

## 1. Annex 10 – Economic and Financial Analysis

### 1 Introduction

The project addresses climate-specific vulnerabilities in the Cunene province for current and future impacts particularly affecting agriculture, food security and health of local communities who are dependent upon agriculture. The main impacts relate to increased temperature, decreased rainfall, and change in seasonality, increased severity of flooding through extreme events. This results in a severe impact on crop production, as shown where all major staple crops are either impacted by greater than 50% or not suitable. Women are particularly impacted by climate change as they are the principal farmers, water collectors, childcare, and cooking. Women are not only the first observers but also the first victims of climate change by their roles in looking after the family and responsibilities in food production, collecting fodder, fuelwood, and water collection.

The 'Empowering Women Groups to Build Resilience to Climate Impacts in the Province of Cunene in South-west Angola' project will take a gender transformative approach since women play a major role in water collection, agricultural work and have reduced access to education, finance and vocational training. The project will focus on capacity building of communities and establishing community-based enterprises or farmer clubs that will be trained in approaches for improving the resilience to climate change to diversify livelihoods, introduce sustainable practices and maintain, or enhance, production. Access to finance will be addressed through a step-wise process aimed at developing the capacity of community groups, initiating through village savings loans, GCF-funded grants and then provision of access to finance for enterprise investment once farmer clubs' business models are provided with appropriate training.

The project aims to target 300,000 beneficiaries including 120,000 directly through the provision of training, equipment and a 'revolving fund', which will be further examined during full proposal development. The beneficiaries include 39,500 farmers and their families (237,000 total), who will benefit from climate-resilient agriculture and livelihood diversification activities, while the remaining beneficiaries include those reached directly by awareness-raising programmes.

The project will achieve a paradigm shift by focusing on women's groups, the development and implementation of climate-resilient agriculture and the provision of mechanisms for access to finance and training for farmer clubs and micro-enterprises.

The project is closely aligned with the draft National Strategy for Climate Change; the Post Disaster Needs Assessment for Cunene 2012-16 and contributes to multiple of the SDGs.

The project will be implemented by OSS, a regional direct access entity, and executed by ADPP, a national NGO with considerable presence and over 30 years of experience in Angola. The project will complement a recently approved Adaptation Fund project in neighbouring regions in Angola, and the watershed in Namibia, offering potential for greater synergies and upscale.

The project is organised into 2 components and 4 outcomes:

**Outcome 1: Strengthened adaptive capacity and knowledge management through gender-transformative climate risk reduction (GCF ARA 1, 2)**

The enabling capacities for women will be increased to improve agriculture, nutrition and food security in the face of climate change. This requires a transformative approach across a

wide range of enabling sectors to enhance their capacity to tackle vulnerabilities. It also addresses the underlying barriers that women are more vulnerable and less empowered to tackle and take leadership on these matters. Thus, a gender transformative approach will be undertaken to build skills and knowledge in climate resilient agriculture, business development and empowering women as champions and decision-makers.

Under this Outcome, the project addresses the lack of awareness, knowledge and understanding of climate change, climate change impacts and appropriate adaptation options. It specifically targets to do so by gender-transformative approaches, empowering women to be at the centre of the community as adaptation champions, and by addressing specific barriers that currently hinder women, girls, and youth's rights and access to capacity building, decision-making and resources, among others. Building on previous experiences, the project will operate through establishing and operationalizing Climate Change Action Centres (CCACs), out of which activities will be coordinated and implemented.

This will contribute to GCF result area ARA 1 "Most vulnerable people and communities" and ARA 2 Health, well-being, food and water security.

**Output 1.1 Enhanced capacities for natural resources management and climate risk reduction with improved gender equity.**

Output 1.1. will build capacities for natural resources management and climate risk reduction through a package of communication for resilient activities; build entrepreneurship capacities of women groups with the potential to become leaders in climate action, conduct a capacity-building programme to address specific gender barriers that prevent women from accessing resources, knowledge and taking leadership to tackle climate change:

**1.2 Knowledge management and applied learning about climate risks are enhanced at the national level**

Output 1.2 will establish women-led Climate Change Action Centres; promote youth as an agent of change against climate change, establish the Green Schools Programme and Environmental Clubs for young people agents, and disseminate lessons learnt and national and subnational levels.

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

component aims to deploy concrete Adaptation activities with a focus on women's empowerment. It targets adaptation of rural livelihoods to the climate impacts identified, by (a) promoting the wide-scale adoption of climate-resilient agricultural (CRA) practices through demonstration plots, introducing adapted seed varieties and local seed multiplication and storage schemes, and climate-resilient school gardens; and (b) facilitating diversification of production and income through promoting short-cycle animal husbandry and horticulture, and through facilitating micro-grants to women groups for new climate-smart income-generating activities.

These livelihood activities, in these rural areas mostly dependent on natural resources, will be accompanied by activities that protect and enhance the surrounding ecosystems, through tree planting, agroforestry and campaigns to stop slash-and-burn agriculture.

Climate Resilient Agriculture aims to simultaneously achieve two outcomes:

- (i) Increased productivity, since producing more food increases food and nutrition security and boosts the incomes of 75 per cent of the world's poor who live in rural areas and mainly rely on agriculture for their livelihoods:

- (ii) Enhanced resilience, since it reduces vulnerability to drought, pests, disease and other shocks; and improves capacity to adapt and grow in the face of longer-term stresses like shortened seasons and erratic weather patterns. Additionally, and however not specifically targeted, CRA practices introduced reduce carbon emissions, since they pursue lower emissions for each calorie or kilo of food produced, avoid deforestation from agriculture and identify ways to sequester carbon in soils and ecosystems.

This Outcome responds to GCF Result Area ARA 2 Health, well-being, food and water security.

**Output 2.1 Improved management of water resources at the local level**

Output 2.1 will support the demonstration and adoption of improved varieties of drought-tolerant crops organized and coordinated by women; the demonstration plots for farmer-to-farmer training; establish school gardens with irrigation for school feeding programmes; and enhance climate resilience of surrounding ecosystems for improved ecosystem services in the context of climate change.

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

This will contribute to GCF result area ARA 1 “Most vulnerable people and communities”

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

Output 3.1 . will empower women groups for the diversification of farming systems by passing on loan systems for seeds and small animals, supporting women-led small-scale irrigation schemes for the production of vegetables (where feasible) will be promoted; and promoting the diversification of income from no-farm sources and strengthening women’s businesses through women’s savings groups and micro-enterprise development.

Aligned with the GCF Integrated Results Management framework, the programme is expected to deliver the following adaptation results:

- a) 120,000 direct beneficiaries
- b) 180,000 indirect beneficiaries

Representing 20% of the rural population of the Province of Cunene (1.1% of the country’s total population)

**Output 3.2 Diversified IGAs to increase community resilience against CC impacts**

## 1.1 Methodology

The methodology consists of 3 steps presented below.

- Step 1. Assess financial and economic climate impacts on the agricultural sector: The first step requires developing a baseline assuming a "without project" Business as Usual (BAU) scenario - (i.e., with climate change but without any project measures to reduce vulnerability and build resilience). This scenario provides the counterfactual model for the agricultural sector based on the findings of the Feasibility Study (Annex 2), which has included an analysis of data on past climate change trends and future scenarios and climate risks.

- Step 2. Develop cost parameters and assumptions for a portfolio of adaptation measures: The second step requires developing the adaptation scenario by gathering cost and benefit parameters for the identified prioritized adaptation measures and consulting with key stakeholders to verify underlying assumptions. These parameters are also used to develop the bottom-up project budget presented in Annex 4.
- Step 3. Prepare an economic and financial analysis of the costs and benefits of proposed adaptation measures: The third step involves calculating the net financial and economic costs and benefits incurred by implementing the proposed adaptation measures.

The financial analysis estimates the increase in incremental income over the baseline (business as usual) scenario as a result of investments in adaptation packages to transform agricultural systems and increase resilience to climate change by smallholder farmers.

Revenues per hectare for each crop are represented by the sum product of:

- The yield per hectare
- The market price per unit.

This method assumes *ceteris paribus*, meaning that all other factors affecting agricultural production systems remain constant. Although in practice there is a dynamic behaviour of family farmers in the management of productive systems, use of inputs, destination of production and technological advances, among others, this analysis holds these variables as fixed. Therefore, the differential of financial benefits is directly related to the productive increase that is generated by the greater productive capacity of agroecological systems adopted by family farmers in the with-project scenario.

The analysis assumes market prices of inputs and outputs. The financial analysis includes the following assumptions:

- Financial discount rate of 14.2% (estimated at 2X the commercial bank deposit rate, to reflect the risks of smallholder agriculture)
- Evaluation horizon of 5 years (period of GCF funding) and 20 years based on the proposed investments and according to the project Pre-Feasibility Study.
- Adoption of multiple adaptation packages by farming families (e.g., for crops and livestock) in proportion to their current coverage in each district.

The economic analysis assesses the net incremental benefits the project yields for society. The economic analysis compares costs and benefits in the counterfactual (business-as-usual) scenario versus the costs and benefits that accrue in the improved (with-project) scenario.

The analysis considers one type of benefit: Avoided costs from malnutrition that result from the improved agricultural production as well as the eggs, milk and meat production from small animals. Since avoided health costs represent a public good, they are not captured by markets and are not usually included in farmers' decision-making processes. Non-marketable benefits are avoided Disability Adjusted Life Years (DALY) caused by malnutrition. The avoided loss of DALYs is then monetized to represent avoided health costs.

The economic analysis includes the following assumptions:

- Economic discount rate of 10.3% (the yield on 30 March 2022 for the Government's 20-year Treasury bond, which represents the opportunity cost if the Government had to borrow to fund the investments)
- Evaluation horizon of 5 years (period of GCF funding) and 20 years (estimated time of agricultural investments)
- Gradual adoption of adaptation packages by farming families over the 5-year implementation period

## 2 Programme benefits

### 2.1 Financial and Economic Climate Impacts on the Agricultural Sector

As noted in the Feasibility Study (Annex 2), climate change is leading to significant changes in temperatures, precipitation, and droughts. The data show increased maximum and minimum temperature, especially in the south of the country, in the Cunene region and neighbouring regions; the central-southern region of Angola, in particular the Cunene region shows a marked decrease in precipitation; and the frequency of droughts is greater in Cunene, Medio Cunene and Cuvelai hydrological units.

These changes are expected to lead to negative impacts in all five agricultural major crops in the Cunene region presenting considerable food security threats to the population. In particular, the Cunene region is amongst the most heavily impacted regions for negative climate change impacts on agriculture.

The financial analysis assumes that changes to growing conditions will lead to incremental reductions in agricultural productivity, and a resultant decrease in yield per hectare or household for selected crops, as indicated in the table below:

**Table 1: Predicted Climate Change Impacts on Production of Agricultural Crops<sup>1</sup>**

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	1,659	0.5	1,211	0.5	-53	-1	-3	-646
Maize	14,628	0.4	12,766	0.4	Estimated based on neighbouring region			
Sorghum	56,231	12.4	11,974	12.4	-28	-3	-18	-3322

### 2.2 Summary of Evaluated Outputs

The analysis takes into consideration benefits that are derived from the following outputs and activities.

#### **Output 3 .1 - Climate-resilient agriculture (CRA) practices are demonstrated and widely adopted**

##### *A 3.1.1 Pilot and promote the adoption of Agro-Silvo-Pastoral Practice*

The activity will facilitate the introduction of short-season, adapted varieties of cereals and legumes will improve the efficiency of natural resource management. The project will promote crops with improved and adapted germplasm that has been developed through

<sup>1</sup> 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.*

natural breeding (not hybrid or genetically modified organisms – GMO). Some examples are pearl millet, sorghum (variety Macia), short season determinant cowpea (IT18 type), Bambara nuts, pigeon pea, orange flesh, sweet potato and cassava. Smallholder farmers will select the most appropriate crops based on characteristics such as yield, grain type and palatability. Then, selected crop varieties will be multiplied at the multiplication schemes. Women groups running the seed multiplication schemes will receive training on seed selection and conservation. Furthermore, the project will promote partnerships with agricultural dealers willing to buy the surplus of seeds to contribute to the sustainability of this activity.

In support of scaling-up activities, the project will improve the seed and grain storage systems, expected to be led and organized by women. As the farmers diversify production, the project will assist in constructing more traditional grain storage systems, and monitor their use, ensuring that the farmers are aware of methods of ensuring proper ventilation and avoiding excess heat and humidity. Low-cost, low-tech models of seed bank models will be promoted and also training will be provided in seed selection, as well as in how to calculate how much to bank, eat and sell.

#### *A3.1.2 Implementation of small-scale adaptive infrastructure and capacity building for CRA*

### **3.2 Diversified IGAs to increase community resilience against CC impacts**

#### *A3.2.1 Facilitate IGAs for the community's livelihood diversification*

Therefore, the project will work to strengthen agricultural and non-food value chains by removing limitations and improving the efficiency of transactions thereby increasing the profit of small businesses run by women. In practical terms, loans will be provided to entrepreneurial women in solidarity groups for village banking for agricultural and non-agricultural value chains. ADPP has successfully implemented women's village banking schemes in other provinces.

This works as follows:

1. Entrepreneurial women will form a solidarity group of 10-15 members.
2. The women will undergo training in the basic principles of microfinance, village banking and business planning. They will be supported to open a group bank account. Adult literacy and numeracy will be provided if necessary. The women will then present a basic business plan;
3. Each solidarity group will be expected to save and deposit 10-20% of the value of the loan in a bank account as a guarantee. The project will provide the other 80-90%;
4. Once their micro-enterprises are operational, and grants can be repaid, the project will support the groups/enterprises to prepare a credit application to access loans that are provided by the Bank of Angola.

#### **2.2.1 Contribution of other project activities**

The following outputs are not directly evaluated in the financial analysis:

- Outcome 1
  - Outputs 1.1, 1.2 and the respective activities
- Outcome 2
  - Output 2.1 and activities 2.1.1 Undertake groundwater and surface water assessment to identify and establish the most viable water solutions and

portability interventions and A2.1.4 2.1.2 Establishment of Small-scale irrigation schemes at the community level.

The reduced financial losses and increased incomes assumed in the financial analysis depend on the successful deployment of these non-evaluated components and outputs, however, they do not reflect investment decisions at the farm level. Moreover, the non-evaluated components (and especially A.2.1.3 Establish school gardens with irrigation for school feeding programmes) contribute significantly to the economic benefits of the project. The relevance of these outputs is summarized below:

**Output 1.1 Enhanced capacities for natural resources management and climate risk reduction with improved gender equity.**

*A1.1.1 Establish and operationalise six women-led Climate Change Action Centers (CCACs)*

*A 1.1.2 Raise awareness of local communities on climate risks for SLWM practices, and livelihood aspects*

**Output 1.2 Knowledge management and applied to learn about climate risks are enhanced at the 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.*

*A1.2.2 Peer-to-peer learning/Systemization of knowledge/Coordination among existing projects*

**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 portability interventions*

*A 2.1.2 Establishment of Small-scale irrigation schemes at the community level*

### 3 Financial Analysis

The estimation of financial returns is based on a hypothetical farming family cultivating 1.56 hectares of land. The activities involved are not entirely distinct, as farmers may engage in several activities supported by the project. There are instances where multiple interventions may bolster the same agricultural product. Rather than attempting an isolated assessment of the impact of each proposed output and activity, the analysis centres around the cumulative advantages resulting from agricultural enhancements.

The incremental benefits specific to the project scenario are estimated based on the proposed activities. Financial outcomes are assessed through three distinct scenarios: (1) assuming the persistence of prevailing conditions (BAU), (2) considering project investments directly undertaken by farmers without external aid, and (3) incorporating support from the GCF alongside co-financing. It is noteworthy to emphasize that the probability of scenario (2) materializing is minimal, given that the project is designed to significantly strengthen capacity and offer assistance to fortify the supportive framework. In scenario (2), the assumption is that farmers will autonomously overcome barriers relating to information, capacity, policies, and coordination that currently obstruct climate-related actions. Moreover, it presupposes that farmers will independently secure resources to execute these measures, potentially resorting to commercial loans, despite the absence of real-world evidence corroborating such conduct. Consequently, the financial returns envisaged in scenario (2) epitomize the most excessively optimistic conceivable scenario in the absence of GCF support.

*Table 2- Commodity mix*

Commodity	Percentage of farm area
1. Beans	6%
2. Groundnut	2%
3. Sorghum	69%
4. Casava	5%
5. Maize	18%

*Table 3 - Estimated losses and gains<sup>2</sup>*

	BAU		Interventions without GCF		Interventions with GCF	
	2050 year % loss	% increase due to interventions	2050 year % loss	% increase due to interventions	2050 year % loss	% increase due to interventions
Production -						
1. Beans	- 58.0%	0%	- 52.2%	0%	-29.00%	5%
2. Groundnut	- 53.0%	0%	-47.7%	0%	-26.50%	5%
3. Sorghum	- 28.0%	0%	-25.2%	0%	-14.00%	5%
4. Casava	- 100.0%	0%	-90.0%	0%	-50.00%	5%
5. Maize	- 50.0%	0%	-45.0%	0%	-25.00%	5%

<sup>2</sup> Assumptions based on Sang, X., Chen, C., Hu, D. et al. Economic benefits of climate-smart agricultural practices: empirical investigations and policy implications. *Mitig Adapt Strateg Glob Change* 29, 9 (2024). <https://doi.org/10.1007/s11027-024-10104-w> <https://link.springer.com/article/10.1007/s11027-024-10104-w>

**Table 4- Incremental benefit over BAU (USD)**

Net income analysis	5 year total (USD)	10-year Total (USD)
Interventions without GCF versus BAU	18.38	75.49
Interventions with GCF versus BAU	1,930.71	4,200.87

**Table 5 – Financial indicators**

	5-Year NPV (USD)	10-Year NPV (USD)	20-Year NPV (USD)
Interventions without GCF versus BAU	10.95	30.42	55.51
Interventions with GCF versus BAU	1,306.05	2,098.89	2,820.60

As indicated in the results presented above, farmers potentially could reduce their financial losses without GCF support. However, the anticipated net benefit from these changes would be very small even over a 10-year timeframe. GCF support is necessary to provide a sufficient financial incentive for farmers to shift from long-established practices and embrace the time and financial opportunity costs required to implement the proposed climate resilience interventions.

### 3.1 Economic analysis

An economic analysis was performed to assess the net incremental benefits the project yields for society. The economic analysis compares costs and benefits in the counterfactual (business-as-usual) scenario versus the costs and benefits that accrue in the improved (with-project) scenario.

The analysis considers two types of benefits: (1) marketable benefits that come from avoiding climate change-related losses and increasing production in climate-resilient agricultural systems, and (2) non-market benefits that provide a benefit to society but are not captured by private actors and are not usually included in farmers’ decision-making processes.

The incremental economic benefit from agriculture comes from a cost-benefit analysis, which considers the increase in production in climate-resilient agricultural systems, comparing the situation with and without the project. It considers the same methodology and assumptions that are specified in the financial analysis, but with the difference that the full costs of project implementation are included, as are societal benefits that might not be captured fully by individual farmers. These costs include GCF investment and co-finance during the project

period as presented in Annex 3 (Detailed Budget Description). As noted previously, all proposed project interventions are considered necessary to the interlinked financial and non-financial barriers and support the successful delivery of climate resilience benefits and co-benefits at the farmer level.

Project benefits include the cumulative net financial benefits for participating farmers compared to business-as-usual, and non-financial benefits like the value of time savings and environmental protection.

The net present value (NPV) of the project-level investment is calculated using a discount rate of 10.3%. This figure represents the Angola Treasury Bill Rate for Government Securities data in 2022. The use of the Treasury Bill Rate for Government Securities is justified as this is the rate at which the Government would have to borrow to fund equivalent investments in the absence of financing. The sensitivity analysis is performed using alternative discount rates.

The projected return varies depending on the period of analysis. The figures below present the NPV and Economic Internal Rate of Return (EIRR) for the 5-year implementation period and an estimated 20-year investment lifetime. Given the project’s focus on long-term agriculture interventions that often last for longer periods, the 20-year investment lifetime is considered most appropriate for this analysis and is aligned with the project lifetime.

The cost-benefit analysis spreadsheet (Annex X) presents these calculations in detail, with the results summarized below:

*Table 6 - Summary - Economic Costs & Benefits*

Direct Project Costs (USD) - including GCF costs, and co-finance	5-YEAR TOTAL	20-YEAR TOTAL
Total Direct Costs (USD)	- 9,994,032	- 9,994,032
Marketable Project Benefits (USD)	5-YEAR TOTAL	20-YEAR TOTAL
Total Marketable Benefits - direct (USD)	8,044,617	39,866,671
Non-marketable Project Benefits (USD)	5-YEAR TOTAL	20-YEAR TOTAL
Total Marketable Benefits - direct (USD)	1,053,120	8,951,520
<b>SUMMARY</b>	<b>5-YEAR TOTAL</b>	<b>20-YEAR TOTAL</b>
Net Benefit, direct (marketable)	-1,949,415	29,872,639
Net Benefit, direct (marketable + non-marketable)	-896,295	38,824,159

### 3.2 Marketable benefits from project interventions

The economic cash flow analysis assumes that no financial benefits are seen in Year 1 of the project, 25% of farmers generate the expected benefits in Year 2, 50% in Year 3, 75% in Year 4, and 100% in Year 5, and then continuing until Year 20.

Net present value and economic internal rate of return considering only marketable benefits are presented below:

*Table 7 - ENPV and EIRR summary – marketable benefits only*

Economic returns, Discount rate 14.2%		
Direct, marketable benefits only	5 Years	20 Years
NPV	Negative	7,541,366
IRR	Negative	34%

When only marketable benefits are considered, project NPV is negative over the 5-year timeframe. As noted in the financial analysis discussion, the project makes significant up-front investments in the first years to support farmers in making gradual changes to their production systems. These future benefits are depressed by the use of a high discount rate that downplays the importance of long-term investments. In addition, the direct marketable benefits are presented in comparison to baseline revenues that result in many cases from overexploitation of resources.

### 3.3 Non-marketable benefits from project interventions

The key non-market benefit from the project analysed was the reduced impact of malnutrition. The benefit is valued as avoided health costs due to reduced Disability Adjusted Life Years (DALYs).

### 3.4 Sensitivity Analysis

A sensitivity analysis was conducted to examine the influence of varying parameters on project returns. This kind of analysis proves valuable in situations where the enduring validity of project assumptions might be uncertain.

#### 3.4.1 Financial Analysis

The sensitivity analysis specifically investigates the ramifications of elevating the discount rate which subsequently diminishes the significance attributed to costs and benefits anticipated in the future. Given the project's emphasis on instigating lasting investments, increasing the discount rate is anticipated to significantly curtail the economic net present value.

*Table 8-Sensitivity analysis - discount rate changes*

Discount rate	5-Year NPV	10-Year NPV	20-Year NPV
14.2%	1,306.05	2,098.89	2,820.60
15%	1,280.73	2,031.64	2,683.63
25%	1,021.13	1,416.40	1,615.62
35%	838.30	1,059.49	1,129.02
45%	704.79	835.06	862.04

A second sensitivity analysis examines the effect of reduced project impact. The analysis evaluates NPV assuming annual marketable benefits are equal to 120%, 110%, 90%, 80%, 70% of the expected benefits.

*Table 8-Sensitivity analysis – project marketable benefit changes*

Benefits	5-Year NPV	10-Year NPV	20-Year NPV
100%	1,306.05	2,098.89	2,820.60
120%	2,089.19	3,290.42	4,336.48
110%	1,697.28	2,693.64	3,576.48
90%	915.50	1,506.16	2,068.84
80%	525.62	915.45	1,321.15
70%	136.41	326.74	577.51

### 3.4.2 Economic Analysis

The sensitivity analysis of the economic benefits investigates the ramifications of elevating the social discount rate. As with the discount rate such elevations subsequently diminish the significance attributed to costs and benefits anticipated in the future.

*Table 8-Sensitivity analysis - discount rate changes*

Impact of economic discount rate change on marketable benefits	5-Year NPV	10-Year NPV	20-Year NPV
10.30%	-1,765,515	2,570,200	7,584,651
15%	-1,673,362	1,455,418	4,172,048
20%	-1,576,134	674,976	2,148,937
25%	-1,482,156	164,820	994,907

A second sensitivity analysis examines the effect of reduced project impact. The analysis evaluates economic NPV assuming annual marketable and non-marketable benefits are 10%, 25% and even 45% less than expected.

*Table 9- Sensitivity analysis, reduced project impact*

Impact of reduced project benefits	5-Year NPV	10-Year NPV	20-Year NPV
0%	-1,765,515	2,570,200	10,711,390
10%	-2,366,275	1,535,869	8,862,940
25%	-3,267,414	-15,628	6,090,265
45%	-4,468,933	-2,084,290	2,393,365

The economic NPV remains positive for reduced project benefits up to 10% over 10 years and it remains positive for all scenarios over 20 years.

## 4 Conclusion

The results of the economic and financial analysis show that the project does not generate sufficient financial returns to incentivize farmers without GCF funding. At the same time, the project generates robust economic benefits from a societal perspective, contributes to the

long-term sustainability of productive landscapes in Angola, and supports the GCF's goal of low-carbon and climate-resilient development.