will conduct the following:

Strengthen the IDF Nursery: The project will revitalize/strengthen the IDF's nursery, based in Xangongo (Ombadja Municipality), to better serve its functions and strengthen its community outreach in Cunene. The project will evaluate the existing infrastructure and the equipment that is required to make the IDF nursery fully functional. The minimal equipment required for rehabilitation and full functionality of the nursery will include the following: two solar powered irrigation pumps to pump water from the river Cunene and for the operation of the nursery sprinklers; inlet and outlet tubing; sprinklers; shading material for the greenhouses; polyethylene sacks; soil, organic matter and inorganic fertilizer. The rehabilitation of the nursery will transform it into its intended purpose – a hub for cultivating native plant species that thrive in local conditions. In return for the investments, IDF will commit to propagate and deliver tree saplings to the project for the execution of this activity, with project support for its community outreach.

The table below depicts the indicative list of the tree species that will be disseminated under the project activities and this will be further elaborated during the first phase of the project and based on the community and different stakeholders consultations with the support of the IDF.

Table 25. Tree species promoted, and their benefits

Tree Species	Benefits
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Baobab (<i>Adansonia digitata</i>)	Drought tolerance, fruit production, soil enrichment
Moringa (<i>Moringa oleifera</i>)	Nutrient-rich leaves, soil improvement, shade
Acacia (<i>Acacia tortilis</i>)	Nitrogen fixation, erosion control, wildlife habitat
Jatropha (<i>Jatropha curcas</i>)	Biodiesel source, erosion prevention, green fence
Mango (<i>Mangifera indica</i>)	Fruit production, shade, soil improvement
Guava (<i>Psidium guajava</i>)	Edible fruit, habitat for pollinators, soil enhancement
Native Orange / Maboqueiro (<i>Strychnos spinosa</i>)	Vitamin-rich fruit, traditional uses, erosion control
Neem (<i>Azadirachta indica</i>)	Pest-repellent properties, medicinal uses, shade
Prosopis juliflora	Forage for livestock, drought resistance, nitrogen fixation
Marula tree (<i>Sclerocarya birrea</i>)	Fruit production, cultural significance, wildlife attraction

Establish community-based nurseries: The project will facilitate the establishment of 6 community-based nurseries near the CCACs, while small tree productions will be promoted at the level of the FFS and at the schools' small gardens within the GSP(A.1.1.2) Small inputs will be provided to the FFS for establishing these small productions. Nursery management teams will be established near the CCACs, which will be a subset of the farmers that are participating in the FFSs that are closest to the CCAC. They will be responsible for operating and maintaining the nurseries. Farmers interested in tree cultivation will be mobilized based on willingness and interest to operate the small tree productions and will subsequently receive some basic trainings and encouraged to establish their own private nursery as part of the IGA activity (A3.2.1). Technical trainings on nursery management will include: (i) creation of germination and seed starter mixes; (ii) assessment of seedling quality; (iii) water requirements and provision; (iv) production methods; (v) regulating shade; and (vi) transplantation of seedlings, among others. The project will provide some small start-up materials for the nurseries, such as trays, bags, shades and fences where relevant. The saplings and trees produced at the nurseries will, just as with the IDF nursery, serve for afforestation and reforestation efforts by the project and beyond, as well as for individual farmers' (FFS members) and other community members who either intend to establish agroforestry systems at their individual farms or homesteads, or are interested in tree cultivation for other purposes (per depictions in the table above). The nurseries will also be used to produce the fodder crops promoted by the project (mentioned above).

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Afforestation/reforestation of degraded areas: The afforestation and reforestation initiative directly address the ecological and social challenges posed by degradation. Through the FFSs and schools, the project will plant an estimated 10,000 trees per municipality from the second year onwards (a total of at least 240,000 trees within the duration of the project). Locations where trees will be planted will be decided upon in consultation with local authorities with relevant knowledge and expertise, and could include along the river banks, chimpacas, or along the new Cunene water system, adjacent to demonstration plot and/or horticulture production sites, in degraded forest areas near communities (e.g., where people collect firewood), etc. The project intends to foster afforestation/reforestation of degraded areas with the tree planting actions and nurseries' establishment which will have a ripple effect and that a multitude of trees will be planted and cultivated by communities, farmers and others as they will see and understand the benefits. The tree species that will be planted are local species, native, and non-invasive. This activity will be implemented in collaboration with the IDF office in Cunene, where guidance will be provided regarding the most suitable species to be used as well as the list of invasive species. By nurturing these diverse tree species, one can significantly enhance Cunene's ecosystems and the services they provide. These trees offer a bounty of resources: timber for construction and tools, medicinal uses, and even decorative materials from their roots and shoots. They hold deep cultural significance and serve as a traditional food source, not only for humans, particularly women in rural communities, but also for livestock and wildlife. Furthermore, some species possess the ability to fix nitrogen, enriching the soil and promoting future growth. Beyond these direct benefits, these trees play a critical role in the environment by attracting wildlife, controlling erosion, and providing fuel and fiber.

Therefore, through afforestation/reforestation, the full potential of these ecological networks will be unlocked, which will foster adaptation to climate change through increased carbon sequestration and reduced deforestation. Ultimately, a healthier network of Cunene's forests will be better equipped to absorb climate shocks, thus providing a wider range of products and services that contribute directly to poverty alleviation (SDG 1) for vulnerable populations living within and around these ecosystems, as well as provide opportunity for economic growth (SDG8) through the availability of more natural resources.

The table below include the initial list of species to be promoted as per the recommendation from IDF during the consultation. Further detailed list will be elaborated in consultation with the different local stakeholders during the implantation phase of the project.

Table 26 - Tree species to be introduced and their benefits

Tree Species	Benefits
Acacia (<i>Acacia tortilis</i>)	Nitrogen fixation, erosion control, wildlife habitat

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Native Orange / Maboqueiro (Strychnos spinosa)	Vitamin-rich fruit, traditional uses, erosion control
Marula tree (Sclerocarya birrea)	Fruit production, cultural significance, wildlife attraction
Vachellia tortilis	Timber for furniture, fence posts, etc., pods and foliage as fodder for desert grazing animals, roots, shoots, and pods for decorations, weapons, tools, and medicines. Rehabilitation of degraded arid land (drought, wind, and salinity tolerance) Nitrogen fixation via symbiotic root bacteria
Sclerocarya birrea	Traditional food source, socioeconomic importance, income source for poor rural people (especially women), processable fruit pulp, pips, kernels and kernel oil
Vachellia nilotica	Animal food, medicine and invertebrate food, has environmental uses and social uses and for fuel and food

The EE will lead the execution of the above sub-activity, and will work in close collaboration with the MoAF and its extension team, as well as with the IDF and its nursery for the production of seedlings.

Introduce fuel saving cookstoves: The project will promote clean cookstoves to reduce pressure on forests and the workload of women and girls while improving their health. Experience shows that the use of fuel saving stoves by women and girls reduces time spent on collecting firewood, the rate at which forest reserves are exploited, and health risks due to toxic off-gassing and particulate matter in biomass smoke. The EE will introduce 18,000 stoves throughout all municipalities and the project will organize a total of 120 strategically located practical training sessions on how to best operate the stoves. The stoves are made from local materials, have a simple design that can easily be replicated, and have been piloted in other areas of Angola, including in Cunene Province. Recipients of the stoves will be selected based on vulnerability, leadership abilities and commitment to raise awareness about the benefits of fuel saving stoves. Awareness of the fuel saving stoves and improved firewood gathering will also be promoted over the radio and other community awareness campaigns (A1.1.2; A1.2.2). At a later stage of the project the EE activity team (Farming Instructors) and the CC champions will work together with the women groups and local communities to disseminate and build capacity of the communities on the reproduction of the cookstoves with local materials. The cookstoves production could also be part of the IGA capacity

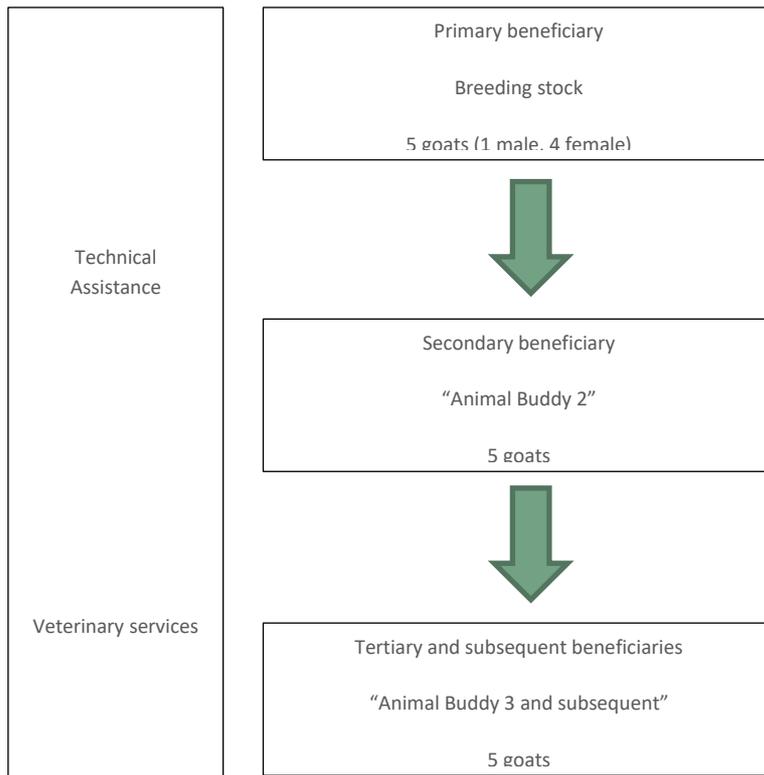
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building (A3.2.1), if any women group shows interest in developing a micro-enterprise for cookstoves.

The EE will lead the implementation of this activity, and will work in close collaboration with the MINAMB and MoAF and their extension teams for facilitation and execution of community-based activities, and with IDF and its nursery for the production of tree sapling and seedlings. Through the Provincial Technical Working Group, the project will coordinate with other projects operating in Cunene Province to ensure synergies and avoid duplication of efforts. Procurement will be led by the EE, in accordance with the AE's procurement rules and the stipulation of those in the AE's AMA with GCF.

Introduce and promote the production of Short-Cycle Livestock (SCL): Farmers and extension workers are increasingly interested in the promotion of SCL species such as goat species and poultry as an alternative to cattle herding, due to adaptable diets, small space requirements, littler water requirements, and the rapid return of income. In the semi-arid region of Cunene, where rainfall is too low or erratic to solely and reliably support productive subsistence farming, SCL is a comparatively resilient source of food and income. In response, the project will empower the FFS through training and implementation of a SCL pass-on systems. Thereby it targets a sustainable increase in the production of short-cycle animals (goats, poultry, etc.) at household-level. This will not only increase diversification of food intake and availability of proteins (eggs and meat), but will also allow for women and their households to increase income from the sales of surplus animals. The activity will also strengthen the veterinary support systems needed for success and continuation of this activity. The pass-on system introduced by the project functions as follows: For goat restocking, normally five animals will be provided (four females and one male) to a household and then the first five offspring will be passed on to a pre-assigned neighbouring household ("goat buddy"). This process will continue until all families interested have received animals. For poultry, ten hens and one rooster will be provided to a woman head of household who will pass on the first eight offspring to another pre-identified family ("poultry buddy"). This process will continue until all families interested have received animals, as shown in the figure below. Selection of the 500 primary and 500 secondary female beneficiaries to receive the animals will satisfy the following criteria: recognized by the community as a "good" livestock farmer; willingness to expand their poultry production, commitment to vaccinate and implement "best practices"; be responsible and agree to pass on offspring to an "animal buddy"; agree to the construction of a confined area for poultry production. The first batches of goats and poultry will be sourced from local animal producers, equally serving as an incentive for continuing local production. The figure below depicts the pass-on system described.

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Facilitation of the veterinary access systems: To enhance the veterinary services and address common cattle diseases prevalent in the Cunene province of Angola, such as Foot and Mouth disease, symptomatic anthrax, hematic anthrax and dermatitis and Contagious Bovine Pleuropneumonia which have significantly affected cattle populations in the region as well as Newcastle disease virus (NDV) which is a common disease in poultry in the area. By collaborating closely with provincial veterinary services and vaccine production laboratories in Lubango, Huila of the Veterinary Services Institute of the Ministry of Agriculture and Forestry, the project will establish accessible and efficient veterinary access systems within target communities. Small offices dedicated to the government extension agents of the provincial veterinary services will be strategically located within the CCACs established under the project. Equipped with essential tools and medicines, these offices will enable the extension agents to provide prompt assistance to a larger population from the local communities, farmers and pastoralist within the Cunene province. The schedule of veterinaries presence within the CCACs will be put in place and communicated with FFS, Jangos, women groups and CC champions who will sensitize communities about the planned visits and the importance of veterinary services in livestock management. Farmer Field Schools (FFS) and Jangos will serve as key points for community engagement and access to veterinary services. Community members can communicate their veterinary needs to responsible FFS members, ensuring swift intervention and response. Adding to that the project as well will equip the veterinaries with motorbikes to facilitate timely response ensure the operation of the veterinary system. By integrating veterinary services into the community efforts, the project aims to improve livestock and cattle health management, ensure sustainable access to vital interventions, foster overall well-being and livelihood sustainability among pastoralist and farmers and

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enhance community adaptive capacities and resilience toward the climate change related risks.

The EE, in collaboration with the MoAF's extension workers, will implement this activity. Experienced Farming Instructors will be recruited to work with the FFS, establish and operate demonstration plots and trainings. Consultants specialized in seeds and seed management will provide initial trainings and guidance to the Farming Instructors in seed production and management, and will support the women groups establishing the seed multiplication productions. The EE, through its Farming Instructors, will work with the FFSs to facilitate the establishment of the pass-on system and the demonstrations of improved storage systems. Through the Provincial Technical Working Group, the project will coordinate with other projects operating in Cunene Province to ensure synergies and avoid duplication of efforts. Procurement will be led by the EE, in accordance with the AE's procurement rules and the stipulation of those in the AE's AMA with GCF.

- Activity 3.1.2 Implementation of small-scale adaptive infrastructure and capacity building for CRA.

Under this activity, the project will establish concrete small-scale agricultural infrastructures and adaptation interventions. These will include: introduction of short-cycle livestock (SCL), the establishment of FFS and demonstration plots, the distribution and multiplication efforts of drought-resilient seed stocks, and improved storage practices for seeds, grains and other crops.

Deliverables under this activity are: (i) 120 new FFS are established and 3,000 farmers are organized and trained; (ii) 120 demonstration plots are established; (iii) 200 existing FFS (5,000 farmers) are reached by project-operated trainings in CRA; (iv) 200 horticulture production sites are established and operational; (v) a short-cycle livestock pass-on system is introduced and operationalized; (vi) 180 demonstration of improved seed storage are established; (vii) two seed multiplication sites are established and operationalized.

Establishment and/or strengthening of FFS: The project will establish Farmer Field Schools (FFSs) in order to facilitate long-term farmer-to-farmer learning and cooperation among farmers, generally lacking within the target areas. This will not only facilitate the dissemination of new practices but will also provide for a long-term platform for mutual support, strengthening social capital (a building block for resilience), and generating access point for extension workers from local agriculture departments. The formation of FFSs will follow the "Farmer Field Schools Model", which has been successfully used and implemented by the EE, its sister organizations and in cooperation with many other international development partners. Farmers will be organized in groups of approximately 25 farmers (depending on geographic proximity of farmers), from which a leadership committee is elected to operate and manage the organization as well as the trainings provided by the project (and others). The leadership committee is provided with extra trainings in group management, conflict management, and initial business management trainings. Where these FFSs or similar associations already exist and demonstration plots have been established in the past, the

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project will strengthen and/or revitalize the existing FFSs with refresher trainings in group management and leadership, and it will introduce – as with the new FFSs – the general ideas of the project and request their prior and informed consent for participation in the new activities. Over time, the FFSs will “graduate” into associations (i.e., be registered as legal entities), supported by the project. This will allow them to access different government services and benefits. The project will establish 120 new FFSs, reaching 3,000 farmers that are currently not reached by projects or government services, most of the FFS will be linked to the Jangos and the CCACs established under A1.1.1, where they will receive the capacity building sessions and be sensitized to subjects related to CC impacts. The project as well will work with an additional 5,000 farmers that are already organized around 200 existing FFSs, some in FFSs and others in different types of organizations.

Establishment of CRA demonstration plots: Once the new 120 FFSs are established, the project will support the establishment of 120 demonstration plots/fields, on which the project will disseminate new and climate-resilient agricultural (CRA) practices. The demonstration plots will serve as FFSs practical sessions for the duration of the project, and will be managed and overseen by the FFSs leadership committees. The project – through the EE’s Farming instructors – will mobilize the farmers to establish their own model plots, while providing small inputs, trainings and technical guidance. The model plots will serve to promote CRA, and hence drought-resilient practices, in order for farmers to apply the new practices on their own fields, and to be better prepared to handle the impacts of climate change. The identification and assignment of land for the model plots will be conducted in consultation with local and traditional authorities and target communities, identification of land and land owners, and signing of agreements between land owners and the community/FFS. The concession terms will be decided upon between the community and the land owners, and will at the minimum serve for the lifespan of the project. After the project life span the established plots could be put under the custody of the community or handed back to its owner as an incentive from the project to ensure sustainability.

CRA Practices to be promoted within the targeted area and their relevance are depicted in the table below:

Table 26b. CRA practices and their relevance

Practices to be promoted	Relevance to address droughts and increasing weather pattern variability
<i>Mulching and composting</i>	To conserve soil moisture, and suppress weed growth. Mulching also contributes to improving soil health and nutrient retention.
<i>Inter-cropping and crop rotation</i>	To break disease cycles, improve soil fertility, and reduce pest pressure. Diversifying crops also ensures that a single climate event won't have as severe an impact on overall food production.
<i>Swales and other micro-scale water retention systems</i>	To capture and store rainfall during the wet season and to recharge groundwater. Stored water can then be used for irrigation during dry periods.
<i>Conservation Agriculture / minimum tillage & cover cropping</i>	To reduce soil erosion, improve soil structure, and retain moisture in the soil. This approach helps conserve water and nutrients, making the soil more resilient to drought.

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<i>Agroforestry</i>	To provide shade, windbreaks, and additional sources of income. Trees can help regulate microclimates, improve soil quality, and provide fruits and other products.
<i>Drip Irrigation and Efficient Water Use</i>	Implement drip irrigation systems that deliver water directly to plant roots, minimizing water wastage. Additionally, practice efficient irrigation scheduling and water management techniques to optimize water use.

Establishment of horticulture production sites: Based on the knowledge gained in the FFS and parallel to the establishment of appropriate irrigation systems (A2.1.2) in the identified locations, the project will promote the establishment of 200 horticulture production sites. Farmers participating in the CRA activities (A3.1.1 and A3.1.2) will be supported in the operationalization of these sites. Apart from the irrigation systems, participants will receive a start-up package with seeds and small tools to start production and shading. The project will promote the introduction of locally adapted varieties of vegetables from which smallholder farmers can save seeds and vegetative propagation material to diversify production and avoid the need to purchase seeds every season. Planting material of improved varieties that are common in Southern Angola will be provided, including high temperature tolerant varieties of tomato, onions, Portuguese kale, green peppers, chili peppers, and okra. The project will work with the farmers to support production out of season when prices are relatively high. This will also involve the use of shading and the cost-effective control of pests and diseases. Red spider mites are a particular problem in August/September during the hot dry conditions and effective control measures will be implemented along with the control of other pests. Natural insecticides made from Neem and other local products will be demonstrated. Emphasis will be placed on high value, non-perishable produce that can undergo processing for added value and the avoidance of harvest gluts (for example garlic, onion, chilli peppers, cassava flour and squash).

Establish and promote improved seed production and distribution: a local production of the selected seeds (under A3.1.1) through the identification and training of seed multipliers, providing technical assistance and start-up packages of seeds for the multipliers, introducing improved storage systems, and by establishing pass-on systems for seeds and promoting a local seed industry. This will be achieved as follows:

- Establish and operationalize seed multiplication: The project will establish two seed multiplication sites, strategically located in the Ombadja and Cuvelai municipalities, where there is a reliable supply of water for irrigation (the margins of the river Cunene, the new canal from the river in Ombadja and a perennial river in Cuvelai). They will be established in the vicinity of the CCACs and will be managed by groups of interested farmers (also participants in the FFS) who are interested in developing a seed business. The criteria for the selection of the members of these groups will be self-selected groups, access to irrigation, technical ability, entrepreneurial spirit and interest in developing a local small-scale seed industry in the long term. The seed production groups will be provided with irrigation equipment and

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seed samples to start up multiplication. Seed samples of small grain cereals, legumes and other crops for multiplication will be sourced from other southern provinces of Angola where suitable varieties and quantities are available (short cycle, yellow flint open-pollinated variety (OPV) maize, pigeon pea, dry beans, cassava, sweet potato) or from commercial sources (pearl millet, sorghum, cowpea, Bambara groundnut, groundnut and pigeon pea). The farmers will be supported by technicians during the first two years of the project. They will receive training on seed production, selection and conservation. Warehousing facilities will be made available by the IDA extension network and the EDAs at the commune level. The project will promote partnerships with agricultural dealers willing to buy the surplus of seeds to contribute to the sustainability of this activity. At least two cycles of rainfed and irrigated production will be possible from November to August.

- Broad introduction of seed samples: Each woman in a household participating in the project activities will be considered to be a head of family and eligible to receive a CCR seed pack. The criteria for the selection of the beneficiaries of the CCR seed samples are as follows: (i) current lack of access to improved short season varieties; (ii) willingness to use the seed following recommended seed rate, planting method, technical recommendations and “best practices” (A2.1.2); (iii) willingness to “pass on” seed to a neighbouring “seed buddy”; (iv) community not targeted for IDA seed distributions; (v) land suitability for the crop (opportunity for irrigation for maize); (vi) and potential to impact food security. All beneficiary households will receive pearl millet. The other crops will be distributed depending on interest and the agro-ecological conditions for production. The expected level of production (in kg) for each crop variety, for the stipulated amount of seeds that each head of household is generally expected to receive is as follows: 300 kg of pearl millet produced from 10 kg of seeds; 50 kg of sorghum from 2kg of seeds; 30 kg of cowpea from 4 kg of seeds; 25 kg of Bambara groundnut from 4 kg of seeds; 25 kg of groundnut from 4 kg of seeds; 10 kg of pigeon pea from 2 kg of seeds. The table below depicts and overview of the seeds to be produced and distributed.

Table 27. Planned seed multiplication and distribution of CCR seed packs over four years

Crop and Quantity in a CC Seed-Pak to be distributed to individual farmers	YEAR 1		YEAR 2		YEAR 3		YEAR 4		TOTAL Number of Beneficiary Farmers	
	Year 1 Ha	Year 1 Tons	Year 2 Farmers	Year 2 Ha	Year 2 Tons	Year 3 Farmers	Year 3 Ha	Year 3 Tons		Year 4 Farmers
Pearl Millet 10 Kg	30	45	4,500	40	60	6,000	60	90	9,000	19,500
Sorghum 2 Kg	2	3	1,500	4	6	3,000	4	6	3,000	7,500
Cowpea 4 Kg	10	6	1,500	20	12	3,000	20	12	3,000	7,500
Bambara Groundnut 4 Kg	10	6	1,500	20	12	3,000	20	12	3,000	7,500
Groundnut 4 Kg	10	6	1,500	20	12	3,000	20	12	3,000	7,500
Pigeon Pea 2 Kg	4	2	1,000	8	4	2,000	8	4	2,000	5,000

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Establish and support a pass-on system for seeds: Building upon local expertise, women groups will be trained to establish themselves in the local seed industry. They will then become conduits for the pass-on system, facilitating the sharing of seeds within the community. By disseminating seeds through this system, the project will ensure that climate-resilient varieties reach a wider network of farmers. This approach strengthens community resilience by enhancing access to quality seeds and fostering a culture of seed sharing. The project will provide technical assistance to the recipients of the CCR seed packs and lead farmers will organize Farmer Field Days at the demonstration plots, the Jangos and the CCACs. All inputs provided for production will be on the basis of conditional credit, whereby technical recommendations for CRA are observed and, at harvest time, the same amount of inputs received are passed on to other members of the farmers' organization. The "seed buddy" will also participate in the Farmer Field Days. Repeat support will only be provided to those who adopt the technical recommendations and pass on seeds (unless justified by circumstances such as illness or force majeure). There will be careful monitoring of the fate of the crop varieties distributed, i.e., seeds saved for the following season.

Demonstrate improved storage systems for seeds and small grain cereals: The project will promote "best practices" for effective grain and seed storage that include: ensuring that the grain is dry before storage; use of sealed containers and proper ventilation; avoidance of excess heat and humidity; treatment of grain with natural products such as wood ash, eucalyptus leaves, neem or chilli pepper; use of rat guards. In a participatory manner with the stakeholders (i.e., smallholder farmers, lead farmers, traditional leaders, farmers' associations members, extension agents, NGOs and private sector actors), seed storage "best practices" will be identified for each region among the various seed/grain storage systems, and 180 improved storage systems will be established (90 traditional and 90 new). Demonstration areas will be established and managed at the community level by a lead farmer or the president of a farmers' association who satisfies the following criteria: respected by the community and recognized as a "good" farmer; willingness to serve his/her counterparts; responsible and serious; communicative; owner of an area, which is easily accessible to most of smallholder farmers in the community. A total of 180 demonstrations will be made (120 at newly established FFS, and another 10 per municipality). In addition, the project will provide a low-cost solution which consists of reusing drums from the Angolan food industry for the storage of up to 200 kg of grain under ideal conditions. For this, the project will: (i) supply a first distribution of barrels; (ii) accompany the negotiation with local suppliers of the barrels; (iii) train farmers on the use of the storage systems; (iv) hold awareness actions on the advantages of using sealed drums.

Output 3.2: Diversified IGAs to increase community resilience against CC impacts.

Enhanced resilience through diversified income and production will allow rural households, and especially women, to better cope with the increasing frequency and severity of shocks to farming systems, such as failed harvests, increases in pests and diseases, and droughts, induced by climate change. Equally, as new or alternative climate-resilient productions and livelihoods are adopted and

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maintained, rural households will increase their food, nutrition and income security, which in turn will contribute to enhanced capacities to adapt to changing agro-ecological conditions and situations. To achieve this, the project will introduce new income generation options, especially targeting women, through the promotion of locally-relevant productions, including short-cycle livestock and horticulture production sites. In addition, the project will strengthen the development of women-led and women-managed micro-enterprises through introducing small grants and informal credit systems, strengthening business and financial literacy, and ultimately building the micro-enterprises capacities to access formal credit systems. Women, who play a significant role in agricultural and household income generating activities (IGAs), are often disproportionately affected and underserved. By empowering women's groups with the means to diversify farming systems, the project addresses climate-related risks and increased resilience. The activities under Output 3.2 and their adaptation relevance are depicted in the table below.

Table 28. Adaptation Relevance of activities under Output 3.2

Output 3.2 - Diversified IGAs to increase community resilience against CC impacts	
Activity	Adaptation Relevance
<i>A3.2.1 Facilitate IGAs for the communities' livelihood diversification</i>	Addresses projected impacts of climate change on food and nutrition insecurity. Builds resilience towards shocks (compared to dependency on 1 or 2 crops or productions) induced by climate change (e.g., failed harvests, increases in pests and diseases, etc.). Builds resilience towards shocks (compared to dependency on 1 income stream). Addresses declining livelihoods and income (current and under a BAU scenario). Supports the development of green enterprises. Addresses limited access to finance to undertake adaptation action or micro-enterprise development.

A total of 60 climate-resilient and women-led micro-enterprises (approximately 600 people) will benefit from strengthened business and financial capacities and access to start-up finance.

- Activity 3.2.1 Facilitate IGAs for the communities' livelihood diversification.

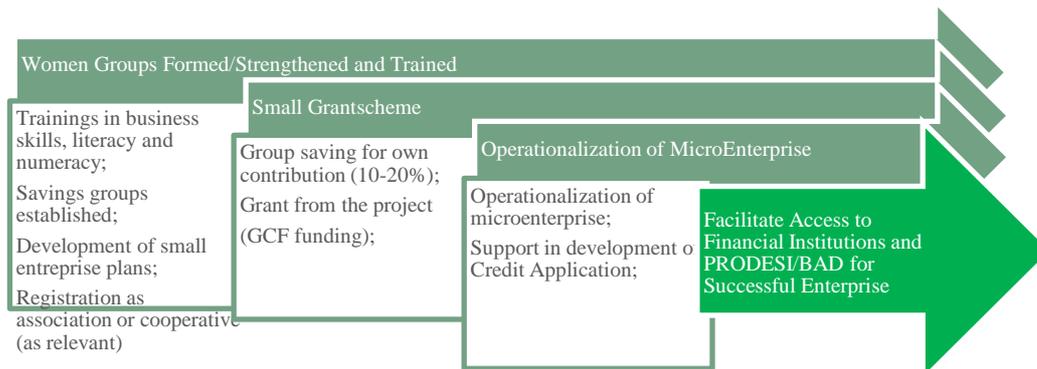
The activity will work with at least 60 micro-enterprises, which are members of the women groups or smaller sub-groups of those groups. The project will provide access to small grants, establish and/or strengthen informal credit systems, facilitate access to formal credits and support the start-up and incubation of micro-enterprises. The project will target women groups and women-led associations and cooperatives with the intention of having them transformed into sustainable micro-enterprises that are relevant to the target areas and that take into account current and projected climate change impacts. In a leadership role, women will conduct their communities to adopt and maintain practices and activities with improved organizational and productive capacities to generate income and contribute to achieving food security and resilience against the impacts of climate change. In democratically run, member-owned organizations, women smallholder farmers and small-scale women business owners will participate in decision-making and develop ways to resolve problems. They will be emboldened to demand

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accountability of their elected leaders and be provided with the skills and confidence to question statements and examine budgets.

Deliverables under this activity are: (i) 60 micro-enterprises identified, trained and operationalized; (ii) informal saving systems are established and operational; (iii) 60 micro-enterprises have accessed a small grant from the project; (iv) 60 micro-enterprises are prepared for and linked to the formal credit system from Bank of Angola.

The sequence of the activity is summarized in the following flow chart:



The activity will include the following:

Formation and capacity building support for women-led and youth micro-enterprises: The project will facilitate the establishment and strengthening of women and youth micro-enterprise groups across the target areas. Entrepreneurial women and youth will organize themselves in a group of 5 to 15 members, totalling approximately 600 participants for this activity. The targeted women will be participants from other activities of the project and likely be subsets of the women groups or the women-led FFSs. A total of 60 groups will be established. Trainings and workshops in business literacy will be provided. The trainings will be done in a way that is easy to understand and that is adapted to the local context of rural Cunene, and will include the following topics, among others: (i) business and credit principles including mandatory savings and interest and principal calculations, where approval of second loans depend on repayment of first loans and calculation of profit margin on potential contracted sales relate to costs of crop production; (ii) bookkeeping/accounting with simple systems that require only basic math and literacy; (iii) loans that are business based, namely the ability to repay; and (iv) timing of loan disbursement and repayment based on timing of crop input procurement, planting, production and marketing. Selection criteria for the micro-enterprises and their participants are described in Annex 13 to this proposal (Ref: Annex 13 – Selection and Eligibility Criteria).

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In addition to these 600 participants, the project will equally train the nursery operators of the 6 community nurseries (30 people) (A3.1.1) and the operators of the two seed multiplication schemes (20 people) (A3.1.2) in the same topics.

Establishment and promotion of informal credit systems (saving groups): the project will support the establishment of saving or solidarity systems within each of the targeted women groups. The establishment of informal savings groups, known as "Kixiquila" in Angola, brings together community members to foster financial inclusion and mutual support. Kixiquila is generally implemented in areas where individuals lack access to formal banking systems, to provide them with a platform to collectively save, access funds and support one another's financial aspirations. The process of creating these informal savings groups is simple and community-driven. Initially, interested individuals within the community come together to form a group. The group size can vary but typically ranges from 10 to 30 members. The group members collectively decide on the frequency of savings cycles and the amount each member will contribute during each cycle, taking into consideration the financial capacities of the participants. Operationalizing Kixiquila not only provides financial benefits, but also cultivates a sense of trust, social cohesion and collective responsibility. In addition, it allows the participants to get initial experiences with how loan and credit systems operate. The Kixiquilas in this project, apart from their traditional uses, will allow women or women groups to provide co-financing for the small grants provided by the project. These saving groups will be those that receive small grants from the project (60 saving groups)

Provide small grants for women-led micro-enterprises: This activity will support the establishment and operationalization of 60 micro-enterprises (30 in year 2, 30 in year 3). The micro-enterprises will be aligned with the project's objectives of building climate resilient livelihoods and adaptation, which is mainly focused on agricultural livelihoods. The project foresees a maximal investment of USD 6,500 per micro-enterprises, on average 90% funded by the GCF grant, and 10% from the savings groups. The exact scope of the businesses will be decided upon by the participants themselves, but will be guided by principles and criteria set out by the EE. Potential businesses include those that would perform specific actions along climate-resilient agricultural value chains, such as small businesses that provide services for processing, conservation, marketing or equipment repairs connected to the adaptation and conservation activities promoted in the project scope. In addition, potential businesses could include, among others, the following: production and sales of hippo-rollers, sustainable forest exploitation, improved cookstoves' production, honey farming and by-products, water system entrepreneurs, etc. The EE will undertake this activity with a specific reference to the AE, who will ensure that all new activities under the micro-enterprises will not cause any E&S impact and will maintain the project category C under E&S risk classification while applying and following its Unidentified Sub-Project (USP) methodology.

The selection procedure for the micro-enterprises is as follows: A template for presenting a business idea will be provided by the project including objectives, structure of the business, financial plan, and type of start-up support needed. The criteria for all the business proposals are: (i) alignment with overall objectives and

outcomes of this GCF project; (ii) consistency with the E&S categorization of the present project (Category C); (iii) commitment of candidates to fully receive mentoring and support from the EE. A final list of potential projects will be compiled by the EE, and a committee will award an estimated 30 grants. As the grants are awarded, the EE will provide the 30 micro-enterprises/IGAs with the financial investments requested, which can be expected to be both in cash but where applicable also in inputs such as small equipment and materials. Subsequent to the awarding of the grants, the micro-enterprises will receive additional coaching, which will include monthly follow-ups with each of the businesses, refresher trainings and troubleshooting support, among others. Each of the businesses will be mentored for a period of 2 years.

Linking of micro-enterprises into formal credit system: as the micro-enterprises are operationalized and become successful businesses, they will become eligible and capable to access formal loans. The project will facilitate access to the PRODESI/BAD program and, where applicable and desired, support the new micro-enterprises to file formal loan requests, for expansion of their businesses. PRODESI (Programa de Apoio à Produção, Diversificação das Exportações e Substituição das Importações) is an economic diversification program in Angola. It was launched in 2018 with the goal of transforming the country's economy by promoting production, reducing dependence on oil exports, and encouraging the growth of other sectors such as agriculture, fisheries, tourism and agro-industry. Under PRODESI, the Development Bank of Angola (BAD) provides loans and financial support mechanisms that are aimed at empowering small enterprises by offering access to capital that can be used for business expansion, modernization, technology adoption, and other initiatives that contribute to economic diversification and job creation. As there are a lot of variables, not in the least the willingness of women groups to expand their businesses, the project will only facilitate access and support those enterprises interested, without committing to “hard” results.

The EE will oversee the implementation of this activity and will recruit a specialized consultant or specialized organizations to execute the activity with the women groups, including the entrepreneurship and financial literacy trainings, the Kixiquila system, the small grants scheme and the follow-up. This consultant/organization will coordinate with the local EE team to mobilize the women groups to participate in this activity.

7.2 Assessment: Adaptation Measures

The following Table 13 justifies the choice of the CREW interventions for adaption to climate change.

Table 29: Justification for the choice of the CREW interventions for adaption to climate change.

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Climate Impact (caused by Climate Risk)	Potential Solutions	Proposed Adaptation Measure (by the project)	Justification of the selected option
Limited access to water (caused by precipitation pattern changes)	Boreholes Reservoirs Diesel pumps Large scale water infrastructure	Solar powered pumps Treadle pumps Small scale water channels and protected reservoirs with ware supplied by from large scale GOA investments in water transfer infrastructure	Reduces emissions and eliminates fuel logistics, fuel price fluctuation dependencies and maintenance. Boreholes are high cost, with frequent problems of water salinity and failure. Limited water availability and conflict with animals from open air reservoirs Pumping from rivers and canals Synergy created with GoA investment in large scale water transfer infrastructure
	Drip irrigation Centre pivot irrigation	Gravity fed furrow irrigation	Furrow irrigation is suitable for the soil type and annual cropping with low capital investment. Water reservoirs are compatible with solar and treadle pumping during the day and allow for multiple water use
Low agricultural productivity (caused by dependence on rain-fed agriculture, which in turn is dependent on adequate precipitation)	Use of inorganic fertilizer Use of crop protection products Use of hybrid varieties	Climate-smart agriculture (CSA) and promotion of best practices and lessons learned through farmer schools and CCAC	CSA minimises the need for cash purchase of external inputs Animal manure is plentiful Soils are relatively fertile Locally available plant products are available for pest contro Externally purchased crop protection products are justified for high value irrigated cash crops Improved varieties are open pollinated so that farmers can save their own seed
Grain loss (due to extreme events)	Community warehouses for grain storage	On-farm grain storage	Lower cost and individual ownership Improved sustainability The EDAs already have warehouses at the commune level.
Food and cash insecurity (caused by compounding of climate impacts on agriculture and	-	Loan schemes and non-farm loan schemes Investment in irrigated horticulture	Agricultural investment is high risk with no scheme for crop insurance and few loan products available from financial institutions Existing deficit for the production of small grain cereals

Climate Impact (caused by Climate Risk)	Potential Solutions	Proposed Adaptation Measure (by the project)	Justification of the selected option
natural resources)		Small loan schemes for animals and non farm enterprises	Complementarity to GoA investment in water transfer infrastructure Agriculture and natural resource entrepreneurial business opportunities are limited

8. Sustainability of the Project Design

8.1 Needs of recipients

Over the course of the past ten years, cereal yields have gradually declined while population has increased, resulting in higher than usual levels of food insecurity in most parts of the province. If changing climatic conditions continue, traditional agricultural systems will become increasingly unsustainable. Since smallholder farmers rely on rain-fed farming, the reduction in productive area due to desertification aggravated by climate change is expected to affect the food security of the majority of the population in the province.

Even diversified livelihood systems with a livestock component are expected to become more vulnerable. Mixed crop-livestock systems are a traditional livelihood strategy of smallholder farmers in semi-arid rural areas. These systems tend to be adapted to climatic conditions characterized by erratic rainfall patterns. However, climatic variability in semi-arid areas poses major threats to natural processes that sustain fodder production for livestock and moisture for rain-fed crop production. Pasture and crop production in the absence of appropriate management practices are at risk of frequent failure with predicted future rainfall expected to be reduced or punctuated by concentrated heavy events separated by prolonged dry spells. Instances of animals dying due to lack of adequate pastures and lack of water, have increased. This is attributed to the erratic rainfall, including dry spells and drought conditions that are prevailing over the region as a consequence of climate change.

Some extreme weather events are particularly critical in jeopardising the food security of the Province of Cunene. Angola is very vulnerable to El Niño influence; thus, droughts are highly correlated to this phenomenon which has caused a heavy impact on food security. Crop failure, as a consequence of droughts, has led to over 0.5 million people to be seriously affected or more than half of the province's population. The most recent prolonged period of severe drought (2018-2021) has been one of the most hazardous in terms of food security.

In summary, if no adaptation measures are taken, climate change is likely to exacerbate food insecurity, especially during prolonged drought events, which are becoming more frequent.

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Figure 27:



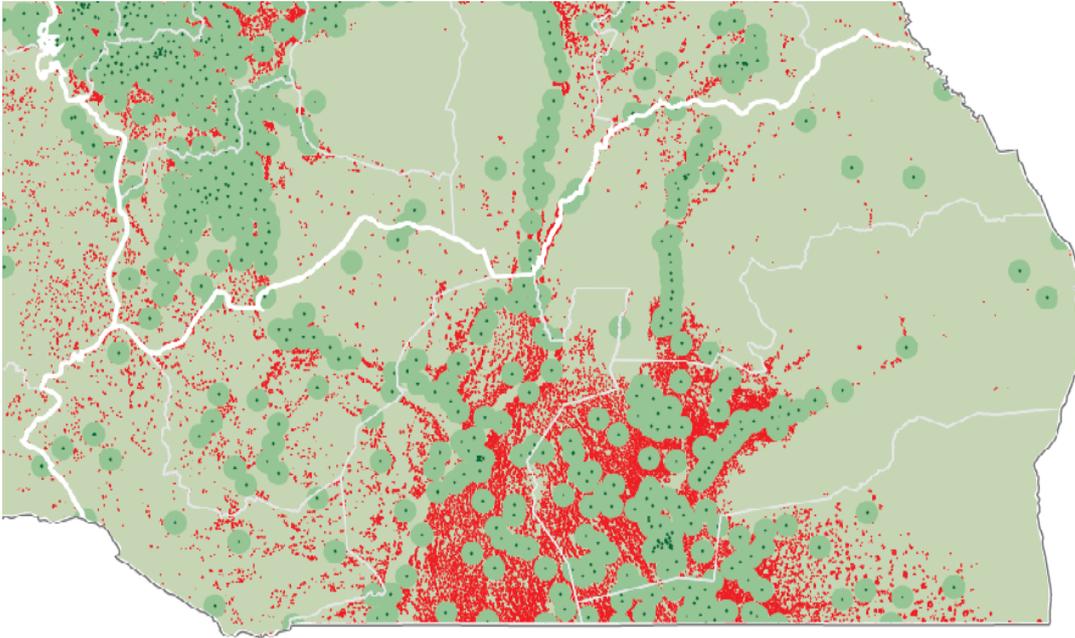
Figure 28: Typical Household structure in Cuanhama municipality



The figure below shows the concentration of population in the central Southern area of the Province, in the municipalities of Ombadja and in the West of the municipalities of Cuanhama and Namacunde.

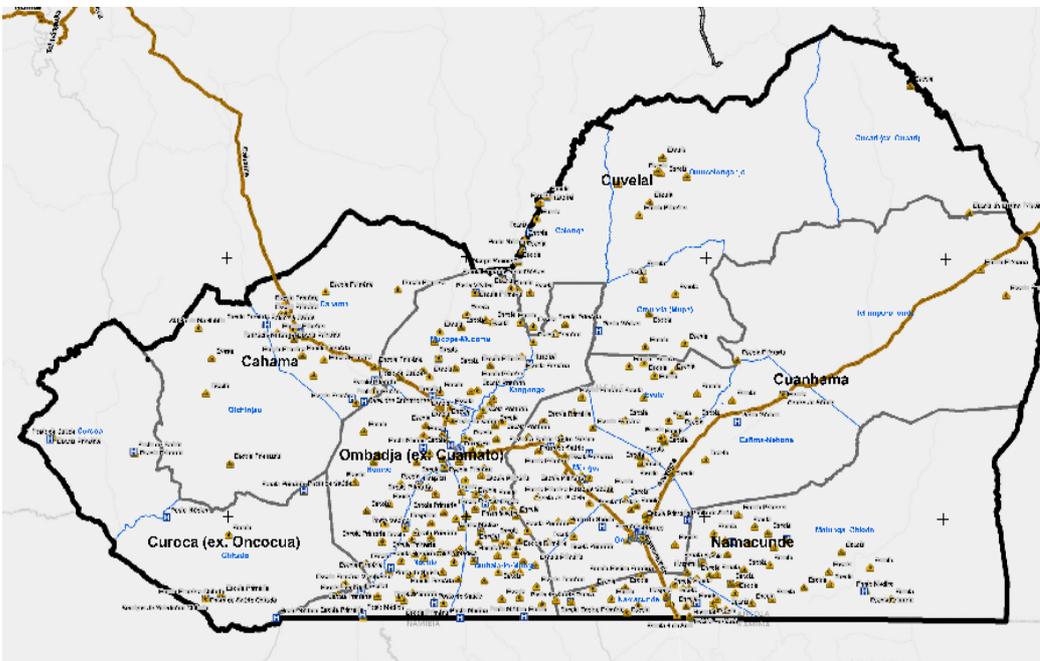
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Map 6. Map of the Province of Cunene - The green circles with dots are schools with a 5KM catchment area. The red dots are houses



The figure below also shows the location of schools as epicentres, to promote resilience to climate change.

Figure 29. Administrative Map of Cunene Province showing the location of Schools (triangle) and Health Posts (H)



Beneficiaries

There will be 120,000 direct beneficiaries (Table 15) that would represent approximately 11,000 “Kimbo” in rural areas. On average each “kimbo” represents a family unit composed of ten people, one man, two wives, children,

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and grandparents. The direct beneficiaries are those who benefit from improved climate change awareness and from actions that result in increased food, water and nutrition security.

A further 180,000 indirect beneficiaries are people in other “Kimbos (19,000) in the neighbourhood that receive communication on CC from the direct beneficiaries (an average of 1.7 indirect beneficiaries per direct beneficiary).

At least 60% of beneficiaries will be women. Women headed families tend to be the poorest when not in a stable single or polygamous relationship. Houses and compounds (“Kimbos”) are dispersed and not collected together into villages.

Figure 30



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Table 30. Direct beneficiaries calculations per activity

#	Activity	#	Deliverables	Direct Beneficiaries Calculations	Estimated Total Direct Beneficiaries *
Impact - Enhanced climate-resilience in targeted rural communities in all six municipalities of the province of Cunene in south west Angola					120,000 **
Outcome 1: Strengthened adaptive capacity and knowledge management through gender-transformative climate risk reduction (GCF ARA1 & 2)					80,000
Output 1.1 – Enhanced capacities for natural resources management and climate risk reduction with improved gender equity					80,000
1.1.1	A1.1.1 Establish and operationalize women-led Climate Change Action Centers (CCACs).	i	(i) 6 CCACs established and operationalized;	48,000 people (8,000 farmers and households through FFS); 20,000 additional community members reached by CCACs;	69,380 people (60% women)
		ii	(ii) 60 Jangos established and operationalized;		
		iii	(iii) at least 30 new women groups and 12 youth environment clubs established.	900 women; 240 teachers; 240 students	
1.1.2	A1.1.2 Raise awareness of local communities on climate risks for sustainable land and water management (SLWM) practices, and livelihood aspects.	i	(i) 840 Women mobilized, trained and acting as CC Champions in their respective communities;	840 women, reaching 20,000 people through open day events	39,220 people (60% women)
		ii	(ii) 30 Women groups (900 people) trained in project-relevant topics and activities that address structural	900 women, each reaching 10 women = 900 + 9,000 = 9,900 people + 2,000 women in literacy classes = 11,900	

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			<i>gender barriers (literacy, nutrition, land tenure);</i>		
		iii	<i>(iii) 120 Schools and 12 Environment Clubs reached by the Green School Program.</i>	<i>240 teachers and 240 students through clubs; 6,000 school children (50 per school)</i>	
Output 1.2 - Knowledge management and applied learning about climate risks is enhanced at national level					50,000
1.2.1	A1.2.1 Provide training and capacity building of provincial and national-level entities on mainstreaming of climate risks and gender transformative adaptation measures.	i	<i>(i) Baseline Study, KAP surveys and Capacity Needs Assessment are conducted;</i>	N/A	<i>85 people (45 women)</i>
		ii	<i>(ii) Training and sensitization materials for the project are developed;</i>	N/A	
		iii	<i>(iii) Extension workers from government and local government as well as project "Activity team" are capacitated in project-relevant knowledge and skills;</i>	<i>60 extensionists (activity team and local government staff, 10 per municipality)</i>	
		iv	<i>(iv) Government officials at national-level have participated in capacity building on CC and gender topics.</i>	<i>25 government officials</i>	

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1.2.2	A1.2.2 Peer-to-peer learning/ Systemization of knowledge/ Coordination among existing projects.	i	<i>(i) a communication strategy developed and implemented, including a community radio program;</i>	<i>Community radio, reaching 50,000 people in Cunene Province</i>	50,400 people (50% women)
		ii	<i>(ii) Coordination with ongoing projects through quarterly technical working group meetings at the municipal and Provincial level;</i>	<i>N/A</i>	
		iii	<i>(iii) Project participants have participated in exchange visits;</i>	<i>N/A</i>	
		iv	<i>(iv) Two national-level dissemination workshops conducted.</i>	<i>200 participants at Provincial level; 200 at national level</i>	
Outcome 2: Enhanced water security and climate resilience through integrated water resource management (ARA 2)					48,000*
Output 2.1 – Improved management of water resources at the local level					48,000
2.1.1	A2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and potability interventions.	i	<i>(i) 200 appropriate sites identified for small-scale water infrastructure;</i>	<i>N/A (beneficiaries in Outcome 3)</i>	400 women + Beneficiaries Oc.3
		ii	<i>(ii) 200 small-scale infrastructures for water are established and operational (an estimated 120 from channels, and 80 artisanal systems);</i>	<i>N/A (beneficiaries in Outcome 3)</i>	

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		iii	<i>(iii) 120 drinking troughs for animals are established;</i>	<i>N/A (beneficiaries in Outcome 3)</i>	
		iv	<i>(iv) Water Point Committees in 200 communities are trained and equipped.</i>	<i>400 women trained (2 per water point, 200 water points)</i>	
2.1.2	A2.1.2 Establishment of small-scale irrigation schemes at the community level.	i	<i>(i) 200 small-scale irrigation systems are established and operational;</i>	<i>N/A (beneficiaries in Outcome 3)</i>	2,000 people + Beneficiaries Oc.3
		ii	<i>(ii) water management plans and O&M protocols updated</i>	<i>N/A</i>	
		iii	<i>(iii) farmers are trained in O&M of irrigation systems.</i>	<i>2,000 farmers trained (10 per water system)</i>	
Outcome 3: Diversified livelihoods and climate resilience of most vulnerable people and communities through resilient agroecology and microenterprise development (ARA 1)					48,600
Output 3.1 - Adapted climate-resilient agriculture (CRA) measures for improved food security					48,000
3.1.1	A3.1.1 Pilot and promote the adoption of Agro-Silvo-Pastoral Practices	i	<i>(i) 3,000 farmers have increased access to climate resilient seed and crop varieties, including for fodder;</i>	<i>3,000 farmers + households (average 6) = 18,000 people</i>	18,000 people (60% women)
		ii	<i>(ii) tree nurseries are established and strengthened (the Provincial IDF Nursery, 6 community nurseries)</i>	<i>N/A</i>	
		iii	<i>(iii) 240,000 trees are planted;</i>	<i>N/A</i>	

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		iv	<i>(iv) 18,000 artisanal fuel-saving stoves are introduced.</i>	<i>18,000 households = 45,000 people</i>	
3.1.2	A3.1.2 Implementation of small-scale adaptive infrastructure and capacity building for CRA	i	<i>(i) 120 new FFS are established and 3,000 farmers are organized and trained;</i>	<i>3,000 farmers + households (average 6) = 18,000 people</i>	<i>48,000 people (60% women)</i>
		ii	<i>(ii) 120 demonstration plots are established; .</i>	<i>3,000 farmers + households (average 6) = 18,000 people</i>	
		iii	<i>(iii) 200 existing FFS (5,000 farmers) are reached by project-operated trainings in CRA;</i>	<i>5,000 farmers + households (average 6) = 30,000 people</i>	
		iv	<i>(iv) 200 horticulture production sites are established and operational;</i>	<i>5,000 farmers (25 per horticulture site) + households = 30,000 people</i>	
		v	<i>(v) a short-cycle livestock pass-on system is introduced and operationalized;</i>	<i>4,000 famers (pass on system = 500 in y2, 500 in y3, 1000 in y4, 2000 in y4)</i>	
		vi	<i>(vi) 30 community-based veterinary agents are trained and equipped, and communities and pastoralists access to veterinary services is improved;</i>	<i>30 CBVAs, each reaching 50 people with support = 1,530 people</i>	
		vii	<i>(vii) 180 demonstration of improved seed storage are established;</i>	<i>4,500 farmers + households (average 6) = 27,000 people</i>	

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		viii	<i>(viii) two seed multiplication sites are established and operationalized</i>	<i>20,000 farmers receiving improved seeds</i>	
Output 3.2 - Diversified IGAs to increase community resilience against CC impacts					600
3.2.1	A3.2.1 Facilitate IGAs for the communities' livelihood diversification	i	<i>(i) 60 micro-enterprises identified, trained and operationalized;</i>	<i>600 women (average 10 per micro-enterprise)</i>	<i>600 women</i>
		ii	<i>(ii) informal saving systems are established and operational;</i>	<i>600 women (average 10 per micro-enterprise)</i>	
		iii	<i>(iii) 60 micro-enterprises have accessed a small grant from the project;</i>	<i>600 women (average 10 per micro-enterprise)</i>	
		iv	<i>(iv) 60 micro-enterprises are prepared for and linked to the formal credit system from Bank of Angola.</i>	<i>600 women (average 10 per micro-enterprise)</i>	

Direct beneficiaries (60% women) are people defined as those who will benefit from at least one of the project outputs.

Description of the Project sites

The project target locations are located in the Cunene province in the Southwest. The capital of Cunene province is Ondjiva, in the central south municipality of Cuanhama. The province consists of 6 municipalities and 20 comunes. The project will operate in all of the six municipalities and in 15 of the 20 comunes of the province of Cunene, namely:

- Namacunde (except Chiede commune),
- Ombanja,
- Cahama,
- Cuvelai (except Calonga and Cubati comunes),
- Curoca (except Oncocua commune);
- Cuanhama (except Chimporo-Oximolo commune).

The project area excludes the Eastern region where the Khoisan hunter-gatherers are present. This sparsely populated area is outside of the geographical focus of the current proposed project, i.e. Chiede commune in Namacunde, Cubati commune in Cuvelai municipality and Chimporo-Oximolo (Simporo) commune in Cuanhama municipality. The National Park of Mupa in the West of the municipality of Cuvelai in Calonga commune is also not included in the targeted geographic area.

The project will be implemented in different sites in SW Angola within the province of Cunene dominated by arid and semi-arid drylands. Resources are focused more in Ombanja and Cuanhama in the Central Southern area for the following reasons:

- ✓ 60% of rural population resides in this region between the river Cunene and Ondjiva;
- ✓ This area represents the greatest risk from flooding;
- ✓ A relatively high population density and pressure on forest and natural resources;
- ✓ High risk of low and poorly distributed rainfall;
- ✓ Potential to generate developmental synergies with other CC development projects primarily with the newly constructed 100 km of irrigation channels with water pumped from the river Cunene.

The sites are considered to be the most vulnerable and prone to drought and floods and to CC impacts, which led to their selection for this project based on the following criteria:

- ✓ Relatively high population density along reasonable access corridors and a high level of vulnerability. The sites experience high rainfall variability with increasing frequency and intensity of drought and flood occurrences, high environmental degradation, loss of biodiversity resources as well as the deterioration of water (quality and quantity) and other resources on which communities depend for alternative livelihoods.
- ✓ The rural context that is more needy than urban or peri urban areas. Rural communities are resource-poor, have low-incomes and limited livelihood options to enable them to cope with drought (and floods) and CC impacts.

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- ✓ Most rural-based communities practice rain-fed subsistence agriculture on communal land, are food insecure due to recurrent famine and cannot sustain HH food security.
- ✓ The southern area with catchment of drainage channels where risk from flooding is high.
- ✓ Socially, there are many vulnerable members among the HHs of small-scale farmers, especially women headed families, children, unemployed youth, physically disabled, people living with HIV/AIDS and the elderly.
- ✓ Communities where technical, financial, and human resource capacities of local government departments are insufficient and inadequate to reach the populations' needs to adapt to CC.
- ✓ Areas where complementarity can be achieved with other projects and to ensure that there is no duplication of activities with other CC initiatives.

The project design phase was informed by stakeholder consultations with public institutions at national and provincial level, civil society, and communities, additional to originating from the long-term experiences and on the ground presence of ADPP. Public institutions consulted were, among others, the MoE (NDA), the Ministry of Agriculture and Forestry, and the Ministry of Water and Energy. Their respective sub-national counterparts at Cunene Province were also consulted. Furthermore, consultations took place with civil society organizations with long-term experience with climate change related activities in Angola.

During full proposal development, consultations took place with the National and Provincial Authorities and with leaders representing the targeted communities. A special emphasis was placed on consulting women's interest groups. During the development of the funding proposal, the MoE was involved and consulted extensively.

8.2 Monitoring, Reporting and Verification (MRV) system

A baseline, mid-term and end of project survey will be undertaken. Following the baseline survey during the first 45 days of the project, the quantification of targets will be reviewed and revised as necessary. All indicators will be disaggregated by gender.

The direct project interventions will take place during the first four years. The final fifth year of the project will be devoted to the monitoring of the adoption rates of best practices for CRA, animal reproduction rates, improved management of natural resources and the documentation of successes for scale up and replication in other similar environments in Angola. Project results, knowledge gained and lessons learned will be widely disseminated at national and provincial level, and where possible at regional level through the network.

The project has multiple sustainable development co-benefits, and contributes to at least seven of the 17 UN Sustainable Development Goals. Given the emphasis on capacity building at the community level, the potential for sustainable development is high. Some of the major indicators by the end of project are as follows (subject to verification during the baseline survey):

- ✓ 80% of farming families report improved food and water security;

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- ✓ 70% of targeted rural families report increased income (as reflected in increased household assets);
- ✓ Average 22% increase in yields of small grain cereals and legume staples;
- ✓ 30% of farmers have diversified their farming system and have shorter production cycles;
- ✓ A total of 6,000 people benefit from irrigated vegetable production;
- ✓ 20,000 people participate in FFS at model demonstrations for improved soil quality;
- ✓ 100,000 trees are planted;
- ✓ 110,000 children and young people have improved access to climate change education; and,
- ✓ 50,000 families use fuel saving stoves by the end of the project.

Adaptation efforts will be assessed through indicators of resilience based on the implementation process and results and international indexes, as the vulnerability to climate change and climate-related risk reduction. Examples of relevant indicators are:

- Change in annual temperature;
- Mean monthly temperature;
- Number of hot days;
- Change in annual precipitation;
- Monthly precipitation and number of rainy days;
- Extreme precipitation events;
- Number of households affected by drought;
- %age of total livestock killed by drought;
- Number of people at high risk of heat stress;
- Number of people living in flood prone areas;
- Number of properties flooded per year;
- Number of properties located in river floodplain;
- Number of hectares of productive land lost to soil erosion;
- Total forest area impacted by wildfire per year;
- Number of public awareness campaigns on resilience to climate change.

For a successful exit strategy, the project involves a wide range of stakeholders from the onset of the project to foster a sense of ownership. It is assumed that with community focused capacity building and the investment in livelihoods, community resilience will be strengthened and cropping systems will be more resilient and better prepared to withstand future shocks. The project has strong governmental endorsement and support at the national and provincial levels. The organization of farmers and communities through strong structures (FOs, CBOs, CCACs) builds sustainability and social development. The engagement with local government, schools with the involvement of young people, agriculture extension officers and local NGOs/CSOs will ensure continued support to local smallholder farmers beyond the duration of the project. The formation and capacity building of committees at all levels will ensure income from the sale of irrigated produce is reinvested to guarantee the sustainability of any small scale water infrastructure. This investment in community ownership and local governance organizations will ensure social sustainability.

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ADPP has a strong track record in recruiting local staff and providing quarterly capacity building sessions, as well as regular formative supervision. The project has strong governmental endorsement and support at the national and provincial levels and political sustainability will continue to be supported in the long term via the involvement of the MoE, IDA, IDF and provincial and municipality government structures. The exit strategy outlined in the design phase will be subject to annual review by the provincial steering committee and refined at national level at the end of the third year of project implementation.

Some of the key activities linked to the sustainability of the project include women's solidarity groups in Farmers Clubs will also be considered to be the heads of household for the animal loan scheme and seed banks. Among the activities that will support longer-term resilience will be: (1) vegetable gardening activities, which will promote dietary diversity and income generation; (2) local seed multiplication schemes and training in seed selection and storage; (3) the integration of shorter season varieties of cereals and legumes and increased awareness of smallholder farmers to the importance of timeliness of planting in relation to crop cycle and rainfall early finish to the rainy season or flooding in valley bottoms; (4) community based loan schemes to diversify farming systems; and, (5) documentation of the CRA techniques to publish a manual for teaching in schools and for extensionists.

Specifically, potential scaling-up and replication opportunities include: (1) the multisector integrated approach to improving the resilience of farmers can be scaled-up to other systems in target areas as well as replicated to other geographical regions of the country and the SADC region; and, (2) CRA knowledge transferred through a 'training of trainer's' approach and FFS with model demonstrations can be replicated for adoption among other dryland farmers in Southern Africa through the Humana People to People network.

The overall goal of this project is to achieve lasting change within the targeted areas of Cunene transforming it into productive and climate resilient ecosystems and communities. The project addresses barriers to achieving transformative change by establishing the right mix of enabling environment conditions necessary for farming and social participation. Establishing enabling conditions for investments in irrigation and agro-forestry sets the basis for climate resilient and adaptive economic development. Beyond establishing enabling conditions, empowering local stakeholders to maintain these measures beyond the scope of the project is an essential element to the project exit strategy.

An essential objective of the programme is that the different components reach a certain degree of self-sufficiency by the end of the implementation period. During the last year of the project, the focus will be on expansion of scale with a gradual phasing out from CREW support in the existing project areas. Such an objective relies on two main pillars:

- 1. Increased productivity and profitability of beneficiaries.** A central tenet of the programme is that there is an economic advantage for farmers to increase and diversify their income through their participation. This will be achieved through focusing on the introduction of a viable market for crops, and on appropriate crops, technology and extension support.
- 2. Capacity building.** A capacity building plan for smallholder farmers is a cross cutting theme. The training plans will be based upon key stakeholders' existing capacity and beneficiary needs. Produced training information can be adapted to local contexts (e.g., local language). It is essential that participants, farmer organizations, and savings structures

embedded in the project build the capacity for self-management, again based on clear economic advantages to do so.

8.3 Sustainability

The CREW project is focused on developing and promoting activities that bring sustainable benefits in various aspects, including technical capacities, knowledge and awareness of CC, increased production and resilience of agricultural systems, enhanced social capital and improved organizational and institutional capacities at community as well as at government level. The sustainability of these benefits was considered from the onset of the project idea and the identification of the concept and will be achieved through the central involvement of communities, farmers, local leaders, CAs, and sub-national and national authorities, who have been consulted throughout the process, which will continue during project implementation and whose capacities will be built by the project. Having built the project on the understanding, knowledge, needs identified, and preferences of these stakeholders gives the project's sustainability a solid foundation.

To ensure that structures being established, as well as interventions being implemented, will continue beyond the scope and the duration of the project, a special emphasis is placed on building technical and organizational capacities in the institutions involved. Project components and activities were built upon national and sub-national strategies and priorities, and will be integrated in national and sub-national programmes. Additionally, the project will establish and institutionalize linkages between communities, representative of traditional leadership and local government officials, as well as a cross-sectoral and cross-border platform that will monitor the continuation of the CREW project's achievements.

A detailed exit strategy will be discussed with stakeholders and developed at the start of the fourth year of the project. The design of the project has considered the sustainability of all project interventions in all aspects including environmental, economic, technical, social and institutional sustainability, as follows:

Institutional Sustainability

The project design has secured that the project will be implemented in close collaboration with existing government and CBO structures and programmes, which will facilitate continuity. In complement, the project will train and involve local staff such as extension workers, community agents and municipality-level officials in the project's methodologies, technologies and practices.

At national level, the key ministries have had and will have key roles in the project's design, development and implementation. These are the Ministry of Agriculture and Forestry (MAF), the Ministry of Culture, Tourism and the Environment (MCTE), the Ministry of Energy and Water (MEW), the Ministry of Health (MoH), and the Ministry of Social Action, Family and promotion of Women (MSAFW). The participatory methodology of the development of CCACs will strengthen the ownership of local authorities of the project's achievements. The CCACs themselves will give a formal and documented foundation for the continuation of concrete CCA activities.

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The EDAs, the municipal division of the Institute of Agrarian Development, will include implementation of all activities related to agriculture in their operation. Water activities will be integrated within the National Institute of Water Resources (INRH) and the Office for the Administration of the Cunene River Basin (GABHIC), while activities will be supported at local level by the Municipal Departments of Water and Energy. Schools will be important in ensuring the long-term institutional sustainability of project activities, directors and teachers will be trained on CC adaptation and mitigation measures, and schools will be equipped with manuals for teachers and information materials for students. The CCACs will be operated in collaboration with the local administration and will be transferred to their ownership at the end of the project, with the expectation that it will continue to promote CC adaptation and mitigation measures.

Social Sustainability

The project will: establish and strengthen CSOs; will work in close relation with local development committees and community leaders; will reinforce women solidarity groups; and CCACs will be established and operationalized. All CSOs will be trained and sensitized to maintain and continue the project's activities beyond the scope of the project. Trainings will focus not only on technical capacities, but also on organizational management related capacities, including planning, organizing and holding meetings, communication skills, conflict resolution, among others. A special emphasis will be placed on the participation of women in all management committees that will be established by the project. These CSOs will be supported in their establishment and will also be mentored and coached throughout the project's lifespan.

Community members of benefiting communities, and members of the different CSOs are actively engaged from the start of the project, and will participate in all phases of the project, from inception, planning of activities, to monitoring and evaluation. This will generate the ownership and agency needed for the activities to be sustainable and impactful. The long-term perspectives of the structures will be anchored within plans that go beyond the scope and duration of the project. The women solidarity groups will have business plans and established linkages to input/output markets. Community water management committees will be trained in the management and repair of equipment with established linkages to the municipality authorities and private sector providers of technical services and spare parts.

Environmental Sustainability

The project will ensure environmental sustainability through strengthening the resilience of smallholder farmers through adoption of CSA practices, and small-scale irrigation infrastructure to be developed. This will on the one hand, allow to cope with CC related crisis situations and on the other hand avoid overexploitation of NR, which will be reinforced through the awareness campaigns at community and school levels.

For activities that are anticipated to have significant social and environmental impacts, an independent Environmental and Social Impact Assessments (ESIAs) was undertaken and approval sought from the the Ministry of Culture, Tourism and the Environment as required by Angolan law. An environmental and social monitoring plan will guide periodic monitoring and evaluation to track changes that

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could have adverse environmental and social impacts and ensure adequate mitigation.

Economic and Financial Sustainability

The economic sustainability at community-level will be secured through strengthening the CSOs involved in the project, both existing and new ones, to strengthen their technical capacities, which will include the setup and management of simple payment and financial management systems. Additionally, the financial sustainability is reinforced by the additional income that will be generated through the activities promoted by the project.

Climate Change Action Centres' functioning will be funded by the project for its duration, including staff and money for outreach campaigns and small demonstrations at the centres themselves. CCACs will be directly integrated in the functioning of the municipality administrations. The actual buildings and spaces to host the CCACs will be provided by these authorities during and beyond the project. Intentionally, the staff's salaries and budget for campaigns and demonstrations will be integrated in the local government's budgets after the lifespan of the project.

The project builds upon experiences of other successful projects, in which the salaries of the human resources of new setups progressively and gradually are absorbed by the civil service, being hired directly by the State. Examples of these projects include UNICEF's (for the children's education sector and for the health sector), FAO's (for the agricultural sector) and UNDP's (for the environmental sector - National Parks). The staff working on these projects were gradually included (during the projects or at the end of the projects) in the government staff, depending directly on the Ministries (for example the National Parks guards, hired by the Minister of the Environment) or on the local administrations (for example ADECO - Community Health Agents - hired by the Municipal Administrations). Recognizing the importance of addressing the sustainability of the CCACs, detailed plans for continuation of the centers will need to be made during the penultimate year of project implementation, in collaboration with municipality authorities.

The Green School Programme is integrated within the functioning of the Ministry of Education. The curricula developed under the project for environmental education will be validated by the MoE and integrated in national curricula of teacher training programs, securing that teachers continue and scale-up activities. At school level, small committees will be organized, consisting of teachers and members of PTAs. Without any tangible operating costs, these committees will continue to exist beyond the project, supported by the teachers who have it in their curricula.

The project will have raised income levels for farmers, women and youth groups with improved crop and livestock production and will strengthen the organization of farmers in associations and cooperatives and link them to markets to be able to sell their products. In addition, the project will support farmers to add value to their animal and crop products so that they can be able to fetch higher market prices as well as prolonging their shelf life. All these will help the farmers, and in particular women, to enhance their incomes, improve their livelihoods and ensure economic sustainability. Based on ADPP experiences with the model for strengthening FOs, the positive experience of working together in a group is critical with regards to:

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infrastructure development, bargaining powers with input supply and marketing, joint learning, sharing of expertise and support of one another, enhancing community structures facilitating organization and executing strategic plans. Once the benefit thereof is experienced, the system, even if adapted, will be adopted and maintained along generational phases. By the end of the project cycle, FOs will have achieved financial independence and independence from external support.

Community Water Committees will be responsible for the management of the water infrastructure (solar pumps, tubing and small-scale reservoirs and wells) introduced by the project. They will be supported with trainings in organizational management, which will include the setup of a payment-system for the use of water and/or technologies. The fees collected will be managed by the Water Committees to have a financial reserve for repairs or replacement of technologies when necessary. Linkages will be established with the relevant municipality authority, private sector importers/suppliers and technical service providers.

Financial management systems of the water infrastructure are built on existing models and systems in Angola, where community members pay a small fee for the use of water, which allows for having funds available for maintenance and repair of infrastructure. CWCs will be the managers of these systems, and their capacities will be built accordingly. In Angola, this is defined by the “*Modelo de Gestão Comunitária de Água (MoGeCA)*” (Ministry of Water & Energy, UNICEF) which covers the principles for community management of water, including cost recovery and sustainability and describes the roles of all stakeholders in the processes.

Technical Sustainability

The project includes the introduction of new technologies, such as the development and establishment of water infrastructure and irrigation systems, land preparation, conservation agriculture, pest control, processing and storage, and introduction of new crop germplasm. The project will conduct the necessary capacity building activities to secure technical capacities are in place. Orientation manuals will be developed and regularly updated for the different technologies. Seeds and planting materials can be saved by smallholder farmers from the crops introduced. Training in seed selection and management of seed stocks will ensure the sustainability of this intervention.

The project is focused on developing and promoting activities that bring sustainable benefits in various aspects, including technical capacities, knowledge and awareness, increased production and resilience of agricultural systems, enhanced social capital and improved organizational and institutional capacities at community as well as at municipality level. The sustainability of these benefits was considered from the onset of the project concept. The identification of the concept was achieved through the central involvement of communities, farmers, local leaders and provincial sub-national and national authorities, who have been consulted throughout the process, which will continue during project implementation and whose capacities will be built by the project. Having built the project on the understanding, knowledge, needs identified, and preferences of these stakeholders; this gives the project’s sustainability a solid foundation.

To ensure that structures being established, as well as interventions being implemented, will continue beyond the scope and the duration of the project, a special emphasis is placed on building technical and organizational capacities in

the institutions involved. Project components and activities were built upon national and provincial strategies and priorities, and will be integrated in national and provincial programmes. Additionally, the project will establish and institutionalize linkages between communities, representative of traditional leadership and local government officials, as well as a cross-sectoral platform that will monitor the continuation of the project’s achievements.

9. Implementation Arrangements

The Sahara and Sahel Observatory (OSS) will have a specialist advisory role and management oversight in relation to ADPP that will be responsible for project implementation together with implementing partners. ADPP will use communication for development methodologies in local dialect that have proven to be effective in the past. The capacity building of local IDA and IDF extension officers and other officials in the province will facilitate the adoption of climate smart practices. ADPP will establish water committees at the start of project interventions and ensure income from the sale of irrigated produce is reinvested to ensure the sustainability of water infrastructure. Access to veterinary services and quarantine will ensure that animal diversification will suffer low rates of animal mortality. An inadequate management of the project may result in delayed implementation failure to meet project targets. A dedicated and qualified Project Management Unit (PMU), with support from a Project Steering Committee (PSC), and oversight by OSS, will ensure effective project management. Qualified technical expertise will be available based on the activity needs and requirements. Contingency plans will be made at the provincial and municipality levels for future natural disasters.

During implementation, the EWRCC, under the auspices of the MoE, will lead execution with roles and responsibilities clearly defined for the EWRCC’s staff and all partners. The main execution partners will be: the MoE and provincial representation for environmental issues; the IDA and its municipality representation (EDAs) for extension activities; the Provincial Department of Agriculture and Forestry in support of agricultural activities; the Provincial Department of Water and Energy in support of water-related activities; the Provincial Department of Civil Protection for response to natural disasters and emergencies; the Provincial Department of Education will select schools to take part, certify green schools and work on possibilities for education for children who drop out. The main local NGOs and CBOs in the province with competency in the agriculture and environmental sectors will gain financing to implement mini-projects as part of the CCACs.

The table and the organogram below depict the implementation arrangements:

Table 31: Role of each participating entity, including OSS (Accredited Entity)

1	Sahara and Sahel Observatory (OSS): Accredited Entity (AE)	<ul style="list-style-type: none"> ● Provide qualified expertise; ● Oversee overall financial and monitoring aspects of the project; ● Reporting of project consolidated results to GCF; ● Approval of project annual work plan and budget;
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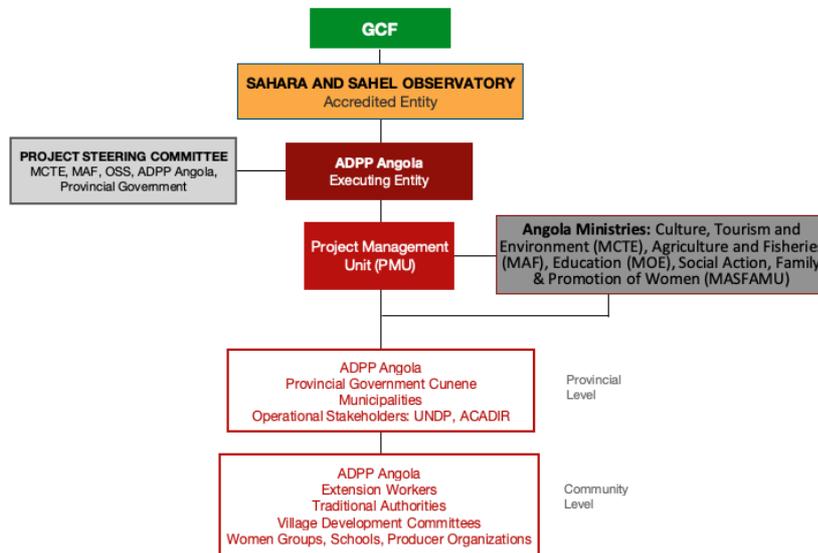
		<ul style="list-style-type: none"> • Approval of annual financial and technical reports; • Provide administrative and management support.
National Level		
2	Ajuda de Desenvolvimento de Povo para Povo Angola (ADPP): Executing Entity – (EE)	<ul style="list-style-type: none"> • Oversee project management and execution; • Grant management and overall financial aspects; • Provide Technical Advice, guidance, support to the project; • Communication, networking and partnership building; • Stakeholder engagement at national level; • Monitoring and evaluation at the regional level and M&E data collecting; • Providing technical and financial reports to OSS based on PMU reports;
3	National Government (Angola Ministries of Environment, Agriculture and Water & Energy)	<ul style="list-style-type: none"> • Create a conducive environment for the program execution especially by mobilizing technical experts at the national level where needed; • Provide political support and advocacy; • Provide policy guidance; • Ensure local government engagement and participation; • Ensure ownership and sustainability; • Dissemination of project results in national and international forums;
Provincial Level		
4	Ajuda de Desenvolvimento de Povo para Povo Angola (ADPP) Executing Entity – (EE)	<p>PMU based in the province and responsible for the following;</p> <ul style="list-style-type: none"> • Coordinate project management and execution at the provincial and municipal level; • Ensuring the project activities are implemented according to plan and have a positive impact on the beneficiaries; • Ensure compliance with national technical standards and integration with government programmes; • Consolidation the results from the project sites and link with the Provincial and municipal Steering Committees. • Monitoring and evaluation at provincial and municipal level; • Stakeholder engagement at Provincial level; • Provide technical and financial reports to ADPP national level.
5	Provincial Project Steering Committee (PSC)	<ul style="list-style-type: none"> • Meet once a quarter and provide strategic direction for the project at the provincial level; • Facilitate cooperation between all project partners and facilitate collaboration between the project and other

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		<p>relevant programmes, projects and initiatives in the province.</p> <ul style="list-style-type: none"> • Advise on issues and problems arising during project implementation;
6	<p>Local Governments (Provincial Government of Cunene, Provincial Cabinets of Agriculture, Environment, Education, Water & Energy, Social action, Family and promotion of Women, Health. Provincial Department of Civil Protection, IDA, IDF)</p>	<ul style="list-style-type: none"> • Create a conducive environment for the program execution especially by mobilizing extension workers and technicians at provincial; • Ensure compliance with national and provincial strategies; • Provide political support and advocacy; • Provide policy guidance; • Ensure ownership and sustainability;
Municipal Level		
7	<p>Ajuda de Desenvolvimento de Povo para Povo Angola (ADPP) Executing Entity – (EE)</p>	<ul style="list-style-type: none"> • Manage execution of project activities at community-level; • Ensuring the project activities are implemented according to plan and have a positive impact on the beneficiaries; • Provide components progress reports to PMU. • Stake holder engagement on municipal level.
8	<p>Municipal Administrations, EDA, Municipal departments of above mentioned provincial cabinets and departments.</p>	<ul style="list-style-type: none"> • Create a create a conducive environment for the program execution especially by mobilizing extension workers and technicians on municipal level; • Support mapping of project areas and beneficiaries; • Provide technical support to the project implementation; • Ensure ownership and sustainability;
9	<p>Municipal Project Steering</p>	<ul style="list-style-type: none"> • Meet once a month and provide strategic direction for the project at the municipal level ; • Facilitate cooperation between all project partners and facilitate collaboration between the project and other

	Committee (MSC)	<p>relevant programmes, projects and initiatives in the municipality.</p> <ul style="list-style-type: none"> Advise on issues and problems arising during project implementation.
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Figure 31: Organigramme for Implementation



10. Complementarity and Cohesion: country ownership and synergies with other climate-resilience initiatives

10.1 Country ownership of the CREW

The CREW Project is fully aligned with Angola’s iNDC. Angola submitted its first Intended Nationally Determined Contribution (iNDC) to the UNFCCC in 2015. After the ratification of the Paris Agreement in November 2020, Angola updated its NDC to align with the Paris Agreement goals.

The CREW Project has been designed to support Angola in achieving its NDC objectives. It focuses on enhancing climate resilience in the agricultural sector, especially in the vulnerable southwest region of the country. The project takes a women-centered approach, recognizing the vital role of women in climate change adaptation and mitigation, particularly in rural areas. By empowering women and providing education and training, the project not only addresses immediate needs but also establishes a foundation for long-term climate resilience. These efforts align with Angola's Sustainable Development Goals and National Development Plan mentioned in the NDC. Furthermore, the EWRCC's community-based approach, with a specific regional focus (Cunene), serves as a model for potential

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replication in other regions of Angola, recognizing the need for regional-specific adaptation strategies.

In summary, the CREW complements Angola's NDC targets, providing a practical roadmap for achieving a significant portion of these goals. It demonstrates the synergy between local project planning and broader national climate objectives. Angola is committed to global climate action, with its NDC encompassing both mitigation and adaptation measures, and it is determined to reduce GHG emissions and enhance resilience in line with its Sustainable Development Goals and National Development Plan. The government engaged stakeholders extensively to refine its NDC in alignment with its development vision.

Further, the CREW has been designed in complementarity with the Government of Angola infrastructure scheme to transfer water from the river Cunene:

The transfer of water from the Cunene river along 100 kilometers of canal in the municipalities of Ombadja and Cuanhama offers a new opportunity for irrigation. The CREW will complement this US\$ 200 million investment from the Government of Angola in the construction of water channels supplied by water pumped from the river Cunene.

- **ADPP has worked with the Ministry of the Environment – Climate Change Department from 2019 to 2020** to also implement a small project for training extensionists to strengthen resilience in the Cuvelai basin. It supports the following activities: horticulture, introduction of new crops, production and planting of trees, construction of reservoirs to store water and demonstrate fuel saving stoves, seed banks, fish farming, bee keeping and savings groups. These experiences will offer lessons learned for scale up into a broader geographical area.
- The CREW Project will benefit from the updating of **Province of Cunene Master Plan** with regard to the documentation of best practices and policy normatives in climate-resilient development planning. This will include the training of Civil Protection officials on climate change impacts and adaptation measures. It will also benefit from the case studies developed and disseminated that capture traditional knowledge about climate change management at local level and from the micro seasonal maps of adaptability of different climate-resilient crops.

Other projects operating in the province of Cunene are:

- ADPP is working with seven projects namely land tenure rights, the promotion of solar energy, field schools for pastoral farmers in partnership with FAO, agricultural clubs with 1,530 smallholder farmers, HIV/AIDS and TB, teacher training schools and malaria eradication.
- CODESPA is working with land rights and food security.
- Development Workshop is working with WATSAN.
- World Vision is working with Global Fund malaria eradication and with the Ministry of Health to combat child malnutrition. This NGO is also involved with USAID and various other donors for emergency response to drought in Cunene.
- UNICEF and FAO, in partnership with World Vision, People in Need and ADRA for emergency response to the 2019 drought in the sectors of child nutrition, health, WATSAN and agriculture.

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- UNICEF, in partnership with NGOs, has a project to collect rainwater and promote school gardens.
- The *Modelo de Gestao Comunitaria da Agua* (MoGeCA) works well at the community level and needs to be scaled up, but past pilots have failed due to the lack of an enabling environment and support at the municipal and provincial levels.
- Provincial participation in the National Program for Education, Training and Environmental Awareness (PEFCA 2015-2030).

These projects and programs are coordinated through the Ministry of Culture, Tourism and the Environment, the Ministry of Education, the Ministry of Health and the Ministry of Agriculture and Forestry, which are also key partners in the proposed CREW Project. The project will align with these existing initiatives, and seek synergies where possible and applicable.

10.2 Co-finance and Complementarity

The CREW is seeking GCF finance to develop targeted strategies for strengthening adaptive capacities in rural farming communities and particularly focus on gender-transformative action in upscaling of climate-resilient agriculture at community level. The project will operate in the six municipalities of the province of Cunene: namely Namacunde, Ombanja, Cahama, Cuvelai (except Calonga-Nampala and Cubati-Cachueca communes), Curoca (except Oncocua commune) and Cuanhama (except Tchimporo-londe commune).

ADPP has extensive experience working in Angola, and currently receives 31% of its program budget from the Government of Angola. It targets one million people in most regions of the country. The following main initiatives, which could be considered for co-financing, are ongoing in Cunene, and during full proposal development these will be analysed for best practices and financial feasibility:

(1) *Fortalecimento da Resiliência e da Segurança Alimentar e Nutricional em Angola* (FRESAN) is a project financed by the European Union, through the 11th EDF, managed by Camões, IP, which aims to contribute to the reduction of hunger, poverty and vulnerability to food and nutritional insecurity, through the sustainable strengthening of agriculture in the southern provinces of Angola most affected by climate change. FRESAN covers several projects, of which ADPP is involved in three in Cunene Province:

1a. ADPP leads (CODESPA partner) on *Increasing the resilience of communities in the Kunene through access to water for domestic and agricultural (2020/2022)* - linkages to ongoing ADPP projects will be developed including resilience and land rights projects in Cunene region.

1.b. CODESPA leads (ADPP partner) on *Adapting Agrarian Systems for to Improve Food Safety and Nutrition in Cunene (2020/2022)*

1.c CODESPA/ADPP - ECOSAN: *Agroecological Strategies for Production and Recovery of Biodiversity to Improve food safety and nutrition in the Province of Cunene (2021/2023)*

(2) FAO will develop as from April this year two projects related to agriculture and cattle breeding in the provinces of Cunene, Huíla and Namibe to support drought victim families Improved food security for drought affected households in Cunene and Huíla Province of Angola (19-RR-FAO-021).

(3) Nineteen projects linked to the health, education and water sectors will be carried out this year in the municipalities of Ombanja and Curoca, in the province of Cunene, through the Social Support Fund (FAS).

(4) IFAD ASAP project in Angola – learning from models that have been implemented.

10.3 Complementarity with Adaptation Fund

In June 2021, OSS and ADPP were awarded an Adaptation Fund project covering the south-east part of Angola and boundary regions in Namibia, that places good potential for transformative impact across the southern region of Angola, synergies for development of models, cost savings and poses a platform for further upscale.¹⁸⁴ The cross-boundary aspect of the Adaptation Fund project also poses potential for investigation for linkages to the Namibian side of the Cunene region. The project – *Resilience Building as Climate Change Adaptation in Drought Struck South-Western African Communities* – aims to enhance adaptation capacity and resilience of communities to climate change impacts and variability in the transboundary region between Angola and Namibia. This will be done through the three components below:

Component 1: Strengthening awareness, knowledge and capacity to adapt to climate change and variability at community, district, national and regional level (USD 1,523,365);

Component 2: Organizational and technical learning for climate-resilient production and water management (USD 1,737,440);

Component 3: Improving resilience of ecosystems and livelihoods through the implementation of community adaptation actions to improve food security in response to climate change and variability (USD 6,860,050).

The overall objective of the project is to enhance adaptation capacity and resilience of communities to climate change impacts and variability in the transboundary region between Angola and Namibia. The project targets to consolidate synergies and adopt innovative and resilient food security actions and interventions from the selected SADC region countries including Namibia and Angola.

The project specifically intended to strengthen drought resilience through the specific objectives to:

- Enhance local, sub-national and regional capacities to adapt and respond to climate change risks in the cross-border area of Angola and Namibia;
- Build organizational and technical capacity for climate-resilient production and water management;
- Improve food security in response to climate change impacts amongst rural and vulnerable communities in Cuando Cubango Province and the Regions of Kavango East and Kavango West.

It is estimated that overall, the project will directly benefit 6,500 small-scale farmers (50% women), their families (+36,000 family members) through concrete adaptation interventions, while another 140,000 people will directly benefit from awareness campaigns and capacity building. An estimated additional 200,000 people will benefit from the project indirectly (25% of the provincial and regional population). In Cuando Cubango Province of Angola (municipalities of *Cuangular*, *Calai*, *Dirico* and *Rivungo*), the project will benefit 4,800 farmers and their families

¹⁸⁴ ADPP & DAPP 2021

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(+23,000 family members), and 80,000 people through increased awareness and enhanced capacities at various levels. This serves to create a contiguous geographical area near the southern border and the corresponding sites in Namibia.

The CREW will further extend CC awareness and adaptation best practices across the South West region of Angola. There will be opportunities to share best practices and lessons learned between the two projects to be facilitated through an annual workshop involving project staff and senior government officials.

10.4 Complementarity with GEF UNDP

The GEF funded UNDP project promoting – Climate-resilient Development and Enhanced Adaptive Capacity to Withstand Disaster Risks in Angola’s Cuvelai River Basin – is an ongoing project in the region and was approved in December 2014. The project will build on the 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 and provide early warning. It will also complement the achievements in terms of the 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. The germplasm resources together with those imported with proven success in other semi-arid environments in Southern Africa will be evaluated and local multiplication schemes will work with the most appropriate germplasm as identified by smallholder farmers. The CREW will operate in close coordination with the UNDP project, promote developmental synergies and scale up advances in the identification of improved drought tolerant germplasm.

10.5 Other ongoing projects in Cunene

The following main initiatives, which could be considered for co-financing, are ongoing in the Cunene Province:

- FRESAN is a project financed by the European Union, through the 11th EDF, managed by Camões, IP, which aims to contribute to the reduction of hunger, poverty and vulnerability to food and nutritional insecurity, through the sustainable strengthening of agriculture in the southern provinces of Angola most affected by climate change. The Institute Camões issued a call for proposals to be submitted by October 2019 with focus on the provinces of Cunene, Huíla and Namibe with a duration of 24-32 months and with a focus on water supply (€ 7.5M) and food and nutritional security (€ 4.7M).
- Increasing the resilience of communities in the Cunene through access to water for domestic and agricultural use (ADPP/CODESPA);
- FAO will develop as from April this year two projects related to agriculture and cattle breeding in the provinces of Cunene, Huíla and Namibe to support drought victim families: Improved food security for drought affected households in Cunene and Huila Province of Angola (19-RR-FAO-021);

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- Nineteen projects linked to the health, education and water sectors will be carried out this year in the municipalities of Ombadja and Curoca, in the province of Cunene, through the Social Support Fund (FAS).
- Project for Environmental Management of the University Mandume Ya Ndemufayo Implemented by the Ondjiva Polytechnical college.
- Agence Francaise de Developpment – Agriculture in Angola
- United States Agency for International Development – Women in Angola Farming

10.6 Concessionality and justification for GCF financing

The GCF contribution is critical for this project due to the urgent need for enhanced adaptation capacity for vulnerable communities at risk of high exposure to climate change impacts in rural areas of Cunene. This project will be one of the first large scale climate centred projects in SW Angola that will strengthen simultaneously the resilience of agricultural production systems. The GCF resources will also contribute to reduce the recurring process of emergency response for water and food security. The amount requested is over five years which is a reasonable timeframe to evaluate the sustainable impact of the project and to refine the implementation. The finance requested is compatible with the need to demonstrate impact on a reasonable scale and involve all major stakeholders.

11. Project Implementation / institutional arrangements

The following sections summarise the implementation structure of the project, outlining legal, contractual and institutional arrangements, as well as the structure between the GCF, the AEs and EEs and beneficiaries.

11.1 Programme Implementation structure:

The OSS upon getting accredited by the GCF in 2017 launched a call to receive concept notes towards the various thematic of the GCF. Within this call, numerous agencies submitted proposals which were assessed by the OSS technical committee to identify bankable proposals. Out of the numerous proposals, ADPP came out as one of the agencies who were within the scope, understanding the climate change relevance and working within the regions of operation of the OSS. Furthermore, OSS will have a specialist advisory role and management oversight in relation to Ajuda de Desenvolvimento de Povo para Povo Angola (ADPP) that will be responsible for project implementation together with implementing partners. ADPP will act as the sole Executing Entity for all components and respective activities and will involve project partners where necessary who will support in the execution of the project.

OSS has a long-term relationship with ADPP and its sister organizations within the network of Humana People to People Federation. This includes (i) an ongoing partnership with ADPP Angola and DAPP Namibia in the implementation of a regional Adaptation Fund project (referenced in section B.1), (ii) an ongoing partnership with ADPP Guinea-Bissau as EE in a GCF Funded project (SAP025), (iii) ongoing partnerships with DAPP Malawi and DAPP Zimbabwe regarding GCF projects that are in Concept Note stage.

ADPP will use communication for development methodologies in local dialect that have proven to be effective in the past. The capacity building of local IDA and IDF extension officers and other officials in the province will facilitate the adoption of climate smart practices. ADPP will establish water committees at the start of project interventions and ensure income from the sale of irrigated produce is reinvested to ensure the sustainability of water infrastructure. Access to veterinary services and quarantine will ensure that animal diversification will suffer low rates of animal mortality. An inadequate management of the project may result in delayed implementation failure to meet project targets. A dedicated and qualified Project Management Unit (PMU), with support from a Project Steering Committee (PSC), and oversight by OSS, will ensure effective project management. Qualified technical expertise will be available based on the activity needs and requirements. Contingency plans will be made at the provincial and municipality levels for future natural disasters. ADPP will undertake procurement activities in accordance with the procurement rules of OSS (see annex 8 for further details)

During implementation, the CREW, under the auspices of the MoE, will lead execution with roles and responsibilities clearly defined for the CREW's staff and all partners. The main execution partners will be: the MoE and provincial representation for environmental issues; the IDA and its municipality representation (EDAs) for extension activities; the Provincial Department of Agriculture and Forestry in support of agricultural activities; the Provincial Department of Water and Energy in support of water-related activities; the Provincial Department of Civil Protection for response to natural disasters and emergencies; the Provincial Department of Education will select schools to take part, certify green schools and work on possibilities for education for children who drop out. The main local NGOs and CBOs in the province with competency in the agriculture and environmental sectors will gain financing to implement mini-projects as part of the CCACs.

The project will ensure alignment with the following legislation that inform environment-related invests:

- Decree 5/98 of 19 June Law of Bases for the Environment.

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- Decree 117/20 of 22 April on Evaluation of Environmental Impacts.
- Decree 59/07 of 13 July on Environmental Licencing.
- Decree 1/10 of 01 March on June Environment Auditing.
- Decree 92/12 of 01 March on Terms of Reference for the Elaboration of Environmental Impact Studies.

Below is the organigramme for implementation featuring they key project actors.

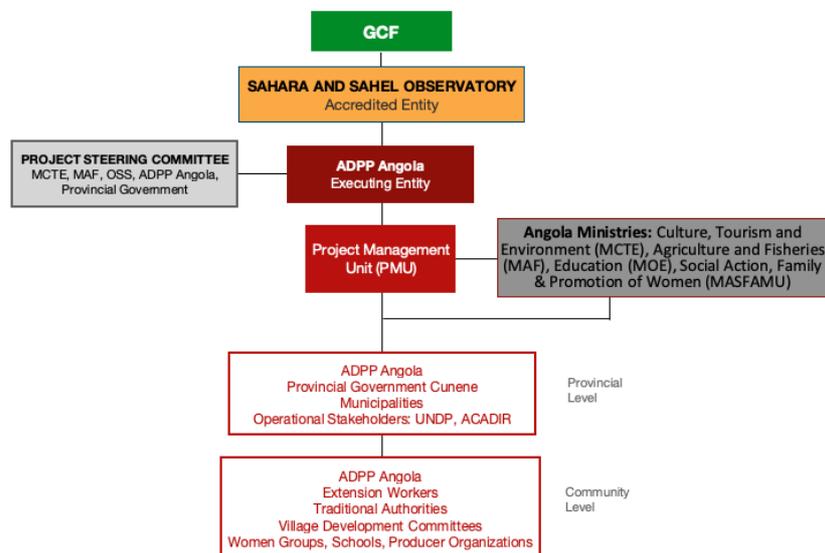


Figure 32. Organogram for Implementation

To be clear, the project design has secured that the project will be implemented in close collaboration with existing government and CBO structures and programmes, which will facilitate continuity. In complement, the project will train and involve local staff such as extension workers, community agents and municipality-level officials in the project’s methodologies, technologies and practices. Local government and their respective officials and extension workers that were included within the different phases of the project and capacity built to the different project aspects, will be responsible for monitoring the various sub-projects (irrigation systems, nurseries, veterinary access, etc.) beyond the project’s implementation period.

Below is a table highlighting the roles of each participating entity, at the national, provincial and municipal level in order to have a clear understanding of their roles and functions.

Table 7 - Role of each participating entity, including OSS (Accredited Entity)¹

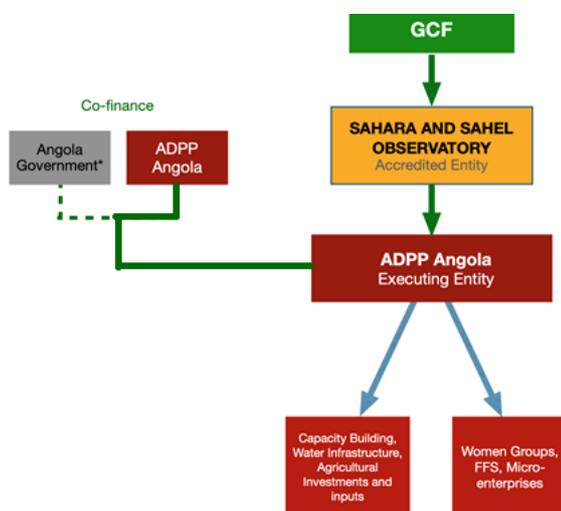
	Sahara and Sahel Observatory (OSS): Accredited Entity (AE)	<ul style="list-style-type: none"> • Provide qualified expertise; • Oversee overall financial and monitoring aspects of the project; • Reporting of project consolidated results to GCF; • Approval of project annual work plan and budget; • Approval of annual financial and technical reports; • Provide administrative and management support.
National Level		
2	Ajuda de Desenvolvimento de Povo para Povo Angola (ADPP): Executing Entity – (EE)	<ul style="list-style-type: none"> • Oversee project management and execution; • Grant management and overall financial aspects; • Provide Technical Advice, guidance, support to the project; • Communication, networking and partnership building;

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		<ul style="list-style-type: none"> Stakeholder engagement at national level; Monitoring and evaluation at the regional level and M&E data collecting; Providing technical and financial reports to OSS based on PMU reports;
3	National Government (Angola Ministries of Environment, Agriculture and Water & Energy)	<ul style="list-style-type: none"> Create a conducive environment for the program execution especially by mobilizing technical experts at the national level where needed; Provide political support and advocacy; Provide policy guidance; Ensure local government engagement and participation; Ensure ownership and sustainability; Dissemination of project results in national and international forums;
Provincial Level		
4	Ajuda de Desenvolvimento de Povo para Povo Angola (ADPP) Executing Entity – (EE)	<p>PMU based in the province and responsible for the following;</p> <ul style="list-style-type: none"> Coordinate project management and execution at the provincial and municipal level; Ensuring the project activities are implemented according to plan and have a positive impact on the beneficiaries; Ensure compliance with national technical standards and integration with government programmes; Consolidation the results from the project sites and link with the Provincial and municipal Steering Committees. Monitoring and evaluation at provincial and municipal level; Stakeholder engagement at Provincial level; Provide technical and financial reports to ADPP national level.
5	Provincial Project Steering Committee (PSC)	<ul style="list-style-type: none"> Meet once a quarter and provide strategic direction for the project at the provincial level; Facilitate cooperation between all project partners and facilitate collaboration between the project and other relevant programmes, projects and initiatives in the province. Advise on issues and problems arising during project implementation;
6	Local Governments (Provincial Government of Cunene, Provincial Cabinets of Agriculture, Environment, Education, Water & Energy, Social action, Family and promotion of Women, Health. Provincial Department of Civil Protection, IDA, IDF)	<ul style="list-style-type: none"> Create a conducive environment for the program execution especially by mobilizing extension workers and technicians at provincial; Ensure compliance with national and provincial strategies; Provide political support and advocacy; Provide policy guidance; Ensure ownership and sustainability;
Municipal Level		
7	Ajuda de Desenvolvimento de Povo para Povo Angola (ADPP) Executing Entity – (EE)	<ul style="list-style-type: none"> Manage execution of project activities at community-level; Ensuring the project activities are implemented according to plan and have a positive impact on the beneficiaries; Provide components progress reports to PMU. Stake holder engagement on municipal level.
8	Municipal Administrations, EDA, Municipal departments of above-mentioned provincial cabinets and departments.	<ul style="list-style-type: none"> Create a create a conducive environment for the program execution especially by mobilizing extension workers and technicians on municipal level; Support mapping of project areas and beneficiaries; Provide technical support to the project implementation; Ensure ownership and sustainability;
9	Municipal Project Steering Committee (MSC)	<ul style="list-style-type: none"> Meet once a month and provide strategic direction for the project at the municipal level ; Facilitate cooperation between all project partners and facilitate collaboration between the project and other relevant programmes, projects and initiatives in the municipality. Advise on issues and problems arising during project implementation.

11.2 Flow of Funds

Figure 33 - Flow of Funds diagram



The flow of funding for the project is depicted in the figure on the left. As the AE, OSS will receive the GCF funds. It will operate as the fund manager and implementing entity. OSS will channel funding to ADPP Angola, which will lead the project in Angola, and the execution of activities on the ground. Co-finance will be provided by ADPP Angola (in kind); and the Government of Angola (in kind) will be identified and fixed during the implementation phase of the project.

Funding will be deployed by ADPP to (i) execute the activities (capacity building, CCACs, awareness raising, operationalizing model plots, promoting the adoption of CRA practices, implementing the GSP, micro-scale irrigation infrastructure, etc.), and (ii) to provide support and small grants to Women Groups, FFS, etc., and clubs to establish and operationalize their micro-enterprises.

Implementation responsibilities are presented in the table below. ADPP is the EE for the entire project, and project partners supporting the implementation are presented per activity.

Table 32 - Actors involved in Execution, by Activity

Activity	The Executing Entity	Key actors involved in execution
Outcome 1: Strengthened adaptive capacity and knowledge management through gender-transformative climate risk reduction (GCF ARA1 & 2)		
Output 1.1 – Enhanced capacities for natural resources management and climate risk reduction with improved gender equity		
A1.1.1 Establish and operationalize women-led Climate Change Action Centers (CCACs).	ADPP	Municipal Administration, Soba's
A1.1.2 Raise awareness of local communities on climate risks for sustainable land and water management (SLWM) practices, and livelihood aspects.	ADPP	MINAMB, MASFAMU
Output 1.2 - Knowledge management and applied learning about climate risks is enhanced at national level		
A1.2.1 Provide training and capacity building of provincial and national-level entities on mainstreaming of climate risks and gender transformative adaptation measures.	ADPP	MINAMB, MASFAMU, MoAF (IDF and IDA)
A1.2.2 Peer-to-peer learning/ Systemization of knowledge/ Coordination among existing projects.	ADPP	MINAMB, MASFAMU, MoAF (IDF and IDA, National Radio of Angola)
Outcome 2: Enhanced water security and climate resilience through integrated water resource management (ARA 2)		
Output 2.1 – Improved management of water resources at the local level		

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A2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and potability interventions.	ADPP	MoAF
A2.1.2 Establishment of small-scale irrigation schemes at the community level.	ADPP	MoAF
Outcome 3: Diversified livelihoods and climate resilience of most vulnerable people and communities through resilient agroecology and microenterprise development (ARA 1)		
Output 3.1 - Adapted climate-resilient agriculture (CRA) measures for improved food security		
A3.1.1 Pilot and promote the adoption of Agro-Silvo-Pastoral Practices	ADPP	MINAMB, MoAF - IDA and IDF
A3.1.2 Implementation of small-scale adaptive infrastructure and capacity building for CRA	ADPP	MoAF and IDA
Output 3.2 - Diversified IGAs to increase community resilience against CC impacts		
A3.2.1 Facilitate IGAs for the communities' livelihood diversification		ADPP

Annex A: District-wise distribution of activities and predictive implementation timeline

Outputs	Activities	Number of Direct beneficiaries	Curoca	Cahama	Ombanja	Canhama	Cuvelai	Namacunde
Outcome 1: Strengthened adaptive capacity and knowledge management through gender-transformative climate risk reduction (GCF ARA 1, 2)								
Output 1.1 Enhanced capacities for natural resources management and climate risk reduction with improved gender equity.	A. 1.1.1 Establish and operationalize six women-led Climate Change Action Centers (CCACs)		X	X	X	X	X	X
	A. 1.1.2 Raise awareness of local communities on climate risks for SLWM practices, and livelihood aspects		X	X	X	X	X	X

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Outputs	Activities	Number of Direct beneficiaries	Curoca	Cahama	Ombanja	Canhama	Cuvelai	Namacunde
Output 1.2 Knowledge management and applied learning about climate risks is enhanced at national level	A. 1.2.1 Provide training and capacity building of provincial and national-level entities on mainstreaming of climate risks and gender transformative adaptation measures		X	X	X	X	X	X
	A. 1.2.2 Peer-to-peer learning/Systemization of knowledge/Coordination among existing projects		X	X	X	X	X	X
Outcome 2: Enhanced water security and climate resilience through integrated water resource management (ARA 2)								
Output 2.1 Improved management of water resources at the local level	A. 2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and potability interventions		X	X	X	X		

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Outputs	Activities	Number of Direct beneficiaries	Curoca	Cahama	Ombanja	Canhama	Cuvelai	Namacunde
	2.1.2 Establishment of Small-scale irrigation schemes at the community level		X	X	X	X		
Outcome 3: Diversified livelihoods and climate resilience of most vulnerable people and communities through resilient agroecology and microenterprise development (ARA 1)								
Output 3.1 Adapted climate-resilient agriculture (CRA) measures for improved food security	A. 3.1.1 Pilot and promote the adoption of Agro-Silvo-Pastoral Practices		X	X	X	X		
	A. 3.1.2 Implementation of small-scale adaptive infrastructure and capacity building for CRA		X	X	X	X		
Output 3.2 Diversified IGAs to increase community resilience against CC impacts	A. 3.2.1 Facilitate IGAs for the communities livelihood diversification		X	X	X	X	X	X

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TIMELINE	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
MAJOR ACTIVITIES	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	X																			
	X																			
	X																			
		X																		
		X																		
	X	X	X																	
		X																		
			X																	
		X	X																	
			X	X																
				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
		X				X														

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			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		X	X																	
									X	X										
				X	X	X	X	X	X	X	X	X	X	X						
				X	X					X	X									
			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		X	X																	
				X	X		X	X		X	X		X	X		X		X		
						X			X			X			X				X	
						X	X	X	X	X	X	X	X	X	X	X	X	X	X	
			X	X																
				X	X	X	X	X	X	X	X	X	X	X	X	X	X			

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							X	X	X	X	X	X	X	X	X	X	X	X	X	
Review of exit strategy															X					
Monitoring and Evaluation			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Annual CC Project Coordination meeting				X				X				X				X				X
Mid Term and Final Evaluation												X								X
Annual Reports					X				X				X				X			X

Annex B: Consultation Process (August 2023) for Annex 2 and Stakeholder Consultations Report and Engagement Plan (separate Annex)

National Stakeholder Consultations

The national stakeholder consultations were held in Luanda, Angola's capital for 3 days (14 – 17 August 2023). It included a combination of coordination and engagement meetings as well as a National Stakeholder Consultation Workshop (see Annex C).

14 August 2023

Introductions and coordination - ADPP

The national stakeholder engagement process was initiated with an introduction and coordination meeting at the ADPP Office in Luanda, including team members from OSS, ADPP, Humana People for People and E Co. The objective the meeting was a presentation of the different partners engaged in the project development and coordination on next steps of the engagement and consultation process. The discussions held addressed the following topics:

- Context on Angola and the Cunene Province.
- Background and timeline of the project.
- Agenda of the National Stakeholder engagement including meeting at the Ministry of Environment and the National Stakeholder Consultation Workshop.
- Agenda and logistics of the Stakeholder Consultations at the Province, municipalities, and community levels (see Section 3 on next steps).

Engagement and coordination - Ministry of Environment

The team from the MINAMB, the National Director for Climate Change and Sustainable Development, Luis Constantino; Ivone Pascoal, Director of the Mitigation and Adaptation; and Arlette Massala, Angola's GCF Focal point, kindly received the project formulation team: OSS, ADPP, Humana and E Co. To coordinate on the Technical National Stakeholder Consultation Workshop, Consultations at the Province, Municipalities, and communities and on next steps of the project development and approval process. The main topics discussed included:

- Acknowledgements to all the support from the MINAMB for the project development, since its Concept Note.
- Presentation of the agenda of the National Stakeholder Consultation Workshop and consultations at the provincial level in Cunene.
- Support needed from the MINAMB to issue the invitations for the Workshop and to inform the province Governor about the consultations to come at the province level.
- Request from the MINAMB that, for future events, the MINAMB is briefed and involved in advance / confirmation of the support requested.
- Overview on the ongoing Adaptation Fund project being implemented by OSS/ADPP.
- Invitation from OSS that the Republic of Angola becomes a member state of the Sahara and Sahel Observatory.
- Confirmation of the meeting with the Secretary of Climate Change of the MINAMB on 15.8.

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15 August 2023

Coordination - Ministry of Environment

The Secretary of State for Climate Action and Sustainable Development of the MINAMB, Paula Cristina Francisco Coelho; the National Director for Climate Change and Sustainable Development, Luis Constantino; and the Director of the Mitigation and Adaptation Department, Ivone Pascoal, received the project formulation team to update the Secretary on the national-level workshop and province consultations as well as on the development and approval process of the project. The invitation that Angola becomes a member state from OSS was well received by the Secretary Paula Coelho.

16 August 2023

National Stakeholder Consultation Workshop - Hotel Forum

The National Stakeholder Consultation Workshop (see Section 3 for details) was attended by representatives of the Government of Angola, civil society, and academy (see attendance list in Annex C 3.). After the project presentation (see Annex A on the workshop agenda) a general discussion was held with all participants regarding general aspects of the project such as food and water security challenges in Cunene, policy tools for climate adaptation at national, provincial, and municipal level, innovative water management technologies. In the following step of the workshop, participants were divided into three breakout groups to discuss the topics: i) Data availability; ii. Gender mainstreaming; and, and iii. Exit strategy and long-term sustainability. See Section 2 on main findings and Annex B on guiding questions used during the general and group discussions.

17 August 2023

Technical meeting for the project formulation and preparation for the province consultations - ADPP

The technical meeting following the National Workshop included ADPP, OSS, Humana People to People and E Co. and was focused on the description of the project activities. The team went through the each one of the project activities to identify gaps of information and next steps (see Section 3). ADPP's water expert also made a presentation on different water use and management solutions that would be applicable in the proposed project area.

The team also revised the agenda for the stakeholder consultation to come at the province, municipalities and communities' level and identified the main aspects to be confirmed by E Co's stakeholder engagement expert based in Cunene (e.g. logistics and confirmation of the agenda).

Provincial Stakeholder Consultations

In order to ensure that the proposed project is country-driven and fully responsive to local needs and to gather baseline data and information for the further development of the SAP FP, the project formulation team also conducted stakeholder consultations at the province, municipalities and communities (from 14 – 26 August 2023). The stakeholder consultations at the local level aimed to facilitate primary data collection, engage the communities and key beneficiaries, as well as seek validation of the proposed approaches, beyond the inputs collected during the National Stakeholder Consultation Workshop.

Day 1, Monday, August 14 - Provincial Level Commitment - Ondjiva		Ondjiva
Delivery of the information note to the Provincial Government		
Involvement with FRESAN provincial coordination	1 hour	Ondjiva
Day 2, Tuesday, August 15 - Commitment at provincial level - Ondjiva		Ondjiva
Consultation of the response in the informative note to the Provincial Government		

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Day 3, Wednesday, August 16 - Commitment at municipal level - Kwanhama		Ondjiva
Engagement with the provincial IDA	2 hours	Ondjiva
Involvement with provincial Education	1 Hours	
Day 4, Thursday, August 17 - Commitment at municipal level - Kwanhama		Ondjiva
Courtesy meeting with the Director of the Provincial Environment	1 hour	Ondjiva
Meeting with the Provincial Director of Agriculture	1 hour	
Day 5, Friday, August 18 - Municipal Engagement - Kwanhama		Ondjiva
Involvement of focus groups with the main local NGOs and CSOs, namely: CODESPA; ADRA, DW, LWF, TESE and ADPP.	4 hours	Ondjiva
Participation in a focus group with representatives of parents, teachers and directors of local schools - Kwanhama.	1 hour	Ondjiva
Engagement with SEREP	2 hours	Ondjiva
Day 6, Saturday, August 19		
Day 7, Sunday, August 20		
Day 8, Monday, August 21 - Municipal level involvement - Ombadja		Xangongo
Traveling from Ondjiva to Xangongo	1 hour	Xangongo
Focus group engagement in Ombadja with the municipal administration. Municipal departments of above-mentioned provincial cabinets and departments.	3 hours	Xangongo
Focus group with farmers' cooperatives: Farmer's Field Schools - Ombajda	2 hours	Xangongo
Travel from Xangongo to Cahama	1 hour	Cahama
Courtesy meeting with the Municipal Administration of Cahama	1 hour	Cahama
Focus group with farmers' cooperatives: Agricultural Field Schools - Cahama	2 hours	Cahama
Traveling from Cahama to Oncocua (Curoca)	3 hours	Oncocua
Day 9, Tuesday, August 22 - Community Level Commitment - Oncocua (Curoca)		Oncocua
Involvement of focus groups with the municipal administration of Curoca. Municipal departments of the aforementioned offices and provincial departments.	3 hours	Oncocua
Focus group with traditional authority/senior council representatives.	2 hours	Oncocua
Involvement in focus groups with women's groups/associations/cooperatives.	2 hours	Oncocua
Travel to Ondjiva	5 hours	Ondjiva
Day 10 ,Wednesday, August 23 - Commitment at provincial level - Ondjiva		Ondjiva
Focus group with representatives of the Provincial Government of Cunene: Provincial Offices of Agriculture, Environment, Education, Water and Energy, Social Action, Family and Women, Health; Provincial Department of Civil Protection.	3 hours	Ondjiva
Engagement with provincial educational institutions; Mandume Ya Ndemufayo University (Higher School of Pedagogy), Instituto Superior Politécnico, Instituto Superior Politécnico do Sul, Cunene Teacher Training School, ADPP Cunene Teacher Training School.	3 hours	Ondjiva
Involvement in focus groups with women's groups/associations/cooperatives (in the provincial capital): Associação Alma Esperançosa, Associação de Mulheres Empreendedoras.	2 hours	Ondjiva

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Day 11, Thursday, August 24th - Commitment at municipal level - Kwanhama		Ondjiva
Participation in focus group, departments of the municipality of Kwanhama; municipal administration, agriculture, education, environment, energy and water, social action, family and women, health.	2 hours	Ondjiva
Farmers Association focus group	2 hours	Ondjiva
Focus group with traditional authority/representatives of the council of sobas - Kwanhama.	2 hours	Ondjiva
Involvement with local Churches. (CICA and Catholic Church)	2 hours	Ondjiva
Day 12, Friday, August 25th - Involvement at municipal level - Cuvelai		Mukulongondji
Traveling from Ondjiva to Mukulongondjo	2 hours	Mukulongondji
Participation in a focus group in Cuvelai with the municipal administration. Municipal departments of aforementioned provincial offices and departments	3 hours	Mukulongondji
Focus group with farmers' cooperatives: Agricultural Field Schools - Cuvelai.	2 hours	Mukulongondji
Travel to Ondjiva	2 hours	
Day 13, Saturday 26 August		

For further details, please review the Stakeholder Consultations and Stakeholder Engagement Plan, included in the Environmental and Social Action Plan..

Annex C: Methodology (July – August 2021) of the preceding technical study (used in the pre-feasibility study)

During July – August 2021, ADPP developed a feasibility/technical study which has informed the development of this Annex 2 (Pre-Feasibility Study).

Extensive field visits were conducted, consisting of the collection of data and information from the proposed project area in the province of Cunene by a Consultant and ADPP senior staff member, supported by the ADPP team in Cunene. The main methodologies used were interviews with key informants, collection of ADPP experience with rural communities and past and present interaction with civil society. The holding of community meetings and focal groups during the field study was limited by the COVID19 pandemic.

The study developed and refined realistic and high impact interventions after consultation with all stakeholders. This included the provincial representations of the Ministry of the Environment, the Ministry of Agriculture and Forests, the Ministry of Education, the Ministry of Health, the Ministry of Energy and Water, the National Institute for Water resources, Department of Infrastructure, Department of Civil Protection, municipal authorities and NGOs operating in the province. Recommendations were made for the definition of the targeted geographical project area that is most appropriate within each of the six municipalities. This made particular reference to national parks and areas with predominantly Khoisan nomadic activity. Extensive consultations were made to obtain information on the ongoing emergency response activities following the severe drought that seriously affected the 2018/19 agricultural season and subsequent drought in 2020/21. It also analysed periodic flooding in high-risk areas to the south of the province. Other aspects included attitudes to the proposed climate smart agriculture and conservation agriculture interventions; Department of Education reaction to the proposed Green Schools intervention; and, with Municipality authorities the availability of infrastructure for Climate Change Action Centres (CCAC) and definition of any upgrading of facilities.

The project design phase was informed by stakeholder consultations with public institutions at national and provincial level, civil society, and communities, additional to originating from the long-term experiences and on the ground presence of ADPP. The CREW Concept Note was developed with ongoing interaction and consultation with the Ministry of Culture, Tourism and the Environment. At the Provincial level consultation was made with the following entities and details of the meetings.

The following are the key government departments that were consulted:

The Ministry of Agriculture and Forestry

- The Provincial Department of the Institute of Agrarian Development (IDA);
- Provincial Department of Agriculture and Forestry;
- The Provincial Department of the Institute of Veterinary Services (ISV);
- The Provincial Department of the Institute of Forestry Development (IDF);

Ministry of Education

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- Provincial Department of Education

Ministry of Energy and Water

- Provincial Department of Water

Ministry of Territory

- Provincial Department of Civil Protection;
- The municipality administrations of Cahama, Cuanhama, Ombanja, Cuvelai and Namacunde.

Ministry of Culture, Tourism and the Environment

- Provincial Department of Culture, Tourism and the Environment.

The non-government institutions consulted included civil society organizations and private sector companies with long-term experience with climate change related activities in Angola, notably ADPP, CODESPA, World Vision International Angola and Grupo Reis.

Annex D: Economic Analysis

Please see separate document.

Annex E: Bibliography

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