ADAPTATION FUND

AFB/PPRC.35/Inf.1
17 March 2025

Adaptation Fund Board
Project and Programme Review Committee
Thirty-fifth Meeting
Bonn, Germany, 8-9 April 2025

PROPOSAL FOR EGYPT

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY:

Country/Region: Egypt
Project Title: Climate Change Adaptation to Improve Livelihoods in Siwa Oasis (CCAILSO)
Thematic Focal Area: Multisector
Implementing Entity: Sahara and Sahel Observatory (OSS)
Executing Entities: Ministry of Agriculture - Desert Research Center (DRC)
AF Project ID: AF00000331
IE Project ID: **Requested Financing from Adaptation Fund (US Dollars):**
Reviewer and contact person: Ahmad Ghosn **Co-reviewer(s): -**
IE Contact Person: Khaoula JAOUI

Technical Summary	The project "Climate Change Adaptation to Improve Livelihoods in Siwa Oasis" aims to strengthen the resilience of the SIWA Ecosystem while improving the community's livelihoods to climate impacts through the enhancement of soil and water management systems, agricultural production and promotion of ecotourism. This will be done through the three components below: Component 1: Improving water resource access and management (USD 2,375,000); Component 2: Enhancing resilience of Siwa Oasis ecosystems to climate change impacts (USD 1,765,000); Component 3: Diversifying the livelihoods through IGAs and value chain addition (USD 1,994,000). Component 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts (USD 641,549). Requested financing overview: Project/Programme Execution Cost: USD 600,000 Total Project/Programme Cost: USD 7,375,549 (total components cost + execution cost) Implementing Fee: USD 624,451 Financing Requested: USD 8,000,000 The initial technical review raises several issues, such as providing more details on the concrete activities, highlighting the climate change adaptation nature of the IGAs, revising the calculations of some project costs,

	providing details on the lessons learned from related/ ongoing projects, providing more details on the consultation process, discussing the key areas of sustainability aspects of the project outcomes, revising the information provided in AF E&S checklist and consistency with ESMP, discussing other project management risks other than financial risks, clarifying the budge provisions for ESMP implementation, providing a breakdown of the implementing entity fees, M&E budget, revising some information provided in the project results framework and AF core indicators, among others as indicated in the Clarification Requests (CRs) and Corrective Action Request (CARs) raised in the review. The second technical review finds that most of the CRs and CARs of the initial review are addressed. However, few remaining CRs and CARs are insufficiently addressed. These include providing details on the project activities including USPs, clarifying "further assessments" needed for USPs, providing numbers for some targets of the results framework, and reflecting some implementing entity fees, among others as indicated in the review. Please be advised that the findings of the AFB Secretariat's review of the funding proposal(s) do not reflect, indicate, or prejudge the outcome of the reaccreditation process currently underway. The Implementing Entity (IE) shall acknowledge that the funding proposal will not be approved by the Board if the IE's accreditation has expired, and reaccreditation has not been achieved at the time of the Board's decision. Notwithstanding this potential risk, the IE has elected to proceed with the development of the funding proposal.
Date:	**13 February 2025**

Review Criteria	**Questions**	**Initial Technical Review Comments November 10, 2024**	**Second Technical Review Comments February 13, 2025**
Country Eligibility	1. Is the country party to the Kyoto Protocol and/or the Paris Agreement?	**Yes**.	-
	2. Is the country a developing country particularly vulnerable to the adverse effects of climate change?	**Yes.** Egypt is highly vulnerable to climate change impacts including , temperature increase and heat waves, dust storms, storms along the Mediterranean coast and extreme weather events.	-
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	**Yes.** As per the Endorsement letter dated 23 April 2024 (See Annexes: 1. Endorsement Letter).	-
	2. Does the length of the	**Yes.** However, the issues indicated	

	proposal amount to no more than One hundred (100) pages for the fully-developed project document, and one hundred (100) pages for its annexes?	below need to be addressed. **CR1:** Add "CCAILSO" to the abbreviations list and spell out abbreviations when first used throughout the document. **CR2:** Proof reading/editing of the document is recommended. **CR3:** The project overall objective statement, paragraph 36, p. 9, is lengthy **(**This project aims to bolster the resilience of the Siwa ecosystem while……as well as promoting ecotourism). Re-phrase objective in one concise statement. **CAR1:** At the end of Part I B **(**Progamme/ project objectives) add a statement to indicate the AF Strategic objectives/ outcomes supported by the project.	**CR1: Cleared.** **CR2: Cleared.** **CR3: Cleared.** See paragraphs 36 (p. 9) and 43 (p. 11). **CAR1:** Cleared, See paragraphs 41-42 (pp. 9-10).
	3. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?	**Yes.** Concrete actions include modernizing irrigation channels, installing efficient water pumps, upgrading drainage systems/ installing new ones, demonstration plots on sustainable land management, tree nurseries, green belts for sand dunes fixations, income generating activities/ IGAs (beekeeping, ecotourism, zero grazing, etc.), among other capacity building activities as described in Part II A, pp.11-23. The project includes some USPs related to the water solutions activities under outcome 1.2, promotion and implementation of SLM & agro-sylvo-pastoral practices under outcome 2.1; and the income generating activities	

		(IGAs) under outcome 3.1. The management of these USPs as per AF requirements is discussed in Part III C, pp. 54-55. However, it would be recommended to provide more details on the concrete interventions and highlight the CC adaptation aspects of the IGAs. Also, please provide a brief discussion on the project theory of change (TOC) and a schematic presentation of the same. Moreover, the calculations of total project cost and the percentages of the execution costs and implementation fee need to be revised. **CR4:** provide more details on the concrete activities interventions (number of water boreholes and pumps, length of drainage systems to be upgraded/ installed, area of the green belt to be established, number of plant/ tree nurses, etc.), and highlight the climate change adaptation nature of the IGAs. **CR5**: include a brief discussion on the project theory of change and a schematic presentation of the same **CR6:** In Table 3, p. 10, add subtotal of each component and delete the % column. Also, remove decimals and present amounts to the nearest dollar. **CAR2:** Revise the bottom rows of Table 3, p.10. The total project cost (TC)	**CR4: Not Cleared.** More details on all activities including USPs are needed to justify requested funds. Details may include numbers of wells/ boreholes, nurseries, demonstration plots, capacity building sessions; estimated greenbelt/ dune fixation areas; estimated IGAs number; In fact, the budget notes include details that can be used and/ or further expanded. The allocated budget of USD 570,000 for IGAs must be justified (how many IGAs?). Also, highlighting climate change adaptation aspects of the IGAs is needed to avoid as possible business-as-usual development IGAs (non-agriculture/ non-climate change based). **CR5: Cleared.** See paragraphs 46-51 and Figure 9 (pp.11-12) **CR6: Cleared.** See Table 3, p. 10. **CAR2: Cleared.** See Table 3, p.10.

		should be equal to the components cost plus execution cost (EC). **CAR3:** All Costs/ fees amounts should be rounded to the nearest whole number dollar (i.e. no decimals). Apply throughout the whole document.	**CAR3: Cleared.**
	4. Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations, while avoiding or mitigating negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?	**Yes.** See Part II B, pp. 23-45 for related discussions. **CR7:** In paragraph 125, p.25, change the term "AF ESS" to AF ESP".	**CR7: Cleared.** See para 136, p. 26
	5. Is the project / programme cost effective?	**Yes.** See Part II C, pp. 25-28, for related details.	-
	6. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?	**Yes.** See Part II D, pp. 29-30, for related discussions.	-
	7. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?	**Yes.** See Part II E, pp. 30-33 for related information.	-

	8. Is there duplication of project / programme with other funding sources?	**No.** See Part II F, 33-34. However, while complementarities/ synergies with relevant potentially overlapping projects are outlined, lessons learned from these projects are not indicated (i.e.: building on positive practices and avoiding problems/mistakes are considered in the project design). **CAR4:** In Part II F, Table 10, include a column to briefly indicate the lesson learned, if any, and briefly discuss how these lessons were considered in project design.	**CAR4: Cleared.** See Table 10 pp. 35-36.
	9. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?	**Yes.** As reflected in Component 4 "Learning and knowledge management" and in Part II G (pp. 34-39).	-
	10. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations in compliance with the Environmental and Social Policy and Gender Policy of the Fund?	**To a large extent.** See Part II H, pp. 39-41. However, more information is needed on the consultations' participants, outcomes, and a brief indication on how these outcomes were considered in project design. **CAR5:** In Part II H, provide in tabulated form a summary of consultations with the communities and other stakeholders, including date, number of participants (with due consideration to gender aspects (i.e., number of women), topics discussed, outcomes, and these outcomes were considered in project design/ activities). **CR8:** Revise paragraph 172, p.40, on the	**CAR5: Cleared.** See Para 181 (pp. 41-42) and Table 15, pp. 43-44. **CR8: Cleared.** See Para 181 p.42.

		communities and stakeholders' consultations for more clarity. **CR9:** Make sure the USPs mentioned in paragraphs 176, p.41, and paragraph 214, p. 55, are consistent and include those under outcomes 1.2, 2.1 and 3.1.	**CR9: Cleared.** See paragraphs 64 (p.15),92 (p.19), 106,107,108 (p. 22).
	11. Is the requested financing justified on the basis of full cost of adaptation reasoning?	**Yes.** See Part II"I", pp. 41-43, for related discussions.	-
	12. Is the project / program aligned with AF's results framework?	**Yes.** See Part III E and Part III F.AF outcomes 2, 3, 4, 5,6 , 7 and 8 identified.	-
	13. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	**Not fully.** See Part IIJ, pp. 43-44. Besides the provided information, please briefly discuss under dedicated titled/ heading the key areas of sustainability including limited economic, social, environmental, institutional, financial, etc. **CAR6:** Briefly discuss under dedicated titles/ headings the key areas of sustainability including but not limited to economic, social, environmental, institutional, and financial.	**CAR 6: Cleared.** See revised paragraphs 195-200, pg. 46-47.
	14. Does the project / programme provide an overview of environmental and social impacts / risks identified, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?	**To a large extent.** See Part IIK, pp. 44-48. However, few issues indicated below need to be addressed. **CAR7:** In Table 17, pp.45-48, the risks and impacts of some AF E&S principles that require further assessment are not indicted. If such risks/ impacts do not require further assessment, then move related discussion to under "No further assessment required". **CR10:** Table 17 refers to ESMF (should	**CAR7: Cleared.** See Table 17, pp. 48-51. **CR10: Cleared.** See Table 17, pp. 48-

		be ESMP). It also includes a statement: "Further consultations and assessments will be required in the development of the Environmental and Social Management Framework (ESMF) for the proposed project". Please revise this statement as the ESMP has been prepared/ developed. **CR11:** Paragraph 211, p.54, reads out of context/ erratic particularly since USPs in the context of the Adaptation Fund refers to Unidentified Sub-projects. Please re-visit. **CR12:** Ensure that the indicated risks in Table 17 are consistent with those mentioned in the ESMP.	52. **CR11: Cleared.** See para 222, p. 58 **CR12: Cleared.** See Table 2 in the ESMP (Annex 3).
Resource Availability	1. Is the requested project / programme funding within the cap of the country?	**Yes.**	-
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	**Yes.** the implementing entity fee (USD 624,451) is 8.47% of the total project cost (USD 7,375,549).	-
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?	**Yes.** Execution costs (USD 600,000) are 8.1% of the total project cost (USD 7,375,549).	-
Eligibility of IE	1. Is the project/programme submitted through an eligible Implementing Entity that has been accredited by the Board?	**Yes.** Accreditation status: <u>In Re-accreditation Process</u> <u>Accreditation Expiration Date: 22 January 2024</u> *Please be advised that the findings of the AFB Secretariat's review of the funding*	- No change in accreditation status. *Please be advised that the findings of the AFB Secretariat's review of the funding proposal(s) do not reflect, indicate, or prejudge the outcome of the*

		proposal(s) do not reflect, indicate, or prejudge the outcome of the reaccreditation process currently underway. The Implementing Entity (IE) shall acknowledge that the funding proposal will not be approved by the Board if the IE's accreditation has expired, and reaccreditation has not been achieved at the time of the Board's decision. Notwithstanding this potential risk, the IE has elected to proceed with the development of the funding proposal.	*reaccreditation process currently underway. The Implementing Entity (IE) shall acknowledge that the funding proposal will not be approved by the Board if the IE's accreditation has expired, and reaccreditation has not been achieved at the time of the Board's decision. Notwithstanding this potential risk, the IE has elected to proceed with the development of the funding proposal.*
Implementation Arrangements	1. Is there adequate arrangement for project / programme management, in compliance with the Gender Policy of the Fund?	**Yes.** See Part IIIA, pp. 49-52. However, it is not clear whether the implementation arrangements incorporate gender-responsive elements, as appropriate. **CAR8:** Clarify the incorporation of gender-responsive elements in implementation arrangements, as appropriate.	**CAR8: Cleared.** See paragraphs 206 & 210 (p.52) and Table 19 (pp.52-52).
	2. Are there measures for financial and project/programme risk management?	**Not fully addressed.** See Part III B, pp. 52-53, for related discussions. Part III B only discusses financial risks. Other risks should be discussed including those related to the environmental, social, institutional, etc. **CAR9:** Discuss other project potential risks (environmental, social, institutional, etc.) including their level and how they will be managed.	**CAR9: Cleared.** See para 216 (p. 55) and Table 20 (pp. 55-57).
	3. Are there measures in place for the management of environmental and social	**To a large extent.** See Part III, pp. 53-56, Annex 3. However, few issues below	

	risks, in line with the Environmental and Social Policy and Gender Policy of the Fund?	need to be addressed/ clarified. **CR13:** In paragraph 206, p.53, mention the ESMP Annex number. **CR14:** The Project Grievance Mechanism and related discussions/ details should be included in the ESMP. Move/ include in the ESMP. **CR15:** Ensure that the USPs are indicated in the ESMP along with their management in accordance with the AF related requirements/ guidelines. Also, ensure that the indicated risks in the ESMP are consistent with those mentioned in Part IIK. **CR16:** Clarify budget provisions, for the implementation of the ESMP as well as the implementing entity arrangements to supervise executing entities for implementation of ESMP.	**CR 13: Cleared.** See para 219, p.57. **CR14: Cleared.** See ESMP Annex (35-137) on p. 61. **CR15: Not Cleared.** Indicate the "further assessment" needed for full compliance with AF requirements (e.g.: site specific ESIA/ESMP, ESIA & updating current ESMP, etc.). Also, ensure that the risks mentioned in Part IIK align with those provided in the ESMP Annex 3. **CR16: Not Cleared.** While the requested is clarified in para 266 (p. 64), they still need to be reflected as notes in the execution costs and implementing fee tables in Part IIIG.
	4. Is a budget on the Implementing Entity Management Fee use included?	**Not presented in sufficient detail.** The implementing entity management fee need to be presented in more detail. **CAR10:** In part III G budget table, provide further breakdown of the implementing entity management fee. The fee may cover: Corporate activities fees related to engagement with donor (Policy support, Portfolio management, Reporting, Outreach and knowledge sharing) and Project cycle management	**CAR10: Cleared.** See Part IIIG, p.88.

		fees (Project preparation and management oversight including financial management and quality insurance, Implementation reports supervision, and Project completion and evaluation oversight).	
	5. Is an explanation and a breakdown of the execution costs included?	**Yes.** See Part III G, pp. 81-84.	-
	6. Is a detailed budget including budget notes included?	**Yes.** See Part III G, pp. 81-84.	-
	7. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-disaggregated data, targets and indicators, in compliance with the Gender Policy of the Fund?	**Yes.** See Part III D, pp. 57-60. **CR17:** Paragraph 245 refers to USPs as Unique Selling Points. The abbreviation in AF terms refers to unspecified subprojects. Please revise paragraph 245 accordingly.	**CR17: Cleared.** See para 224 p. 58.
	8. Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function?	**Yes.** See CAR7 above.	-
	9. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	**Yes.** See Part III E, Tables 24 and 25, pp. 61-77 for project results framework (Table 24) and AF core indicators (Table 25). Also, see Part III F, Table 26, pp. 77-80 for alignment with AF results framework. However, the presented information needs to address the issues indicated below. **CAR11:** In Table 24 on the project results framework, several milestones/	**CAR11: Not Cleared.** For the "Global

		targets are indicated as percentages, please provide number where applicable and as possible. **CAR12:** In Table 25 on AF core indicators, last column states "Target at project approval". It should be "Target at project completion". Please revise. Other entries targets in are also not quantified. Please quantify/ provide numbers. **CAR13:** In Part III F, Table 26, distribute the amount of USD 8,000,000 at AF outcome level for the first part of the table and for the second part of the table at the output level.	Objective", Table 24, provide numbers for indicated % targets. **CAR12: Not Cleared.** For the "Targeted Asset" in Table 25, provide information instead of "Refer to the results framework" statement. **CAR13: Cleared.** See Table 26 (pp. 81-84).
	10. Is a disbursement schedule with time-bound milestones included?	**Yes.** See Part III H, p. 84. However, it should be amended to reflect the template requirements. **CAR14:** The disbursement schedule template is available at Disbursement Schedule Template (**For fully-developed proposals**) (18 kB, XLS) Please note that project funds total should include the cost of components and execution costs. Total cost includes project funding and Implementing Entity Fee. Costs and Fees calculator can be found here: https://adaptation-fund.org/document/ie-and-ee-fees-calculator/	**CAR 14: Cleared.** See Table 28, p. 88. Note: Add milestones for the yearly disbursement (e.g.: annual report, midterm report, etc.).

ADAPTATION FUND

FULLY DEVELOPED PROPOSAL FOR SINGLE COUNTRY

CCAILSO Project
Climate Change Adaptation to Improve livelihoods in Siwa Oasis

Title of Project:	Climate Change Adaptation to Improve livelihoods in Siwa Oasis (Project: CCAILSO)
Countries:	Egypt
Thematic Focal Area:	Multisector
Type of Implementing Entity:	Regional Implementing Entity
Implementing Entity:	Sahara and Sahel Observatory (OSS)
Executing Entities:	Desert Research Center (DRC) Ministry of Agriculture
Amount of Financing Requested	8,000,000 in U.S Dollars Equivalent
Letters of Endorsement (LOE) signed for all countries:	Yes ☒ No ☐

NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: https://www.adaptation-fund.org/apply-funding/designated-authorities

Stage of Submission:

☒This proposal has been submitted before including at a different stage (pre-concept, concept, fully-developed proposal)
☐ This is the first submission ever of the proposal at any stage

In case of a resubmission, please indicate the last submission date: January 9th, 2023

Table of Contents

List of tables

List of figures

Abbreviations

AF	Adaptation Fund
AIGAs	Alternative Income Generating Activities
B/A	Benefit Cost Ratio
BUR	Biennial Update Report
CAAPs	Community Adaptation Action Plans
CAICs	Climate Adaptation and Innovation Centers
CDM	Clean Development Mechanism
CNA	Capacity Needs Assessment
CAPMAS	Central Agency for Public Mobilization and Statistics
CCAILSO	Climate Change Adaptation to Improve Livelihoods in Siwa Oasis
CBT	Community Based Trainers
CE	Cost Effectiveness
CEA	Cost Effectiveness Analysis
CER	Cost Effectiveness Rate
CN	Concept Note
CNP	Concept Note Proposal
CRA	Climate Resilience Agriculture
CSOs	Civil Society Organizations
CSGS	Competitive Small Grants Scheme
CVAs	Climate Variability Assessment
DAPP	Development Aid from People to People
DRC	Desert Research Center
E&S	Environmental and Social
EIA	Environmental Impact Assessment
EMA	Egyptian Meteorological Authority
EGP	Egyptian Pound
EPC	Engineering Procurement and Construction
ESMP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization
GCF	Green Climate Fund
GCMs	Global Circulation Models
GERICS	German Climate Service Centre
GHG	Greenhouse Gas
IGAD	Inter-Governmental Authority on Development
IGAs	Income Generating Activities
IEC	Information Education and Communication
IFIs	International Financial Institutions
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
KAP	Knowledge Attitude and Practice
M&E	Monitoring and Evaluation
MWRI	Ministry of Water Resources and Irrigation
NDC	Nationally Determined Contribution
NEE	National Executing Entity
NGO	Non-Governmental Organization
NP	Net Present Value
PA	Protected Area
PMD	Ministerial Decree
PMU	Project Management Unit
PRA	Participatory Rural Appraisal
PSC	Project Steering Committee
RCP	Representative Concentration Pathway
RIE	Regional Implementing Entity
ROI	Return on Investment
SACCO	Savings and Credit Cooperative Society
SACCOs	Savings and Credit Cooperative Societies
SDG	Sustainable Development Goals
SLM	Sustainable Land Management
SLWM	Sustainable Land and Water Management
SDM	Soil Degradation Management
ToT	Training of Trainers
US$	United States Dollar
USD	United States Dollar
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WASH	Water Sanitation and Hygiene
WRMP	Water Resources Management Plan
WUAs	Water Users Associations
OSS	Sahara and Sahel Observatory
SCL	Short Cycle Livestock

PART I: PROJECT INFORMATION

A. Project Background and Context:

National background

1. Egypt is about 1 million km^2 in area. It is located on the edge of Africa and Asia, within the geographic boundaries of latitude 22°–32° N and longitude 25°–35° E[1], with a population of about 100 million people[2]. Egypt is ranked 111 on the Human Development Index[3]. According to the National Household Income, Expenditure and Consumption Survey (HIECS), 15.9% of the population have poor access to food. Additionally, unemployment rates remain persistently high at 12.5%[4]. Egypt's population is growing rapidly, where the total population is more than 94.8 million people (2017) [5]. As a result, there is a decrease in arable land, fresh water and the necessary resources for sustainable development. Egypt is characterized by severe scarcity of water resources, especially in desert areas. Agriculture accounts to about 80% of the fresh water resources with renewable water resources which are almost fully exploited, while the non-renewable (fossil) water resources are decreasing[6] .
2. Egypt is a lower-middle income country, with a GDP per capita of USD 2,448 (2020). The GDP by sector in 2017 was: 12% for agriculture; 32% for industry, and 56% for services. The Labour force in 2019 was 28 million, with 29% in agriculture, 24% in industry and 47% in services. Agriculture directly and indirectly engages about 55% of Egypt's Labour force.[7]
3. Egypt launched its "Vision 2030" which aims to achieve sustainable development that would enable Egypt possess a competitive, balanced and diversified economy that is dependent on innovation and knowledge, with the right to secure access to food and nutrition being a priority in the strategy.
4. In spite of its ambitious SDG 2030 Vision, Egypt faces significant challenges, particularly with a very high population growth which will exacerbate levels of food, water and energy insecurity. Other issues related to water shortages, soil salination and extreme weather events particularly temperature changes will make it challenging to achieve this vision.
5. Current and future government measures and efforts to combat climate change and its impacts have been expressed in the National Determined Contributions (NDCs). Adaptation and mitigation measures have been put forward in all the relevant sectors and their implementation will depend on international support in relation to financial flows, capacity building and technology transfer.
6. Initial estimates indicate that Egypt, with the assistance of international partners, will need about 73.04 billion USD to implement adaptation and GHG emission reduction measures for the period of 2020-2030[8] (GoE, 2015). To mobilize the required financial resources, Egypt like other African countries, will need diverse internal and external funding sources in addition to public sources.
7. Private sector climate finance for NDCs is considered to be a critical part of the financial landscape. However, African countries including Egypt, have not yet attracted the levels of private climate finance that are widely believed to be necessary. This gap can be related to the fact that the role of the private sector, which is key in driving climate finance and climate innovation has not been clearly defined and understood within the African context. Thus, enhancing private sector participation in NDC-related investments in Africa in general and Egypt in particular is crucial.

Climate of Egypt

8. Egypt's climate is hot and dry. The average daily temperature ranges from 17°C to 20°C along the Mediterranean to more than 25°C in Upper Egypt along the Nile. Precipitation is generally very low. It is highest along the Mediterranean where it averages more than 200 mm/yr. Precipitation rates drop quickly as one moves away from the coast. Most of Egypt receives about 10 mm of precipitation per year which shows average annual precipitation across the country. Thus, most of Egypt is a desert and can be classified as

[1] Hamed MM, Nashwan MS, Shahid S .2022. Novel selection method of CMIP6 GCMs for robust climate projection. Int J Climatol. https://doi.org/10. 1002/joc.7461.
[2] WDI, Macro Poverty Outlook, and official data.
[3] Household Income Expenditure and Consumption Survey, Central Agency for Public Mobilization and Statistics (CAPMAS), Jan-Dec 2015.
[4] Quarterly Labour Survey, CAPMAS. https://dsbb.imf.org/sdds/dqaf-base/country/EGY/category/EMP00
[5] Egypt, (2017), Central Agency for Public Mobilization and Statistics, Cairo, Egypt, 2017
[6] Egypt, (2017), Ministry of agriculture and land reclamation, Egypt,2017
[7] https://www.cia.gov/the-world-factbook/field/gdp-composition-by-sector-of-origin/
[8] https://unfccc.int/sites/default/files/NDC/2022-07/Egypt%20Updated%20NDC.pdf.

arid. The exception is the slightly wetter Mediterranean coast, which can be considered semi-arid. Generally, the small amount of rain that does fall comes in the winter, and hence Egypt has a Mediterranean climate.[9]

Bioclimatic zones in Egypt

9. According to Koppen climate classification, Egypt experiences the 'hot desert climate type' (BWh) in the southern and central parts of the country and the 'hot steppe climate type' (BSh) along the coast. Most parts of Egypt are occupied by the Sahara Desert, which represents the most extensive arid area on the planet. In general, Egypt possesses a hot-arid climate throughout the year.[10]

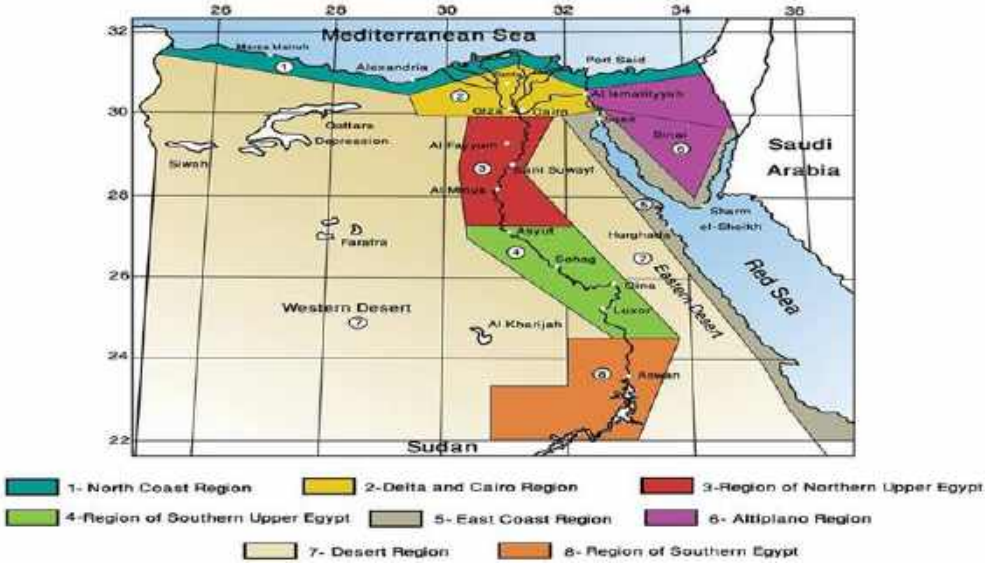


Figure 1: Bioclimatic zones in Egypt

Temperature

10. Throughout Egypt, days are often warm, and nights are cool. Egypt has only two seasons: a mild winter from November to April and a hot summer from May to October. The only differences between the seasons are variations in daytime temperatures and changes in prevailing winds. In the coastal regions, temperatures range between an average minimum of 14°C in winter and an average maximum of 30°C in summer. The annual average temperatures increase from about 20°C on the Mediterranean coastline to around 24°C on the Red Sea coastline, 25°C in Cairo, and 26°C in Aswan.

Precipitation and Flooding

11. Egypt receives less than 80 mm of precipitation annually. Most of the rain falls along the coast, but even the wettest area, around Alexandria, receives only about 200mm of precipitation per year. Precipitation rates drop quickly as one moves away from the coast and most of Egypt receives only about 2 mm of precipitation per year. Over the last few years there has been a heightened severity and frequency of flash flooding across Egypt.
12. Egypt has 97% dependency ratio as far as water is concerned, since its renewable water sources comes from outside its territory, increasing its sensitivity to external influences. The Nile River is the main source of fresh water for Egypt, supplying 55.5 billion cubic meters (BCM) per year. Additional marginal amounts are provided from deep non-renewable groundwater aquifers (2.1 BCM), limited rainfall (1.3 BCM), and desalination (0.35 BCM) to increase the total yearly available water resources to 59.25 BCM. Climate change impacts, water pollution, and geopolitical factors are expected to exacerbate water stress in Egypt. The climate change scenarios indicate that the Nile inflow at Aswan will decrease as a result of the impact throughout the Nile Basin.
13. Future precipitation trends for Egypt are highly uncertain and information is not readily available. There is however agreement across climate models that temperatures are projected to increase significantly under climate change, increasing the prevalent water scarcity. Data from the World Bank's Climate Change Knowledge Portal (CCKP) below shows historical information for annual mean temperature for Egypt

[9] https://www.eeaa.gov.eg/portals/0/eeaaReports/SoE2011en/completereport/SOE-2010-En.pdf
[10] M. Kottek J. Grieser . Beck B. Rudolf and F. Rubel "World Map of the Köppen-Geiger climate classification updated" Meteorol. Z., vol. 15, no. 3, pp. 259–263, Jun. 2006

between 1901–2019 was 22.5°C, with average monthly temperatures ranging between 30°C (July) and 13°C (January).

Climate Variables	1901-2019
Climate Variables	22.5°C
Mean Annual Temperature (°C)	33.3 mm
Mean Annual Precipitation (mm)	29.9°C
Mean Maximum Annual Temperature (°C)	15.1°C

Table 1: Climate summary statistics in Egypt

Future Climate

14. The German Climate Service Centre predicts that the climate of Egypt will become hotter and drier, with temperatures increasing by 2 to 3°C by mid-century. GERICS further predicts a rise in annual mean temperature of between 2 to 5°C, with the maximum temperatures increasing by 2 to 6°C and minimum temperatures increasing by 1.5 to 4.6°C. Rainfall projections are variable and it is more likely that there will be a reduction in the total precipitation, longer dry spells, and a higher number of extreme weather events, including flash floods. The Working Group on Coupled Modelling 5 in Figure 2 below shows the following projected changes over Egypt.
15. Future Temperature Trends: The mean annual temperature in Egypt is projected to increase by 1.07°C to 1.27°C by 2030 for the RCP4.5 and RCP8.5 median model ensemble, and by 0.37°C and 0.61°C for the RCP4.5 and RCP8.5 10th percentile, and by 1.78°C and 2.11°C for the RCP4.5 and RCP8.5 90th percentile [CCKP]. Maximum temperatures are projected to increase by 1.0°C to 1.22°C, and minimum temperatures by 1.09°C and 1.32°C for the RCP4.5 and RCP8.5 median ensemble. Annual minimum and maximum temperatures are projected to increase in the future.

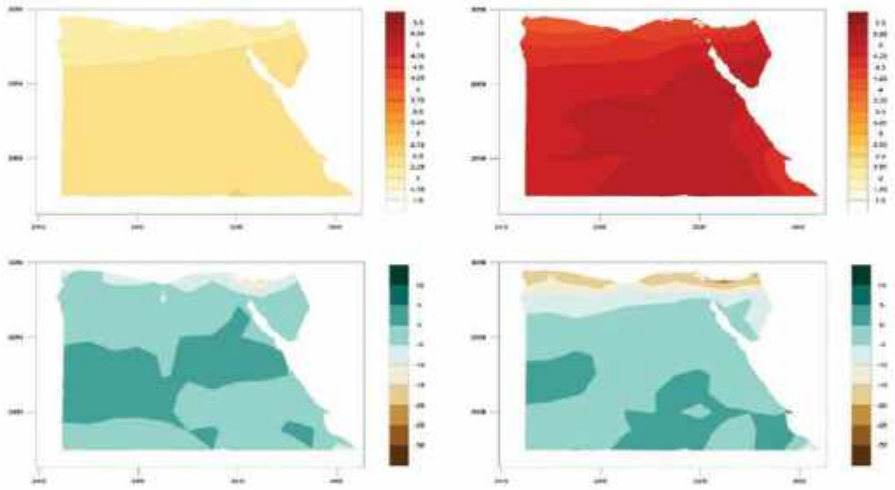


Figure 2: Projected annual temperature/ precipitation changes over Egypt

16. On the other hand, Egypt, projected Climate Table 2 provides CMIP5 projections for essential climate variables under high emission scenario (RCP 8.5) over 4 different time horizons. Figure2 presents the multi-model (CMIP5) ensemble of 32 Global Circulation Models (GCMs) showing the projected changes in annual precipitation and temperature for the periods 2020-2039, 2040–2059 and 2080–2099.

CMIP5 Ensemble Projection	2020-2039	2040-2059	2060-2079	2080-2099
Annual Temperature Anomaly	**+0.6°C to +1.7°C**	**+1.5°C to +3.0°C**	**+2.4°C to +4.5°C**	**+3.4°C to +6.2°C**
(°C)	**(1.6°C)**	**(2.1°C)**	**(3.3°C)**	**(4.4°C)**
Annual Precipitation Anomaly	**-21.6 to +20.1**	**-27.3 to +21.0**	**-26.5 to +26.7**	**-30.2 to +28.2**
(mm)	**(0.5 mm)**	**(1.9 mm)**	**(1.6 mm)**	**(2.9 mm)**
Source: Egypt, Climate Risk Profile: Egypt. 2021. World Bank Group2021. p. 7.				

Table 2: Data snapshot: CMIP5 ensemble projections

Climate Change context in Egypt

17. Egypt is highly vulnerable to climate change, with projected increase in heat waves, dust storms, storms along the Mediterranean coast and extreme weather events. Stronger warming has been documented over the past 30 years, with average annual temperatures increasing by 0.53 degree Celsius per decade. Crucially, the awareness of the importance of climate change action both domestically and at the global level is fast increasing in Egypt. The country is at a turning point in its commitment and action to tackle the consequences of climate change. In the 2030 Vision and sustainable development strategy, Egypt has also made commitments to integrate climate change in national development policies and to progressively green its budget across sectors.
18. The government of Egypt is part of the UNFCCC, and thus recognizes the importance of collectively meeting the ultimate objective of the Convention, which is mainly to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Egypt submitted the Initial National Communication in 1999, the Second National Communication in 2010, the Third National Communication in 2016 and the first Biennial Update Report (BUR) in 2018. Climate policies, strategies and actions revolve around the two key areas of CC vulnerability and adaptation and climate change mitigation. In July 2022, Egypt submitted its updated first Nationally Determined Contribution (NDC), in which the country reviewed its emission reduction objectives for 2030. These goals are conditional to an outside support financing of US$246bn (US$196bn for mitigation interventions and US$50bn for adaptation interventions).

Siwa Oasis Context

Local background

19. The Siwa Oasis is a natural depression located in the northern edge of the Western Desert. It is about 300 km south of the Mediterranean port town of Marsa Matrouh and lies between 29° N and 25.5° E, covering an area of about 800 km^2. It stretches about 80 km in east-west direction is bounded by the Qattara Depression from the east, the Jaghbub Depression from the east, the Jaghbub Oasis, the west, the Great Sand Sea from the south, and the El-Diffa Plateau from the north. The Siwa Oasis is covered by a variety of eolian sands and sabkhas. The distinctive natural elements of the Siwa Oasis are saline lakes, which receive water from natural springs and from agricultural drainage.

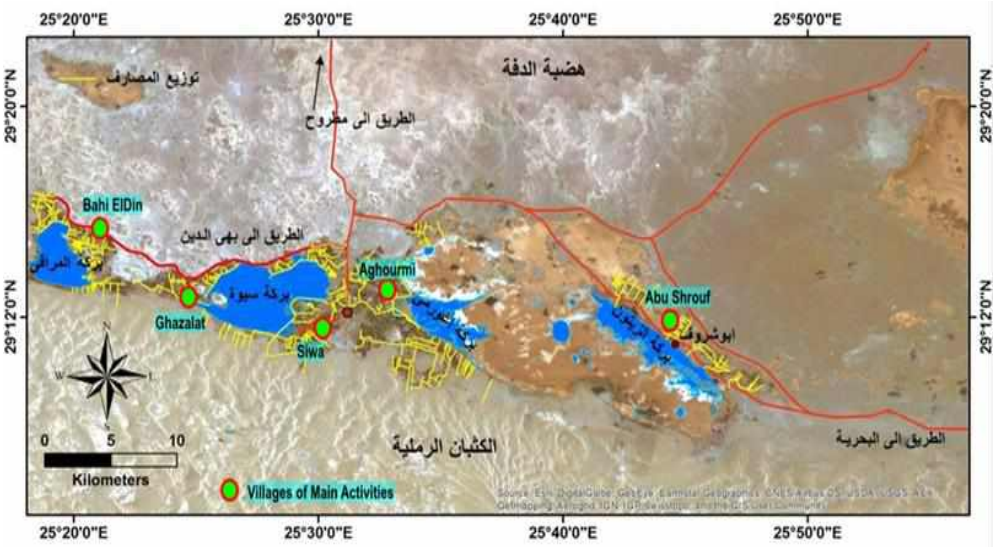


Figure 3: Satellite image of the Siwa Oasis, Egypt Source: Google Maps

Siwa Oasis Climate

20. The climate of Siwa exhibits extreme aridity from April to November with very low rainfall experienced from December to March, usually an average of just 10 mm/year. The monthly mean maximum temperatures range from 20°C in January to 38°C in July, with a yearly average of approximately 30°C. Monthly mean minimum temperatures range from 4°C in January 21°C in July. Maximum temperatures can reach 50°C while the absolute minimum is 4.5°C. Rainfall is scarce with an average annual rainfall of 13 mm, but humidity is relatively high ranges from 22% in May to 45% in December depending on the associating daily evaporation rate (average 17 mm in June–5.2 mm in December).[11]

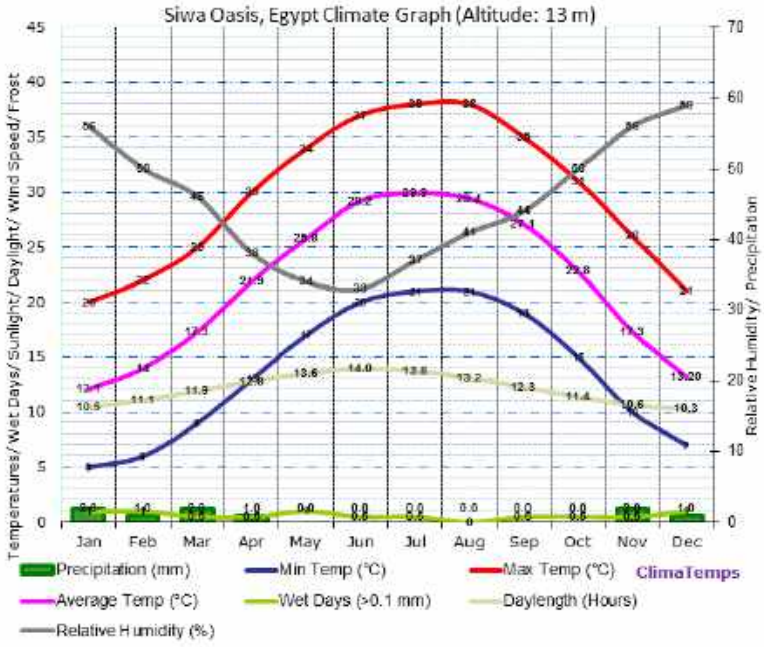


Figure 4: Climate diagram of Siwa Oasis Climate (temperature and precipitation)

Siwa Oasis Biodiversity

21. Siwa Oasis became a protectorate in 2002 as per Prime Ministerial decree number 1219, although nowadays visitors would have a hard time noticing any overt measures meant to be in place to ensure that the environment in the area is in fact protected. Such measures are much needed since Siwa is particularly rich environmentally and in cultural history. A total of 7800 km2 of this oasis is classified as PA. (figure 5, zone N°22).
22. Biodiversity reported in Siwa includes 53 plant species, 28 wild mammals including 8 rare species threatened with extinction (namely cheetah, striped hyena, Egyptian gazelle, white gazelle, red fox, wild cat and Fennec fox), 32 reptile species, 164 bird species and36 insects and a large number of invertebrates. In Wadi El Gemal and Hamata 140 plant species including 32 used in traditional medicine, 24 mammal species, 29 species of reptiles and amphibians and 45 bird species were recorded.[12]

11 EMA, Egyptian Meteorological Authority (2012) http://www.ema.gov.eg/map?menu=3&lang=en (http://www.ema.gov.eg/map? menu=3&lang=en

12 https://www.cbd.int/doc/world/eg/eg-nbsap-v2-en.pdf

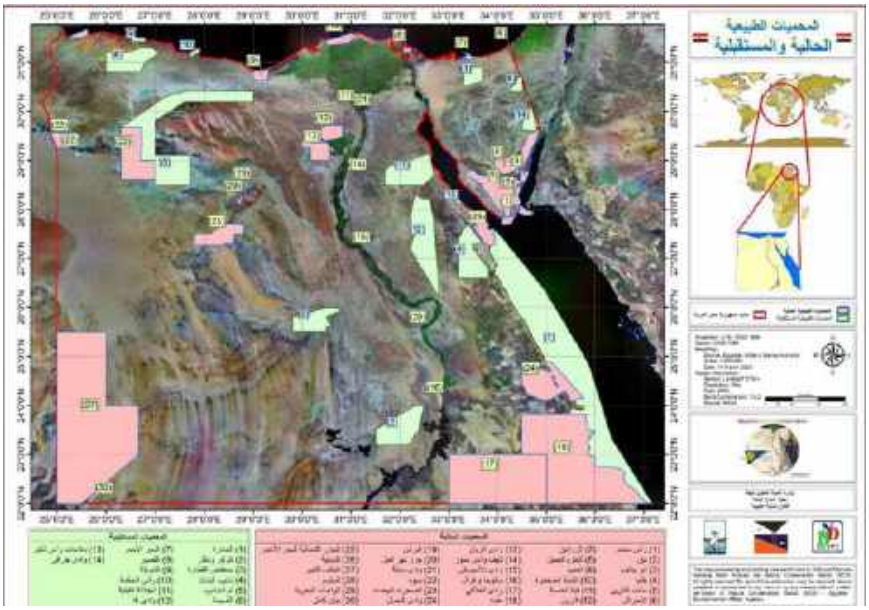


Figure 5: Location of Egypt's protected areas

Siwa Oasis Hydrology

23. Siwa is located above two huge reservoirs of groundwater, the only substantial fresh water supply in the region. The upper reservoir is composed of interstitial water confined in the cavities of Miocene limestone. This aquifer extends down to a depth of about 550m below ground surface. The deep aquifer consists of thick layers of Nubian Sandstone, which go down to a depth of about 2000m below ground surface but being a high artesian pressure, it comes out of the ground appearing as natural springs.[13] Groundwater wells in Siwa Oasis are divided into four types: natural springs, native wells, ministerial wells, and deep wells. Each of these types has characteristics that distinguish it in terms of the total depth, origin of the groundwater, salinity of water, and the amount of discharge. In the beginning, there was reliance on natural springs to provide the required water needs for the oasis. With the growth of the population and the increase in the agricultural area inside and outside the oasis, the number of groundwater wells increased to large numbers, the number of ministerial wells (150-300 m depth) reached 279 wells, and the native wells (< 100 m depth) reached about 650 wells, about 161 natural springs and 25 deep wells (> 100m depth).

Siwa Oasis Climate Vulnerability

24. The Siwa oasis is a specific ecological landscape that characterizes the Western part of Egypt. It is a complex and fragile agro-ecosystem which sustains agriculture under extreme climatic conditions. Agriculture, the main economic activity in the oasis will be impacted negatively by climate change as the area typically prone to water scarcity and increasing soil salinization will require more water for irrigation as evaporation levels increase will lead to more water usage for irrigation compounding the problem of waterlogging and soil salinization in the Siwa oasis.

Drainage water and stagnation in Siwa

25. Siwa depression is an isolated closed drainage basin which uses naturally flowing springs and deep groundwater wells as the only source for everyday domestic use as well as all other development and economic activities. Because of the intensive use of groundwater, the drainage lakes or evaporation pond in Siwa oasis became insufficient to accommodate the water from the groundwater wells. The cultivated lands are therefore suffering from waterlogging and soil salinization problems. Climate change is expected to increase the pressure on water resources in Siwa Oasis. It is predicted that with the increase in temperatures and the increase in the rate of evaporation, the problems within the oasis will exacerbate and may eventually lead to the disappearance of the historical oasis known today.

13 El-Fadl, Moustafa & Wassel, Magdy & Zaky Sayed, Ahmed & Mahmod, Ammar. (2013). Hydrochemical Characteristics of Groundwater in Siwa Oasis, Egypt. Part I. Significance of the Situation Groundwater Resources and Future Outlook. 4. 4-438

Figure 6: Water Drainage and stagnation issues

Impacts on Soils in Siwa Oasis

26. The soil water retention level in the oasis is rising steadily. The increase in the ground water level has been estimated by the Desert Research Center in the oasis about 4.5 cm/year[14]. This phenomenon is concentrated around the lakes, where the rise in the soil water level leads to the destruction of the land and its transformation into bare marshes or highly saline water pools.
27. The reasons for the rise in ground water in the oasis vary, but often it is from the wasteful exploitation of irrigation water, as flood irrigation is the prevailing method of irrigation in the oasis, the small drainage network, the poorly permeable clay soil that covers most parts of the oasis, as well as the presence of a solid, impermeable rocky layer under the soil layer that prevents water from percolating into the lower stratospheres.
28. The lands in Siwa Oasis have deteriorated significantly, as part of the fertile agricultural lands turns into weak agricultural lands and further into waste lands as a result of salts concentration in the soil. The reasons for this deterioration in the soil are due to the stagnated ground water at certain points, high rate of heat and evaporation, among others. This therefore, sets up a cycle for more salts to accumulate in the soils. The project will provide a set of practices to reduce the deterioration of agricultural land, including encouraging the transition to improved irrigation systems as well as raising awareness of the concern for internal drainage.

Figure 7: Soil salinization and degradation

14 A.Wassel, Magdy & Zaky Sayed, Ahmed & El-Fadl, Moustafa & M.Mahmod, Ammar. (2016). EVALUATION OF GROUNDWATER QUALITY OF SIWA OASIS. Journal of Advances in Chemistry. 12. 4292-4311. 10.24297/jac.v12i4.2170

Impacts on agriculture and food security

29. The occurrence of agricultural water drainage in the oasis is the main barrier that besieges the Siwa Oasis. This problem began its manifestation at the end of the seventies with the growth of the agricultural area and the increase in the frequency of drilling groundwater wells in the oasis. It was developed in the eighties and exacerbated in the nineties until it reached the current critical status. This situation threatens the existence of the oasis itself. The temperature increases being experienced will reduce Siwa's level food production by at least 20% by 2040 as a result of the effects of climate variability[15]. This will include losses from extreme weather events, reduced crop and livestock productivity, and increased demand for water and crops.

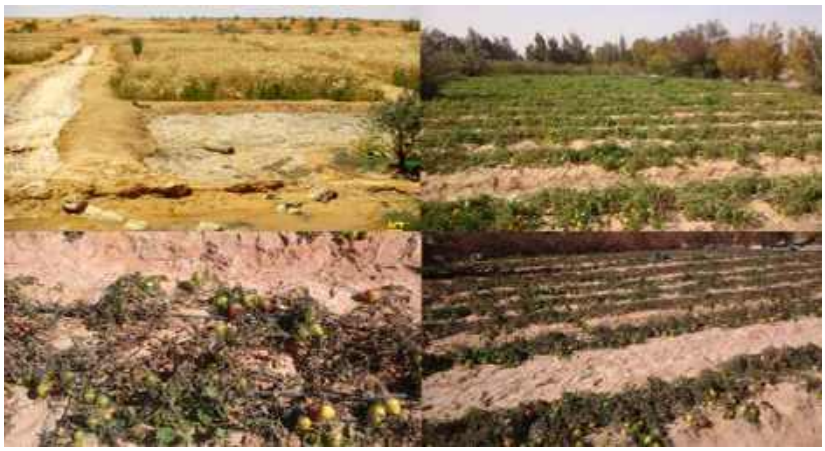


Figure 8: Decreased productivity of soils due to increased temperatures

Impacts on the Siwa oasis ecosystem

30. The southwest of Siwa Oasis is exposed to the problem of sand dune encroachment. Wind causes sand particles to move threatening roads infrastructures, cultivated lands and newly reclaimed areas, as well as causing severe damage to human settlements, irrigation and drainage constructions. The total area affected by the Sand Dune Movement (SDM) is about 21,200 Ha. The total cost of economic losses as a result of SDM is estimated to 485.9 million EGP (19,606,260.33 USD). The total protecting cost of the cultivated area, roads and drainage from SDM risk in Siwa Oasis are estimated to 47.9 million EGP (1,932,784.26 USD)[16].
31. The developing tourism sector in the Siwa will suffer from indirect impacts from climate induced changes in assets of the tourism particularly from biodiversity loss, to water shortages, to increased sand dune activity and ultimately migration. The dunes submerge the unique architectural, geological and paleontological sites in the desert environment cutting off all access into the region and particularly causing losses for olive crop, reclaimed cultivated areas, roads, drainage canals and buildings.[17]

Socio-demographic characteristics

32. Siwa, spanning across 48,031.9 square kilometers, is home to a population of 36,575 individuals. Among them, 19,299 (52.8%) are male, while 14,275 (47.23%) are female in year 2022/2023. Situated at the convergence of trade routes, the populace of Siwa boasts a diverse genetic heritage, yet culturally identifies with the Berber tradition. Predominantly engaged in agriculture, craftsmanship, and animal husbandry, the inhabitants have cultivated a distinct way of life owing to their geographical isolation.
33. The Berber community in the Oasis has fostered a unique cultural identity, evident in their craftsmanship, including basketry, pottery, silverwork, and embroidery, as well as their distinctive attire. Particularly renowned are the bridal silver artifacts and the array of silver ornaments and beads adorning women during weddings and ceremonial occasions. These ornate pieces are adorned with symbolic motifs, reflecting the rich history, beliefs, and values of Siwa's inhabitants.

15 Moghazy, Noha H., and Jagath J. Kaluarachchi. 2021. "Impact of Climate Change on Agricultural Development in a Closed Groundwater-Driven Basin: A Case Study of the Siwa Region, Western Desert of Egypt" Sustainability 13, no. 3: 1578. https://doi.org/10.3390/su1303157

16Abo-Ragab Samy, (2015), Sand dunes movement and its impact on development plans, Siwa Oasis, International Journal of Research in Economics and Social Sciences(IJRESS),Volume 5, Issue 11

17 Alhaddad, Ashraf & Ibrahim, Osama & Lotaif, Hoda. (2017). The Potential of Ecotourism in Siwa Oasis: Opportunities and Obstacles. International Journal of Heritage, Tourism and Hospitality. 11. 1-16. 10.21608/ijhth.2017.27862

Siwa Oasis Economic activities

34. Agriculture remains the cornerstone of Siwan livelihoods, with its saline soils conducive to cultivating salt-tolerant crops like oil palm and olives. The oasis boasts approximately 280,000 date palms, yielding around 25,000 tons of dates annually, along with 27,500 tons of olives[18]. Beyond primary agricultural production, activities such as drying, packaging, and value-added processing of dates and olives contribute significantly to income generation and employment opportunities. In addition to staple crops, farming communities in Siwa cultivate watermelon, black grapes, figs, cucumbers, tomatoes, wheat, and barley, with many households also engaged in livestock rearing.
35. The cultural and natural richness of the Siwa Oasis draws tourists from far and wide. Historical sites dot the landscape, featuring Romanic monuments like the temple of Alexander the Great, the mountain of the Dead, Shali Fortress, the temples of Amun, Cleopatra Spring, and Fitnass Island, among others. Siwan culture, exemplified through intricate baskets, pottery, jewellery, and embroidered women's clothing, adds to the allure of the oasis, making it a highly sought-after destination for visitors.

B. Project/Programme Objectives

36. The Siwa Oasis exemplifies a delicate desert ecosystem, prone to the impacts of climate change both presently and increasingly so in the future. The project aims to enhance the resilience of the Siwa ecosystem and improve local livelihoods by promoting sustainable water and soil management, boosting agricultural production, and supporting ecotourism in response to climate change impacts. The project seeks to achieve several specific objectives: (i) Enhance water access and management through sustainable practices; (ii) Improve food security in response to climate change; and (iii) Strengthen local communities' resilience to climate change impacts by diversifying livelihood practices. To realize these objectives, the project is divided into four components:

Component 1: Improving water resource access and management for local communities:

37. This component aims to ensure sustainable water management to sustain the Siwa Oasis and support food security and livelihoods. It involves enhancing water distribution for agriculture and human consumption, increasing access, and building local capacity for water resource management.

Component 2: Enhancing resilience of Siwa Oasis ecosystems to climate change impacts:

38. Focusing on the vulnerable ecosystem, this component aims to improve resilience by adopting Sustainable Land Management (SLM) practices and diversifying livelihoods. The goal is to empower the community to adapt to climate change impacts and variability.

Component 3: Diversifying livelihoods through Income Generating Activities (IGAs) and value chain addition:

39. This component aims to improve the resilience of Siwa Oasis communities by diversifying livelihoods and adding value to local products. It focuses on creating alternative sources of income to reduce dependence on agriculture and enhance overall resilience.

Component 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts:

40. Recognizing the importance of knowledge and capacity-building, this component works on empowering local communities and institutions. It enhances communication and knowledge management, engaging government agencies, private enterprises, and communities to disseminate best practices and leverage local knowledge in the fight against climate change impacts.
41. The CCAILSO Project aligns with the Adaptation Fund's strategic objectives by supporting vulnerable communities in adapting to the adverse effects of climate change. Specifically, the project contributes to the following AF outcomes:
    - *Enhanced resilience of vulnerable communities to climate change impacts* through improved water resource management, sustainable agricultural practices, and diversified livelihoods.
    - *Strengthened adaptive capacity of local institutions and stakeholders* by building knowledge, skills, and awareness on climate change adaptation.
    - *Promotion of ecosystem-based adaptation* through sustainable land management practices and the establishment of green belts to combat desertification and sand dune encroachment.
    - *Gender-responsive adaptation actions* by ensuring the active participation of women and marginalized groups in project activities and decision-making processes.

18 https://www.fao.org/giahs/giahsaroundtheworld/designated-sites/near-east-and-north-africa/siwa-oasis/en/

42. By addressing these strategic outcomes, the CCAILSO Project aligns itself with the Adaptation Fund's mission to reduce vulnerability and enhance resilience in communities most vulnerable to climate change. This statement clearly demonstrates the project's objectives' connection to the AF's strategic goals, ensuring a seamless alignment with the fund's priorities.

C. Project/Programme Components and Financing

Table 3 : Project/Programme Components and Financing

Project Components	Expected Outcomes	Expected Outputs	Amount (US$)
COMPONENT 1: Improving water resource access and management	Outcome 1.1: Enhanced Water Resource Management Capacity	Output 1.1.1: Developed/updated water resources management plans	150,000
		Output 1.1.2: Strengthened water resources management in target communities	215,000
	Outcome 1.2: Access to irrigation and potable water for target communities is enhanced	Output 1.2.1: Increased irrigation water access and use in the target communities	1,470,000
		Output 1.2.2: Increased access to potable water among the target communities (20% women)	540,000
Sub-total-1			**2,375,000**
COMPONENT 2: Enhancing resilience of Siwa Oasis ecosystems to climate change impacts	Outcome 2.1: Operationalized Sustainable Land Management	Output 2.1.1: Climate resilient Agricultural practices are adopted	1,150,000
		Output 2.1.2: Sustained Green belts developed	615,000
Sub-total-2			**1,765,000**
COMPONENT 3: Diversifying the livelihoods through IGAs and value chain addition	Outcome 3.1: Promoted Climate-Resilient Livelihoods	Output 3.1.1: Improved livestock production practices adopted	874,000
		Output 3.1.2: Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs)	1,120,000
Sub-total-3			**1,994,000**
COMPONENT 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts	Outcome 4.1: Promoted CC Awareness & Knowledge at local, national and international levels	Output 4.1.1: Improved understanding of stakeholders to integrate CC into Planning Processes.	300,000
		Output 4.1.2: Raised community awareness on CC adaptation	341,549
Sub-total-4			**641,549**
Total for sub component (1,2,3,4,)			**6,775,549**
Project Execution cost			**600,000**
Total Project Cost (A)			**7,375,549**
Project Cycle Management Fee charged by the Implementing Entity (B)			**624,451**
Amount of Financing Requested (A+B)			**8,000,000**

D. Projected Calendar:

Table 4 : Projected calendar

Milestones	Expected Dates
Start of Project/Programme Implementation	January 2025
Mid-term Review (if planned)	February 2027
Project/Programme Closing	December 2028
Final Evaluation	May 2029

PART II: PROJECT JUSTIFICATION

A. Project components Description

43. The main objective of the CCAILSO's project is to enhance the resilience of the Siwa ecosystem and improve local livelihoods by promoting sustainable water and soil management, boosting agricultural production, and supporting ecotourism in response to climate change impacts. To maximize efficiency and effectiveness, the CCAILSO project will adopt a participatory and inclusive approach involving both the community and various institutions. This approach will integrate knowledge management and establish suitable channels to ensure active participation from all key stakeholders, including beneficiaries, throughout the implementation cycle.
44. The project aims to utilize the local communities and stakeholders, with support from both local and national authorities, to enhance and introduce new adaptation measures suited to the local context. This initiative will broaden the resilience scope and enhance adaptive capacities within the oasis. It will also facilitate the generation of knowledge, documentation of lessons learned, and identification of best practices regarding climate resilience and food security enhancement for the most vulnerable communities facing climate change threats. These insights will be disseminated to inform policy decisions and serve as benchmarks for future interventions in the Siwa area.
45. The project is structured around four main components, aligning its planned activities, expected outputs, and outcomes with the strategic objectives of the Adaptation Fund. Below, we provide details on these components, their outcomes, and associated activities.

Theory of change

46. The Theory of Change (ToC) for the CCAILSO project outlines the logical pathway through which the project aims to achieve its long-term goals. It identifies the key inputs, activities, outputs, outcomes, and impacts that will lead to improved resilience and livelihoods in Siwa Oasis.
47. The CCAILSO project is based on the understanding that climate change exacerbates existing vulnerabilities in Siwa Oasis, particularly water scarcity, soil degradation, and limited economic opportunities. The project's Theory of Change is built on the premise that by addressing these challenges through integrated interventions, the resilience of the community can be significantly enhanced.
48. The desired paradigm for the project is focused on collective management of natural and rural land resources to enhance the adaptive capacity of rural landscapes and vulnerable households whilst also providing diversification/alternative source of income and agriculture contributions. It represents a visionary shift in addressing the complex challenges posed by climate change and land degradation as well as diminishing water quality and availability in Siwa. In this paradigm, the primary goals of the project is two-fold: to empower vulnerable households in Siwa with increased adaptive capacity and to optimize land, water and agriculture practices for climate resilience. This shift is not merely conceptual but entails a comprehensive restructuring of governance, farming methods, water management and community engagement. It embraces an approach that prioritizes climate-resilient agricultural practices, water management interventions, informed decision-making, and sustainable land management, setting the stage for greater economic security and the conservation of ecosystems: *Improving Governance and Information Availability*- This aligns with the grant's priority on adaptation. The project aims to enhance governance structures and information availability to facilitate climate-responsive agriculture planning. This includes measures to improve ecosystem productivity and foster informed decision-making in rural communities; *Institutionalizing Communal Adaptive Management*- The project seeks to institutionalize adaptive management in communal agricultural production systems. This includes aspects like crop rotation, farm/crop health, crop composition, record-keeping, and off-take, all of which are vital for climate-resilient agriculture and; *Rewarding Collective Action and Market Access*- The project aims to reward collective action that leads to improved ecosystem health. It does so by unlocking market access and enterprise development opportunities. It also focuses on building industry awareness and consumer demand for regenerative agriculture products, which contributes to adaptation while supporting income security for vulnerable farming households and sustains low-emission production systems.
49. In moving Siwa towards a climate-resilient, low-emission sustainable development paradigm, the project envisions the following outcomes: 1) Aligned Programmes and Policies- The desired paradigm envisions a

Siwa where the government's commitments to the Sustainable Development Goals (SDGs) and the United Nations Framework Convention on Climate Change (UNFCCC) translate into aligned programs and policies. These will empower community-level governance structures to develop and enforce climate-resilient communal farming and land management strategies, with a focus on adaptation; 2) Training and Employment of Marginalized Rural People- The project will empower marginalized rural populations by providing training and employment opportunities as professional restoration workers. These individuals will draw on indigenous knowledge systems and utilize new technologies to restore and maintain rural land ecosystems and farm health. This approach also improves farm management for record-keeping and offtake; 3) Reduced Losses and Improved Farm Management- By implementing parametric insurance, innovation and land/ management practices, the project strives to help farmers and their communities experience fewer losses of their economic assets due to climate stresses. These practices enhance the resilience of agricultural systems and rural livelihoods. They will benefit from new land and farm management practices designed for adaptation and; 4) Market Access and Climate-Resilience Protocols- The desired paradigm involves the *creation of new market access channels and climate-resilience protocols*. These initiatives build value-chain partnerships and promote local-level enterprise development, which may encompass activities such as restoration enterprises, organic fertilizer production, tree nursery operations and ventures inter alia. Additionally, the project seeks to establish fund mechanisms that supports the SLWM practices.

50. Through these multifaceted approaches, the project aims to shift Siwa towards a climate-resilient, and sustainable development paradigm that prioritizes adaptation, benefits rural communities, and promotes the conservation of natural resources and ecosystems. The theory of change diagram (Fig. xx) illustrates how the Project will overcome key barriers to achieve its goals to reduce climate vulnerability from rural land degradation and agricultural production through enabling and monitoring gender equitable governance, supporting climate-resilient agricultural farming, water management interventions and developing sustainable value chains.

51. As part of the reasoning behind the TOC, the statement below provides the justification: ***IF*** *the project improves access to water resources, invests in sustainable land management practices, diversifies livelihoods, and strengthens local knowledge,* ***THEN*** *communities in Siwa Oasis will adopt climate-resilient behaviours that reduce vulnerability to environmental shocks. When these practices are consistently implemented—such as efficient irrigation, agro-silvo-pastoral systems, and the development of value-added enterprises—households gain stable incomes and ecosystems are better protected.* ***BECAUSE*** *integrated approaches to water and land use have been shown to enhance both economic well-being and environmental sustainability, this combination of interventions ultimately fosters a more climate-resilient and prosperous Siwa Oasis.*

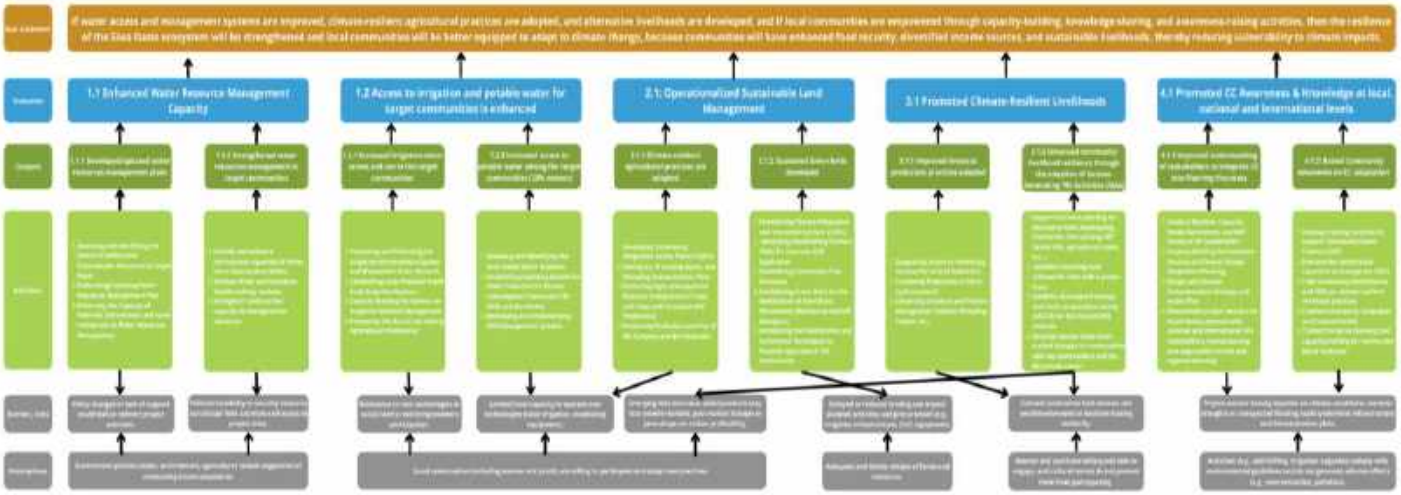


Figure 9: CCAILSO Theory of Change

Component 1: Improving water resources access and management

52. Water, the paramount natural resource in the oasis, is primarily sourced from non-renewable groundwater. With the projected rise in temperatures due to climate change, there is an anticipated surge in water demand for both domestic and agricultural purposes in the oasis. The escalating temperatures caused by climate change are expected to heighten water demand, particularly for irrigation, exacerbating existing water drainage issues. This, in turn, may elevate water stagnation levels, diminish soil fertility, and increase salinization. The primary objectives of this project's component are twofold:
    i) To improve access to enhanced irrigation techniques and systems.
    ii) To ensure access to safe drinking water for targeted communities and bolster water resource management.
53. To improve the resilience of local communities, it is crucial to enhance water management practices and soil characteristics, alongside addressing the issues of water drainage. Consequently, efforts will focus on upgrading water access and management by promoting and augmenting irrigation infrastructure systems and wastewater drainage networks. Solar-powered small-scale irrigation systems and wastewater drainage networks will help reduce reliance on fossil fuels and mitigate drainage impact.

Outcome 1.1: Enhanced Water Resource Management Capacity

54. Ensuring the resilience of water resources is pivotal for sustaining the economic and ecological equilibrium of the Siwa Oasis. The management of water, both in surplus and scarcity, is central to discussions surrounding food security and livelihoods in the region. Achieving this goal hinges on three primary strategies: (i) improving water resource management plans, (ii) fortifying community-based water resource management, and (iii) guaranteeing expanded access to irrigation water and its efficient utilization within the targeted communities.

Output 1.1.1: Developed/updated water resources management plans

55. Siwa relies predominantly on groundwater, primarily sourced from several non-renewable reservoirs such as the fractured limestone aquifer and the Nubian sandstone aquifer. With climate change exacerbating pressure on water resources in the Oasis, effective management becomes paramount to sustain these vital resources, crucial for the health and livelihoods of the communities. This initiative seeks to enhance the capacity of various national authorities and local communities in coping with water demands within the Siwa Oasis.
56. *Activity 1.1.1.1: Assessing and Identifying the Status of Surface and Groundwater Resources in Target Areas:* This activity involves conducting comprehensive assessments to determine the current status of surface and groundwater resources in specific areas of focus within Siwa as well as water infrastructure systems and networks. Utilizing various methods such as hydrological surveys, monitoring programs, and data analysis, the aim is to gain insights into the availability, quality, and sustainability of water sources. Through this assessment, potential challenges and threats to water resources can be identified, forming the basis for informed decision-making in water management.
57. *Activity 1.1.1.2: Elaborating/Updating Water Resources Management Plan (WRMP):* In this activity, a detailed water resources management plan will be update and develop the required documents based on the findings of the assessments conducted in Activity 1.1.1.1. This plan outlines strategies, policies, and actions to optimize the utilization and conservation of surface and groundwater resources in Siwa. It may include measures for sustainable extraction, recharging aquifers, addressing pollution, and promoting efficient water use practices. Regular review and updating of this plan ensure its relevance and effectiveness in meeting evolving water management needs. The WRMP will require consultations with local communities, farmers, water users, and other stakeholders to ensure that their needs and concerns are addressed. Community participation will ensure that the plan is both practical and effective, fostering a sense of ownership and responsibility for water resource management at the local level. This activity will include trainings by the consultant for community members, local leaders, and other stakeholders on the key elements of the WRMP. These trainings will focus on but not limited to, sustainable water use practices, conservation techniques, and the importance of adhering to the plan's guidelines through a cascading effect to all the stakeholders. This WRMP will further serve as a strategic guide for optimizing the use and conservation of surface and groundwater resources, addressing key challenges such as water scarcity, pollution, and infrastructure needs. Regular review and updating of the plan will ensure its continued relevance and effectiveness,

supporting long-term water security and sustainable development in the Siwa Oasis.

58. *Activity 1.1.1.3: Enhancing the Capacity of National, Sub-national, and Local Institutions in Water Resources Management:* This activity focuses on enhancing the capacity of national, sub-national, and local institutions to manage water resources effectively in Siwa. Through a combination of workshops, technical assistance, institutional reforms, and improved water monitoring systems, this activity aims to strengthen governance structures, regulatory frameworks, and stakeholder engagement. By building institutional capacity and providing the necessary tools for effective water monitoring, this activity will support the sustainable management of water resources, mitigate risks, and enhance the resilience of Siwa's water management practices in the face of changing conditions to enforce the WRMP developed in Activity 1.1.1.2. The equipment to be utilised will be pivotal towards monitoring of water quality and testing as well. This equipment will include but not limited to, tools for measuring key water parameters such as pH levels, salinity, temperature, and pollutant concentrations. Where feasible and applicable, real-time water monitoring systems will be established to continuously track water levels, usage, and quality. This could involve installing sensors at key points in water supply networks and aquifers to provide up-to-date information on water conditions.

Output 1.1.2: Strengthened water resources management in target communities.

59. Water resources management and the implementation of adaptation measures requires real adhesion with the involvement of communities especially at the grassroots level. The project will strengthen the community's capacity in order to ensure sustainable and equitable access to water. This output aligns with AF core indicators 1 and 2.

60. *Activity 1.1.2.1: Identify and enhance institutional capacities of Water Users Associations (WUAs):* This activity focuses on identifying and strengthening the institutional capacities of Water Users Associations (WUAs) to improve the performance and sustainability of irrigation systems. The project will enhance WUAs by empowering them with better governance, management skills, and technical knowledge. A key approach will involve employing a model where local entrepreneurial water operators, selected by the communities, are responsible for operating, maintaining, and managing water supply systems. This ensures that water resources are effectively managed and that irrigation systems are maintained for long-term sustainability. This will also include improving decision-making processes, leadership development, financial management, and conflict resolution within the associations.

61. *Activity 1.1.2.2: Develop Water and Sanitation Health training modules:* Informed by the baseline assessment under ac. 4.1.1.1, and building on existing evidence, comprehensive training modules focused on water, sanitation, and health (WASH) practices will be developed. These modules will be tailored to create awareness and foster social responsibility among the community members to promote and apply the role of optimal potable water (ac. 1.2.2.2), sanitation and hygiene practices for the improvement of the health and nutritional status of women, children and vulnerable community groups. Furthermore, based on the health situation of communicable diseases between livestock to livestock and livestock to human, the project will take into account the ES principal 13 on public health of the area during the development of the modules. This will also be supported by the dissemination through the extension agents' services (ac.4.1.1.2).

62. *Activity 1.1.2.3: Strengthen communities' capacity to manage water resources:* This activity focuses on enhancing the capacity of key community stakeholders, who are the primary users of water, to effectively manage these resources. The aim is to equip communities with the knowledge and skills to operationalize water management processes (as outlined in ac. 1.1.1.2) to ensure water equity, efficiency, and environmental sustainability. The capacity-building efforts will be informed by the baseline and capacity needs assessment (ac. 4.1.1.1) and will cover key areas such as but not limited to: a)Water Availability, Access, and Demand: Training and resources will focus on understanding water availability, improving access, and managing demand to ensure that water resources are distributed fairly and efficiently; b)Water Sanitation and Hygiene (WASH): Building on ac. 1.1.2.2, communities will be further educated on WASH practices to improve health and hygiene; c)Risk Management: Practical engagement of communities in identifying and managing risks to water resources and water supply systems will be emphasized to ensure resilience and sustainability (linked to ac. 1.2.2.3).This activity aims to empower communities to take ownership of water resource management, making informed decisions to optimize their use while protecting environmental assets. The activity will capitalise on its execution to acquire tools and resources to strengthen the capacities as well as undertake robust awareness campaigns developed under ac. 4.1.1.3.

Outcome 1.2 Access to irrigation and potable water for target communities is enhanced

63. Climate change impacts experienced in Siwa is amplifying the severity of droughts thus, affecting the non-renewable hydrological patterns in the Oasis which is exacerbating the frequency and contributing to escalating water scarcity within the targeted communities. Addressing these interconnected water challenges requires bolstering the capacity of local communities to effectively manage water resources and related services. Emphasizing irrigation as a resilient agricultural technique holds promise for augmenting farmers' yields in the face of climatic uncertainties. This objective aims to secure fair and ample access to water resources, thereby improving food security and fostering prosperity among the Oasis community.
64. This outcome will include USPS as identified in some of the activities as exampled in 1.2.1.2, 1.2.2.2, 1.2.2.3 which are related to water management.

Output 1.2.1 Increased irrigation water access and use in the target communities

65. The challenges of water resources management, particularly extraction, and the impacts of climate change pose significant threats to the sustainability of Siwa Oasis. These issues have profound implications for agricultural development and the overall welfare of the population, especially in Egypt's arid and semi-arid regions. This initiative aims to increase access to water for irrigation to uphold agricultural productivity and ensure regional food security. Efforts to conserve water resources in the oasis will be grounded in an integrated management approach, focusing on reducing excessive water consumption. Improvements in irrigation water management will target three key levels: the water source, distribution channels, and irrigation practices. Initially, the CCAILSO project will address the first two levels of the irrigation cycle by promoting new irrigation methods and infrastructure, such as solar-powered pumping, and enhancing the maintenance of the drainage network to minimize wastage. For the third level of the cycle, capacity-building sessions will be conducted for farmers, focusing on the efficient management of irrigation networks and advocating the use of low-salinity wastewater, particularly for fodder production to support livestock. To accomplish the objectives outlined in this initiative, various activities will be implemented across different areas within the Siwa Oasis. This output aligns with AF core indicators 1,3, 4 and 5.
66. *Activity 1.2.1.1: Promoting and Enhancing the Irrigation Infrastructure System and Wastewater Drain Network:* This activity entails initiatives aimed at improving the irrigation infrastructure system and wastewater drain network within the Siwa Oasis. It involves promoting upgrades and enhancements to existing irrigation infrastructure to ensure efficiency and reliability in water distribution for agricultural purposes as identified in ac. 1.1.1.1. This may include but not limited to modernizing irrigation channels, installing more efficient water pumps, repairing or upgrading existing drainage systems, installing new drainage infrastructure where needed, and implementing best practices for wastewater drain network to minimize water loss and contamination, thereby enhancing overall water management in the region. Demonstration workshops will be undertaken on how to utilize and maintain the upgraded infrastructure, ensuring that the new systems are used effectively and sustainably. Operations and maintenance will also be key and will be part of the community engagements and sustainability plan.
67. *Activity 1.2.1.2: Establishing Solar-Powered Small-Scale Irrigation Systems:* This activity focuses on the establishment of solar-powered small-scale irrigation systems in the targeted areas. This will include identification of most viable sites for installation of the systems through a stakeholder engagement process, where local knowledge will guide the decision-making process, and community members will be actively involved in the planning and implementation stages. This will ensure that the selected sites meet the needs of the community and have the potential for effective implementation. Expert consultancy will be undertaken to also identify the most viable equipment as well as its installation with O&M with the support of the PMU. By harnessing solar energy to power irrigation systems, this initiative aims to provide sustainable and reliable access to water for agricultural purposes, particularly in remote or off-grid locations where conventional power sources may be limited or unreliable.
68. *Activity 1.2.1.3: Capacity Building for Farmers on Irrigation Network Management:* This activity involves capacity-building training sessions designed to empower farmers with the knowledge and skills required to effectively manage irrigation networks. Farmers will receive training on various aspects of irrigation network management, including maintenance, operation, and optimization techniques as well as promoting exchange visits within other regions and localities for practical action on the ground using a “through seeing is doing” approach. By enhancing farmers' capacity in this area, the aim is to improve the efficiency and effectiveness

of water distribution for agricultural purposes in the Siwa Oasis.

69. *Activity 1.2.1.4: Promoting the Use of Low Salinity Agricultural Wastewater:* This activity focuses on promoting the utilization of low-salinity agricultural wastewater for irrigation purposes within the Siwa Oasis. By advocating for the safe and efficient use of this resource, particularly for fodder production to support livestock (ac. 3.1.1.3), the initiative aims to reduce the demand for freshwater resources while simultaneously enhancing agricultural productivity and sustainability in the region. Through stakeholder engagements, the communities will identify and propose areas within the project that are suited for the installation of micro infrastructure and treatment of low salinity methods. Equipment such as water quality testing will be procured and provided to the community. Ensuring ongoing monitoring of salinity and other water quality parameters is crucial for preventing potential negative impacts on soil and crop health. By regularly testing the water, communities can adjust their practices as needed to maintain optimal conditions for irrigation.

Output 1.2.2 Increased access to potable water among the target communities (20% women).

70. The project aims to evaluate and disseminate the most effective water solutions, along with establishing exemplary rainwater and groundwater collection and management systems. These systems will be implemented at key public locations like schools and the Desert Research Station in Siwa. Not only will these models benefit the local communities by providing access to water, but they will also serve as demonstration centres for the showcased solutions. Emphasis will be placed on raising awareness about water demand and usage practices among the populace. This output aligns with AF core indicators 1,3 and 5.

71. *Activity 1.2.2.1: Assessing and Identifying the Most Viable Water Solutions:* This activity involves conducting assessments to evaluate various water solutions and identifying those that are most suitable and effective for addressing water scarcity in Siwa. The focus is on evaluating a range of potential solutions to determine which innovative and sustainable approaches will be most suitable and sustainable for improving water access within the community. These solutions might include technological innovations, traditional practices, and novel methods for water conservation, extraction, and management. The assessment will consider factors such as effectiveness, sustainability, cost, feasibility, and alignment with local needs and conditions. Solutions will be evaluated based on how well they address specific water scarcity issues in the region, including their potential impact on water availability and quality by the consultant. The outcome will be a set of well-researched recommendations for implementing effective water solutions tailored to the needs and conditions of Siwa.

72. *Activity 1.2.2.2: Establishing/Updating Models for Water Collection for Human Consumption (Communal Wells and Boreholes):* In this activity, models for water collection systems, such as communal wells and boreholes, will be established or upgraded to ensure efficient and reliable access to clean water for human consumption and subsistence farming practices based on the assessment in ac. 1.2.2.1. These models will be designed to meet the specific needs and requirements of the community while considering factors such as accessibility, sustainability, and water quality in line with the AF principles 2, 5 and core indicators 1,3, 4 and 5. The activity will include designing and selecting appropriate technologies and materials, ensuring proper construction techniques, and establishing maintenance protocols to ensure long-term functionality as well as O&M on the equipment.

73. *Activity 1.2.2.3: Developing and Implementing Well-Management Systems:* This activity focuses on developing and implementing well-management systems based on ac 1.1.1.2. related to the WRMP, to ensure the sustainable use and maintenance of water resources. It involves establishing protocols and practices for the management of communal wells and boreholes, including regular monitoring, maintenance, and resource allocation. By implementing effective well-management systems, the aim is to optimize the utilization of water resources and ensure their long-term sustainability for the benefit of the community.

Component 2 Enhancing resilience of Siwa Oasis ecosystems to climate change impacts

74. In response to the challenges posed by the desert ecosystem of Siwa Oasis, characterized by heat and drought, it becomes imperative to enhance the resilience of the ecosystem to climate change impacts. The adverse effects of the desert environment exacerbate the vulnerability of the Siwa ecosystem, rendering it more susceptible to the shocks of climate change. The escalating population and heightened aridity further stress the delicate balance of the oasis ecosystem. To safeguard its continued existence and ability to support the growing needs of communities, there is a pressing need to adopt sustainable land management practices. By embracing this, Siwa Oasis can better withstand the impacts of climate change and preserve

its ecological integrity.

75. Ultimately, enhancing the resilience of Siwa Oasis ecosystems requires a multifaceted approach that integrates sustainable land management practices with the diversification of livelihood strategies. By doing so, Siwa can mitigate the adverse effects of climate change, ensuring the continued well-being of both its ecosystem and its inhabitants.

Outcome 2.1: Operationalized Sustainable Land Management

76. Sustainable Land Management (SLM) presents significant opportunities for both environmental conservation and the well-being of communities reliant on it. By adopting SLM practices, farmers can maximize the use of existing land resources in a sustainable manner, boosting productivity while safeguarding soil health. Moreover, SLM facilitates enhanced management of agro-ecosystem services across various production systems, alleviating strain on natural resources. Ultimately, SLM contributes to the improvement and long-term sustainability of economic productivity and environmental health.

Output 2.1.1 Climate resilient agricultural practices are adopted.

77. The Siwa Oasis, our designated project area, represents one of the most ecologically vulnerable regions facing severe threats of degradation (https://egyptiangeographic.com/en/news/show/312). The area is plagued by prolonged drought, land degradation, desertification, and a decline in agricultural biodiversity, all of which significantly hinder food security and poverty alleviation efforts. In addition to these natural challenges—such as high temperatures, wind erosion, and shifting sand dunes—the region struggles with escalating energy costs, inefficient water management, and unsustainable farming practices. These issues collectively contribute to soil degradation, reduced crop yields, and lower income for local farmers.

78. To address these challenges, the project aims to introduce innovative agricultural practices that will enhance the resilience of local communities. A key component of this effort is the promotion of agro-silvo-pastoral practices, which integrate trees, crops, and livestock. These practices are designed to improve adaptive capacities in the face of climate change and support sustainable development in Siwa. This output aligns with AF core indicators 1,3 and 5.

79. *Activity 2.1.1.1: Developing Community Adaptation Action Plans (CAAPs):* This activity involves working closely with local communities to develop comprehensive adaptation action plans tailored to the specific challenges faced in Siwa Oasis. Through a continuous participatory process through a consultancy, key stakeholders will identify priority areas for intervention and formulate strategies to address issues such as prolonged drought, land degradation, and loss of agricultural biodiversity in line with government strategies as the backbone. These action plans will serve as roadmaps for implementing targeted initiatives aimed at enhancing resilience and sustainable development.

80. *Activity 2.1.1.2: Setting Up, Procuring Inputs, and Managing Demonstration Plots:* In this activity, demonstration plots will be established to showcase sustainable land management practices identified in the CAAPs (ac. 2.1.1.1). This will include engaging with local stakeholders, including community leaders and farmers, to select suitable sites and gain their support for the demonstration plots. Inputs required for these plots, such as seeds, fertilizers, and tools, will be procured and managed to ensure effective implementation through the PMU. These demonstration plots will serve as practical learning environments, enabling farmers to observe and adopt innovative techniques to mitigate the effects of climate change and improve agricultural productivity. The main CAIC will be established at the DRC Research station in Siwa (ac. 2.1.2.1) and will be a focal point for the initial trainings and act as the main hub for innovative adaptation solutions identified which the communities will replicate the demonstration plots within their localities.

81. *Activity 2.1.1.3: Promoting Agro-sylvo-pastoral Practices (Integration of Trees and Crops with Livestock Production):* This activity focuses on promoting agro-sylvo-pastoral practices, which involve integrating trees, crops, and livestock production systems. By planting trees within agricultural fields and incorporating livestock grazing into cropping systems, farmers can enhance soil fertility, conserve water, and improve biodiversity. This activity will include procurement of inputs and necessary tools for planting, maintenance, and livestock management, site preparation, conducting training sessions for farmers on agro-sylvo-pastoral practices, including planting techniques, livestock management, and sustainable farming methods. The utilization of agricultural extension services will be key to disseminate knowledge and best practices to a broader audience. The extension agents can offer technical support and advice to farmers implementing agro-sylvo-pastoral systems, ensuring successful adoption and scaling up of the practices. This integrated

approach not only mitigates the impacts of climate change but also enhances overall farm resilience and productivity.

82. *Activity 2.1.1.4: Promoting Production and Use of Bio-Compost and Bio-Pesticides:* This activity aims to promote the production and application of bio-compost and bio-pesticides as environmentally friendly alternatives to conventional synthetic agricultural inputs. Emphasis will be on the use of palm tree by-products which the region capitalises on at small scale in their farming activities. It will be the basis of raw material that is readily available applying both traditional and modern technologies to improve agricultural yields. Training and capacity-building initiatives will be conducted at the CAICs (ac. 2.1.2.1) and also onsite in the communities to educate farmers on the preparation and usage of bio-compost and bio-pesticides. These sessions will cover the entire process, from sourcing raw materials to the preparation of the compost and pesticides, emphasizing the benefits of using these organic inputs for soil fertility and crop protection through a community led approach. It will also include but not limited to the procurement and use of inputs such as compost turners, mixers, and containers. By reducing reliance on synthetic fertilizers and pesticides, this approach contributes to soil health, biodiversity conservation, and overall sustainability of agricultural production in Siwa Oasis.

Output 2.1.2. Sustained Green belts developed.

83. This initiative focuses on enhancing the capabilities of their communities in advocating for and adopting climate-resilient practices. Its goal is to assist in establishing green belts to stabilize sand dune movements, employing both mechanical and biological methods. These green belts will act as protective barriers, safeguarding communities and agricultural lands from the impacts of sand dune movement. Ultimately, this effort aims to also foster and compliment improved Sustainable Land Management (SLM) and Climate Resilience Agriculture (CRA) practices within the region. Based on this, the CCAILSO project proposes the establishment of Climate Adaptation and Innovation Centers (CAICs) one hosted at the Desert Research Centre Station (DRC) in Siwa. This output aligns with AF core indicators 1,3, 4 and 5.

84. *Activity 2.1.2.1: Establishing Climate Adaptation and Innovation Centers (CAICs):* This activity involves the establishment of Climate Adaptation and Innovation Centers. These centers serve as hubs for knowledge exchange, training, and innovations related to climate adaptation and resilience-building practices highlighted from previous DRC and other stakeholders' interventions which will be cascaded to the communities. They provide resources, workshops, and technical support to empower local communities in implementing effective strategies to mitigate the impacts of climate change. The central CAIC will be established at the DRC research station in the existing infrastructure which require minimal upgrading and will serve as a meeting point for all stakeholders as well as a centre of excellence. Two additional CAICs within the communities will be established at a small-scale to support climate change interventions, inter alia, as well as ensuring accessibility and proximity to the relevant stakeholders. As part of the CAICs, equipment related to operationalization and day-to-day running will be procured.

85. *Activity 2.1.2.2: Identifying/Establishing Farmers Clubs for Concrete SLM Application:* This activity is dedicated to identifying and establishing Farmers' Clubs (FCs) aimed at the practical application of Sustainable Land Management (SLM) techniques. The goal is to create a platform for farmers to collaborate, share experiences, and receive training in implementing SLM practices that are specifically tailored to their unique agricultural contexts. The project will work in close partnership with local communities and relevant stakeholders to identify potential members and strengthen or establish FCs within the project area. These clubs will be strategically formed based on the specific environmental and agricultural challenges faced by each community. By doing so, FCs will ensure that members focus on relevant SLM practices that directly address local issues, such as soil erosion, water scarcity, or soil fertility improvement. The establishment of these clubs will promote collective action, creating a supportive environment where farmers can exchange knowledge and experiences on sustainable farming techniques.

86. The activity will also involve conducting training sessions and workshops to guide the establishment and operation of the Farmers' Clubs. These sessions will focus on both the organizational structure of the clubs and the application of specific SLM techniques, ensuring that farmers are equipped with the knowledge and tools necessary for sustainable agricultural practices. A selection criterion will be employed to ensure the FCs are structured and operational in a sustainable and inclusive manner which will include but not limited to: Willingness to participate, Access to arable land, Methodology and Approach inter alia. Each Farmers' Club will include 2-3 Lead Farmers, who are early adopters of new techniques and practices. These Lead

Farmers will be responsible for providing direct support to 8-10 other farmers within the club. Lead Farmers will serve as key contact points for both TOTs and Agricultural Extension Workers, acting as local champions of SLM techniques. Their leadership role will extend beyond the project's lifespan, ensuring the continuity of knowledge transfer and the sustainability of best practices within the community. The establishment of these Farmers' Clubs will be informed by the extensive experience of the Regional Implementing Entity (RIE) and Executing Entity (EE), as well as by the Farmers' Clubs Model (FCM) developed by the Food and Agriculture Organization (FAO). The FCM is an agricultural extension methodology that supports the creation of Farmers' Clubs and smallholder networks. It has been successfully implemented in over 330 projects across Sub-Saharan Africa, Asia, and Latin America, reaching more than 200,000 smallholders.

87. The FCM emphasizes the creation of local structures, such as Farmers' Clubs, to promote peer learning, knowledge exchange, and social cohesion among farmers. This approach strengthens community ties and fosters an environment where sustainable farming practices can be disseminated and maintained at the local level. The collective action and peer learning encouraged through FCs also contribute to increased resilience against environmental and economic challenges.
88. By adopting this model, the project ensures that the knowledge and skills gained by Farmers' Club members will be embedded within the community, supporting the long-term sustainability of SLM practices and the overall resilience of the agricultural systems.
89. *Activity 2.1.2.3: Establishing Community Tree Nurseries:* This activity entails the establishment of 1 general nursery at the CAIC and 2 community tree nurseries to support reforestation and afforestation efforts. These nurseries serve as local sources of tree seedlings, providing communities with the resources needed to establish green belts and other vegetation cover for soil stabilization (ac. 2.1.2.4) and climate resilience purposes and will be managed by the local communities in conjunction with the agricultural extension agents. The main nursery will be established at the main CAIC and will offer the initial training to the extension agents who will then work with the communities to set up the other nurseries within the project area. This activity will complement ac. 2.1.1.3. It further includes thorough planning and site selection, providing training and capacity building for local communities and extension agents, and ensuring ongoing management and maintenance of the nurseries to achieve sustainable tree production and climate resilience.
90. *Activity 2.1.2.4: Establishing Green Belts for the Stabilization of Sand Dune Movements (Mechanical and Biological):* This activity focuses on establishing green belts using both mechanical and biological methods to stabilize sand dune movements. Green belts act as protective barriers against sand encroachment, safeguarding communities and agricultural lands from the adverse effects of desertification. Mechanical methods will include but not limited to the construction of physical barriers and structures that prevent the movement of sand dunes such as fences, windbreaks, or other engineered solutions designed to reduce the impact of wind on sand movement whereas biological methods will involve planting specific vegetation and ideally native species which are well adapted to the region that naturally holds the soil in place with a good root system network, reducing sand movement over time. By integrating tree planting and other forms of vegetation into agricultural fields and open areas, biological methods not only stabilize the dunes but also contribute to the enhancement of biodiversity and ecosystem health in the region.
91. Selected biological methods will capitalise on the establishment of the nurseries (ac. 2.1.2.3) to provide viable tree species that will also support the micro climate of Siwa.
92. Towards implementation of this activity, an assessment specific to SDM will be undertaken to identify the exact area to apply the most viable techniques. This is, however, a basis that will be further elaborate during implementation due to the fact that this activity is considered as a USP.
93. *Activity 2.1.2.5: Introducing Soil Stabilization and Enrichment Techniques to Promote Agricultural Productivity:* This activity involves the introduction of soil stabilization and enrichment techniques aimed at enhancing agricultural productivity in the face of climate change. Techniques such as demi-lunes, zai pits, contour ploughing and cover cropping assist in reducing the loss of topsoil, which is essential for maintaining soil health and productivity, mulching which improves water retention in the soil, reducing the need for irrigation and making crops more resilient to drought conditions, cover cropping which adds organic matter to the soil, enhancing its fertility and structure, which supports better crop growth and yields. By improving soil health and moisture levels, these techniques contribute to higher and more stable crop yields, which is crucial for food security as well as assist farmers adapt to the impacts of climate change by building more resilient agricultural systems that can withstand extreme weather events and changing climatic conditions.

Promoting these techniques aligns with sustainable agriculture practices and livelihood resilience, reducing the reliance on chemical inputs, and enhancing the long-term viability of farming in Siwa. The project will capitalize also on SLM practices (ac. 2.1.1.3 and ac. 2.1.2.2) to further enhance and promote agricultural productivity.

COMPONENT 3: Diversifying the livelihoods through IGAs and value chain addition

94. This Component endeavours to enhance the resilience of Siwa Oasis communities by diversifying livelihoods through Income-Generating Activities (IGAs) and value chain addition. It entails innovative strategies to transform the traditional economic landscape, embracing a socio-economic model that addresses current vulnerabilities while paving the way for a more resilient future. This involves strategically incorporating IGAs to introduce new income avenues beyond agriculture and tourism, broadening the economic base to navigate climatic variations and market fluctuations. Furthermore, the value chain addition component aims to create a positive ripple effect across various sectors by enhancing the value of local products and services, promoting sustainable and equitable development. By elevating the economic potential of the oasis and increasing incomes for community members, this approach fosters pride and ownership in their cultural offerings while preserving the rich culture of Siwa Oasis.
95. As a community-driven initiative, the goal is not only to mitigate challenges but also to celebrate and preserve the cultural heritage of Siwa Oasis. By integrating traditional practices into new IGAs and value chains, economic development is harmonized with cultural preservation, resulting in a resilient community that draws strength from its cultural roots while adapting to modern dynamics. Ultimately, diversifying livelihoods through IGAs and value chain addition in Siwa Oasis is a visionary step towards building a more resilient, empowered, and sustainable community. This initiative seeks to redefine the narrative of economic prosperity, intertwining it with environmental consciousness, cultural pride, and the collective resilience of its people.

Outcome 3.1 Promoted Climate-Resilient Livelihoods

96. The project aims to enhance the resilience of communities in Siwa Oasis to CC impacts by diversifying livelihood. This involves broadening the sources of income for women and youth, who face limited local employment opportunities. Cultural norms, particularly among the Amazigh community which is the majority group in Siwa, often restricts women's engagement outside their homes. Therefore, the project will focus on promoting the establishment of women's groups among other activities to access facilities that not only promote their cultural heritage and generational skills and artistry while striking a balance between cultural norms and technological advancements. This approach aims to empower women and youth economically within the constraints of local cultural expectations, thus fostering resilience in the face of climate change.

Output 3.1.1 Improved livestock production practices adopted.

97. Livestock production serves as a vital livelihood for farmers in the Oasis, providing both food and income. However, challenges such as increasing temperatures, poor genetics, inadequate nutrition, subpar reproductive management, and prevalent animal diseases hinder livestock productivity in the oasis. This output aims to tackle these issues by implementing practical solutions to enhance livestock production.
98. In semi-arid regions like the oasis, where social and climate vulnerability is widespread, even minor environmental changes can have significant impacts on water supply and local food security. Given the current climate change impacts, farmers need to adapt to the new environmental conditions through climate-resilient agriculture (op 2.1.1). This can be achieved by promoting the production of short-cycle livestock and implementing adaptation measures for Livestock and Pasture Management. This output aligns with AF core indicators 1,3, 4 and 5.
99. *Activity 3.1.1.1: Supporting Access to Veterinary Services for animal husbandry:* This activity focuses on ensuring farmers have access to essential veterinary services. By facilitating access to veterinary care, including vaccinations, treatments, and disease prevention measures, this initiative aims to improve the health and well-being of livestock populations. In Siwa Oasis, the existence of the mobile veterinary units will be enhanced/upgraded to be deployed to reach the underserved communities, offering on-site veterinary consultations and treatments. The CAIC to be established will act as a centre for training as well employ the resources of the DRC to research and link with other government institutions to have extension workers and quality services to the communities. The veterinary services will be an ongoing service offered to the communities at a basic level and in the occurrences of extra ordinary events that affect the livestock, the

services will be rendered at a cost that will be used to sustain the services when and where necessary. The inclusion of government services through the extension agents and the assistance provided by the DRC will ensure that the services are included in the budgeting cycle past project implementation.

100. *Activity 3.1.1.2: Promoting Production of Short-Cycle Livestock:* This activity entails promoting the production of short-cycle livestock breeds that are better suited to the climatic conditions and resource limitations of the oasis. Short-cycle livestock have shorter gestation and maturity periods, allowing for more efficient breeding and quicker turnover rates. The first step is to identify and prioritize short-cycle livestock species that are well-suited to Siwa and based on the market demand. This may include species such as poultry and sheep that have shorter reproductive cycles and faster growth rates. Identifying superior breeding stock with desirable traits such as disease resistance and adaptability to local conditions will be done by establishing breeding centers. This will also facilitate controlled mating and genetic improvement with the assistance of relevant ministries, providing training and technical support to livestock owners on breeding techniques and selection criteria among others.

101. *Activity 3.1.1.3: Enhancing Livestock and Pasture Management Systems (Breeding, Fodder, etc.):* This activity will focus to address challenges such as poor genetics, inadequate nutrition, and subpar reproductive management. This will involve identifying and implementing rotational grazing systems to prevent overgrazing and soil erosion. Also, rehabilitating degraded pastures through reseeding and soil conservation measures linked to ac. 2.1.2.5 and promoting community-based natural resource management approaches to ensure equitable access to pasture resources while preventing overexploitation. The introduction of improved forage species that are well-suited to local climate and soil conditions, as well as the implementation of sustainable practices for fodder cultivation will enhance the local pasture management system, utilizing techniques like silage making and hay production to preserve fodder for use during lean seasons. The demonstration plots established in ac. 2.1.1.2 will also be an advantage to provide on-site trainings as well share experiences on the various project areas.

Output 3.1.2 Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs)

102. To foster livelihood diversification and resilience in Siwa Oasis, this output focuses on the promotion of both agricultural and non-agricultural income-generating activities (IGAs). The strategy emphasizes diversifying income streams through the cultivation of mini-agricultural activities and non-agricultural ventures, such as artisan crafts, agricultural trades, and culturally significant product lines. Examples of IGAs include but not limited to, creating beauty products from Siwa Salt, processing palm tree leaves into goods, and preserving cultural crafts inspired by the Amazigh heritage.

103. Specialized trainings will be provided to support the development of these IGAs. Experts, extension workers, and project personnel will be engaged to deliver training tailored to the specific needs of the community, ensuring that participants acquire practical skills for launching and managing small enterprises. These trainings will also incorporate knowledge on market access, product development, and sustainable production methods to ensure long-term viability. This output aligns with AF core indicators 1,3 and 4.

104. *Focus on Social Inclusion and Cultural Sensitivity:* Particular attention will be given to women and youth, who often face greater socio-economic challenges and limited access to resources. These groups will be prioritized in the training and support programs, enabling them to establish small businesses that are culturally appropriate and socially acceptable. The activities will take into account cultural norms, including gender roles and social expectations, to ensure that participants can engage without facing community resistance or social stigmatization. Involving community leaders and ensuring their buy-in will be critical to overcoming any potential cultural constraints. *Addressing Social Constraints*: In recognizing the social dynamics of Siwa, where traditional roles and expectations may limit participation, the project will engage community elders and leaders from the outset to advocate for the inclusion of women and youth in IGAs. Additionally, efforts will be made to ensure that the selected activities align with the community's cultural values, particularly by promoting trades that already hold social significance, such as handicrafts and heritage preservation. *Resilience and Economic Empowerment*: Diversifying livelihood options is essential for strengthening community resilience in the face of climate change. By supporting both agricultural and non-agricultural IGAs, the project enhances Siwa's adaptive capacity, ensuring that economic opportunities

extend beyond traditional farming. Moreover, these IGAs contribute to reducing economic vulnerability by offering alternative income sources during times of environmental stress, such as droughts or crop failures.

105. Ultimately, the development of these IGAs will not only fortify the economic resilience of Siwa communities but also foster greater financial autonomy, particularly for marginalized groups like women and youth, thereby enhancing overall social cohesion and long-term sustainability.

106. As this output includes USPs within the project, it is still not certain on the number of savings and cooperative that will be identified, the number of community groups that will be also established taking into account the women and social context of the Siwa oasis as examples. Furthermore, this will also be part of the USPs criteria that will use the selection criteria of the project as well as other tools that were identified or will be developed towards implementation of CCAILSO.

107. *Activity 3.1.2.1: Support business planning for alternative IGAs (Beekeeping, Ecotourism, Zero grazing, Handcrafts, agricultural trades etc...):* This activity involves providing assistance and guidance to individuals or groups interested in diversifying their income sources beyond traditional agriculture through initially conducting an assessment and market analysis to identify viable opportunities and the demand for alternative IGAs in the target area. This assessment is mandatory due to the activity being a USP as it will be further detailed in consultations with the beneficiaries among the communities and utilizing tools developed for the project such as the selection criteria. The project will provide tailored support to the communities in developing comprehensive business plans. These plans will outline the steps needed to establish and grow alternative IGAs such as, but not limited to, beekeeping, ecotourism and other non-agricultural endeavours, covering aspects such as business objectives, target markets, marketing strategies, production processes, financial projections, and risk management. A key part of this activity will involve conducting a detailed market analysis to determine the demand for various alternative IGAs. This analysis will assist identify which sectors have the highest potential for profitability and sustainability. It will consider factors such as market trends, competition, pricing, and consumer preferences, both locally and regionally. The support may include training sessions on entrepreneurship, business development which will be determined during the implementation phase, and financial management, mentoring, and access to resources necessary for successful planning and implementation through workshops, seminars coupled with providing access to educational resources.

108. *Activity 3.1.2.2: Establish revolving fund schemes for IGAs with a gender focus:* This activity will be specifically for targeted at supporting the IGAs with a gender focus prioritizing women and youth, addressing the specific barriers they face in accessing financial resources. The funds will be designed to provide financial support to women and youth who are interested in starting or expanding businesses in sectors like artisan crafts, beauty products sourced from Siwa Salt, and processing palm tree leaves inter alia. As some of the activities identified in ac. 3.1.2.1 will require funding as start-ups, they will be considered as USPs as the number and frequency will be identified during implementation. Furthermore, based on the context of Siwa and as an example, the number of community groups to be established is estimated and no fixed number is identified as the gender focus and social setting plays a major role hence incorporating the USP context within this activity as well as ac 3.1.2.3 and 3.1.2.4. The project will develop a framework for the revolving fund scheme based on consultations conducted at the development stage where some frameworks were identified specifically to provide flexible and accessible financing to women entrepreneurs. The revolving fund will operate on a loan basis, where funds are provided to eligible entrepreneurs to start or expand their IGAs. The loans will be structured with manageable interest rates and repayment terms that align with the cash flow patterns of the businesses being supported. Interest rates will be set at a level that ensures the sustainability of the fund while remaining accessible to the target groups. Loan terms will be flexible, with provisions for grace periods and repayment schedules that align with the nature of the supported businesses. As loans are repaid, the funds will be reinvested into the fund to support new entrepreneurs or expand existing businesses. This creates a sustainable funding mechanism that continuously benefits the community over time. The revolving nature also allows the fund to grow organically, increasing its impact on the local economy.

109. *Activity 3.1.2.3: Establish and support savings and credit co-operative society (SACCO) for Eco-tourism ventures:* This activity will be specifically tailored to individuals or groups involved in eco-tourism ventures in the Siwa community. The SACCO provides members with access to financial services such as savings, credit, and insurance, which are crucial for the development and sustainability of eco-tourism initiatives. By pooling resources and sharing risks, the SACCO enhances the financial resilience of its members and

promotes the growth of eco-tourism as a viable economic activity in the region.

110. *Activity 3.1.2.4: Develop/upscale value chain market linkages for communities with key stakeholders and the private sector:* This activity focuses on strengthening and expanding value chain market linkages for communities engaged in both agricultural and non-agricultural economic activities. It entails identifying key stakeholders and private sector partners involved in various stages of the value chain, from production to distribution and marketing. By fostering collaboration and partnership between communities and these stakeholders, the activity aims to improve market access, increase value addition, and enhance the competitiveness of products derived from artisan crafts, beauty products, and other non-agricultural streams of income. This development and upscaling of market linkages contribute to the resilience and economic autonomy of Siwa communities.

COMPONENT 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts

111. The primary objective of this Component is to enhance awareness and bolster the capabilities of diverse stakeholders in adapting to climate change. Initiatives for awareness-raising and technical capacity-building will foster the establishment of a robust information infrastructure and network that embeds climate change adaptation. Capacity building endeavours will streamline the acquisition and dissemination of skills and competencies, empowering communities to autonomously make decisions and take action. The insights gained and exemplary approaches derived from project implementation will constitute a vital facet, warranting thorough documentation that integrates policy formulation and public involvement. Furthermore, these insights should be widely disseminated both nationally and internationally.

Outcome 4.1 Promoted CC Awareness & Knowledge at local, national and international levels

112. Upon project initiation, a knowledge management strategy will be implemented to leverage existing climate-related information. This strategy will facilitate seamless information exchange among stakeholders and dissemination of project outcomes. Tailored knowledge materials will be created and distributed, addressing the specific demands and requirements of diverse stakeholders. Additionally, opportunities for knowledge sharing, interaction, and exchanging best practices will be facilitated at regional, national, and global events such as conferences, symposia, workshops, and meetings.

Output 4.1.1 Improved understanding of stakeholders to integrate CC into Planning Processes.

113. Climate change injects heightened uncertainty into development trajectories, necessitating greater flexibility compared to conventional practices. Stakeholder engagement stands as a pivotal means of securing ownership and ensuring the quality of decision-making in climate change adaptation efforts. Methodological tools aimed at integrating climate change considerations into development processes, including planning, programming, budgeting, and monitoring-evaluation actions, will be imparted to stakeholders. This transfer of tools aims to bolster the long-term sustainability and ownership of climate change adaptation interventions. This output aligns with AF core indicators 1 and 5.

114. *Activity 4.1.1.1: Conduct Baseline, Capacity Needs Assessment, and KAP Survey of All Stakeholders:* This activity involves conducting a comprehensive baseline assessment, capacity needs assessment, and Knowledge, Attitude, and Practice (KAP) survey among all relevant stakeholders. The purpose is to establish a clear understanding of the current situation regarding climate change adaptation within the community. The baseline assessment will provide a starting point for measuring progress, while the capacity needs assessment will identify areas where stakeholders require support and training. The KAP survey will help gauge the knowledge, attitudes, and practices of stakeholders regarding climate change adaptation.

115. *Activity 4.1.1.2: Capacity Building for Extension Services on Climate Change Adaptation Planning:* This activity focuses on enhancing the capacity of extension services personnel in climate change adaptation planning. Training sessions, workshops, and other capacity-building initiatives will be organized to equip extension workers with the necessary knowledge and skills to effectively support communities in adapting to climate change. By strengthening the capacity of extension services, the project aims to improve the quality and effectiveness of climate change adaptation efforts at the grassroots level.

116. *Activity 4.1.1.3: Design and Develop Communication Strategy and Action Plan:* This activity entails the design and development of a communication strategy with an action plan, along with the creation of supporting materials such as leaflets, posters, and flyers. The communication strategy will outline how key messages about climate change adaptation will be disseminated to stakeholders, ensuring widespread awareness and

understanding. The supporting materials will serve as visual aids to reinforce these messages and engage stakeholders in the adaptation process. Effective communication is crucial for fostering stakeholder engagement, promoting ownership, and facilitating informed decision-making in climate change adaptation initiatives.

117. *Activity 4.1.1.4: Disseminate project results and share lessons learned with national and international stakeholders, mainstreaming new approaches in local and regional planning:* This activity focuses on sharing the outcomes and lessons learned from the project with a broader audience, including national and international stakeholders. It involves disseminating project results through various channels and platforms, such as conferences, workshops, and publications, to mainstream new approaches to climate change adaptation in local and regional planning processes.

Output 4.1.2: Raised Community Awareness on CC adaptation

118. This output aims to raise awareness and build the capacities of the communities in terms of adaptation to climate change. The proposed activities will contribute to the creation of a solid information framework that integrates adaptation to climate change. The community needs to be made aware of the risks, acquire knowledge about the options that are available for a response, and be empowered to take their own actions. Effective public engagement is therefore key to success in planning for climate change. This output aligns with AF core indicators 1 and 5.

119. *Activity 4.1.2.1: Develop training materials to support Community-Based Trainers (CBT):* Informed by the baseline (ac. 4.1.1.1), by the project document and building on existing evidence, a detailed training plan for the project will be developed. The training plan will include plans and modules for all trainings and capacity building related to all project activities, including crop farming, small livestock rearing, water management based on outcomes of cp. 2 & 3.

120. *Activity 4.1.2.2: Enhance the institutional capacities to manage the CAICs:* CAICs will be the prime responsibility of the EEs. The CAICs will constitute a community meeting place, and will serve for capacity building of local authorities, coordinating CC awareness campaigns in communities and for leading local participatory Climate Vulnerability Assessments (CVAs) which will involve the active participation of community members, local authorities, and technical experts to identify and prioritize climate vulnerabilities within the region. The outcomes of these assessments will directly inform the development of community-based adaptation plans, ensuring that interventions are grounded in local realities and needs and adaptation planning which will address critical areas such as water management, agriculture, disaster preparedness, and ecosystem restoration, aligning with broader regional and national climate goals. Through targeted training programs, workshops, and knowledge-sharing sessions, the CAICs will enhance the technical and institutional capacities of key stakeholders to address climate change challenges. The training sessions will cover climate-smart agricultural practices, water resource management, and disaster risk reduction, among other relevant topics.

121. *Activity 4.1.2.3: Train community beneficiaries and CSOs on climate resilient livelihood practices:* Community-driven resilience planning ensures that vulnerable and impacted communities actively participate in creating solutions tailored to their unique challenges. The CCAILSO project aims to conduct comprehensive training sessions for community members, CSOs and stakeholders, focusing on how to climate-proof their lives and communities. By enhancing their resilience through practical and sustainable practices, the project will empower participants to better cope with the impacts of climate change, ultimately fostering stronger, more adaptive communities in line with op. 2.1.1.

122. *Activity 4.1.2.4: Conduct community campaigns on CC/water/health:* The project seeks to enhance knowledge and awareness of the impacts of CC to human/animal health particularly to spur more climate resilient behaviour patterns in the community based on the assessments undertaken and the KAP survey. The community members will have a better understanding of how climate change affects health and what actions they can take to mitigate these impacts where they will adopt more climate-resilient practices, leading to improved health outcomes and reduced vulnerability to climate-related health issues, enhanced capacity of the community to cope with and adapt to the health impacts of climate change, supported by local leaders and health practitioners, inter alia. By conducting these community campaigns, the project will foster a more informed and resilient community, capable of adapting to the challenges posed by climate change and ensuring the well-being of both human and animal populations.

123. *Activity 4.1.2.5: Conduct inclusive planning and capacity building for community-based Ecotourism:* Eco/community-based tourism is a viable pathway to achieve economic empowerment through employment generation. The project will map existing innovative community-based solutions in the tourism sector of Siwa, facilitate capacity building trainings and skill development training among the community, selecting women and youth to train them in crafts based on the biodiversity of the Oasis area (tablecloths, handbags, key rings, handkerchiefs, vanity bags, etc.) which they can sell to tourists.

124. In general, some of the activities above will require a selection criterion which will be updated upon commencement of the project. This will also be specific to some activities which will include and not limited to Gender, land use, water availability and usage, economic activities inter alia. The table below presents an indicative criterion that will be the backbone for updating accordingly.

General Information	0	1	2	3	4	5
Number of members in WUA/ FC						
Number of active farmers in the community						
Number of farmers willing to integrate SLM techniques						
Need for supplementary food during dry period						
Gender consideration						
Infrastructure						
Access to main grid electricity						
Availability of energy efficient system (solar)						
Access to water						
Access to road network						
Existence and condition of storage facilities						
Organizational and Financial capacities of SACCOs						
Availability of registration documents						
Existence of banks accounts						
Available financial means						
Capacity of members to mobile seed capital						
Experience in collaborating with financial institutions						
Currently undertaking an IGA						

B. Economic, Social and Environmental Benefits

125. The diverse range of planned project activities is poised to yield economic, social, and environmental advantages at both local and national scales, with a particular emphasis on gender inclusivity within the project's purview. Through these activities, the CCAILSO project aims to encourage and utilize the adaptive capabilities of communities and fortify the ecosystem's resilience within the Siwa oasis. Moreover, it will establish community-based resource management systems to safeguard sustainability and ensure the realization of project objectives.

Economic Benefits:

126. The CCAILSO project, with its primary objective of enhancing the per capita income of impoverished farmers in the oasis, promises significant economic co-benefits. By focusing on enhancing livelihood resilience through increased farm productivity and improved access to water for agricultural and domestic purposes, the project aims to catalyse economic growth within the Siwa Community.

127. Under Component 1, initiatives such as enhancing water access for farming and implementing efficient irrigation systems, including the utilization of solar pumps, not only lead to heightened agricultural production but also reduce energy costs and emissions. The cost savings from solar energy adoption can be reinvested by farmers into diversifying economic activities, thus rendering them more resilient and profitable. Moreover, time and labour saved through streamlined irrigation methods enable farmers to engage in additional income-generating endeavours.

128. Component 2 targets enhanced Agricultural Productivity by Implementing sustainable land management practices which can lead to increased agricultural productivity despite the adverse conditions of heat and drought. This can result in higher yields and improved incomes for farmers, contributing to economic stability within the community. Tourism Development under component 2 will Preserve the ecological integrity of the oasis through sustainable land management practices which will attract tourists interested in experiencing unique and well-preserved natural environments. This can stimulate economic growth through tourism-

related businesses and services, such as accommodations, restaurants, and guided tours as well as job Creation in various sectors, including agriculture, tourism, and environmental conservation. This can help reduce unemployment and poverty levels within the community.

129. Component 3 emphasizes livelihood diversification through Income-Generating Activities (IGAs) and value chain addition, envisioning a socio-economic model that transcends traditional sectors. This enhancement of household incomes not only will promote climate-resilient agricultural practices and tapping into economic opportunities linked with the oasis's ecological, cultural, and environmental services but also establish community cooperatives for agricultural and handicraft products which fosters sustainable marketing and enhances bargaining power in markets, thus augmenting income generation potential. This approach not only shields against climatic and market uncertainties but also elevates the economic potential of the oasis, promoting equitable development and preserving cultural heritage.
130. Overall, the CCAILSO project's multifaceted approach to economic empowerment and resilience-building signifies a transformative step towards a sustainable future for the Siwa Oasis community, where economic prosperity intertwines with environmental stewardship and cultural preservation.

Social Benefits:

131. The CCAILSO project aims to bring about significant social benefits, primarily revolving around economic empowerment, across various domains causing an interlinkage. With its focus on enhancing water systems (Component 1), ensuring food security (Component 2) and fostering IGAs (Component 3), the project endeavours to alleviate household and community-level challenges stemming from water scarcity and food insecurity. By mitigating the adverse socio-economic impacts of drought, such as water and food shortages and income loss, the project aims to establish sustainable access to reliable domestic water supply and water for productive uses as well as promote IGAs within community members who will group together.
132. Furthermore, the project seeks to enhance the livelihoods of the community by investing in the development of organizational and technical capacities of farmers and stakeholders (Output 3.1.2). It anticipates that community production systems will become more resilient to climate change through outcomes focused on improved access to water for irrigation and the introduction of alternative or additional livelihood options through sustainable diversification of production and opportunities within the ecosystem (Outcomes 1.1, 2.1, and 2.2).
133. Moreover, the project will support community organizations by strengthening their technical and organizational capacities, facilitating institutionalization of community groups, and fostering social skills and learning among community members. Through knowledge-sharing and capacity-building efforts (Component 4), the project not only enhances the resilience of individual households but also strengthens the collective resilience of communities.
134. Importantly, the project ensures that communities are active participants in climate change adaptation efforts and that activities are tailored to their needs, culture, and traditions, garnering acceptance and ownership of climate change issues within the community. By empowering communities to respond effectively to climate change challenges, the project fosters social cohesion, community ownership, and resilience-building at both the individual and household levels.

Gender consideration:

135. The project will prioritize gender sensitivity and responsiveness, aligning with the AF's Gender Policy and Action Plan. Concrete measures will be taken to ensure women's participation in decision-making processes, as well as their access to knowledge, training, inputs, and all project activities. These efforts aim to bolster the position of women within the community and society at large.
136. To address the conservative cultural attitudes towards women prevalent in the local community, the project will proactively promote opportunities for women to engage in various project activities and enhance their technical capacities. Additionally, the Environmental and Social risk screening process, in accordance with AF ESP guidelines, will be integrated into project implementation. A comprehensive social and environmental risk management plan will be developed during the full proposal development phase.
137. Specifically addressing the benefits to local women, the project will strive to create an inclusive environment where women can actively participate in project activities and contribute their expertise. Measures will be implemented to avoid or mitigate negative social and environmental impacts, including ensuring inclusive and representative community involvement in project planning and implementation. Consultation and engagement with beneficiary communities, including separate focus groups with women and indigenous

groups, will be conducted, ensuring their Free, Prior, and Informed Consent (FPIC) process.

138. Furthermore, the project will maintain strong collaboration with relevant ministries throughout the design and implementation phases, seeking technical support from experts in irrigation and ecosystem management. All activities will adhere to national standards and safeguards outlined in various strategies and guidance documents. Additionally, the project will establish a complaints and feedback mechanism to solicit community input and address any grievances in accordance with established protocols for resolution.

Environmental benefits:

139. The CCAILSO project promises several environmental benefits, particularly in advancing sustainable water management and addressing ecological challenges within the Siwa Oasis.

140. Firstly, through Outcome 1.2, the project aims to enhance access to irrigation and potable water for local communities. By implementing efficient water use techniques and conducting capacity-building activities, the project seeks to improve water resource management. This will not only contribute to maintaining the hydraulic balance in the oasis but also ensure ecological stability, especially during periods of drought. By optimizing water usage, the project mitigates the strain on water resources and fosters resilience within the local ecosystem. Moreover, the project targets the issue of sand dune encroachment, a significant environmental concern in the Siwa Oasis. Under Outcome 2.1, the project promotes sustainable land management practices by establishing community tree nurseries and implementing green belts in areas susceptible to sand movement. These initiatives serve to mitigate the tangible damages inflicted on agricultural lands, population centers, and infrastructure by shifting sands. By curbing sand dune encroachment, the project enhances the resilience of ecosystems to climatic variations and ensures the provision of essential services vital for the well-being of communities and their livelihoods.

141. Additionally, capacity-building and awareness-raising activities under Component 4 contribute to the sustainable management of the Siwa Oasis. By increasing understanding of climate change and its impacts on the local ecosystem, these initiatives empower communities to actively participate in conservation efforts. Furthermore, the benefits of the project extend beyond the local level, potentially serving as a benchmark for similar projects in ecologically sensitive areas facing environmental challenges exacerbated by climate change.

142. It's noteworthy that Siwa faces serious environmental changes and challenges, compounded by the impacts of climate change, such as soil salinity resulting from the expansion of surface lakes due to uncontrolled groundwater extraction. By addressing these challenges through targeted interventions and promoting sustainable practices, the CCAILSO project aims to safeguard the ecological integrity of the Siwa Oasis for future generations.

C. Cost-effectiveness of the project.

143. The CCAILSO Project is strategically designed to address the pressing needs of the Siwa Region, a community marked by deep vulnerabilities, poverty, and deprivation. The region's challenging logistics and high management costs have often deterred direct interventions, leaving its scattered communities underserved in terms of local development, climate change adaptation, and disaster risk reduction projects. This project stands out as one of the few initiatives targeting these marginalized communities, offering a critical opportunity for change by focusing on building resilience within the unique ecosystem of the Oasis.

144. The CCAILSO Project aligns with national and international policies and strategies, particularly those that prioritize resilience building in vulnerable communities. The project’s design integrates a unifying approach to the Oasis ecosystem, ensuring that interventions are not only contextually relevant but also strategically focused on long-term sustainability. By addressing the specific needs of Siwa’s population, the project promises both immediate and enduring impacts on the community’s socio-economic development and environmental health.

145. The project is particularly significant given its rare focus on a region often overlooked by other development initiatives. It aims to empower 9,695 direct beneficiaries, with the impacts spanning to 17,150 indirect beneficiaries and a combined total of 26,845 beneficiaries, by establishing community groups to manage water resources and productive activities. Additionally, the project engages local and national public institutions, private sector entities, and national and international networks dedicated to climate change adaptation, disaster risk reduction, and environmental protection.

146. Through its four interlinked components, the CCAILSO Project not only builds capacity and knowledge but also creates opportunities for these highly vulnerable communities. The project is expected to yield

immediate benefits while fostering long-term resilience, significantly improving the livelihoods of the people in the Siwa Region. The focused investment in capacity-building, knowledge transfer, and sustainable practices underscores the project's commitment to addressing the critical needs of a region that has long been on the periphery of development efforts. Thus, the CCAILSO Project is designed to enhance the resilience of Siwa Oasis communities to climate change through a focus on water resource management, agricultural productivity, and capacity building. This summary outlines the findings of the cost-effectiveness analysis for the project.

147. Context Analysis: Siwa Oasis faces severe water scarcity and environmental challenges exacerbated by climate change. The CCAILSO project addresses these issues through an integrated approach that combines sustainable water management, advanced agricultural practices, and community empowerment.

148. General Analysis:

a) *Alignment with Regional Needs* - The project components are tailored to the specific needs of Siwa Oasis, focusing on water management, agricultural productivity, and community resilience. This targeted intervention directly addresses the region's vulnerabilities.

b) *Comparison with Similar Interventions* - The project distinguishes itself from other regional initiatives by its holistic approach. Integrating water management, sustainable agriculture, and comprehensive community training offers a multifaceted solution that many other interventions lack.

c) *Long-term Effectiveness* - The analysis indicates that the CCAILSO project will provide sustainable benefits, significantly enhancing the region's climate resilience. Without such interventions, existing challenges would likely worsen, underscoring the project's necessity.

149. Through a thorough cost effectiveness of the project interventions under each component and further elaborate in the full CE study, below is an analysis presenting the benefits of the project in the region and related to the targeted communities:

Table 5 : Cost-effectiveness of the project

Component	Cost US$	Benefit $	Cost-Effectiveness Ratio	Expected yield in returns (US$)	Cost per beneficiaries (US$)	Area of land improved (feddan)	water quantity (m3)	Add Agriculture (feddan)	water point
Comp1	2,375,000	4,910,000	0.48	2.07	286	2,330	2,840,000	315	386
Comp 2	1,765,000	3,949,600	0.45	2.24	284.7	5500	50	545	
Comp 3	1,994,000	3,509,685	0.57	1.76	356.1				
Comp 4	641,549	1,410,000	0.45	2.20	95.0				
Totals	**6,775,549**	**13,779,285**	**0.49**	**2.03**	**252.4**	**7,830**	**2,840,050**	**860**	**386**
Project EC	600,000								
Project SM	624,451								
All	**8,000,000**	**13,779,285**	**0.58**	**1.72**	**298.0**				

150. As part of the CE study, a specific synthesis analysis of project activities has been summarised in the table below from the CE study annexed to the FP:

Table 6 : synthesis analysis of project activities from the CE study

Component 1: Water Resource Management	
Assessing Water Resources	Involves thorough assessments of surface and groundwater resources, ensuring that interventions are based on accurate data.
Management Plans	Detailed plans will optimize water use for agriculture and domestic needs, ensuring sustainable distribution.
Enhancing Institutional Capacities	Strengthening local and regional institutions involved in water management to effectively sustain the project's initiatives.
Budget and Returns	With a budget of budget of $ 2,375,000, the benefit and returns are projected at $ 4,910,000
Cost-Effectiveness: These activities are highly cost-effective, given their potential to improve water availability and quality, essential for agriculture and community well-being making it cost effective with a rate of 0.48.	
This component focuses on water resource management, addressing critical issues related to water availability and	

sustainability in agricultural and domestic use. The cost per beneficiary ($286) is moderate, given the vast improvement in land and water resources. The savings in water is about 2,840,000 M3 which suggests a significant positive environmental impact, which, in turn, supports long-term community sustainability.	
Component 2: Agricultural Productivity	
Soil Stabilization and Enrichment Techniques	Practices like contour ploughing, mulching, and cover cropping are promoted to maintain soil health and increase yields.
Budget and Returns	With a budget of $1,765,000 the expected returns are projected at $3,949,600, highlighting the cost-effectiveness of the agricultural interventions.
Cost-Effectiveness: Emphasizing sustainable practices ensures long-term productivity, making these interventions highly cost-effective with a rate of 0.45	
The emphasis on sustainable agriculture through soil stabilization and enrichment techniques provides a favourable Return On Investment (ROI) of 2.24. The project significantly boosts land productivity, enhancing 5,500 feddans and creating an additional 545 feddans for agricultural use. The cost per beneficiary aligns with that of the water resource management component. While there are no immediate water savings, the improved agricultural practices are expected to yield long-term benefits for soil health and crop sustainability.	
Component 3: Improved livelihoods and IGAs (livestock and Market Access)	
Veterinary Services Enhancement	Includes enhancing veterinary services by procuring supplies, upgrading mobile units, and training staff.
Market Access Improvements	Facilitates better market access for livestock products, boosting farmer profitability and economic stability.
Empowerment and Long-term Benefits	By empowering communities, the project ensures sustainability and long-term resilience.
Budget and Returns	With a budget of $1,994,000, the expected returns are projected at $3,509,685. This positive return on investment highlights the cost-effectiveness of the agricultural interventions.
Cost-Effectiveness: The emphasis on sustainable agricultural practices specifically on animal husbandry and IGAs ensures long-term productivity gains, making these interventions highly cost-effective rate 0.57.	
The emphasis on animal husbandry with IGAs and access to markets through training programs and provision of equipment and seed funding are a cost-effective way to sustain project benefits through community empowerment ensuring long-term productivity gains. The cost per beneficiary is higher ($356.1) compared to the other components, but this is justified by the long-term benefits of knowledge transfer and sustainability through empowered local communities. The focus on veterinary services and market access improvements for livestock farmers provides a high ROI of 2.2	
Livestock and Market Access	
Training for Livestock Management	Programs aim to improve livestock farming efficiency and productivity, contributing to economic sustainability.
Cost-Effectiveness: Investments in veterinary services and livestock training are expected to yield significant economic benefits, enhancing farmer livelihoods and community resilience.	
Cost-Effectiveness Analysis of Unidentified Sub-Projects	
Agricultural Production Initiatives	
Soil Stabilization and Enrichment	Activities like contour ploughing, mulching, and cover cropping are highly cost-effective, ensuring sustainable productivity by maintaining soil health and increasing yields.
Veterinary and Livestock Management	
Economic Benefits	Enhanced veterinary services and training for livestock management are projected to deliver significant economic benefits, supporting local farmers and community resilience.
Community-Based Adaptation	
Training and Capacity Building	Essential for the project's long-term success, these programs equip communities with the knowledge to adapt to climate change, ensuring sustained impact.
Empowerment Initiatives	Focus on building the capacity of local institutions and communities to effectively manage and sustain project outcomes.

151. The CCAILSO project showcases strong economic viability, with a return on investment (ROI) of 1.72 across all components. The total cost of $8 million is justified by its broad benefits, including a total benefit of $13.8 million—both direct (improved land and water resources) and indirect (enhanced community capacity and livestock market access). The net benefit of over $5.8 million underscores the project's potential to generate

substantial economic gains for the local population, benefiting a large number of people (26,845). The project is thus poised to deliver substantial long-term benefits, making it a model for similar initiatives in the region.

152. *Cost-Effectiveness:* The project demonstrates economic soundness with a cost-effectiveness rate of 0.58. The cost per beneficiary ($298.59) is reasonable, given the comprehensive nature of the interventions, which span water resource management, agricultural productivity, and capacity building within the community.

153. *Land and Water Impact:* The project will improve 7,830 feddans of land and save 2.84 million cubic meters of water, reflecting its significant environmental and agricultural impact. These outcomes contribute to the long-term sustainability of the region, ensuring that the community can thrive in a resource-scarce environment.

154. *Financial Analysis:* The financial viability of the project is detailed in the table below, which analyses the cost-effectiveness. The financial profitability is determined by evaluating the cost components and estimating the benefits from the interventions using the following financial appraisal techniques: i) cash flow, ii) benefit-cost ratio, iii) Net Present Value (NPV), and iv) Internal Rate of Return (IRR).

Table 7 : The financial viability of the project

A. Cost Components	Year 1	Year 2	Year3	year 4	Budgets (US$)
Component 1	374,000	1,198,000	585,000	218,000	2,375,000
Component 2	558,000	734,000	353,000	120,000	1,765,000
Component 3	223,750	691,000	659,000	420,250	1,994,000
Component 4	160,000	260,000	100,000	121,549	641,549
Project Execution Cost (EE)	150,000.00	150,000.00	150,000.00	150,000.00	600,000
Project Cycle Management Fee (IE)	174,000.00	150,451.00	150,000.00	150,000.00	624,451
Total Cost (A)	**1,639,750**	**3,183,451**	**1,997,000**	**1,179,799**	**8,000,000**
B. Financial benefits					
Component 1 Benefit	245500	491000	1718500	2,455,000	4,910,000
Component 2 Benefit	197480	394960	1382360	1,974,800	3,949,600
Component 3 Benefit	175484.25	350968.5	1228389.75	1,754,842.5	3,509,685
Component 4 Benefit	70500	141000	493500	705,000	1,410,000
Total Financial Benefits (B)	**688,964.25**	**1,377,928.5**	**4,822,749.75**	**6,889,642.5**	**13,779,285**
Cash flow (B-A)	(950,786)	(1,805,523)	2,825,750	5,709,844	5,779,285
Benefit Cost Ratio (B/A)	0.42	0.43	2.41	5.84	1.72
Net Present Value (NPV)					2,562,463.51
Internal Rate of Return (IRR)					**75%**
Discount Rate					**18%**

155. The financial analysis reveals a favourable benefit-cost ratio of 1.72, with a positive NPV of $2.56 million and an internal rate of return (IRR) of 75%. Notably, the additional benefits from implementing the project interventions will continue to accrue annually, ensuring sustained long-term value. This makes the proposed project both cost-effective and a worthwhile investment.

156. The interventions in water resource management, agricultural productivity, capacity building, and livestock management address both the immediate and long-term needs of the community, positioning the project as a sustainable and economically viable initiative.

D. Consistency with sustainable development strategies

157. The proposed project is designed to support Egypt's national adaptation priorities, with a particular focus on agriculture and water security, which are critical for the Siwa region. By aligning with national and sub-national sustainable agriculture development strategies, development plans, poverty reduction strategies, and national adaptation programs of action, the project ensures its relevance and contribution to Egypt's overarching goals.

158. The project is consistent with Egypt's socio-economic priorities, climate change objectives, and food security

goals. Notably, Egypt has demonstrated its commitment to addressing climate change through its ratification of key international agreements: the United Nations Framework Convention on Climate Change (UNFCCC) in 1994, the Kyoto Protocol in 2005, the Paris Agreement in 2017, and the Doha Amendment in February 2020.

159. Additionally, the project aligns with various pillars and objectives outlined in Egypt's sustainable development strategies. These alignments are detailed in the table below, which highlights how the project supports Egypt's strategic framework for sustainable development and climate resilience.

Table 8 : Egypt's sustainable development strategies aligned with the project's

Strategy	Project's Consistency with the Pillars and Objectives of Egypt's Framework Documents
Sustainable Development Strategy (SDS): Egypt Vision 2030	The project is in line with the priority of ensuring access to food and nutrition in Egypt's Vision 2030. Specifically, the activities proposed under this phase contribute directly to the following objectives stipulated by the strategy for the achievement of this priority: - Development of agricultural areas - Development of short-cycle animal husbandry (outcome 2.1) - Rationalization of water use and development of water resources (outcome 1.1) - Combating climate change as well as protection of settlements.
National Strategy for Adaptation to Climate Change & Disaster Risk Reduction (2011)	The Project addresses the strategy pillars focused on applying enhanced irrigation systems and climate-resilient agriculture practices to improve irrigation techniques, increase water-use efficiency, and continuously improve agricultural productivity (including through enhanced soil management practices), while also addressing the climate-change-adaptation capacity needs of local farmers.
Third National Communication (NC) under the UNFCCC (published in 2016)	The Project components address the pillars of the 3rd NC that focus on building capacity to adapt to climate change by constructing enhanced irrigation infrastructure systems and techniques, and applying dissemination of climate resilient agricultural and sustainable land management practices to conserve and optimize the use of water, and reducing water loss and wastage.
National Strategy for Mainstreaming Gender in Climate Change in Egypt (published in 2011)	The Project addresses the strategy pillars focused on enhancing the capacity of women and men in local communities to manage and efficiently use agricultural water. The Project will conduct awareness campaigns on the impact of climate change, improve the conditions of agricultural work through training and empowerment, and introduce other livelihood opportunities for the community.
Water for the Future (NWRP) (published in 2017))	The Project addresses the plan pillars focused on improving the performance of the water resources system and promoting the coordinated development and management of water, land, and resources to maximize welfare in an equitable and sustainable manner.
Egypt's Intended Nationally Determined Contribution (NDC) (published in 2016)	The Project addresses the NDC pillars by improving irrigation, increasing the efficiency of irrigation water while maintaining crop productivity and protecting land from degradation, raising awareness on the need to rationalize water use, and supporting rural communities to adapt to the expected climate-induced-changes on crops and livestock
Egypt's National Climate Change Strategy 2050	The project is aligned with the Egyptian National Climate Change Strategy pillars, as follow: 1. The strategy's first pillar is to achieve sustainable economic growth and low-emissions development in various sectors, the project sees to introduce use of solar pumps, also targets lowering greenhouse gas emissions in agricultural activities in addition to focusing on recycling agricultural waste to make fertilizer 2. The second pillar aims to build resilience and adaptability to climate change, with a focus on mitigating the negative effects of the global phenomenon. The project aims to protect natural resources and ecological systems from climate change, improve adaptation capabilities of the communities and promote adaptation methods. 3. The fourth pillar aims to improve infrastructure for financing climate activities and promoting domestic green banking and green credit lines, the environment minister pointed out. 4. The fifth pillar focuses on enhancing scientific research, technology transfer, knowledge management and awareness to combat, alleviate and adapt to climate change. The project will work to create awareness about climate change, especially

	among policy makers and the community of SIWA and share the knowledge learnt /produced with the rest of the country and region.
Egypt 2018/2019-2021/2022 plan	The Egyptian government's 2018/2019-2021/2022 plan has 5 strategic objectives, of which protecting Egypt's national security and foreign policy is the first. Food security is one of the main pillars of this strategic objective, and the various interventions proposed by this project related to improving agricultural techniques for climate change resilient production directly contribute to several objectives of this pillar, namely the objectives of: - Improving the crop irrigation system to increase farmers' income (component 1) - Increasing the production of crops, poultry, The project's agro-processing activities are in line with the plan's strategic objective of increasing employment rates, where diversification of rural income-generating activities, with emphasis on those related to agriculture, and encouragement of income-generating activities for women in rural areas are stipulated as key interventions for the achievement of this objective (component 2).
The National Sustainable Agricultural Development Strategy 2030	The "Egyptian National Strategy for Sustainable Agricultural Development to 2030" recognizes that building the resilience of smallholder farmers to climate change is a priority. To this end, it highlights vulnerability to rising temperatures as one of the most urgent issues that require an immediate response. Highlighting the expected negative impacts of rising temperatures on crop and livestock production, the strategy lists the following adaptation approaches: - compiling and analysing climate data to implement appropriate solutions, better soil management, improving irrigation systems, establishing strategic food stocks needed for livestock - supporting capacity building and relevant training programs; - supporting agricultural policies that encourage farmers to choose climate resilient crop and livestock varieties; and - supporting the livelihoods of small-scale farmers who are most vulnerable to CCs through income generating activities. Through its activities, and its implementation modalities, the Siwa project contributes directly to the recommendations outlined in the strategy aimed at strengthening the climate resilience of vulnerable rural communities through: - improved agricultural practices such as the installation of irrigation systems adapted to the region needs, the planting of heat, salinity and drought tolerant crops, etc. - improved soil quality through the promotion of compost and organic pesticides, - Reinforced farmers' resources thanks to the diversification and expansion of income-generating activities. - civil society role promoted as an important stakeholder in supporting smallholder farmers and agricultural development.
National Adaptation Plan	The project also addresses the following priority areas of the National Adaptation Plan issued in 2012 as well as its updated version developed in 2021: 1. Improvement of irrigation systems (component 1), 2. Introduce heat tolerant varieties, 3. Introduce simple agriculture technique to increase resilience (output 2.1.1), 4. Diversification of householder income through animal keeping activities (output 2.2.2), 6. Small land holding consolidation. 7. Community mobilization and awareness toward climate adaptation activities (component 3).
The National Water Resources Supply Management Vision	Through its interventions to improve irrigation efficiency, the project (component 1) responds directly to the National Water Resources Supply Management Vision for 2050. Issued by the Ministry of Water Resources and Irrigation, this vision would make the best agriculture, social and environmental use of the available water resources by means of irrigation improvement and changing crop patterns as one of its main pillars.

E. Alignment with national technical standards

160. The project adheres to the Environmental and Social Policy (ESP) of the Adaptation Fund and aligns with Egypt's national environmental and social regulations. While there may be limited adverse impacts associated with activities in Component 3, which involves improvements to field sites, these have been carefully evaluated. The proposed activities have been discussed and validated by the executing entity - DRC through consultation workshops detailed in PART II.H, ensuring they meet relevant technical standards in Egypt.

161. The project's primary focus is on enhancing the capacities of communities and institutions for the sustainable management of land and water. This includes promoting organic fertilizers and other related practices. To support these goals, applicable technical standards for sustainable land management (c), irrigation systems,

land tenure, seed production and selection, and the production and use of organic fertilizers have been reviewed. These standards will be incorporated into the training modules and materials that will be developed.

162. The table below outlines the relevant national laws and regulations of Egypt concerning agriculture, land, water, soil resources, and environmental and social standards.

Table 9 : relevant national laws and regulations of Egypt concerning agriculture, land, water, soil resources, and environmental and social standards.

Law / Decree /Regulation	Scope & Relevance to Project
Law No. 93 / 1962 (and amendments 1962, 1982, 1989)	*Scope: Regulates the discharge to open streams and the discharge of liquid waste* • Requires wastewater discharged to the sewerage network to comply with the standards stipulated in the regulations / decree 44/2000 • Relevant to Components 1 (Outputs 1.1.1., 1.1.2.), and especially Activities 1.1.1.1, 1.1.1.2 and 1.2.2.3 focused on monitoring water quality. Relevant to AF Principles 1 and 12.
Law No. 12 / 1984, concerning the issue of the Law on Irrigation and Drainage, and Law No. 213/1994 (supplement) (MWRI)	*Scope: Defines public properties for irrigation and drainage, the use and maintenance of private canals and field drains (e.g., main canals, drains and branches) and the arrangement to recover the costs of drainage works* • Provides rules to allocate water • Regulates the construction of water intakes from the Nile and public canals and use of groundwater and drainage water • Requires consultation with landowners • Controls the development of New Lands and the price for irrigation and drainage • Sets measures for navigation, coastal protection, and protection against flooding • Stipulates penalties for violations and has provisions to settle disputes • Relevant to Component 1 (Output 1.1.1., 1.1.2), especially Activities 1.1.1.1, 1.1.1.2, 1.1.2.1, 1.1.2.2 and 1.1.2.3 related to canals, irrigation, water allocation, use of groundwater, and drainage. Relevant to AF Principles 1, 2, 3, 5, 12 and 15.
Law No 147 of October 2021 (replacing Law 121984) The executive regulations for Law 147 will be issued soon	*Scope: Improves water management* • Requires well owners to install a control system to monitor groundwater use • Provides steeper penalties for non-compliance • Establishes a high-level committee / board to review applications to dig groundwater wells and to issue the groundwater license (Article 68) • Requires government to conduct technical studies on groundwater resources to regulate the use, and to protect and monitor groundwater quantity and quality • Forbids entities/individuals from digging underground wells without a license (Art. 70) • Relevant to Component 1 (Output 1.1.1., 1.1.2.), especially Activities 1.1.1.4, 1.1.1.5, and 1.1.2.1 related to using and monitoring groundwater. Relevant to AF Principles 1 and 12.
Law No. 213/1994, concerning Farmers' Participation MWRI	*Scope: Establishes Water User Associations (WUAs) at mesqa level in New Lands and in Old Lands (1995 update)* • Provides a management transfer process to develop and maintain improved mesqa and to promote water protection • Discusses cost-sharing arrangements • Indicates the roles and responsibilities • Defines the election process, institutional set-up of the Board • Most relevant to Components 1 and 2 (Outputs 1.3.1, partly 2.2.1 and 2.3.1), especially the capacity development Activities • 1.3.1.1., 1.3.1.2, partly 2.2.1.1, 2.3.1.1, 2.3.1.3. under given that the Project will strengthen the WUAs at the targeted sites and that the Project will improve the mesqa and protect the water resources. Relevant to AF Principles 1, 2, 3, and 5.
Ministerial Decree No. 33/2001 (MWRI)	*Scope: Defines the mandate of the Water Boards* • Somewhat relevant to Component 1, especially the capacity development Activities under Output 1.2.2 for the WUAs. Of note, the Project will work with WUAs. Relevant to AF Principle 1 to 3and 5.

Egyptian Code for Water Resources and Irrigation Works of 2003	*Scope: Supports the design, implementation and monitoring process of irrigation projects.* • Chapter 1 has provisions on engineering alignment of irrigation network at different levels, estimation of supply (discharge) and demand, water quality requirement, preparation of operation and maintenance documentation, training requirements. • Chapter 2 has provisions on canal linings (pipes), distribution and auxiliary infrastructure, assessment of the status of groundwater, set the maximum limit of groundwater extraction, design and construction of wells, operation and maintenance of wells. • Chapter 3 has provisions on mechanical works related to pump selection, auxiliary equipment, installation of pump, operation and maintenance of pumps, performance test. • Chapter 4 has provisions on electrical works related to electric motor selection, speed control, operation and maintenance, electric protection and earthing of AC systems, control circuits and devices. • Most relevant to Components 1 (Outputs 1.1.1. and1.1.2), especially Activities 1.1.1.1, 1.1.1.2, 1.1.2.3, on irrigation infrastructure improvement, monitoring of well and drain and modernized demonstration farm system.
Law No. 14 of 2019 Amending some provisions of Law No. 38 (1976) (MALR)	*Scope: Supports modern field irrigation methods & works to improve, maintain, and develop farm-level field irrigation* • Establishes a network of open field drains and requires MALR to estimate the cost of the irrigation improvement at field level, based on the actual cost per acre • Article 3 requires landowners to clean the open field drains and maintain the irrigation works on their lands • Relevant to Component 1, especially Outputs 1.1.1 and 1.1.2 and the corresponding activities, focused on irrigation management and sustainable use of water resources. • Relevant to AF Principles 1, 2, 3, and 8.
Climate Change Laws and Regulations, Prime Minister's Decision No. 1129/2019 Article 12 of the Kyoto Protocol (CDM)	*Scope: Establishes Egypt's state's policies for climate change* • Provides the framework to develop and update the national and sectoral strategies and plans for climate change, considering international agreements, national interests, and links to the sustainable development strategy • Raises the awareness of officials, decision makers, and the public on climate change • Integrates climate change into the education sector Assists Annex 1 Parties to comply with their quantified emission limits and reduction commitments (Article 3) Relevant to all Components and Outputs, as the Project supports implementation of Egypt's climate change policy framework. Relevant to AF Principles 1 and 11.
Electricity and Renewable Energy Regulations in Egypt	*Scope:* • Requires state-owned projects to apply competitive bidding for engineering, procurement, and construction (EPC) contracts and competitive bidding for build-own-operate contracts; provides for feed-in tariffs; provides a merchant scheme which allows independent power producers to enter bilateral contracts to sell power directly to consumers using the national grid against wheeling and grid-access charges payable to the grid operator • Relevant to Component 1 (Output 1.1.1.), Activity 1.1.1.2, focused on the procurement of solar panels. Relevant to AF Principles 1, 2, 11, 12, and 13.
Decree No. 230/2016 of the Minister of Electricity and Renewable Energy	*Scope:* • Encourages energy efficiency and the generation of electricity from renewable sources; provides for the independence of the activities of generation, distribution, and transmission of electricity to achieve a liberalized and competitive electricity market • Relevant to Component 1 (Output 1.1.1.), Activity 1.1.1.2, given the use of solar water pumps. Relevant to AF Principles 1,2, 11, 12, and 13.
The Renewable Energy Law No. 203/2014	*Scope: Encourages the private sector to produce electricity from renewable energy sources; allows a shift away from state- administered to privately-financed projects; provides mechanisms and incentives to develop renewable energy projects; supports the creation of a favourable economic environment to increase investment in renewable energy' defines renewable energy resources as 'natural sources of energy, which are non-depletable and can be used to produce electricity'*

	• Relevant to Component 1 (Output 1.1.1.), Activity 1.1.1.2, given the use of solar water pumps. Relevant to AF Principles 1, 2, 11, 12, and 13.
PMD 2906/1995 Ministerial and Decree No. 589 of the year 2010	*Scope: Regulates the management and usage of land allocated to the General Organization for Urbanization and Agricultural Development Projects* • Intellectual property and plant variety protection: use of varieties and hybrids that are nationally registered by certification of the concerned government authority • Relevant to Component 2 (Output 2.1.1.) Activity 2.1.1.3 The establishment of model plots the promotion of climate-resilient agricultural practices and inputs (Activities 2.1.1.4, 2.1.1.5) and the promotion of short-cycle livestock production and their fodder (Activities 2.2.1.2 and 2.2.1.3) are subject to the regulations on livestock breeds and crop varieties, (ensuring that the varieties plants or animals meet Egyptian National Standards)

F. Project duplication with other funding sources

163. The project will not duplicate existing efforts; instead, it will complement other development projects aimed at supporting smallholder farmers and vulnerable communities in building resilience to climate change. The listed projects below are complementary to the proposed project, featuring cross-cutting factors and Results-Based Management (RBM) across various regions of Egypt.

Table 10 : List of complementary projects to the proposed project, featuring cross-cutting factors and RBM across various regions of Egypt.

Project	Objectives	Synergies (duplication/complementarity)	Lessons Learned	Consideration in Siwa Project Design
"Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt" (Funded by GCF, implemented by UNDP, 2017-2025, $US 73,807,000)	Targeting 5 coastal governorates to reduce coastal flooding risks in the North Coast.	Complementary – both projects address climate vulnerability in different regions, promoting inclusiveness in Egypt's climate response.	**Lesson**: Effective climate adaptation requires region-specific approaches; ensure alignment with local conditions.	The Siwa project tailors interventions to local needs, focusing on water and soil management in the desert ecosystem, ensuring solutions are context-specific.
"GCF-EBRD Egypt Renewable Energy Financing Framework" (Funded by GCF, implemented by European Bank, 2017-2022, $US 852,300,000)	To scale up renewable energy integration and investments in Egypt.	Complementary – both projects address climate vulnerability in different regions, with a focus on Egypt's diverse climate risks.	**Lesson**: With the establishment of the frameworks from the GCF-EBRD Project, CCAILSO will capitalize on the results of the developed financing modalities to be downscaled and included within the local context of the project areas. This will ensure alignment with the national agendas on renewable energy.	The CCAILSO Project plans to use the RE in several activities such as the established mini solar irrigation systems, water pumping inter alia and thus will refer to the established framework among other guiding policies and regulations. Also, the institutions and capacities built will be consulted during implementation.
"Building Resilient Food Security Systems to Benefit the Southern Egypt Region"	Improve adaptive capacity to climate change in Southern Egypt by promoting	Complementary – focuses on food security and adaptive agriculture in the South and Siwa, ensuring alignment across different climate-vulnerable areas.	**Lesson**: Water-efficient practices are crucial for resilience in arid regions.	The Siwa project prioritizes sustainable water management and efficient irrigation to enhance agricultural resilience to climate impacts.

(Funded by Adaptation Fund, implemented by UN WFP, 2013-2017, US$ 6,904,318)	water-efficient irrigation, agroforestry, and livestock.			
"Building Resilient Food Security Systems to Benefit the Southern Egypt Region- Phase 2" (Funded by Adaptation Fund, implemented by UN WFP, 2021-2024, US$ 3,094,962)	Build resilience by promoting agricultural solutions, diversification, water management, and early warning systems.	Complementary – both projects target agricultural adaptation to climate change in Egypt's vulnerable areas.	**Lesson**: Diversified farming practices are essential for increasing resilience to climate shocks.	Siwa integrates diverse livelihood strategies, including ecotourism and sustainable agriculture, to increase the community's resilience to climate impacts.
GRID Connected Small-Scale Photovoltaic Systems (PVS) (Funded by GCF, implemented by UNDP, 2017-2022, US$ 33,796,364)	Improve energy efficiency through building systems and appliances.	Complementary – both projects aim to enhance climate resilience, with Siwa focusing on water management and renewable energy.	**Lesson**: Public awareness and capacity building are crucial for sustainable energy projects.	The Siwa project incorporates community training and awareness initiatives to ensure the effective use of renewable energy and water-saving technologies.
"Enhancing Climate Resilience of Smallholders in Middle Egypt" (Funded by GCF, implemented by WFP, starting in 2025)	Strengthen resilience in smallholder communities in Middle Egypt through agricultural adaptation.	Complementary – both projects target climate vulnerability in different regions, focusing on agriculture and community resilience.	**Lesson**: Cross-regional learning and sharing agricultural knowledge are valuable for scaling solutions.	The Siwa project fosters knowledge-sharing between regions to promote best agricultural and water management practices, facilitating broader adoption of successful strategies.

G. Learning and knowledge management.

164. Learning and knowledge management (component 4) is crucial in capturing, disseminating, and leveraging insights gained throughout the implementation of the CCAILSO project. Thus, the primary focus is on building resilience and enhancing adaptive capacities within the Siwa Oasis communities to address climate change threats which is hence included in the project framework. The following outlines key elements of the learning and knowledge management component:

165. *Knowledge Generation:* The project aims to generate knowledge through the implementation of various activities within its components. This includes interventions related to water resource access, ecosystem resilience, livelihood diversification, and stakeholder engagement.

166. *Documentation of Lessons Learned and Best Practices:* A systematic approach will be adopted to document lessons learned and best practices throughout the project's lifecycle. This involves capturing insights gained from the local communities, stakeholders, and authorities involved in the adaptation interventions.

167. *Information Sharing and Dissemination:* The documented knowledge, lessons learned, and best practices will be disseminated to relevant stakeholders. This dissemination can take various forms, such as reports,

workshops, training sessions, and other communication channels, ensuring that the information reaches a wide audience.

168. *Policy Informing:* The project emphasizes the use of the gathered knowledge to inform policy decisions. Insights from the project's activities will serve as baselines for future interventions and contribute to the formulation of policies related to climate resilience, water and food security, and sustainable development in the Siwa area.
169. *Capacity Building:* This will entail activities aimed at strengthening the adaptive capacities of stakeholders. This involves training and capacity-building initiatives to empower local communities, authorities, and other key stakeholders to effectively respond to and manage climate change impacts.
170. *Participatory Approach:* The implementation will continuously follow a participatory and inclusive community and inter-institutional approach since inception. This will ensure active involvement and contribution from all key stakeholders, including project beneficiaries, throughout the project cycle.
171. Integration with Project Components: Knowledge management through component 4 is integrated into each of the project's three main components. This integration ensures that learning and knowledge-sharing are inherent in the activities related to water resources access, ecosystem resilience, livelihood diversification, and stakeholder engagement.
172. *Monitoring and Evaluation:* A robust monitoring and evaluation system will be established to track the effectiveness of knowledge management and project activities. This includes assessing the impact of disseminated knowledge on project outcomes and the overall resilience of the Siwa Oasis communities.
173. *Development of Information, Education and Communication (IEC) materials:* The project will not only develop IEC materials included but not limited to print materials such as posters, brochures, flyers, inter alia that are intended to draw attention to information about climate risks and adaptation measures holistically throughout the components via communication strategy to be developed during implementation.
174. For the knowledge generation, learning and dissemination strategy, the following constrains and proposed actions will be taken into account:

Table 11 : Knowledge generation, learning and dissemination strategy constrains and proposed actions

Constraints / Baseline Situation	Proposed Activities
• Limited information on climate vulnerability at local level, and/or lack of conceptual interpretation • Lack of consideration of CC adaptation measures in community development plans • Limited local knowledge on successful concrete adaptation interventions • Limited exchange of knowledge between Siwa and other regions • CC Adaptation as a relatively novel concept in the region	• Conduct local rapid vulnerability analyses, document and share findings and methodologies • Awareness raising and capacity building activities, CAAPs • Documentation of best practices, challenges, lessons learned and dissemination to stakeholders at all levels • Exchange visits in and between regions, attendance and participation in international conferences to share experiences.

175. In addition to public knowledge sharing, the lessons learned and best practices emerging from the project will be disseminated by the RIE (Regional Implementing Entity), EE (Executing Entity), and other relevant stakeholders. This dissemination will take place within a broader context, specifically targeting other oasis regions that face similar climate change (CC) impacts and share comparable agro-ecological conditions, water resource challenges, and drought-related issues. The knowledge generated from the project will not only contribute to a deeper understanding of local resilience but also inform the design and implementation of climate change adaptation strategies for future projects, especially those in similar environments.
176. The EE will ensure that representatives actively participate in international forums and meetings, where key information about the project will be shared with a global audience. These meetings will include significant climate and development events such as the United Nations Framework Convention on Climate Change (UNFCCC) Conferences of the Parties (COPs), Adaptation Futures conferences, Green Climate Fund (GCF) Board meetings, European Development Days, and regional climate weeks, among others. Both formal and informal platforms will be utilized to share insights and progress from the CCAILSO (Climate Change Adaptation to Improve Livelihoods in Siwa Oasis) project. Official side events, exhibits, and networking opportunities during these events will serve as key avenues for exchanging knowledge.
177. In addition to the comprehensive documentation, the project will emphasize awareness generation, focusing

on building capacity around climate change adaptation. Key areas of training and capacity-building initiatives will include climate-resilient agricultural practices, sustainable water management techniques, and the development of climate-resilient alternative livelihoods. Through these efforts, the project aims to enhance the adaptive capacities of local communities while promoting broader climate resilience knowledge sharing on national, regional, and global scales.

178. In the tables below, knowledge-related activities are summarized, as well as the responsible parties and time-frame (table 12), an overview of the training plan for the project (table 13), and an overview of the Training of Trainers (ToT) (table 14):

Table 12 : Knowledge Management Plan

Knowledge Activities	Learning Objectives / Outputs	Responsible	Time-frame
Knowledge management strategy is implemented	Assure knowledge generation and dissemination is managed	OSS, DRC	Throughout the project
Project Launch(es) and Closure(s)	Information about the CCAILSO project is disseminated	OSS, DRC	Project launch and closure
Climate Adaptation and Innovation Centers (CAICs) are established	Establish local centers of knowledge, action and innovation for climate change adaptation	DRC	Year 1
Increasing local knowledge on climate change	Increase knowledge and capacities to assess climate vulnerability and adaptation planning	DRC, CAICs	Throughout the project
Development of CAAPs	Consolidate local adaptation planning in strategic documents	DRC, CAICs	Throughout the project
Awareness raising campaigns in communities	Increase knowledge of climate change among communities	DRC, CAICs	Throughout the project
Knowledge and capacity building on specific agriculture adaptation practices	Theoretical knowledge and practical capacities on climate-resilient agriculture practices	DRC, CAICs	Throughout the project
Knowledge and capacity building on drought and water management strategies	Theoretical knowledge and practical capacities on drought resilient water practices	DRC, CAICs	Throughout the project
Lessons learned are documented	Analyse, understand and document successful adaptation practices	OSS, DRC	Ongoing process, Mid-term review, Annual Reports, Final Evaluation
Case studies are documented	Data collection and knowledge gathering on local adaptation practices	DRC	In semi-annual reports
Knowledge generated is shared with sub-national and national authorities	Assure knowledge generated informs future policies and programmes	DRC	Annual reports shared with authorities PSC meetings
Case studies are published online and in national media	Reach wider public with knowledge adaptation practices	DRC	2 x year
Reports are shared on the website(s) and through social media channels	Reach wider public with knowledge adaptation practices	OSS, DRC	Annually
Knowledge generated and lessons learned are shared in partner networks	Assure lessons learned and knowledge generated is being used in design and development of other CC programmes	OSS, DRC	Throughout the project
Knowledge generated and lessons learned are shared in regional and international forums	Assure lessons learned and knowledge generated is shared among regional and international stakeholders	OSS, DRC	COPs, Adaptation Futures conferences, inter alia
Universities and research centers are engaged to conduct studies	Facilitate research and development of national academia	DRC, Research Entities	After year 2 of implementation
Knowledge generated is shared with universities	Reach academic sector with lesson learned and data gathered	DRC	After year 2 of implementation

Table 13 : Training Plan

Component	Specific Training Theme/Activity	Stakeholders	Training Methods	Responsible Persons	Timeline (Years)			
					1	2	3	4
COMPONENT 1: Improving Water Resource Access and Management	*Activity 1.1.1.3: Enhancing the Capacity of National, Sub-national, and Local Institutions in Water Resources Management*	- Staff from national, sub-national, and local institutions.	• Workshops	DRC				
	Activity 1.1.2.1: Identify and enhance institutional capacities of Water Users Associations (WUAs)	- WUAs members	• Training Sessions • Capacity building workshops	DRC				
	Activity 1.1.2.2: Develop Water and Sanitation Health training modules.	- Health experts, - Local leaders, - Stakeholders	• Consultations • Workshops	DRC				
	Activity 1.1.2.3: Strengthen communities' capacity to manage water resources.	- Local communities	• Training sessions • Campaign	DRC				
	Activity 1.2.1.1: Promoting and Enhancing the Irrigation Infrastructure System and Wastewater Drain Network	- Local communities	• Demonstration workshops	DRC				
	Activity 1.2.1.2: Establishing Solar-Powered Small-Scale Irrigation Systems	- Stakeholders - Local communities - Local users	• Meetings • Training sessions	DRC				
	Activity 1.2.1.3: Capacity Building for Farmers on Irrigation Network Management	- WUAs	• Training sessions • Practical demonstrations	DRC				
	Activity 1.2.1.4: Promoting the Use of Low Salinity Agricultural Wastewater	- Stakeholders	• Workshops • Training sessions	DRC				
	Activity 1.2.2.1: Assessing and Identifying the Most Viable Water Solutions	- Local stakeholders - Local communities - Experts	• Consultations	DRC				
	Activity 1.2.2.2: Establishing/Updating Models for Water Collection for Human Consumption (Communal Wells and Boreholes)	- Local communities	• Training sessions	DRC				
	Activity 1.2.2.3: Developing and Implementing Well-Management Systems	- Local communities, - Local authorities, - Water managers	• Workshops	DRC				
COMPONENT 2: Enhancing Resilience of Siwa Oasis Ecosystems to Climate Change Impacts	*Activity 2.1.1.1: Developing Community Adaptation Action Plans*	- Local communities - Government Representatives - Other key stakeholders	• Workshops • Training sessions	DRC				
	Activity 2.1.1.2: Setting Up, Procuring Inputs, and Managing Demonstration Plots	- Community leaders - Farmers	• Workshops • Training sessions • Demonstration Plots	DRC				
	Activity 2.1.1.3: Promoting Agro-sylvo-pastoral Practices (Integration of Trees and	- Local communities - Farmers	• Consultative workshops • Training sessions	DRC				

	Crops with Livestock Production)							
	Activity 2.1.1.4: Promoting Production and Use of Bio-Compost and Bio-Pesticides	-Local communities, -Local authorities, -Water managers	• Workshops • Training sessions • Onsite demonstration	DRC (EE)				
	Activity 2.1.2.2: Identifying/Establishing Farmers Clubs for Concrete SLM Application	-Farmers clubs	• Training sessions • Workshops	DRC (EE)				
	Activity 2.1.2.3: Establishing Community Tree Nurseries	-Local authorities, -Extension agents -Local communities	• Meetings • Training sessions	DRC (EE)				
	Activity 2.1.2.4: Establishing Green Belts for the Stabilization of Sand Dune Movements (Mechanical and Biological)	-Local authorities, -Local communities	• Training sessions • Consultations	DRC (EE)				
	Activity 2.1.2.5: Introducing Soil Stabilization and Enrichment Techniques to Promote Agricultural Productivity	-Local authorities, -Local communities	• Consultations	DRC (EE)				
COMPONENT 3: Diversifying Livelihoods through IGAs and Value Chain Addition	*Activity 3.1.1.1: Supporting Access to Veterinary Services for Farmers and Communities*	-Local authorities, -Extension agents, -Community veterinarians	• Training sessions	DRC (EE)				
	Activity 3.1.1.2: Promoting Production of Short-Cycle Livestock	-Livestock owners	• Training sessions	DRC (EE)				
	Activity 3.1.1.3: Enhancing Livestock and Pasture Management Systems (Breeding, Fodder, etc.)	-Local authorities, -Extension agents, -Livestock owners -Pastoralists	• Training sessions	DRC (EE)				
	Activity 3.1.2.1: Support business planning for alternative IGAs (Beekeeping, Ecotourism, Zero grazing, Handcrafts, etc...):	-Local authorities, -Extension agents, -Local communities,	• Training sessions • Meetings	DRC (EE)				
	Activity 3.1.2.2: Establish revolving fund schemes for IGAs with a gender focus	-Local authorities, -Loan recipients, -Local communities,	• Training sessions	DRC (EE)				
	Activity 3.1.2.3: Establish and support savings and credit co-operative society (SACCO) for Eco-tourism ventures	-Local authorities, -SACCO members,	• Workshops	DRC (EE)				
	Activity 3.1.2.4: Develop/upscale value chain market linkages for communities with key stakeholders and the private sector	-Local authorities, -Local communities,	• Meetings • Workshops • Campaigns	DRC (EE)				
COMPONENT 4: Strengthening	*Activity 4.1.2.2: Enhance the institutional capacities to*	-CAIC staff -Local authorities	• Training sessions	DRC (EE)				

knowledge and adaptive capacities of stakeholders to climate change impacts	*manage the CAICs.*	-Local communities,	• Workshops • Campaigns					
	Activity 4.1.2.3: Train community beneficiaries and CSOs on climate resilient livelihood practices.	-Local communities, -Identified CSOs	• Workshops • Practical trainings	DRC (EE)				
	Activity 4.1.2.4: Conduct community campaigns on CC/water/health.	-Local communities	• Workshops • Seminars	DRC (EE)				
	Activity 4.1.2.5: Conduct inclusive planning and capacity building for community-based Ecotourism.	-Local authorities -Crafters	• Workshops • Trainings	DRC (EE)				

Ongoing
Completed activity trainings

Table 14 : Topics for the training the trainers (ToT)

Objective of the training	Topic of the ToT and the module	Number of trainings	Persons to be trained to become a trainer	Persons to be trained by ToTs
To Enhance the Capacity of National, Sub-national, and Local Institutions in Water Resources Management.	• Integrated water resources management (IWRM), • GIS applications, • Water quality monitoring.	4 workshop sessions	Key personnel in areas such as integrated water resources management (IWRM).	Staff from national, sub-national, and local institutions.
Strengthen communities' capacity to manage water resources.	• Water resource management, • WASH practices, • Risk management.	4 training sessions	500 key community stakeholders (e.g., community leaders, WUAs)	Local community farmers
Strengthen communities' knowledge and capacity on Sustainable Land Management (SLM)	• SLM practices • Use of land resources sustainably	6 trainings	Farmers Clubs	Local community farmers
Conduct inclusive planning and capacity building for community-based Ecotourism.	• Skill development in crafts (e.g., tablecloths, handbags).	2 workshops	30 participants from community crafters.	Community members

179. In summary, the learning and knowledge management component is a pivotal aspect of the CCAILSO project, ensuring that valuable insights are captured, shared, and utilized to enhance climate resilience and improve the livelihoods of the local communities in the Siwa Oasis.

H. Consultative process

180. This project originated from the urgent needs of local communities, NGOs, and the Siwa City Council to address the environmental, social, and economic challenges facing the oasis, driven by climate change and unsustainable practices in managing natural resources. The project's concept was shaped through extensive collaboration with a diverse range of stakeholders in the oasis, including ongoing meetings with local partners and key stakeholders, which helped to refine and expand the project's activities. Key partners in this process included the Desert Research Center, the Ministry of Agriculture and Land Reclamation, the Ministry of Environment, the Ministry of Public Works and Water Resources, Siwa City Council, the Agricultural Research Center, NGOs, the private sector, and the Tribal Elders' Council.

181. The initiative culminated in the Desert Research Center organizing several national stakeholder workshops to secure endorsement from national and local authorities, laying the groundwork for deeper engagement and highlighting the necessity to tackle the increasing frequency of droughts, water scarcity, and to promote

adaptive resilience among local communities. The local communities have been actively involved in the project design, particularly in identifying the main issues and specific needs related to climate change resilience. This includes selecting appropriate sites for project implementation and defining the roles they will play throughout the project's execution. Additionally, consultations have involved local and regional government authorities, as well as various government ministries and institutions, as outlined in the table (15). These stakeholders have provided valuable input into the planning and design process. Through numerous stakeholder exchanges, as briefly highlighted and further expounded in the consultation annex where local consultations were conducted at the grassroot levels in the 4 beneficiary villages: Siwa, Bahi Eldin, Ghazalat, Aghormi between April 2022 to March 2024. The objective was to refine the project approach, aligning and tailoring it with local, regional, and national priorities on sustainable agriculture, climate change, and its impact on the livelihoods of farming communities in the oasis.

182. The consultations were methodically structured, utilizing a variety of data collection methods such as questionnaires, face-to-face meetings, and sector-wide approach workshops These activities not only facilitated the gathering of baseline data on the conditions of communities and households in the targeted areas but also served as a foundation for the project's design. The information gathered was compiled into reports, which has informed the project framework and which data are included in this proposal, mainly in the first section (project context) as well as activity identification and descriptions. These sessions were complemented by continuous consultations with individuals from relevant institutions.

183. The local communities are involved in project design particularly in identifying the problematics, specific needs related to resilience to climate change, sites for project implementation and the role they play in project implementation.

184. A comprehensive situational assessment was conducted by the Desert Research Center and relevant stakeholders in the Siwa and Matrouh regions, focusing on food security, rural development, agriculture, irrigation, livestock production, and institutional dynamics. This assessment involved consulting both men and women, collectively and individually, as well as youth, to fully capture the diverse needs and priorities regarding climate change adaptation, resilience, and livelihood diversification. The consultations were centred around several key points:

- Disseminating information to key stakeholders
- Facilitating stakeholder input integration
- Securing endorsement from national and local authorities
- Understanding the needs, vulnerabilities, and barriers faced by various parties
- Identifying execution needs and requirements
- Assessing bio-climatic conditions and challenges
- Collecting data to support the development of the full proposal and associated annexes
- Identifying needs for improving and adapting local living conditions

185. At the community level, the primary goal of these consultations was to gather beneficiaries' perspectives and information to enhance the project’s design, with a focus on engaging vulnerable groups, indigenous people, minorities, farmers, women, and youth. The Adaptation Fund’s Gender Policy was incorporated into the planning and execution of these consultations. Women were consulted in various capacities, including Women Group representatives and community members, while national-level workshops featured significant female participation.

186. Their inputs were vital to the development of the full proposal, including the design and development of the Gender Assessment and Action Plan, which was annexed to the proposal. Additionally, the FPIC process was employed at all levels based on the AF ESP and the OSS E&S standards which facilitated an all-inclusive approach and consent letters are evidenced in the consultation report annexed to the FP. As the FPIC and consultation process is a continuous activity throughout the project cycle, efforts will continue to engage the communities, and apply the FPIC process.

187. The free, prior and informed consent regarding certain activities at community level can also be highlighted and only be obtained during the implementation of the project, given that the project includes some Unidentified Sub Projects (USPs) at proposal stage related to water solutions and new Income Generating Activities (IGAs)). As such, the FPIC process and consultations and discussions with the community will continue throughout the project, not only to inform and agree on the interventions, but equally to collect traditional knowledge from the group and integrate it with new technologies proposed to be implemented.

188. Additionally, the consultation meetings and workshops aimed to raise awareness about the project, foster understanding of the planned activities, present budget outlines, and gather stakeholder input and recommendations at various levels. This consultative process was led by the Desert Research Center, with the support of line ministry representatives, regional entities, and other relevant authorities.
189. A comprehensive summary of these consultations as well as all the other stakeholders' engagements are found in Annex 5.
190. Below is a summary table of the consultations with the communities and other stakeholders, including date, number of participants highlighting key outcomes and detailing how these have been integrated into the design of the project components. The feedback received is directly influencing specific outputs, especially in the areas of water management, agricultural practices, livelihoods, and community awareness.

Table 15: Summary table of the consultations with the communities and other stakeholders, including date, number of participants

Date	Participants	Key Topics Discussed	Expected Outcomes & Outputs	Consultation Outcomes	Consideration in Project Design
April 2022	Local communities (25 men and 1 woman), Youth, NGOs, Government (Siwa, Matrouh)	Water access, irrigation methods, community water needs	Component 1: Improving water resource access and management Outcome 1.1: Enhanced Water Resource Management Capacity Output 1.1.1: Developed water management plans	Communities emphasized challenges with current water access, highlighting the need for updated and inclusive water resource management plans.	Water management plans were designed with local input on water availability, focusing on the integration of both traditional practices and modern irrigation methods.
June 2022	Government officials (Siwa Council, Ministries), NGOs, Women's groups	Sustainable land use, agricultural practices, gender inclusion	Component 2: Enhancing resilience of Siwa Oasis ecosystems to climate change impacts Outcome 2.1: Operationalized Sustainable Land Management Output 2.1.1: Climate-resilient agricultural practices	Women's groups stressed the importance of involving women in agricultural decision-making and the adoption of climate-resilient practices.	The design of sustainable agricultural practices specifically targeted women's involvement, ensuring training and resources for their adoption of climate-resilient methods.
August 2022	Tribal elders, Agricultural cooperatives, Private sector, NGOs	Climate adaptation techniques, traditional knowledge, sustainable agriculture	Component 2: Enhancing resilience of Siwa Oasis ecosystems to climate change impacts Outcome 2.1: Operationalized Sustainable Land Management Output 2.1.2: Sustained Green belts developed	Traditional knowledge about water conservation and land management was valued. Communities sought integration of new technologies with traditional methods.	Integration of green belts and agroforestry methods incorporated both local knowledge and modern sustainable practices for ecosystem restoration.
December 2022	Local women's groups, Youth, Farmers, NGOs	Women's role in agriculture, youth engagement, economic diversification	Component 3: Diversifying livelihoods through IGAs and value chain addition Outcome 3.1: Promoted Climate-Resilient Livelihoods	Women's groups highlighted barriers to entering income-generating activities (IGAs), requesting specific support to overcome financial and skill gaps.	IGAs were designed with a focus on providing women with targeted skills training, financial support, and access to markets for agricultural products

			Output 3.1.2: Enhanced community livelihood resilience through IGAs		and services.
March 2024	National stakeholders (19 men and 24 women) Ministries of Agriculture, Environment), Local communities, CSOs, NGOs	National climate change policies, integration of livelihoods with climate change adaptation	Component 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts Outcome 4.1: Promoted CC Awareness & Knowledge at local, national, and international levels Output 4.1.2: Raised community awareness on CC adaptation	Communities requested greater emphasis on educational campaigns and knowledge-sharing platforms to increase climate change awareness, especially for youth and women.	The project design includes comprehensive awareness programs and capacity-building sessions targeting all stakeholders, with a focus on youth and women as key drivers of change.

I. Justification for funding requested, focusing on the full cost of adaptation reasoning.

191. Egypt has a population of about 113 million people with a growth rate of 1.63% and according to current projections, Egypt's population is expected to double by 2078. The population is currently growing at a rate of 1.94%, a rate that adds about 2 million people to the population every year. This will no doubt put pressure on the available water and food resources. Meanwhile, rising temperatures and falling rainfall mean crops which consume 86% of Egypt's water supply will require more irrigation to survive. Without additional climate adaptation measures, crop yields in Egypt could fall 10% on average by 2050, the Project targets building adaptive capacity and enhancing climate resilience of local communities through implementing concrete adaptation actions.

192. The justification for seeking funding from climate financing institutions, such as the Adaptation Fund (AF), for the CCAILSO project is based on the comprehensive approach to addressing critical climate-related challenges in the Siwa Oasis. The focus is on drought risk management, sustainable land and water resources management, and the overall improvement of water and food security, livelihoods, and ecosystem health with the rationale of: i) *Urgency of Climate Risks*-The Siwa Oasis faces imminent and escalating threats from climate change, particularly in the form of drought and related risks. The urgency of these challenges necessitates immediate and strategic interventions to prevent further negative impacts on the local communities and ecosystems; ii) *Vulnerability of Communities and Ecosystems* - Without adaptive measures, the vulnerability of the populations and ecosystems in the Siwa Oasis will increase significantly. This vulnerability is associated with the continuation and intensification of climate hazards, affecting water and food security, livelihoods, and the overall well-being of the communities; iii) *Cost-Effectiveness and Efficiency* - The CCAILSO project adopts a proactive and integrated approach to address climate risks. Investing in adaptation measures now is more cost-effective than dealing with the potentially higher costs of inaction, which could result from increased damages, loss of productivity, and the need for emergency response measures; iv) *Innovative Solutions and Sustainable Responses* - The project aims to identify and implement innovative solutions for sustainable adaptation at the basin level. By addressing issues such as drought risk management and integrated land and water resources management, the project seeks to provide long-term, sustainable responses that can serve as models for future initiatives; v) *Climate Financing for Resilience Building* - Seeking funding from climate financing institutions like the Adaptation Fund is crucial to ensure that the project's scope and impact align with international climate resilience goals. This funding will support the implementation of robust adaptation strategies and measures that are essential for achieving sustainable development objectives in the Siwa Oasis; vi) *Capacity Building Requirements* - The project recognizes the importance of capacity building for stakeholders involved in climate change adaptation. Funding will be utilized to strengthen the capabilities of local communities, authorities, and other key actors, ensuring active and informed participation in the implementation and long-term sustainability of adaptation

measures; and vii) *Prevention of Escalating Costs* - Failure to implement the CCAILSO project would result in the continuation and exacerbation of climate-related threats, leading to increased adaptation costs for the vulnerable communities. The project's proactive approach is aimed at preventing higher costs associated with emergency responses, rehabilitation, and reconstruction.

193. The funding requested from the Adaptation Fund is justified by the pressing need to address climate risks in the Siwa Oasis comprehensively. The CCAILSO project represents a proactive, cost-effective, and sustainable approach to building resilience, protecting livelihoods, and revitalizing the ecosystem, with a clear focus on the basin level to ensure long-term impact and scalability where by the end of the project, it is expected that new innovative solutions will be identified and implemented to respond effectively and sustainably to the challenges related to these issues at the basin level. If no action is taken, the threats and negative impacts related to the above-mentioned climate risks will continue and intensify in the oasis and consequently increase the vulnerability of the populations and ecosystems. The following table provides an analysis of the scenarios without these interventions in this project and a justification of the full cost of adaptation.

Table 16 : Analysis of the scenarios without the interventions of the CCAILSO project and a justification of the full cost of adaptation.

	Baseline: Without any support from the Adaptation Fund	Impacts of the proposed project: with the Adaptation Fund support
Component 1	The Siwa oasis is located in a depression and with water flowing from underground as springs and many drilled wells the water which is the lifeline of the Siwa is causing its death. without the support of the Adaptation Fund the situation may deteriorate, given the urgency of effective management, the poor irrigation infrastructure and lack of integrated planning and management of the water resource the sustainability and the existence of the Siwa Oasis is threatened.	With the Adaptation Fund support, the following impacts could be achieved: - Sustainable management of water resources by ensuring the local community capacity to manage the water resource is strengthened - Better water access and management will lead to better socioeconomic livelihoods for the community through increased productivity and incomes. irrigation infrastructure systems and wastewater drain network. - The enhanced institutional capacities will ensure both the efficiency and the equity of water to the community supporting the resilience of the different national authorities and local communities to avoid the possible fresh water deficit of the Oasis.
Component 2	The increasing temperatures will drive more water demand for irrigation, in an oasis that is particularly arid and is dependent on the intensive use of water for irrigation. It will also intensify sand dune movement. Without the AF funding, the problem of soil salinity and waterlogging will continue, further deteriorating the soil making it impossible to carry out agriculture, the main livelihood of the community. The sand dune movements will a negative impact on the agricultural production and related the socio-economic linkages. From this perspective, the local community exposure is very high making them extremely vulnerable as their livelihood depend on the water combined with limited adaptive capacity and recurrent food crisis and water shortages.	With the Adaptation Fund support, the following impacts could be achieved: - Improved adapting practices that must involve reducing the vulnerability of community and the ecosystem. Through Sustainable Land Management Practices. - Strengthening the climate vulnerable communities' resilience through the implementation of various concrete adaptation actions (on the water and land resources - Livelihoods strengthening and diversification for the most vulnerable through Climate resilient practices and IGAs

Component 3	The need to have economic power in the community constantly increases with the exacerbated CC impacts leading to further exploitation of the non- renewable natural resources. Without the AF funding, the problem of these exploitations will continuously increase enhanced with the growing populations and the cultural norms adversely affecting inclusion of women in IGAs	With the Adaptation Fund support, the following impacts could be achieved: - Reducing Dependency on Non-Renewable Natural Resources by facilitating the implementation of alternative income-generating activities (IGAs) that are less reliant on non-renewable natural resources. - By investing in renewable energy initiatives, sustainable agriculture practices, or eco-tourism ventures, the project can mitigate the pressure on these resources, thereby reducing exploitation. - Capacity Building and Empowerment**: AF funding can be allocated towards capacity building programs aimed at empowering community members, especially women, to actively participate in IGAs. Training sessions, workshops, and skill development programs tailored to address cultural norms that hinder women's inclusion in economic activities can be implemented, promoting gender equality and social inclusion. - Population Management and Sustainable Growth**: With AF support, the project can incorporate population management strategies and family planning initiatives into its framework. By raising awareness about the link between population growth and natural resource exploitation, the project can encourage sustainable population growth practices, thus alleviating the pressure on resources and reducing the likelihood of overexploitation. - Promoting Sustainable Livelihoods**: AF funding can be utilized to support the establishment of sustainable livelihood models that prioritize environmental conservation and resilience-building. This can include promoting organic farming practices, setting up community-based natural resource management systems, or fostering partnerships with sustainable industries that align with the project's objectives.
Component 4	The local communities and various stakeholders in the oasis lack the capacities and capabilities to strengthen the resilience of the ecosystem and of their livelihoods in a changing climate	The following improvements are possible through the implementation of the current project: - institutional capacity and systems which are a vital aspect in the fight against CC will be developed for information exchange; training and learning; - Appropriate communication materials will be developed for the various target groups including vulnerable communities, women, youth, smallholder farmers, pastoralists, artisans, - Local communities' awareness of the impacts of climate change (land degradation, desertification, etc.) and adaptation solutions will be strengthened, enabling them to facilitate the implementation of adaptation actions leading to enhanced resilience.

J. Sustainability of the project outcomes

194. The CCAILSO project encompasses a range of diversified sustainable benefits aimed at enhancing technical capacities, knowledge and awareness, increasing production, promoting climate-resilient agricultural practices, and improving water resources management. Sustainability is embedded in the project's design from its inception, ensuring lasting impacts beyond its lifecycle:

195. *Economic Sustainability:* The CCAILSO project is designed to ensure long-term economic benefits for communities by promoting climate-resilient agricultural practices and diversified livelihood options. By enhancing agricultural productivity and farmer incomes, the project supports food security and economic resilience. Additionally, activities such as selling produce from the Climate Adaptation and Innovation Centers (CAICs) create ongoing revenue streams. Smallholder farmers receive training on seed management, helping them reduce input costs while maintaining productive agricultural systems and reducing input costs by 25-40% and ensuring self-sufficiency based on the CE study. These measures contribute to a self-reliant economy, reducing dependency on external support after the project ends.

196. *Social Sustainability:* The project emphasizes the inclusion and active participation of community members, ensuring they are central to the implementation and management of project initiatives. This participatory approach fosters ownership, builds trust, and empowers communities to make informed decisions on climate

adaptation. Specific attention is given to providing opportunities for women and youth, including livelihood alternatives through Income Generating Activities (IGAs), increasing women-led business ventures by 20%. Social cohesion is strengthened through collaborative efforts involving local organizations, community administrations, and NGOs, promoting long-term commitment to project outcomes.

197. *Environmental Sustainability:* The CCAILSO project integrates sustainable resource management practices to protect the environment and mitigate climate impacts. Key actions include improving water resource management, reducing waterlogging, enhancing soil fertility, and adopting silvo-pastoral practices. These initiatives are designed to increase the resilience of agricultural lands to extreme weather events and climate variability as well as soil fertility improvements aim to increase agricultural yields by up to 40%. Restoring and maintaining irrigation systems also play a vital role in protecting local ecosystems, safeguarding the long-term viability of natural resources, and improving living conditions for affected communities by reducing water losses by 35%.

198. *Institutional Sustainability*: Building institutional capacity is a cornerstone of the project's sustainability plan. Training programs for over 500 stakeholders at national, regional, and local levels will aim to embed climate adaptation expertise at all levels of governance. The project leverages existing national and local government structures to maintain leadership and continuity in project activities. The Climate Adaptation and Innovation Centers (CAICs) will be fully integrated into local government operations, with staffing and maintenance incorporated into long-term budget plans. These efforts are expected to establish a sustainable governance framework that supports climate-resilient development strategies beyond the project's duration as well as ensuring sustained institutional support for climate-resilient agricultural practices and technology dissemination.

199. *Financial Sustainability:* Financial sustainability is ensured through a combination of cost-recovery mechanisms, local budget integration, and capacity-building efforts. The CAICs, for example, generate revenue by selling produce, which helps offset operational costs will generate sufficient income from agricultural production to cover up to 60%. After the project ends, the Desert Research Center (DRC) and Siwa Council administrations will incorporate staff salaries and outreach campaign budgets into their financial plans. Furthermore, the project enhances farmers' ability to manage seeds and procure technical assistance through established connections with government extension services and the private sector, reducing long-term financial risks.

200. *Technological Sustainability:* The project introduces advanced technologies, including climate-adaptive irrigation, land preparation, and pest management systems. To ensure these innovations are maintained, over 200 community members and technicians will receive specialized training in operations and maintenance (O&M). Comprehensive O&M manuals will be developed and distributed, ensuring consistent technical performance. Continuous support from trainers of trainers (ToTs) and the Project Management Unit (PMU) provides a framework for adaptive management, enhancing both productivity and resilience over the long term.

K. Environmental and social impacts and risks identified as being relevant to the project.

201. The project is designed to enhance the resilience of vulnerable communities in the Siwa Oasis against the adverse effects of climate change. It focuses on sustainable practices that avoid the conversion of natural habitats, and instead, aims to improve water quality, soil fertility, and overall ecosystem health with activities such as SDM mitigation and use of bio-compost. Additionally, the project seeks to mitigate erosion, prevent soil nutrient depletion, and enhance the livelihoods of the Siwa community.

202. While the project is expected to have positive impacts that could further improve its outcomes (as detailed in Section II.C), it is important to acknowledge that some limited negative consequences could arise. To address these potential risks, the project activities were thoroughly screened for environmental and social (E&S) risks in accordance with the 15 principles established by the Adaptation Fund's Environmental and Social Policy (ESP).

203. The risk screening identified that Components 1 and 4, which focus on studies, policy development, capacity building, communication, and advocacy, fall under Category C as indicated in part II sec.C, indicating a lower risk level. Conversely, Components 2 and 3 involve concrete adaptation activities conducted on-site, which are categorized as Category B, reflecting a medium risk level. Despite this, the project's design incorporates measures to minimize potential negative social and environmental impacts, thereby ensuring a focus on

sustainability and resilience.

204. Thus, the E&S principles of the AF that will be triggered by the project in terms of negative impacts and environmental and social risks are presented in the table below:

Table 17 : The E&S principles of the AF that will be triggered by the project in terms of negative impacts and environmental and social risks

Checklist of E&S principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law		**X** *The preparation of the ESMP takes into account national and international laws and regulations in the formulation of the project. In addition, the work involved in the relevant institutions concerned will ensure compliance with regulations and laws during project implementation.* *The project will set up a mechanism to monitor compliance with laws and regulations in the implementation of the project.* *Furthermore, the proposed project has been developed in line with international standards on climate change, biodiversity, land conservation, water resources, ecosystem management and poverty reduction. It considers selected national and regional priorities, policies, plans and technical standards for climate change adaptation and sustainable development.*
Access and Equity		**X** *The project will seek to ensure fair and equitable access to the benefits of the project. During the various studies for the implementation of the FP, mechanisms and approaches will be identified to ensure equitable access to project benefits. All the relevant stakeholders will participate in this process to avoid any potential conflict related to this issue.* *Risk: Inequalities between women, men, children and particularly vulnerable groups.* *Potential Impact: Low* *The project will promote equitable access to project resources by potential beneficiaries, with particular emphasis on women's and youth groups.* *The project will ensure the participation of all stakeholders in project activities without discrimination and with the aim of ensuring fair and equitable access to project benefits, including for women and men as well as marginalized groups.* *The project team will ensure that project activities do not adversely affect users' existing rights to shared natural resources and guarantee equitable benefits from project investments.*

Marginalizedand Vulnerable Groups		*X* *Risk: Exclusion of vulnerable groups. To reach and ensure the protection of marginalized and vulnerable groups including AMAZIGH groups, women, youth, orphans, the elderly, and people with disabilities, the E&S assessment of the project based on a participatory approach, incorporating consultations with communities to identify the best approaches for their inclusion will be further updated during implementation.* *The study was carried out using a participatory approach, incorporating consultations with communities to identify the best approaches for their inclusion.* *A Stakeholder Mobilization Plan and a Workforce Management Procedure will be further developed up prior to project implementation to assist avoid the exclusion of any category of the community.* *The project will conduct comprehensive community awareness-raising in target localities, including with vulnerable groups, female-headed households, youth and others inter alia* *Additionally, criteria will be established for participant selection that prioritize the active involvement of vulnerable groups.*
Human Rights	**X** *(The project activities are not discriminatory by tribe, age and gender or, level of education. The project design relied on the consultative approach involving various stakeholders. No activities are identified whose execution is not in line with the established international human rights. Project objectives promote basic human rights for fair andequitable access to resources to enhance their resilience to climate change in the beneficiary countries.)*	
Gender Equityand Women's Empowerment		**X** *Risk: In some parts of the project area, women do not have the same rights as men (participation in decision-making and access to information etc.) but this is not ruled by statutory law but rather by local and common practice.* *Potential Impact: Medium* *Given this risk, the project places particular emphasis on women's and youth groups, especially for capacity building on innovative and resilient agricultural practices. Moreover, advocacy, information and awareness-raising activities conducted by women and men leaders, community leaders and religious leaders are planned in order to reverse the tendencies of exclusion and separation. A plan for training and energizing women in connection with the AF's gender policies will be integrated into the project's activities in these areas and then implemented.* *The project will have a special on focus on women and youth*

		groups especially for capacity building, leadership in FCs and WUA committees to ensure that they fully participate and benefit from the project. Also, Participation of women will be encouraged in the field as well as in access to micro-credits other enterprises development.
Core Labour Rights		**X** *The Project will ensure that Labour laws are considered in activity implementation especially during development and maintenance of water solutions, installation of small-scale irrigation systems and other concrete adaptation actions of the proposed project. During the E&S application, a special focus on National labour laws in force will be ensured. The country laws and regulations will be followed and children's work will be forbidden as well as remuneration inequity between men and women.*
Indigenous People	**X** *No further assessment required. The presence of indigenous people is not present in the selected project area.*	
Involuntary Resettlement	**X** *No further assessment required. The project will work with communities in their locations and on voluntary basis. Therefore, no resettlements or displacement to new locations is expected. Also, during the consultation process the local authorities has expressed their willingness to provide some community lands for demonstration plots*.	
Protection of Natural Habitats		**X** Risk: Through the SDM techniques, the risk will be to limit their movement and create new areas. Low *Further assessment to identify the project risks on natural habitat is included in the ESMP and shall be monitored on a regular basis*
Conservation of Biological Diversity		**X** *Risk: Biological diversity slightly affected due to land conversion* *Potential Impact: Low* *Although the project envisages ecosystem-based approaches, the possible conversion of land for agricultural production (i.e., for small scale irrigation activities) may affect biological diversity. Awareness raising sessions will be organized to guide people in selecting new land for agricultural production to avoid negative environmental impacts. Further consultations and assessments will be required in the application of the Environmental and Social Management Plan (ESMP) for the proposed project.*
Climate Change	**X** *No further assessment required. The Project activities proposed are aimed to enhance the resilience of ecosystems and populations to Climate.*	

Pollution Prevention and Resource Efficiency		*X* *There are minor risks of potential water contamination in the reservoir due to the introduction of impurities, wastewater, and solid waste. Therefore, further assessment is necessary, and the Environmental and Social Management Plan (ESMP) will be applied to include appropriate mitigation measures and monitoring mechanisms.* *The project activities themselves will not generate pollution or lead to resource depletion. Instead, they will promote sustainable land management, efficient water use, and the prevention of water pollution.*
Public Health	**X** *No further assessment required. The project interventions will not have negative impacts on public health. On the contrary, the increased income generated by the introduction of new income-generating activities can be used for other household needs such as schooling for children, access to health care and/or investment in other economic activities. Additionally, the project interventions among others will also focus on sensitization campaigns in all targeted communities on safe water use and hygiene. This will include information dissemination on water demand management and hygiene to avoid incidences of epidemics hence contributing to public health.*	
Physical and Cultural Heritage		**X** *(Further detailed E&S and gender analysis will be done at the project implementation in order to incorporate gender aspects including culture and other heritage within the cross-border area. The project will promote local knowledge and train communities to handle the new technologies without affecting cultural heritage. As regards to physical heritage the project will not implement activities that will target specific physical assets in the project sites.*)
Lands, Soil and Conservation		**X** *(Further assessment on soil and land will be ensured during the implementation of the project. No damages to soil, vegetation and land resources are expected to occur from the project activities.)*

PART III: IMPLEMENTATION ARRANGEMENTS

A. Project implementation.

205. *The Sahara and Sahel Observatory (OSS)* will serve as the *Regional Implementing Entity (RIE)* for the project, responsible for overseeing all aspects of financial management, monitoring, and reporting to the Adaptation Fund. OSS will act as the primary intermediary between the Adaptation Fund and the National Executing Entity (NEE), ensuring that the project is executed in line with the approved proposal and adheres to all relevant standards and guidelines. The OSS will be responsible for: a) Financial Oversight to manage and disburse funds from the Adaptation Fund, ensuring that financial resources are allocated appropriately and used efficiently by the Desert Research Centre (DRC); b) Undertake M&E from the framework developed by the EE to track project progress, measure outcomes, and ensure that the project remains aligned with its objectives. This includes regular site visits, audits, and reviews; c) compile and submit periodic financial and progress reports to the Adaptation Fund, providing detailed accounts of project activities, achievements, and any challenges encountered; d) offer administrative and management support to the NEE, providing guidance on project implementation, ensuring compliance with the Fund's requirements, and facilitating capacity building where necessary; and e) accountable to the Adaptation Fund for the overall implementation of the project, ensuring that all activities meet the Fund's policy requirements.

206. *Desert Research Centre (DRC) as the National Executing Entity (NEE)*, will be responsible for the on-the-ground execution of the project, working in close collaboration with national and local stakeholders. The DRC will leverage its expertise and technical resources to execute the project effectively, ensuring that activities are aligned with national priorities and the needs of local communities. The DRC will be responsible for: a) managing the day-to-day operations of the project, coordinating with various stakeholders, including technical partners, line ministries, and local communities, to execute project activities as outlined in the project document; b) facilitating engagement with relevant stakeholders at national and local levels, ensuring that their inputs and concerns are integrated into the project's execution. This includes coordination with the Ministry of Agriculture, Ministry of Water, and other relevant bodies; c) providing technical expertise in agriculture, water management, and environmental conservation, leveraging its specialized departments and collaborating with technical partners to address project challenges; d) managing the financial resources allocated for project execution, ensuring transparency and accountability in the use of funds, and providing regular financial reports to OSS; and e) contributing to the project's M&E processes, ensuring that data is collected, analysed, and reported accurately to assess project progress and impact. The DRC through its departments will provide the technical, administrative, financial backstopping to the PMU to ensure that the established procedures are followed and that data management is efficient and effective. As the CCAILSO Project is gender focused, it will also include monitoring of all gender aspects within the project where a gender expert anchored within the DRC will be part of the PMU team that will ensure the project is engendered.

207. *The Project Steering Committee (PSC)* will play a critical role in overseeing the planning, coordination, and supervision of project execution. The PSC will be composed of representatives from key national stakeholders, including line ministries, local authorities, and community leaders, ensuring that diverse perspectives are considered in decision-making. The PSC will convene at least twice a year to provide strategic guidance, review progress, and address challenges. The PSC will be responsible for: a) providing strategic direction to the EE to ensure that project activities remain aligned with the project document and objectives; b) assessing project progress through the review of biannual Project Progress Reports and Project Execution Reviews, ensuring that the project is on track to achieve its planned results; c) Providing advice on any issues or obstacles encountered during project execution, proposing solutions and adjustments as needed; and d) fostering collaboration among project partners and facilitate synergies with other relevant programs, projects, and initiatives in the Siwa Oasis, enhancing the overall impact of the project. The PSC will have a chair who will be elected from the representatives and the chairmanship shall be on a rotational basis. The DRC and PMU will act as the secretariat to the PSC and will be responsible to convening meetings, logistics, compiling meeting minutes, follow up on the recommendations of the PSC, inter alia.

208. The table below represents proposed composition of the PSC representatives:

Table 18 : The proposed composition of the PSC representatives

PSC Representative	No
OSS	1
Ministry of Agriculture	1
Ministry of Water	1
Ministry of Environment	1
Ministry of Gender	1
Ministry of Tourism	1
Siwa Local council	1
Total	**7**

209. *The Project Management Unit (PMU)* will be established at the DRC station in Siwa, serving as the operational hub for project coordination and execution. The PMU will be composed of: a) Project Coordinator who will be responsible for overall project management and will oversee the execution of activities, coordinate with stakeholders, and ensure alignment with project goals. The coordinator will be stationed in the project office in Siwa for proximity to the target area; b) Monitoring and Evaluation officer who will be tracking project progress, collecting data, and preparing M&E reports. The officer will work closely with the PMU members to ensure accurate reporting and compliance with M&E frameworks; and c) technical assistant/specialist in/or agriculture and water management to provide technical guidance and support for project activities.
210. A gender expert will be nominated from the DRC to be part of the PMU so as to ensure all gender aspects of the project are incorporated, and adhered to as per the Gender assessment and action plan (GAAP).
211. The PMU will receive support from the DRC's national office in Cairo, which will provide additional resources for financial management, M&E, and technical tasks. Regular field visits by Cairo-based staff will ensure continuous oversight and support for project activities in Siwa.
212. *Towards Roles and Responsibilities:* Project Management Unit (PMU), based at the Desert Research Centre (DRC) research station, is responsible for overseeing all M&E activities. This includes organizing evaluations, approving annual work plans and budgets, and ensuring that project progress is systematically tracked, monitor project activities closely, identifying any emerging issues and proposing corrective actions to ensure that the project remains on track and delivers results in a timely manner and foster collaboration with related initiatives and institutions to enhance project effectiveness and integrate lessons learned from other programs. For monitoring and evaluation, an M&E Expert will be recruited to coordinate data collection efforts with national and local teams, ensuring consistency and accuracy in the information gathered. He/she will also be instrumental in developing and refining the M&E system, ensuring it is tailored to the project's needs and capable of providing real-time feedback on progress. The DRC will offer technical support through its various departments in executing M&E activities, ensuring that the established procedures are followed and that data management is efficient and effective. The various roles and responsibilities related to M&E are depicted in the table below:

Table 19 : Roles and responsibilities related to M&E

Entity	Roles and responsibilities
OSS	- Review and approval of annual work plan & budget; - Review and approval of annual progress and completion reports; - Monitoring of the recommendations' implementation; - Orientation and/or management decision-making
Project Steering committee	- Review and validation of annual work and budget plans; - Coordination and decision-making related to the implementation of the program and the annual workplan and budget; - Continuous consultations with key stakeholders; - Review and validation of annual progress reports;
DRC - Departments	- Identify and allocate necessary technical resources, including personnel, equipment, and materials required for project execution.;

	- Support in development and management of detailed project schedules, ensuring alignment with overall project timelines and milestones; - Act as a central point of communication between different departments; - Implement quality control measures to ensure that project outputs meet specified standards and objectives; - Monitor project budgets, ensuring efficient use of financial resources and compliance with funding requirements; - Manage the procurement of technical equipment, materials, and services needed for project implementation; - Ensure that all project activities comply with relevant gender, environmental, health, safety, and regulatory standards;
PMU	- Development of the project's operations plan and the annual work plan and budget; - Follow-up of the project's operations plan and the annual work plan and budget execution; - Development of data collection, treatment, analysis and dissemination tools; - Coordination of collection, treatment, analysis and dissemination of data and information; - Preparation and consolidation of activity reports, annual progress reports, and project completion report; - Dissemination of project evaluation and monitoring reports; - Implementation of decisions and corrective actions; - Document and share lessons learned from project execution to inform future projects and enhance institutional knowledge.
Local actors (local governments, community structures	- Create a conducive environment for the program execution, especially by mobilizing communities and technical experts at the local levels - Provide support for extension agents involved in the climate resilient practices dissemination and training for the benefit of communities - Provide political support and advocacy - Ensure ownership and sustainability - Key partners and implementers of the program at the local level - Labor and local material contribution for project activities (in-kind contribution to the project) - Ownership and sustainability by establishing community management structures

213. The organogram below represents the implementation arrangements and flow of funds for project implementation:

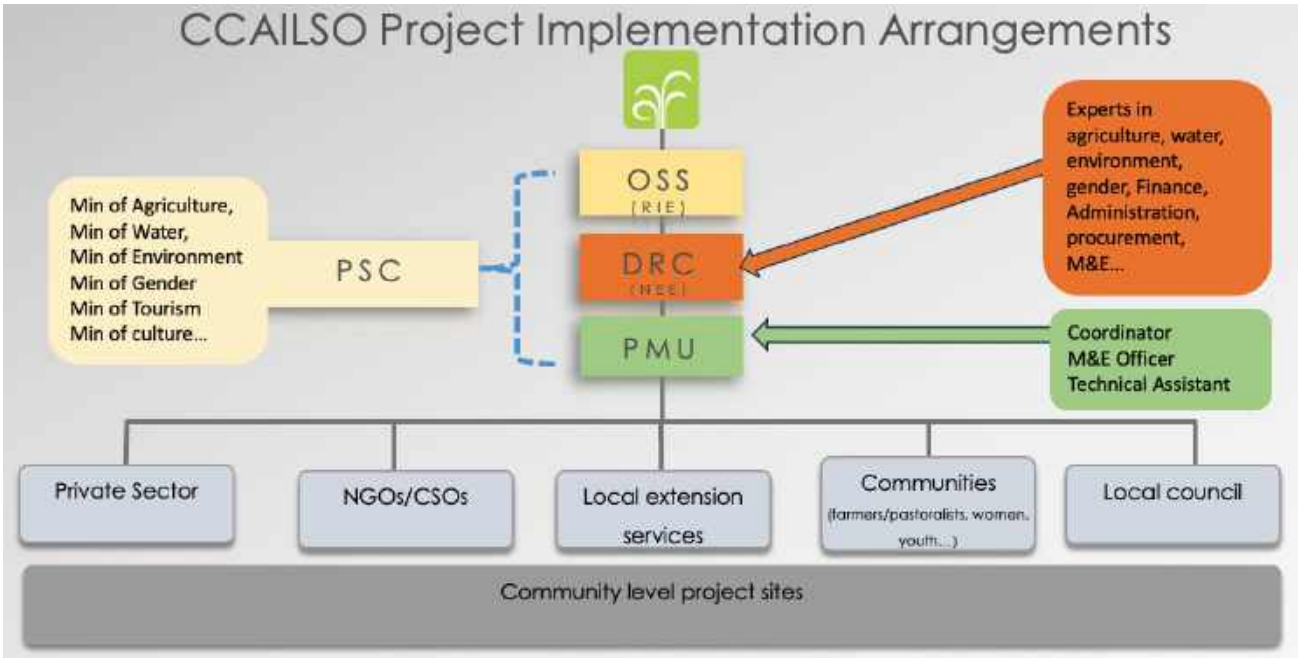


Figure 10: CCAILSO Project Implementation Arrangements

214. *Gender-responsiveness of project implementation:* The Regional Implementing Entity (OSS) and the Executing Entity (DRC) have both a dedicated staff member specialized on gender that will be part of the

project team and ensure that project approaches are effectively integrating the gender-perspective in all project activities. There is vast experience with managing and implementing projects that mainstream gender in their activities, for instance for various technical and financial partners (World Bank, GIZ, European Union, FAO, UNDP, etc.) who work with gender-inclusiveness and responsiveness throughout their project implementation processes. The NEE has also the responsibility to implement the gender action plan of the CCAILSO project, in addition to the governmental strategies on gender. The CCAILSO implementation arrangements, including the institutional programming and the project evaluation system, are set up to disaggregate indicators by gender and youth. The project's implementation arrangements from local to regional level offer also opportunities during annual or more frequent meetings to monitor the implementation of the gender action plan.

215. Indeed, a gender focal point responsible for gender aspects will be designated by the regional implementing entity at the IE level and will work with the designated gender responsible at EE level to ascertain engendering of the project activities at all levels.

B. Financial and project risk management.

216. Continuous assessment of financial and project risks, along with associated management measures, will be conducted throughout the project duration. The significance of primary financial, project, and institutional risks, along with corresponding response measures anticipated with the mitigation measures are summarized in the table below and also some are linked to the AF principles:

Table 20 : Primary financial, project, and institutional risks, along with corresponding response anticipated and mitigation measures

Risk	Likelihood	Response
Fluctuations in exchange rate (USD: EGP) which could affect the funding available for implementation and lead to budgetary constraints.	Medium	The Financial and Procurement division will closely monitor the USD: EGP exchange rate and communicate any implications to the Project Coordinator so that project management can be adaptive. The PMU will collaborate closely with the NE should exchange rates fluctuate to the extent that budget reallocations are required. In this event, budget reallocations shall be made in such a way that the achievements of project outcomes are compromised as little as possible.
Ineffective management of project funds affects project implementation.	Low	A Financial and Procurement Manager will be appointed to strengthen the PIU, and ensure appropriate management of project funds. In addition, NIE oversight and account audits will ensure that there is no ineffective use of project funds.
Delays in the disbursement of funds, procurement and institutional inefficiencies (e.g. lengthy approval processes) result in delayed recruitment of project staff and hence project implementation.	Low	The NIE, PMU and UMDM will work closely to ensure optimum conditions for timely disbursement of funds contracting, monitoring and financial reporting. The Project Director, Financial and Procurement Manager and Project Officer will develop and regularly update a Procurement Plan in line with UMDM guidelines. Key project staff will be in place prior to the project inception meeting.
Poor performance of some partner NGOs due to week capacity	Medium	The design of the project includes activities to enhance abilities of partner NGOs through capacity building. Additionally, and where needed, the project will entrust other more active partner NGOs with some of the potentially delayed activities.
Failure to involve adequate representation of vulnerable communities, particularly women, and therefore failure to create ownership of the project at the community level at project sites.	Low	The project will avoid a „top down" approach and create community ownership of the project interventions by building the capacity of community members at an early stage in the project. Engagement and capacity building will adopt a gender-sensitive approach, as guided by the Gender and Social Expert on the PIU. The development of detailed implementation plans will be undertaken in a participatory manner, encouraging input from all community members, including women. This will also assist with the inclusion of traditional knowledge. This participatory approach has been adopted in the design phase, when traditional authorities were consulted.
Poor coordination and information sharing	Low	The relevant institutions will be invited to the inception workshops for

structures/agreements between project partners and other meteorological and agricultural institutions limits the effectiveness off the flood/storm, fire and agro-meteorological EWSs.		the relevant components, and the PIU, will facilitate of the required data sharing This engagement will build on the consultations undertaken during the design of the project,
Difficulties in supply of goods such animals, canal lining materials, etc. due to specialized nature of these goods and/or large volumes requested	Medium	Alternative suppliers will be sought. Such suppliers include research institutes, with whom the project can partner to produce the needed goods e.g. through intensive breeding for supply of needed goats.
Non-sustainability of the project due to institutional or financial factors	Low	The DRC is already adopting the interventions of Siwa area in its programmes in the area- to date palm and olive cultivation so far. Through trainings as well as on-the-job support, the project will also build technical and institutional capacities of partner NGOs to anchor the project at the local level. It also enhances capacities of loans beneficiaries through specialized trainings to help them sustainably manage their projects.
Given that this project seeks to address the adaptation required over a long time period, there is a risk that the decisions and actions taken during the project may not be ratified	Low	The participation of the authorities and local communities during the preparation of the concept note of the project, in addition to the continuous training of civil society and the beneficiaries of the project. The presence of more than one scientific research station Desert Research Center in Siwa which is in constant contact with the Siwa community, with a strong relationship with them. The DRC station represents always a resort in problem solving, that makes it won the confidence of the Siwians and local authorities. This reduces the risk, non-compliance.
Institutional capacities challenges noting limited capacity of project partners to coordinate and deliver project outputs.	Low	The project partners all have experience in coordinating, implementing and delivering outputs in their relevant spheres of expertise. This is demonstrated by the successful implementation of previous projects. In addition, the NIE will play an oversight role, and provide additional expertise if required. A training programme will be developed in line with the CNA to mitigate this risk
Staff turnover within the Local Municipalities, project partners and within the PMU may hamper progress.	Low	Institutional rather than individual relationships will be built with the Local Municipalities and with project partners, limiting the negative impact of staff turnover. Where appropriate, contracts will be signed with the beneficiaries of training provided through the project. For the PMU, the recruitment process will ensure Terms of Reference meet human resource requirements to deliver quality outputs, are widely advertised and offer competitive remuneration to ensure the necessary quality of candidates are selected. Particular attention will be given to the key role of Project Director who will be required to have exceptional team building and management skills.
Environmental degradation or resource depletion due to project activities (e.g., overuse of land or water resources).	Medium	The project will conduct thorough Environmental Impact Assessments (EIAs) during implementation. A comprehensive monitoring and evaluation (M&E) system will track environmental impacts, ensuring that activities do not contribute to long-term degradation. In addition, the project will integrate sustainable land and water management practices to minimize negative environmental effects. Periodic audits and feedback loops will also be employed to adjust project activities if any unforeseen environmental damage occurs.
Climate risks e.g., droughts affecting the implementation and sustainability of the project.	High	The project's adaptive management approach includes flexible planning and regular adjustments to address climate variability. Climate risk assessments will be incorporated into the project design, and climate-resilient strategies will be developed. The project will work with meteorological institutions to improve early warning systems and enhance the capacity of local communities to respond to climate shocks.
Social conflict and disparities arising from	Medium	A clear social inclusion strategy will be implemented to ensure that

unequal distribution of project benefits, especially concerning marginalized groups such as women, youth, and ethnic minorities.		marginalized groups are included in decision-making and project activities. Community consultations will be integral at every stage of the project, and gender-sensitive approaches will be employed. The project will also sensitise the communities on the grievance mechanism to allow affected parties to raise concerns, with a strong focus on fair distribution of benefits.
Political instability or changes in government policies that could affect project execution or lead to delays	Low	This will include monitoring the political climate and engage with local and national stakeholders to ensure alignment with current policies. Regular consultations with government representatives and other key stakeholders will assist to anticipate any potential changes in political circumstances, allowing the project to adjust its strategies if necessary. Strong relationships with various levels of authorities, who will be represented at the steering committees levels will also assist to mitigate this risk.

C. Environmental and social risk management, in line with the ESP and Gender Policy of the AF.

217. During the development phase of the CCAILSO project, a comprehensive environmental and social impact assessment was conducted in accordance with Egypt's national standards. Approval was obtained from the national environment authorities. The analysis of environmental and social risks for the CCAILSO project indicated minimal significant impacts, aligning with the Environmental and Social Policy of the AF, as outlined in the provided table. The assessed impact levels were categorized as low or medium risks, resulting in the project being classified under **Category B** of risks. This classification suggests that project activities are associated with small-scale impacts confined to the project area, which can be effectively managed through sound environmental and social practices.

218. Additionally, the project commits to conducting periodic environmental and social impact assessments as needed, depending on the scale of project activities. To identify specific environmental and social risks, each project activity underwent screening against the 15 Environmental and Social Principles of the AF. This screening process involved multiple phases, including risk rating based on the assumption that management measures and plans specified in the respective columns of the assessment were implemented and effective in mitigating risks.

219. Following this screening, certain principles, such as protection of natural habitats and climate change, were identified as presenting moderate risks mainly. Mitigation measures for these identified risks were defined and are elaborated upon in the provided table and further detailed in the Environmental and Social Management Plan (ESMP) annex 3.

Table 21 : Mitigation measures for identified risks

Type	Risk Description	Level	Mitigation Strategy
Protection of Natural Habitats	Natural hazards (drought, storm surges, sand dune movement) hamper some efforts	Medium	The project is seeking to reduce the effect of natural hazards. However, the expected outcomes such as behavioural changes and the construction of infrastructure are at risk in the early phases of the programme. As such, priority will be given to the actions that present more impact with larger numbers of favoured producers.
Climate Change	Climate variability. Changing climatic conditions could affect the success of particular adaptation measures to be piloted during the life of the project.	Medium	The Desert Research Center (DRC) has the overall institutional and farmer-level capacity building in the project area, which will enable careful monitoring of climate variability in the region, and consequent consideration of potential adjustments.

220. The risks further identified for the 15 E&S principles of the Fund in section K, Part II have been described there and concrete mitigation actions have been proposed and to avoid, counteract or minimize their occurrence and impact. As stipulated in the narrative part II Section A of the project activities description, there are some Unidentified Sub-Projects that will require additional environmental and social screening to

ensure compliance with the AF policies. Despite these USPs, the project category will be maintained under Cat. B, and avoiding the activities that could have an important risk and impact on the environmental and social aspects. the USPs are further described below.

Unidentified Sub-Projects (USP)

Compliance with AF Policies

221. All activities carried out within the framework of the USP modality in the CCAILSO project will strictly adhere to the AF Policies applicable to it. These policies encompass: i) *The Adaptation Fund Environmental and Social Policy (AF ESP)*. This policy delineates the obligations for Implementing Entities (IEs) to evaluate and manage environmental and social risks during project execution. It outlines the E&S Principles that govern AF projects, emphasizing the necessity for IEs to implement measures to either prevent, minimize, or mitigate such risks throughout the project lifecycle. The development of the current Policy on USPs aligns with these principles; ii) Any *USP identified and integrated into the CCAILSO project must fully align with the E&S Principles* outlined in the AF ESP. There are no exceptions to this requirement; and iii) the *AF Gender Policy and Action Plan, (AF GP) updated in 2022*, establishes the objectives and principles that AF-funded projects must adhere to in order to safeguard women's rights as fundamental human rights and to promote gender equality. The USP Policy for CCAILSO is further shaped by the AF Guidance Document, issued in February 2019, titled "*Updated guidance for implementing entities on the use of unidentified sub-projects" adopted at the AF board thirty-ninth meeting (Decision B.39/52).*

Compliance with OSS ESP safeguards

222. The Environmental and Social Policy (ESP) within the CCAILSO project, including those for the USPs, are upheld through OSS policies and procedures, which are modelled on the International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability. This sustainability framework ensures a continuous process of identifying, mitigating, and monitoring potential risks and impacts throughout the project's lifecycle.

223. The management of environmental and social risks involves two primary stages: i) Preliminary Risk Screening: This stage, conducted during project preparation, assesses the project's adherence to the ten Performance Standards (PS) outlined in the OSS E&S policy. It categorizes the project based on its level of risk; and ii) Ongoing Risk Screening: Throughout the implementation phase, project interventions undergo continuous risk assessment. Activity-specific risk management follows OSS' procedure, aligning with internationally recognized standards such as ISO 31000:2009, which provides principles and guidelines for risk management. Operational procedures will be established to ensure that all project activities and interventions undergo continuous screening for the identification of emerging risks and impacts.

224. The Environmental and Social Policy (ESP) of the CCAILSO project, as well as for the Unidentified Sub Projects (USPs), are guaranteed through the implementation of OSS policies and procedures. These are grounded in the International Finance Corporation (IFC) Environmental and Social Sustainability Framework.

225. This framework ensures a systematic approach to identifying, mitigating, and monitoring potential risks and impacts throughout the project's life cycle. The management of environmental and social risks involves two primary stages: i)Preliminary Risk Screening: This stage, conducted during project preparation, involves assessing the project against the ten Performance Standards (PS) outlined in OSS E&S policy.

226. This categorizes the project based on its level of risk; and ii) On-going Risk Screening: Throughout the implementation phase, continuous assessment of project interventions is conducted. This activity-wise risk management is governed by OSS' risk management procedure, which aligns with internationally recognized standards, particularly ISO 31000:2009, "Risk Management — Principles and Guidelines." Operational procedures will ensure ongoing screening of all project activities and interventions to identify emerging risks and impacts.

Unidentified Sub-Projects (USPs) in the CCAILSO Project

227. The USP policy applies to activities that have been identified as USPs, and of which the detailed scale, scope and location, and other technical aspects are not yet fully identified at the time of full proposal development. For the CCAILSO project, the USP policy will be applied to: (a) all activities related to the water solutions (activities under outcome 1.2); and (b) all activities related to the promotion and implementation of SLM and agro-sylvo-pastoral practices (activities under outcome 2.1).

228. As mentioned in the consultation process, and as part of the project development process, initial

consultations were undertaken where data was collected and verified through a detailed questionnaire specific to the intervention areas which informed the development and understanding of the project activities. In the same framework, activity 2.1.2.2 is one of the first activities to be carried out after the project launch. This will have a determining role in the USP protocol as it will provide and identify the details and modalities to be respected and implemented to ensure the successful execution of all project activities, especially those identified as USPs during the development of the project document.

229. Once the necessary clarifications and details related to the implementation of the activities identified as USPs have been provided through Ac. 2.1.2.2, the EE will conduct a specific and detailed environmental, social and gender assessment moving forward. This assessment will be done in accordance with national regulations and standards for conducting an assessment such as an EIA and under the supervision of OSS to ensure compliance with OSS and AF safeguards. The costs related to the environmental, social and gender assessment will be charged on the budget line of each activity as stated in the project detailed budget.

Project Grievance Mechanism

230. The proposed project will utilize the existing OSS grievance mechanism to allow affected populations to raise concerns that are not complying with its social and environmental policies or commitments.

231. OSS has established a grievance mechanism through its procedures, which is an independent mechanism whereby a matter, resulting from a project financed or implemented by OSS may file a complaint. The grievance mechanism, which is made available to stakeholders in OSS website, is part of the environmental and social policy to address compliance as well as lodging USPs identified and grievance cases that may arise during implementation by OSS where a public guideline defines the complaint resolution mechanism.

232. It aims to establish an effective dialogue between those affected by the projects' it finances and all interested parties, to resolve the problem(s) the origin of a request, without seeking to assign responsibility or fault to any of these parties.

233. *At the OSS (RIE) level:* the grievance mechanism is coordinated and managed by OSS environmental and social committee (OESC). Communities and other stakeholders which will be affected by the project can submit complaints to OSS, the IE of the present project by: mail, email, fax or phone to the address indicated. Complainants may also refer the matter to the Ad hoc Complaint Handing Mechanism (ACHM) of the Adaptation Fund if the IE is not responsive or are not content with the outcome of their complaint.

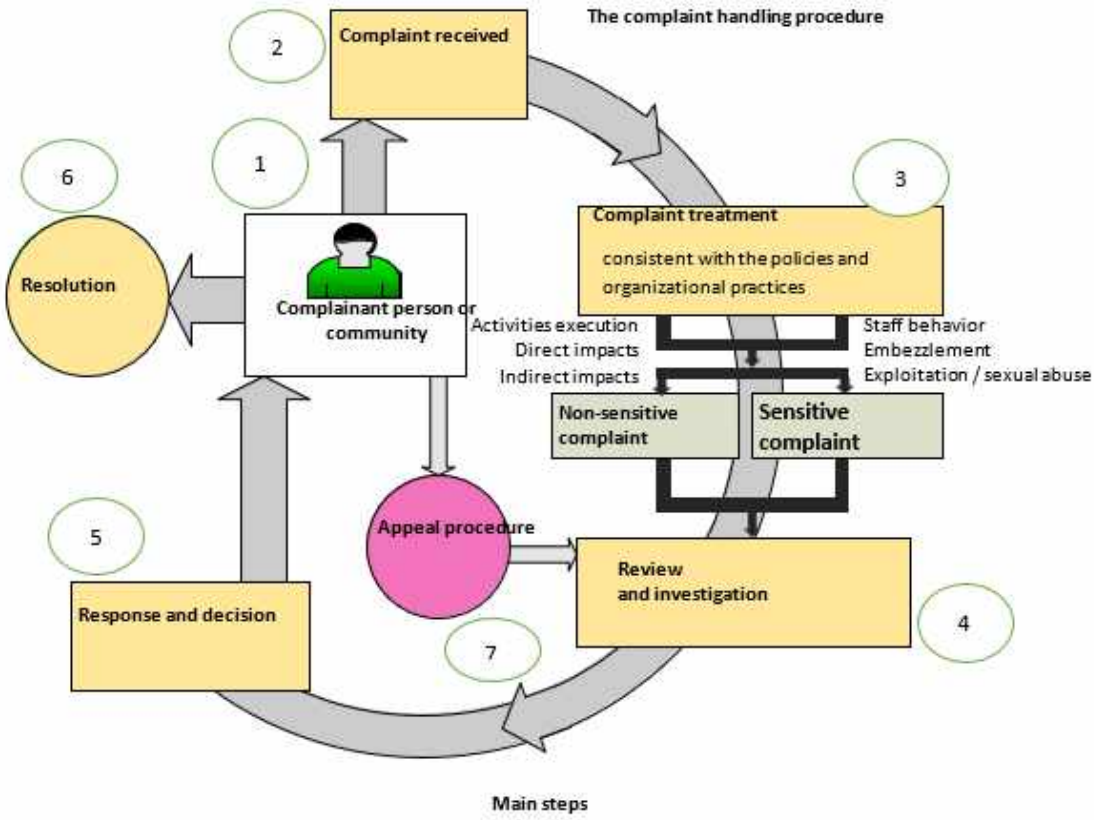
Sahara and Sahel Observatory Boulevard du Leader Yasser Arafat BP 31 Tunis Carthage 1080 Tunisia Tel: (+216) 71 206 633/634 Fax: (+216) 71 206 636 Email: doleances@oss.org.tn or boc@oss.org.tn	Adaptation Fund Board Secretariat Mail stop: MSN P-4-4400 1818 H Street NW Washington DC 20433 USA Tel: 001-202-478-7347 Email: afbsec@adaptation-fund.org

234. *At the project level:* The NEEs are the contact point for any project-related complaints from stakeholders in each country. The National project management with the support of the REE should respond promptly and appropriately with the support of the OESC. Where the complaint cannot be managed at the project level, the NEE or REE will direct the complainants to OSS for further action. The complainants will provide complete information in the form for proper assessment of the complaint(s). It will be the responsibility of the NEE and REE, under the control of OSS, to ensure that all relevant stakeholders are adequately informed about the grievance mechanism through awareness and sensitization campaigns highlighting the issue of potential USPs and how to address them . This mechanism will be made available and widely diffused during the launching workshops and the meetings and trainings. The guideline of grievance mechanism will be made available on the project and the national executing entity website. The procedures on how to submit the complaint are available on the website of the OSS or directly at Guide traitement doleances. If the OESC finds that a complaint is eligible, the OESC composes internal and/or external experts' team to investigate the case and proposes options for the complainant to consider.

235. *Complaint Handling Process – Filling-in a complaint:* Individuals or communities affected by project activities can submit complaints or claims through various forms and channels. To ensure accessibility, the methods for filing complaints will be diversified according to the context: At the national level: Complaints can be directed to OSS or the AF through the contacts provided, including via social media platforms. At the local level: Complaints can be submitted to local authorities or the NEE. The NEE's contact information will be

made publicly available at the start of the project execution.

236. The mechanism will utilize all possible means and channels (both traditional and modern) to receive complaints or claims, whether anonymous or identified. These channels include, but are not limited to: telephone calls (widely used in the target area), self-referrals during supervision missions, observations made during meetings or field visits, social networks (e.g., WhatsApp), the project website, the project's email address, the OSS website, and mail via complaint boxes placed in the localities impacted by the project.
237. *Receipt and registration of complaints:* The NEE is responsible for ensuring the receipt and management of all complaints related to the project's activities and impacts. Upon receipt, complaints will be recorded, and a traceability procedure will be established. Complaints will generally be classified into two categories: (a) Non-sensitive complaints related to the implementation process, such as choices, methods, or results achieved; and (b) Sensitive complaints, which typically involve personal misconduct, including corruption, sexual abuse, or discrimination.
238. The NEE will formally acknowledge receipt of the complaint (via email or letter) within a maximum of one week. This acknowledgment will inform the complainant of the next steps and, if necessary, request clarifications or additional information to facilitate a better understanding of the issue.
239. *Complaint handling:* This process involves assessing the eligibility of a complaint to ensure that it is related to the project's activities or commitments. The goal is to establish a clear link between the issues raised and the project's impacts. The eligibility assessment will also determine whether the complaint should be addressed through the project-specific grievance mechanism or referred to other relevant mechanisms (e.g., whistleblowing channels).
240. In cases where complaints are unfounded, it is crucial to conduct thorough investigations to protect the project's reputation. This responsibility falls to the National Executing Entity (NEE). Unfounded complaints may include those lacking sufficient information, or those based on rumours or malicious intent, which could disrupt the project's progress. Public complaints or accusations made to a wider audience that are deemed unfounded will be handled jointly by the Implementing Entity (IE) and NEE, potentially resulting in a formal statement.
241. For well-founded complaints, two types of responses are possible: (i) a direct response and action to resolve the issue, or (ii) a comprehensive audit, involving joint investigations, dialogues, and negotiations to reach a meaningful resolution. This may require expanding the team to include national and local experts.
242. Following the audit and investigations, a contextually appropriate and formal response will be provided to the complainant. This response should outline the procedures the NEE will follow to address the complaint or suggest the appropriate authorities to contact if the matter falls outside the NEE's responsibilities.
243. The diagram provides a schematic representation of the grievance mechanism process.



D. Monitoring and evaluation arrangements

244. The Monitoring and Evaluation (M&E) framework for the CCAILSO project is designed to ensure systematic tracking of project activities, timely assessment of progress, and comprehensive evaluation of outcomes. This framework supports adaptive management by providing continuous feedback, enabling the project to make informed decisions and adjustments to enhance effectiveness and achieve its objectives.

245. *The M&E framework* will track the entire lifecycle of the project, from input delivery and work schedule adherence to the achievement of outputs and long-term impacts. It is structured to provide stakeholders with regular updates and facilitate evidence-based decision-making. This framework shall be developed by the EE to support in the project execution and it will include: a) *Systematic Data Collection* - Regular and structured data collection will be conducted to monitor progress across all project components. Data will be gathered from a variety of sources, including field reports, stakeholder consultations, and surveys; b) *Data Analysis and Reporting* - Collected data will be analysed to assess project performance against the established targets and indicators. Findings will be reported to partners, stakeholders, and funders to maintain transparency and facilitate accountability; and c) *Evaluation Mechanisms* - Evaluation will be conducted at various stages of the project to objectively assess the design, implementation, and outcomes. This includes assessments of the project's relevance, effectiveness, efficiency, impact, and sustainability.

246. Table below further breaks down budget of Monitoring and Evaluation Plan.

Table 22 : M&E Plan Budget Breakdown

Task	Responsible	Estimated Budget	Timeline															
			Y1				Y2				Y3				Y4			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Initial Workshop (IW)	PMU and AE	$20,000																
Baseline, CNA, KAP Studies	PMU and AE	$100,000																
Design of Project M&E	PMU	$50,000																

System and Monitoring																		
Quarterly Field Visits and Reporting	PMU and Community Focal Points	$70,000																
Annual Field Visits	OSS, PMU	$100,000(OSS)+ $30,000(PMU)= $130,000																
Monthly and Quarterly Monitoring and Reports	PMU	$80,000																
Annual Reports	PMU	$20,000																
Meetings of the Project Steering Committee (PSC)	PMU and AE	$20,000																
Mid-term Evaluation	OSS – External Evaluator	$20,000																
Final Project Report	OSS, PMU	$30,000(OSS)+ $30,000(EEs)= $60,000																
Yearly Project Audit	OSS – External Auditor	@$15,000*4= $60,000																
Final Project Audit	OSS – External Auditor	$10,000																
Final Evaluation (FE)	OSS – External Evaluators	$30,000																
Total		**$670,000**																

Ongoing
Completed Deliverable

247. This budget is structured to ensure that all necessary M&E activities are funded and executed in a timely manner, with clear allocation of responsibilities and time frames to facilitate effective project management and accountability.

248. *Inception Phase Activities:* Within the first month of project implementation, an Initial Workshop will be held with the participation of all executing parties. The workshop will establish execution and implementation mechanisms, finalize agreements, and ensure that all stakeholders are aligned with the project's objectives and methodologies. During the workshop, an action plan for the first twelve months of the project will be developed and this plan will include key activities such as baseline and capacity needs assessments, Knowledge, Attitudes, and Practices (KAP) surveys, and the design of the M&E system which will be the first actions to be undertaken in the operationalization of the CCAILSO project.

249. *Baseline Study:* A comprehensive baseline study, capacity needs assessment and KAP survey will be conducted to establish reference points for key indicators and benchmarks. These will provide essential data for measuring progress and evaluating the impact of the project.

250. *Ongoing Monitoring and Evaluation:* Regular monthly coordination meetings between the PMU and DRC's national office in Cairo will be held to review on-the-ground progress, discuss challenges, and plan upcoming activities. These meetings will ensure continuous alignment between field operations and overall project management.

251. *Quarterly and Annual Reporting:* Quarterly progress reports will be prepared to provide updates on activities, resource utilization, and outcomes. These reports will be shared with stakeholders to maintain transparency and accountability.

252. *Annual Reports*: Comprehensive annual reports will summarize the year's achievements, challenges, and lessons learned. These reports will also include financial summaries and audit results, ensuring strong financial accountability.

253. *Mid-Term and Final Evaluation:* A mid-term evaluation will be conducted to assess the project's progress, identify any necessary adjustments, and make recommendations for the remaining implementation period.

254. *Final Evaluation:* At the project's conclusion, a final evaluation will assess the overall impact, sustainability of results, and the achievement of project objectives. This evaluation will inform future initiatives and provide insights for scaling up successful practices.

255. *Field Monitoring and Community Engagement:* Regular field visits will be conducted by the PMU and DRC staff to monitor project implementation at the ground level. These visits will ensure that activities are being carried out as planned and that targets are being met according the workplans developed.
256. *Focus Group Discussions and In-Depth Interviews:* Field visits will include focus group discussions and in-depth interviews (KAP surveys) with key stakeholders, including community members, to gather qualitative data on project impact and identify potential obstacles.
257. *Gender-Inclusive Monitoring:* Special efforts will be made to ensure that both women and men are equally consulted during monitoring activities. Female monitors will be mobilized where necessary taking into account the cultural aspects experienced in Siwa to engage with women in the community, ensuring their perspectives and needs are adequately represented in the project's evaluation.

Monitoring of the ESMP

258. The Environmental and Social Management Plan (ESMP) includes a monitoring program with specific indicators to track the effectiveness of mitigation and improvement measures.
259. *Integration of USPs:* Since the CCAILSO Project under Component 2 incorporates Unique Selling Points (USPs), the Monitoring and Evaluation (M&E) system will be designed and implemented with these USPs in mind. This system will adhere to guidelines developed in line with the Adaptation Fund's standards for USPs to effectively monitor and address related risks and impacts. A participatory, bottom-up approach will be used, involving beneficiaries in the selection and execution of activities. Monitoring will involve the following key actors:
260. *Implementing Entity (OSS):* The Environmental and Social (E&S) monitoring activities will be overseen by the E&S committee of the implementing entity, OSS. This committee will be responsible for submitting monitoring reports to the Adaptation Fund. In compliance with the Adaptation Fund's ES policy, OSS will ensure that all identified environmental and social risks and impacts are considered in project monitoring and evaluation. OSS will conduct monitoring and evaluation missions, ensuring that the project adheres to its schedule and that funds are appropriately allocated to planned activities.
261. *Grievance Management:* In the event of grievances, the E&S Committee (ESCO) will address the issues and seek appropriate solutions. The annual reports from OSS to the Adaptation Fund will include updates on the implementation status of the ESMP and measures taken to avoid, minimize, or mitigate E&S risks and impacts. These reports will also describe any corrective actions taken. Additionally, mid-term and final evaluation reports will assess the project's performance in managing E&S risks and handling grievances.
262. *National Executing Entity (NEE)- DRC:* The NEE will oversee ESMP monitoring at the local level and will be responsible for submitting the ESMP report to OSS. This report will align with the 15 principles of the Adaptation Fund and include details on grievance management.
263. *Quarterly Reporting and Field Visits:* As part of the supervision missions, the NEE will compile and review reports on a quarterly basis, incorporating feedback from local communities into the Project Management Unit (PMU). Regular field visits will be conducted to inspect and verify the effectiveness of mitigation measures and assess the extent of anticipated impacts. Both the NEE and the Regional Implementing Entity (RIE) will carry out these field missions to closely monitor risks, impacts, and mitigation measures, ensuring adherence to established principles. Effective monitoring will require the active involvement of both the implementing and executing entities, with community support, to ensure robust local and national oversight of mitigation measures. The ESMP report will be submitted to OSS annually.
264. *Project Management Unit (PMU):* The PMU in the DRC will coordinate and oversee the monitoring of environmental and social indicators. It will be responsible for analysing data, managing local information systems, and establishing baseline data at the project's start. The PMU will prepare quarterly reports and submit them to the NEE.
265. *Local Communities:* The ESIA monitoring will incorporate a community-based approach. The project plans to provide training and capacity-building sessions for local agents and communities to enhance their skills in data collection and monitoring. Communities will be informed about the risks associated with activities and will be actively involved in the implementation and monitoring of mitigation measures.

Table 23 : Roles and Responsibilities in ESMP Monitoring and Evaluation

Responsible	Role
Implementing entity (OSS)	OSS will be committed to adherence to AF standards and ESP principles and will implement mitigation measures as part of the ESMP.

National Executing Entity (DRC)	Monitor and disseminate the ESIA / ESMP, in particular its grievance mechanism, among relevant stakeholders and beneficiaries. Ensure that the implementation of the project complies with applicable national and standard regulatory frameworks. Monitor the implementation of ESMP activities and evaluate the effectiveness of the mitigation measures put in place.
Project Management Unit	Ensure the day-to-day execution of the project and ensure regular monitoring, identifying any new potential risks for society and/or the environment during the project implementation, so that measures of support and appropriate attenuation can be implemented and adopted in a timely manner.
Local Communities	Provide information on potential new social / environmental risks that may arise during the implementation of the project activities. Assist in the implementation and monitoring of mitigation measures based on their local expertise.

266. The Environmental and Social Management Plan (ESMP) is integrated into the project's framework to ensure that all activities comply with environmental and social safeguards of the AF and OSS. While specific budget allocations for ESMP implementation are not detailed in the available documents, the IE fees under operating cost budget line (USD 80,000) and EE Project Execution Cost under M&E (USD 223,000) will encompass expenses related to ESMP activities, including monitoring, compliance, and mitigation measures.

Funds Flow Arrangement

267. *Disbursement from the Adaptation Fund to OSS (Implementing Entity):* Upon approval of the project proposal, the Fund disburses the initial tranche of funds to OSS according to the agreed-upon disbursement schedule. The disbursement schedule is based on project milestones, timelines, and financial needs. Subsequent disbursements are contingent upon the submission of satisfactory progress and financial reports by OSS and the achievement of specified project milestones.
268. *Disbursement from OSS to DRC (Executing Entity):* OSS transfers funds to DRC in accordance with the project's cash flow requirements. These transfers are made in tranches, aligned with the project's implementation phases and based on DRC's financial and progress reports. DRC submits financial and progress reports to OSS, demonstrating the utilization of funds and the achievement of milestones. OSS reviews these reports and authorizes the next tranche of funding, ensuring that all conditions are met.
269. *Financial Reporting and Accountability:* DRC will maintain detailed financial records, including receipts, invoices, and contracts, and submits periodic financial reports to OSS. These reports should detail expenditures, activities completed, and any deviations from the budget. OSS will consolidate financial and progress reports from DRC and submits them to the Fund. OSS is responsible for ensuring the accuracy and completeness of these reports.
270. *Annual Audits:* Annual audits will be conducted by independent auditors to verify the accuracy of financial reports and the integrity of financial management systems. Audit findings will be shared with all relevant stakeholders to maintain accountability.
271. *Alignment with Partner Guidelines:* The M&E procedures will align with the guidelines and standards of the DRC, OSS, Adaptation Fund, and relevant International Financial Institutions (IFIs). This alignment ensures consistency in reporting and compliance with international best practices.
272. *M&E System Development:* The DRC will develop a comprehensive M&E system, managed by the PMU, to collect, synthesize, and interpret data effectively. This system will support optimal monitoring by providing timely and accurate information for decision-making.
273. *Capacity Building Workshops:* Regular capacity-building workshops will be conducted to enhance the skills of project staff and stakeholders in M&E practices. These workshops will ensure that all involved parties are equipped to contribute effectively to the project's monitoring and evaluation efforts. By maintaining a rigorous and responsive M&E framework, the CCAILSO project will be well-positioned to achieve its goals, demonstrate impact, and contribute valuable insights to the broader field of climate adaptation in arid regions.

E. Results Framework, including Milestones, Targets and Indicators

Table 24: CCAILSO Project Results Framework

Result	Indicators	Baseline	Milestones (after 2 years)	End of the project targets	Means of verification	Responsible Parties	Risks and Assumptions
Global Objective							
Enhance the resilience of the Siwa ecosystem and improve local livelihoods by promoting sustainable water and soil management, boosting agricultural production, and supporting ecotourism in response to climate change impacts.	**Number of vulnerable community members in Siwa Oasis with increased capacity to implement adaptation projects that address risks to extreme environmental hazards.**	**40%**	**55%**	**70%**	**M&E reports.**	**OSS and DRC.**	**Risks:** • **Rural communities suffer from other shocks during the project life, which affects their ability to adopt the proposed mechanisms.** **Assumption:** • **New facets of climate risks emerge during the project life.**
Component 1: Improving Water Resource Access and Management							
Outcome 1.1: Enhanced Water Resource Management Capacity	Nbr of WUA members improved governance practices and decision-making processes within their associations.	0 (for all)	• At least 40 WUA members report improved governance practices and decision-making processes within their associations.	• At least 80 WUA members report improved governance practices and decision-making processes within their associations.	M&E reports.	OSS and DRC.	Risks: • Resistance to change or inadequate support from key institutions could limit the adoption of new practices and strategies. • Unforeseen costs related to technology upgrades or infrastructure could exceed planned budgets. Assumptions: • Institutions at all levels will actively participate in and support capacity-building initiatives and the adoption of new management practices. • Training programs and technical support will effectively build the necessary skills and knowledge for improved water management.
	Nbr. of WUAs established		• At least 5 WUAs established and operational.	• At least 10 WUAs established and operational..			
	Nbr. of households adopt improved WASH practices		• At least 900 households adopt improved WASH practices	• At least 1900 households adopt improved WASH practices			
	% increase in water equity		• At least 30 % increase in water equity in target communities	• At least 60 % increase in water equity in target communities			

Output 1.1.1: Developed/updated water resources management plans	Number of status report of surface and groundwater resources	0 (for all)	• 1 status report	• 1 status report	M&E report, activities report, fields report, workshop reports	OSS and DRC.	Risks: • Climate variability may affect water levels, leading to inaccurate assessments. • Drought or excessive rainfall may skew the current status of resources. • Conflicts over water resource ownership or access rights. • Possible resistance or lack of engagement from communities due to past negative experiences or low trust in institutions. • Conflicting interests among stakeholders may hinder consensus on water management priorities. Assumptions: • Adequate funding and resources will be available to support comprehensive assessments, plan updates, and institutional capacity-building activities. • Stakeholders, including national, sub-national, and local institutions, will actively participate and collaborate in the development and implementation of the Water Resources Management Plan. • The data collected will be accurate and comprehensive, providing a solid foundation for effective water resources management and planning. • Institutions will be open to adopting new practices and recommendations from the updated plan, leading to improved water management outcomes. • Environmental conditions will remain stable enough to ensure that the assessments and management strategies remain relevant over time.
	WRMP document developed or updated based on findings from the assessments in Activity 1.1.1.1.		• 1 WRMP document developed or updated	• 1 WRMP document developed or updated			

Output 1.1.2: Strengthened water resources management in target communities.	Number of WUAs assessed and constituted for current institutional capacities and areas of improvement.	0 (for all)	• 5 WUAs assessed and constituted. • 4 training sessions conducted for WUA members.	• 10 WUAs assessed and constituted. • 4 training sessions conducted for WUA members.	Consultation reports, training reports, participants record.	OSS and DRC.	Risks: • Weak institutional frameworks may limit the effectiveness of Water Users Associations (WUAs) and hinder capacity-building efforts. • Lack of coordination and support from local governments may obstruct the implementation of training modules and community management initiatives. • Delays in the development and delivery of training modules due to logistical challenges or lack of resources. • High turnover of trained individuals, leading to a loss of capacity and continuity in WUA operations and community water management. • Low engagement or resistance from communities due to lack of trust in institutions or previous negative experiences. • Cultural and language barriers may reduce the effectiveness of training programs and community engagement efforts. Assumptions: • Local institutions, including WUAs, are committed to enhancing their capacity and actively participating in the program. • Adequate funding and resources will be available to develop training modules and implement capacity-building activities. • Trained individuals will remain engaged and apply the skills learned
	Number of WASH training modules developed from consultancy.		• 4 WASH training modules developed from consultancy.	• 4 WASH training modules developed from consultancy.	Training modules.		
	Number of training sessions conducted on WRM.		• 2 trainings sessions conducted on WRM.	• 4 trainings sessions conducted on WRM.	Trainings reports.		
	Number of local advisory committee established.		• 1 local advisory committee established.	• 1 local advisory committee established.	Member records, field visits, meetings reports.		

	Number of extension agents trained.		• 10 extension agents trained	• 20 extension agents trained.	Training reports.		within their communities and institutions. • Communities will be receptive to training on water and sanitation health (WASH) and water resource management. • Local and national authorities will support the efforts to strengthen institutional capacities and community engagement in water management.
Outcome 1.2: Access to irrigation and potable water for target communities is enhanced	Nbr. Of irrigation systems installed.	0 (for all)	• At least 1 infrastructure irrigation systems and wastewater network improved.	• At least 3 infrastructure irrigation systems and wastewater network improved.	M&E reports.	OSS and DRC.	Risk: • Adverse environmental conditions, such as droughts or flooding, could impact the effectiveness of irrigation systems and water supply reliability. • Low community engagement or resistance to adopting new water access solutions may hinder the effectiveness of implemented projects. • Inequitable distribution of water resources may lead to conflicts or dissatisfaction among different community groups. Assumption: • The infrastructure will be designed and constructed effectively to meet the needs of target communities and withstand environmental challenges. • Effective stakeholder engagement and communication strategies will ensure broad community support and equitable access to enhanced irrigation and potable water resources.
	% of improvement in irrigation efficiency.		• At least 50% improvement in irrigation efficiency as measured by water usage data and crop yield reports within 1 year of system installation.	• At least 80% improvement in irrigation efficiency as measured by water usage data and crop yield reports of system installation.			
	% of reduction in reliance on non-renewable energy sources for irrigation and a measurable decrease in operational costs.		• At least 5% reduction in reliance on non-renewable energy sources for irrigation and a measurable decrease in operational costs.	• At least 15% reduction in reliance on non-renewable energy sources for irrigation and a measurable decrease in operational costs.			
	% of improvement in regional water management practices as a result of integrating low salinity wastewater use.		• At least 10% improvement in regional water management practices as a result of integrating low salinity wastewater use.	• At least 25% improvement in regional water management practices as a result of integrating low salinity wastewater use.			
	% of wells and/or boreholes showing improved monitoring and maintenance practices based on new systems.		• At least 30% of wells and/or boreholes showing improved monitoring and maintenance practices based on new systems.	• At least 75% of wells and/or boreholes showing improved monitoring and maintenance practices based on new systems.			

Output 1.2.1: Increased irrigation water access and use in the target communities	Number of irrigation systems and wastewater network improved.	0 (for all)	• 1 infrastructure irrigation systems and wastewater network improved.	• 4 infrastructures irrigation systems and wastewater network improved.	Report, before and after photos, field visits, operational status.	OSS and DRC.	Risks: • Challenges in the installation and maintenance of solar-powered irrigation systems and infrastructure upgrades due to technical limitations or lack of skilled labour. • Poor coordination in the construction and enhancement of irrigation and wastewater systems may cause delays and inefficiencies. • Limited access to necessary materials and equipment, particularly in remote areas, may slow down implementation. • Weak institutional support for the operation and maintenance of enhanced infrastructure or solar-powered systems may lead to sustainability challenges. • Fragmented coordination between different stakeholders, including government agencies, may impede progress. Assumptions: • Adequate funding and resources will be available for infrastructure upgrades, the establishment of solar-powered systems, and capacity-building efforts. • Farmers and local communities will be willing to adopt new irrigation techniques and utilize low-salinity agricultural wastewater for irrigation. • Necessary technical expertise and equipment will be accessible to ensure the proper implementation and maintenance of irrigation systems and wastewater networks. • Coordination and support from relevant governmental and non-governmental institutions will be consistent throughout the project. • Environmental safeguards will be effectively implemented to prevent any adverse effects from using low-salinity wastewater for irrigation.
	• Length of existing irrigation channels modernized. • Length of wastewater drain networks repaired or upgraded. • Length of new drainage infrastructure installed		• 5 kilometres of existing irrigation channels modernized • 10 kilometres of wastewater drain networks repaired or upgraded. • 5 kilometres new drainage infrastructure installed.	• 20 kilometres of existing irrigation channels modernized • 25 kilometres of wastewater drain networks repaired or upgraded. • 15 kilometres new drainage infrastructure installed	Reports, before and after photos, field visits, operational status.		
	• Number of viable sites for solar-powered irrigation systems identified. • Number of small-scale solar-powered irrigation systems installed.		• 4 viable sites for solar-powered irrigation systems identified. • 2 small-scale solar-powered irrigation systems installed.	• 4 viable sites for solar-powered irrigation systems identified. • 6 small-scale solar-powered irrigation systems installed.	Sites selection report, criteria, community feedback, site viability assessments, installation completion reports, photos, field visits.		
	Number of practical demonstrations held to showcase the application of irrigation management techniques.		• 2 practical demonstrations held.	• 4 practical demonstrations held.	Demonstration reports, including participant feedback, demonstration outcomes.		
	Number of micro treatment systems installed for utilizing low salinity wastewater.		• 2 micro treatment systems installed.	• 2 micro treatment systems installed.	Installation reports, including site-specific details, operational status.		

Output 1.2.2: Increased access to potable water among the target communities (20 women)	Number of consultancy report assessing the most viable water solutions.	0 (for all)	• 1 consultancy report assessing the most viable water solutions. • 1 validation workshop	• 1 consultancy report assessing the most viable water solutions. • 1 validation workshop	Viable water solutions report.	OSS and DRC.	Risks: • Poorly implemented well-management systems may result in inefficient water usage and resource depletion. • Technical challenges in establishing or updating water collection models (e.g., drilling boreholes) could cause delays or failures. • Changes in groundwater levels or contamination of water sources may undermine the viability of identified water solutions and well-management systems. • Unpredictable climate events (e.g., droughts) could affect the long-term sustainability of water collection systems. • Potential conflicts within communities over access to communal water resources (wells, boreholes) may disrupt project outcomes. • Resistance from local communities to adopt new well-management practices due to traditional water usage habits. • Weak coordination between local institutions, communities, and water management authorities may hinder the effective implementation of well-management systems. • Lack of capacity within local institutions to manage and maintain water collection infrastructure effectively. Assumptions: • Reliable data will be available to support accurate assessments and identification of viable water solutions. • Adequate funding and resources will be provided for establishing/updating water collection models and implementing well-management systems. • Local communities will be willing to cooperate and adopt new water management practices. • Environmental conditions will remain stable enough to support the long-term
	Number of communal wells and/or boreholes constructed or updated as per the established models.		• 1 communal well and/or 1 borehole constructed or updated.	• 2 communal wells and/or 2 boreholes constructed or updated.	Construction completion reports for each system, including site details, construction methods, operations, functionality tests, user feedback.		
	Number of comprehensive protocols for well-management systems, covering monitoring, maintenance schedule, and resource allocation.		• 1 comprehensive protocol for well-management systems, covering monitoring, maintenance schedule, and resource allocation.	• 1 comprehensive protocol for well-management systems, covering monitoring, maintenance schedule, and resource allocation.	Protocol report.		

							viability of water solutions and collection systems. • Local institutions will have the capacity and willingness to manage and maintain the new infrastructure and systems effectively.
Component 2: Enhancing Resilience of Siwa Oasis Ecosystems to Climate Change Impacts							
Outcome 2.1: Operationalized Sustainable Land Management	% of improvement in agricultural productivity indicators (e.g., crop yields) from demonstration plots applying agro-sylvo-pastoral compared to traditional practices.	0 (for all)	• At least 12% improvement in agricultural productivity indicators (e.g., crop yields) from demonstration plots compared to traditional practices.	• At least 30% improvement in agricultural productivity indicators (e.g., crop yields) from demonstration plots compared to traditional practices.	M&E reports.	OSS and DRC.	Risks: • Inadequate implementation of water resource management strategies due to limited technical expertise or insufficient data. • Delays or challenges in training and capacity-building activities may hinder the development of effective water management practices. Assumptions: • Effective communication and stakeholder engagement strategies will facilitate broad support and adoption of enhanced water management practices. • Effective communication and stakeholder engagement strategies will facilitate broad support and adoption of enhanced water management practices.
	Amount (tons/litres) of bio-compost and bio-pesticides introduced and used by farmers.		• At least 20 tons of bio-compost and 3,000 litres of bio-pesticides introduced and used by farmers.	• At least 40 tons of bio-compost and 8,000 litres of bio-pesticides introduced and used by farmers.			
	No. of farmers in target areas adopting bio-compost and bio-pesticides as their primary inputs for soil fertility and crop protection.		• At least 200 farmers in target areas adopting bio-compost and bio-pesticides as their primary inputs for soil fertility and crop protection.	• At least 900 farmers in target areas adopting bio-compost and bio-pesticides as their primary inputs for soil fertility and crop protection.			
	% of reduction in environmental degradation indicators (e.g., soil degradation, water contamination) in areas where bio-compost and bio-pesticides are widely used.		• At least 5% reduction in environmental degradation indicators (e.g., soil degradation, water contamination) in areas where bio-compost and bio-pesticides are widely used.	• At least 30% reduction in environmental degradation indicators (e.g., soil degradation, water contamination) in areas where bio-compost and bio-pesticides are widely used.			

Output 2.1.1: Climate resilient Agricultural practices are adopted.	Number of Community Adaptation Action Plans (CAAPs) developed.	0 (for all)	• 3 Community Adaptation Action Plans (CAAPs) developed. • 3 stakeholder engagements for CAAPs. • 1 Validation workshop	• 3 Community Adaptation Action Plans (CAAPs) developed. • 3 stakeholder engagements for CAAPs. • 1 Validation workshop.	CAAPs development and validation workshop reports, participants list.	OSS and DRC.	Risks: • Challenges in developing effective and context-specific Community Adaptation Action Plans due to limited data or expertise. • Inefficient management of demonstration plots may lead to poor adoption of best practices by farmers. • Difficulty in integrating agro-sylvo-pastoral practices due to a lack of technical knowledge or resistance to changing traditional farming methods. • Production and use of bio-compost and bio-pesticides may be hindered by inadequate knowledge, infrastructure, or inconsistent quality. • Soil degradation or water scarcity may reduce the effectiveness of bio-compost and bio-pesticide usage. Assumptions: • Local communities and stakeholders will actively participate in developing and implementing adaptation action plans. • Adequate funding and resources will be available for setting up demonstration plots and promoting agro-sylvo-pastoral practices and bio-compost production. • Farmers and communities will be willing to adopt new practices, recognizing the long-term benefits for sustainability and resilience. • Environmental conditions will remain conducive to the success of demonstration plots and agro-sylvo-pastoral practices. • Local institutions will provide the necessary support for managing demonstration plots and promoting sustainable agricultural practices effectively.
	Number of demonstration plot sites selected and approved.		• 3 demonstration plot sites selected and approved.	• 3 demonstration plot sites selected and approved.	Sites selection reports. .		
	Number of sites selected for agro-sylvo-pastoral practices.		• 8 sites selected for agro-sylvo-pastoral practices.	• 8 sites selected for agro-sylvo-pastoral practices.			
	Number of training sessions conducted on agro-sylvo-pastoral practices.		• 3 training sessions conducted on agro-sylvo-pastoral practices. • 150 farmers participated.	• 6 training sessions conducted on agro-sylvo-pastoral practices. • 300 farmers participated.	Training session materials, attendance records, and training feedback reports.		
	Number of agro-sylvo-pastoral systems fully established, integrating trees, crops, and livestock production.		• 5 agro-sylvo-pastoral systems fully established, integrating trees, crops, and livestock production.	• 8 agro-sylvo-pastoral systems fully established, integrating trees, crops, and livestock production.	Reports of operational agro-sylvo-pastoral systems.		
	Number of community bio-compost and bio-pesticide production units fully operational and producing organic inputs.		• 4 community bio-compost and bio-pesticide production units fully operational and producing organic inputs. • Atleast 400 farmers received 20 tons bio-compost and 3,000 litres of bio-pesticides.	• 8 community bio-compost and bio-pesticide production units fully operational and producing organic inputs. • Atleast. 900 farmers received 50 tons of bio-compost and 10,000 litres of bio-pesticides.	Establishment reports, distribution records, lists of recipients, quantities distributed.		
Output 2.1.2: Sustained	Number of CAIC established/upgraded.	0 (for all)	• 3 CAICs established/upgraded.	• 3 CAICs established/upgraded.	Sites selection reports, site visits.	OSS and DRC.	Risks:

Green belts developed.	Number of farmers clubs established for SLM application.		• 3 farmers clubs established for SLM application each with 25-30 members. • 3 training and capacity building sessions conducted on SLM practices. • 300 participants trained on SLM practices.	• 3 farmers clubs established for SLM application each with 25-30 members. • 6 training and capacity building sessions conducted on SLM practices. • 300 participants trained on SLM practices.	Farmers clubs reports, including membership details, club locations, training materials, attendance records.		• Difficulty in identifying and mobilizing farmers for Farmers Clubs, which may hinder the application of sustainable land management (SLM) practices. • Ineffective management of community tree nurseries could result in low survival rates of seedlings and insufficient stock for green belt initiatives. • Insufficient resources or technical knowledge may limit the effectiveness of green belts in stabilizing sand dunes. • Poor implementation of soil stabilization and enrichment techniques may lead to suboptimal improvements in agricultural productivity. • Unpredictable climate conditions, such as extreme heat or drought, may negatively impact the success of tree nurseries, green belts, and soil stabilization efforts. <u>Assumptions:</u> • Adequate funding and technical resources will be available to establish and sustain Climate Adaptation and Innovation Centers, Farmers Clubs, tree nurseries, and green belts. • Farmers and communities will be willing to participate in SLM practices, tree nursery management, and green belt establishment, recognizing the long-term benefits for land productivity and climate resilience. • Local institutions will have the capacity and commitment to support these activities and ensure their successful implementation and sustainability. • Environmental conditions will be conducive to the success of tree nurseries, green belts, and soil stabilization efforts. • Strong stakeholder coordination will be maintained to ensure the effective implementation of these integrated
	Number of nurseries established.		• 1 nursery established.	• 3 nurseries established.	Nursery setup reports, including infrastructure, equipment, and initial seedling production.		
	Number of training sessions conducted on nursery management and seedling production. Number of community members trained on nursery management and seedling production.		• 2 training sessions conducted. • 150 community members trained.	• 3 training sessions conducted. • 300 community members.	Training reports, including participant lists, training materials, and feedback from attendees.		
	Number of reports for sites selection and methods for SDM.		• 1 report for sites selection and methods for SDM.	• 1 report for sites selection and methods for SDM.	Selection report.		
	Length in kilometres of mechanical barriers established. Length in kilometres of green belts. Area in hectares of agricultural and community land protected.		• 30 km of mechanical barriers established. • 80 km of biological green belts established. • 150 hectares of agricultural and community land protected.	• 30 km of mechanical barriers established. • 80 km of biological green belts established. • 150 hectares of agricultural and community land protected.	Report on the establishment of green belts, sand movement including maps, infrastructure data, and impact assessments on sand dune stabilization.		
	Area in hectares of agricultural land using contour ploughing, mulching, and other soil stabilization techniques.		• 1 report for soil stabilization and enrichment techniques. • 250 hectares of agricultural land using contour ploughing,	• 1 report for soil stabilization and enrichment techniques. • 250 hectares of agricultural land using contour ploughing,	Report on the expansion of soil stabilization practices, including impact assessments on crop yields and		

			mulching, and other soil stabilization techniques.	mulching, and other soil stabilization techniques.	soil health improvements.		climate adaptation and agricultural productivity initiatives.
Component 3: Diversifying Livelihoods through IGAs and Value Chain Addition							
Outcome 3.1: Promoted Climate-Resilient Livelihoods	% of reduction in livestock mortality rates in project areas due to improved access to veterinary services.	0 (for all)	• At least 12% reduction in livestock mortality rates in project areas due to improved access to veterinary services.	• At least 30% reduction in livestock mortality rates in project areas due to improved access to veterinary services.	M&E reports.	OSS and DRC.	Risks: • Unanticipated costs related to program implementation or resource procurement may impact the overall effectiveness of the initiatives. • Adverse environmental conditions, such as extreme weather events or long-term climate changes, may undermine the effectiveness of promoted livelihood practices. Assumptions: • Adequate funding and resources will be available to support the promotion and implementation of climate-resilient livelihood practices. • Communities and stakeholders will actively participate in and support the adoption of new climate-resilient practices. • Training and resources will be effectively provided to ensure successful implementation and scaling of livelihood practices.
	% of increase in the population of selected short-cycle livestock species within the project areas.		• At least 20% increase in the population of selected short-cycle livestock species within the project areas.	• At least 50% increase in the population of selected short-cycle livestock species within the project areas.			
	% of livestock in breeding centers show improved traits such as higher growth rates and disease resistance.			• At least 50% of livestock in breeding centers show improved traits such as higher growth rates and disease resistance.			
	% of livestock populations exhibit improved genetics in terms of growth rates and reproductive performance.			• At least 25% of livestock populations exhibit improved genetics in terms of growth rates and reproductive performance.			
	Area in hectares established of sustainable fodder cultivation areas.		• Atleast 200 hectares of sustainable fodder cultivation areas established.	• Atleast 500 hectares of sustainable fodder cultivation areas established.			
	Nbr. of participating farmers adopt sustainable practices like silage making and hay production.		• At least 150 farmers adopt sustainable practices like silage making and hay production.	• At least 270 farmers adopt sustainable practices like silage making and hay production.			
Output 3.1.1: Improved livestock production practices adopted.	Number of upgraded mobile veterinary units.	0 (for all)	• 2 upgraded mobile veterinary units.	• 2 upgraded mobile veterinary units.	Upgraded mobile veterinary units reports, field visits.	OSS and DRC.	Risks: • Challenges in promoting short-cycle livestock production due to limited knowledge, availability of breeds, or access to inputs like feed and veterinary care. • Resistance from farmers to adopt new livestock management practices or short-cycle livestock production due to
	Number of farmers and community members benefiting from veterinary services.		• 300 farmers and community members benefiting from veterinary services.	• 300 farmers and community members benefiting from veterinary services.	Impact report detailing the reach, services provided.		

	Number of extension agents trained on pasture management and community veterinarians.		• 40 extension agents and community veterinarians trained.	• 40 extension agents and community veterinarians trained.	Training session reports, including participant details and training materials distributed.		cultural preferences or traditional methods. • Conflicts over access to veterinary services, resources for livestock production, or pastureland within communities. <u>Assumptions:</u> • Adequate funding and resources will be available to support the expansion of veterinary services, promotion of short-cycle livestock, and enhancement of livestock and pasture management systems. • Farmers and communities will be willing to adopt new practices in livestock production and management, recognizing the long-term benefits for productivity and sustainability. • Local institutions will have the capacity and commitment to support and sustain these activities, including ensuring the availability of veterinary services and pasture management support. • Environmental conditions will remain conducive to the health and productivity of livestock and the sustainability of pasture systems. • Effective stakeholder coordination and community engagement will facilitate the successful implementation of these integrated livestock management activities.
	Number of breeding centers established.		• 2 breeding centers established.	• 2 breeding centers established.	Establishment report, initial operations of breeding centers, including infrastructure, equipment, and staff training.		
	Number of livestock owners trained in breeding techniques and livestock management.		• 20 livestock owners trained in breeding techniques and livestock management.	• 50 livestock owners trained in breeding techniques and livestock management.	Documentation of training sessions, including participant numbers, topics covered, and feedback.		
	Number of breeding programs implemented to improve livestock genetics.		• 1 breeding program implemented.	• 1 breeding program implemented.	Breeding program.		
	Number of rotational grazing systems set up to prevent overgrazing and soil erosion.		• At least 5 rotational grazing systems set up.	• At least 5 rotational grazing systems set up.	Implementation report.		
Output 3.1.2: Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs)	Number of business plans developed for community members or groups engaging in alternative IGAs.	0 (for all)	• 7 business plans developed for community members or groups engaging in alternative IGAs.	• 15 business plans developed for community members or groups engaging in alternative IGAs.	Number of detailed business plans completed and approved for alternative IGAs.	OSS and DRC.	<u>Risks:</u> • Challenges in establishing and managing revolving fund schemes with a gender focus, such as limited financial literacy or mismanagement of funds. • Difficulties in forming and sustaining Savings and Credit Cooperative Societies (SACCOs) for ecotourism
	Number of mentorship programs implemented, providing ongoing guidance.		• 2 mentorship programs implemented.	• 2 mentorship programs implemented.	Mentorship reports including participant details.		

	Number of revolving fund scheme framework developed with a focus on women and youth IGAs.		• 1 revolving fund scheme framework developed with a focus on women and youth IGAs.	• 1 revolving fund scheme framework developed with a focus on women and youth IGAs.	Framework document outlining fund management, eligibility criteria, and loan terms completed.		ventures due to a lack of organizational capacity or limited initial capital. • Ineffective market linkages and value chain development could hinder communities from accessing markets, reducing the profitability of their IGAs. • Resistance to adopting alternative IGAs due to cultural preferences, traditional livelihood methods, or perceived risks associated with new ventures. • Gender biases or exclusion in revolving fund schemes and SACCO participation may undermine the intended inclusivity and empowerment focus. <u>Assumptions:</u> • Adequate funding, technical expertise, and resources will be available to support the successful establishment of IGAs, revolving fund schemes, and SACCOs. • Communities, including women, will be willing to participate in alternative IGAs, revolving fund schemes, and market linkage initiatives, recognizing the long-term benefits for income diversification and economic resilience. • Local institutions and stakeholders will provide the necessary support for SACCO formation, fund management, and value chain development to ensure the sustainability of these initiatives. • Environmental conditions will remain conducive to the success of key IGAs such as beekeeping and ecotourism. • Effective coordination between community groups, private sector actors, and government agencies will enable the development and scaling of market linkages and value chains.
	Number of loans disbursed to women and youth entrepreneurs in sectors such as artisan crafts, beauty products, and palm leaf processing.			• 100 loans disbursed to women and youth entrepreneurs in sectors such as artisan crafts, beauty products, and palm leaf processing.	Loan disbursement records and gender/youth beneficiary tracking.		
	Number of SACCOs established and legally registered for eco-tourism ventures in the Siwa community.			• 6 legally registered SACCOs for eco-tourism ventures in the Siwa community.	Legal registration documents and establishment records for each SACCO.		
	Number of eco-tourism ventures supported through SACCO loans and financial services			• 50 eco-tourism ventures supported through SACCO loans and financial services	Business support records and impact assessments on eco-tourism ventures.		
	Number of market linkage agreements signed with private sector partners to facilitate community access to wider markets.			• 5 market linkage agreements signed with private sector partners to facilitate community access to wider markets.	Signed agreements		
	Number of marketing campaigns conducted to promote community products and services in both local and regional markets.			• 3 marketing campaigns conducted to promote community products and services in both local and regional markets.	Marketing campaign reports, reach statistics, and feedback from consumers.		
Component 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts							
Outcome 4.1: Promoted CC Awareness &	Nbr. of households informed and trained on CC adaptation	0 (for all)	• At least 900 households informed and trained on CC adaptation	• At least 1900 households informed	Project implementation report, field visits,	OSS and DRC.	<u>Risks:</u> • Miscommunication or misunderstandings about climate

Knowledge at local, national and international levels				and trained on CC adaptation	M&E reports, interviews with smallholder farmers and community leaders.		change issues may reduce the effectiveness of the awareness efforts. Assumptions: • Effective communication strategies and materials will be developed and well-received by the target audiences. • Communities will be open to learning about and engaging with climate change issues.
Output 4.1.1: Improved understanding of stakeholders to integrate CC into Planning Processes.	Number of comprehensive baseline, CNA and KAP assessments conducted	0 (for all)	• 1 Comprehensive baseline • 1 Capacity needs assessment • 1 KAPs	• 1 Comprehensive baseline • 1 Capacity needs assessment • 2 KAPs	Report, training and capacity-building plan, list of participants, field visits, survey, photos.	OSS and DRC.	Risks: • Insufficient consideration of local languages and cultural contexts in communication materials could reduce their accessibility and impact. • Challenges in monitoring and evaluating the impact of communication efforts and capacity-building programs may limit the ability to assess their effectiveness. Assumptions: • Sufficient funding and resources will be available to conduct the baseline survey, capacity-building activities, and communication efforts as planned. • Stakeholders at all levels, including local communities, institutions, and national and international actors, will actively engage in the assessment, capacity-building, and knowledge-sharing processes. • The capacity-building activities will effectively enhance the knowledge and skills of extension services in climate change adaptation and water
	Number of comprehensive communication strategy developed.		• 1 comprehensive communication strategy developed.	• 1 comprehensive communication strategy developed.	Communication strategy report		

	• Number of conferences and workshops held for result sharing. • Number of online dissemination activities conducted		• 1 results sharing forums. • 1 webinar conducted.	• 4 results sharing forums. • 4 webinars conducted to disseminate the results for a wider audience	Conferences, workshops and webinars reports.		management planning, resulting in improved implementation at the community level. • The communication strategy and materials will be appropriately designed to meet the needs of diverse stakeholders, ensuring effective dissemination of information and engagement. • Project results and lessons learned will be successfully shared and integrated into local, national, and international planning processes, contributing to the mainstreaming of new approaches in climate change adaptation and water management.
Output 4.1.2: Raised Community Awareness on CC adaptation	Number of detailed training plan and modules developed for CBT.	0 (for all)	• 1 detailed training plan. • 6 training modules.	• 1 detailed training plan. • 6 training modules.	Workshop and training reports, training plan, training modules, participants records, campaign plan and materials, photos.	OSS and DRC.	<u>Risks:</u> • Community resistance or low engagement in training programs and campaigns could hinder the adoption of climate-resilient livelihood practices and the overall success of the project. • Inequitable access to training and resources, particularly among vulnerable groups, could exacerbate existing inequalities and limit the effectiveness of capacity-building efforts. • Training materials and community campaigns may fail to resonate with local communities if they are not culturally sensitive or tailored to local contexts. • Language barriers or lack of effective communication strategies could impede the dissemination of
	Number of training sessions conducted for CAIC staff.		• 2 training sessions conducted.	• 6 training sessions conducted.			

	Number of workshops organized for local authorities and community members.		• 2 workshops organized for local authorities and community members.	• 4 workshops organized for local authorities and community members.			information during training sessions and campaigns. <u>Assumptions:</u> • Sufficient resources and expertise will be available to develop high-quality training materials and conduct effective training and capacity-building programs. • Communities and CSOs will actively participate in training sessions and campaigns, recognizing the benefits of adopting climate-resilient livelihood practices and improving water and health management. • Local institutions and stakeholders will provide strong support and coordination, ensuring the successful management of CAICs and the sustainability of the training and campaign initiatives. • Community campaigns will be designed to be culturally sensitive and contextually relevant, ensuring high levels of engagement and awareness on climate change, water, and health issues. • Adequate funding will be secured to support the development, implementation, and scaling of training programs, capacity-building activities, and community campaigns.
	Number of comprehensive campaign plan		• 1 comprehensive campaign plan and production of all materials.	• 1 comprehensive campaign plan and production of all materials.			
	Number of comprehensive reports on existing solutions and a strategic plan for ecotourism development.		• 1 comprehensive report.	• 1 comprehensive report.			

Adaptation Fund Core Indicators for the CCAILSO Project

The Adaption Fund Core Indicators will be monitored for the project as per below and based on the excel with in-depth numbers annex 6 related to the AF core indicators and related to table 24 on the results framework

Table 25: Core indicators of the CCAILSO Project

	Baseline	Target at project completion
Direct beneficiaries supported by the project	0	**9,695**
Female direct beneficiaries	0	1,939 (20%)
Youth direct beneficiaries	0	3,394 (35%)
Indirect beneficiaries supported by the project	0	**17,150**
Female indirect beneficiaries	0	5,145 (30%)
Youth indirect beneficiaries	0	6,860 (40%)
	Baseline	**Target at project approval**
Sector Climate change adaptation actions		
Targeted Asset 1) Health and Social Infrastructure *(developed/improved)* i) *IGAs* ii) *Provision of Small competitive grants* 2) Physical asset *(produced/improved/strengthened)* *i) Innovative water harvesting and storage infrastructure produced* *ii) Mini-irrigation and delivery system produced* *iii) Water wells improved* **iv)** *Groundwater sources improved* **v)** *Agrosilvopastoral system improved* **vi)** *Climate smart agricultural infrastructure*	0	Refer to the result framework
Changes in Asset *(Quantitative or qualitative depending on the asset)* **1)** Health and Social Infrastructure *(developed/improved)* **2)** *IGAs developed and credits provided* *2*) Physical asset *(produced/improved/strengthened)* i) Innovative water harvesting and storage infrastructure produced ii) Mini-irrigation and delivery system produced iii) Water wells improved iv) Groundwater sources improved **v)** Agro-silvopastoral system improved vi) Climate smart agricultural infrastructure produced	Management of Groundwater and Wells: Overexploitation, pollution, lack of local management. Management of wastewater infrastructure Obsolete, non-functional, lack of local management. Strengthening Water Management Bodies: Weak local governance, usage conflicts. Management plans: Outdated plans, climate impact not considered.	Management of Groundwater and Wells: Enhanced protection, sustainable management by communities, improved water quality. Management of wastewater infrastructure: Upgraded canals, establishment of new canals, sustainable management by communities Establishment of CAICs model water and agriculture systems for demonstration. CSA improved and managed: Establishment of Farmers Clubs (FCs), Strengthening Water Management Bodies: Establishment of Water Users Organizations (WUAs), better collective management, reduced conflicts. Management Plans: Updated plans incorporating climate change, sustainable management, enhanced biodiversity protection. Community Adaptation Action plans (CAAPs) developed at local level

	Rehabilitation of Livestock and Grazing Areas: Land degradation, overgrazing, user conflicts. Access to Veterinary Services and Agricultural Technologies: Limited access, traditional practices, climate vulnerability.	Rehabilitation of Livestock and Grazing Areas: Rehabilitated corridors and grazing areas, sustainable management, conflict reduction. Access to Veterinary Services and Agricultural Technologies: Improved access to veterinary services, adoption of smart agricultural technologies, better resilience and food security.
	Baseline	**Target at project completion**
Household income targets: i) Total number of households ii) Number of households with increase in income	 0 0	 1939 1939
Number of households iii) Total number of households targeted with trainings and adaptation action	0	1939

F. Alignment with Results Framework of the Adaptation Fund

Table 26 : CCAILSO alignment with AF results Framework

Project Objective(s)[19]	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Enhance the resilience of the Siwa ecosystem and improve local livelihoods by promoting sustainable water and soil management, boosting agricultural production, and supporting ecotourism in response to climate change impacts.	• Nbr of WUA members improved governance practices and decision-making processes within their associations.	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2.1. Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased	**215,000**
	• Nbr of households of targeted communities practicing climate change adaptation resilience.	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses 3.2. Percentage of targeted population applying appropriate adaptation responses	**641,549**
	• % of improvement in water quality. • % of improvement in irrigation efficiency.	Outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	4.1. Responsiveness of development sector services to evolving needs from changing and variable climate 4.2. Physical infrastructure improved to withstand climate change and variability-induced stress	**2,029,000**
	• % of reduction in environmental degradation indicators (e.g., soil degradation, water contamination) in areas where bio-compost and bio-pesticides are widely used.	Outcome 5: Increased ecosystem resilience in response to climate change and variabilityinduced stress	Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	**1,150,000**

[19] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

	• Nbr of loans disbursed to women and youth entrepreneurs in sectors such as artisan crafts, beauty products, and palm leaf processing.	Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure access to livelihood assets 6.2. Percentage of targeted population with sustained climate-resilient alternative livelihoods	**1,120,000**
	• % of improvement in water management practices	Outcome 7: Improved policies and regulations that promote and enforce resilience measures	7. Climate change priorities are integrated into national development strategy	**150,000**
	• Nbr of viable sites for solar-powered irrigation systems identified. • Nbr of small-scale solar-powered irrigation systems installed.	Outcome 8: Support the development and diffusion of innovative adaptation practices, tools and technologies	8. Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level.	**1,470,000**
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Component 1: Improving Water Resource Access and Management				
Outcome 1.1: Enhanced Water Resource Management Capacity	• % reduction in water-related conflicts within WUAs. • Number of local advisory committee established. • Number of extension agents trained.	Output 2.1: Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender)	**125,000**
	• Number of status report of surface and groundwater resources • Number of training sessions conducted on WRM.	Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.1 No. of technical committees/associations formed to ensure transfer of knowledge 3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	**40,000**
	• WRMP document developed or updated based on findings from the assessments • Number of status report of surface and groundwater resources	Output 7: Improved integration of climate-resilience strategies into country development plans	7.1. No. of policies introduced or adjusted to address climate change risks (by sector)	**150,000**
	• Number of WASH training modules developed from consultancy.	Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	**50,000**
Outcome 1.2 Access to irrigation and potable water for target communities is enhanced	• Number of irrigation systems and wastewater network improved. • Number of communal wells and/or boreholes	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate	4.1.1. No. and type of development sector services modified to respond to new conditions resulting from climate variability and change (by sector and scale)	**1,210,000**

	constructed or updated as per the established models.	change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	
	• Number of comprehensive protocols for well-management systems, covering monitoring, maintenance schedule, and resource allocation.	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1.No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies	**490,000**
	• Number of micro treatment systems installed for utilizing low salinity wastewater.	Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	**310,000**
Component 2: Enhancing Resilience of Siwa Oasis Ecosystems to Climate Change Impacts				
Outcome 2.1: Concrete adaptation measures under Sustainable Land Management (SLM) Practices are operationalized	• Number of CAIC established/upgraded. • Number of training sessions conducted on agro-sylvo-pastoral practices.	Output 2.1: Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender) 2.1.2 No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)	**335,000**
	• Length in kilometres of mechanical barriers established. • Length in kilometres of green belts. • Area in hectares of agricultural and community land protected.	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	**530,000**
	• Area in hectares of agricultural land using contour ploughing, mulching, and other soil stabilization techniques. • Number of agro-sylvo-pastoral systems fully established, integrating trees, crops, and livestock production.	Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	5.1. No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	**600,000**
	• Number of training sessions conducted on nursery management and seedling production. • Number of community members trained on nursery management and seedling production.	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1.No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies 6.2.1. Type of income sources for households generated under climate	**300,000**

	• Number of community bio-compost and bio-pesticide production units fully operational and producing organic inputs.		change scenario	
Component 3: Diversifying Livelihoods through IGAs and Value Chain Addition				
Outcome 3.1: Long-term climate resilient livelihoods are promoted	• Number of livestock owners trained in breeding techniques and livestock management. • Number of business plans developed for community members or groups engaging in alternative IGAs. • Number of revolving fund scheme framework developed with a focus on women and youth IGAs. • Number of loans disbursed to women and youth entrepreneurs in sectors such as artisan crafts, beauty products, and palm leaf processing.	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1.No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies 6.2.1. Type of income sources for households generated under climate change scenario	**1,120,000**
	• Number of upgraded mobile veterinary units. • Number of farmers and community members benefiting from veterinary services. • Number of breeding centers established	Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	**874,000**
Component 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts				
Outcome 4.1: Knowledge and awareness of CC impacts at local, national and international levels is promoted.	• Number of workshops organized for local authorities and community members • Number of training sessions conducted for CAIC staff.	Output 2.1: Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender) 2.1.2 No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)	**341,549**
	• Number of detailed training plan and modules developed for CBT. • Number of comprehensive communication strategy developed. • Number of comprehensive communication strategy developed.	Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	**300,000**

G. Detailed budget

Table 27 : CCAILSO project detailed budget breakdown

Outcome/Output/Activity	Year 1	Year 2	Year3	year 4	Budget (USD)	Budget Notes
Component 1: Improving Water Resource Access and Management					**2,375,000.00**	
Outcome 1.1: Enhanced Water Resource Management Capacity					**365,000**	
Output 1.1.1: Developed/updated water resources management plans	**84,000.00**	**47,000.00**	**19,000.00**	**-**	**150,000.00**	
Activity 1.1.1.1: Assessing and Identifying the Status of Surface and Groundwater Resources in Target Areas	54,000				54,000	Consultancy @40,000 Support technicians @10,000, Related costs @4,000
Activity 1.1.1.2: Elaborating/Updating Water Resources Management Plan	30,000	10,000			40,000	Consultancy @ 20,000 Stakeholder engagements and consultations @16,000 Related costs @4,000
Activity 1.1.1.3: Enhancing the Capacity of National, Sub-national, and Local Institutions in Water Resources Management		37,000	19,000		56,000	4 trainings and workshops @32,000 Printing of resource materials and tools @5,000 Equipment @15,000 Related costs @4,000 M&E will be included from the M&E budget
Output 1.1.2: Strengthened water resources management in target communities.	**85,000**	**99,000**	**30,500**		**215,000**	
Activity 1.1.2.1: Identify and enhance institutional capacities of Water Users Associations (WUAs)		53,500	21,500		75,000	4 Training and Capacity Building workshops @32,000 (4*8,000/workshop) for 1 year Establishment of WUA @40,000 Related costs @3,000 M&E will be included from the M&E budget
Activity 1.1.2.2: Develop Water and Sanitation Health training modules.	50,000				50,000	Consultancy for developing training plans and modules @30,000 + 5,000 related costs 1 Validation workshop @10,000 Related costs @5,000
Activity 1.1.2.3: Strengthen communities' capacity to manage water resources.	35,000	45,500	9,000		90,000	4 trainings @32,000 for 2 years 4 meetings to establishment of 1 local advisory committee @3,750/meeting for 2 years Tools and resources @ 20,000 Awareness campaigns @ 5,000/year for 3 years Related costs @8,000
Outcome 1.2: Access to irrigation and potable water for target communities is enhanced					**2,010,000**	
Output 1.2.1: Increased irrigation water access and use in the target communities	**45,000**	**822,000**	**405,000**	**198,000**	**1,470,000**	
Activity 1.2.1.1: Promoting and Enhancing the Irrigation Infrastructure System and Wastewater Drain Network		340,000	220,000	150,000	710,000	Cost of Infrastructure Upgrades and plans @600,000 (irrigation systems @300,000 + Wastewater network @300,000) 2 demonstration workshops @10,000 (5,000/workshop) 3 meetings @5,000/year for 3 years O&M @45,000 M&E @35,000 Related costs @5,000
Activity 1.2.1.2: Establishing Solar-Powered Small-Scale Irrigation Systems	45,000	320,000	115,000	20,000	500,000	2 meetings @10,000 (5,000/meeting) Expert consultancy @ 40,000 Equipment and installation @400,000 O&M @ 35,000 M&E @10,000 Related costs @5,000
Activity 1.2.1.3: Capacity Building for Farmers on Irrigation Network Management		20,000	20,000	20,000	60,000	4 Training sessions @30,000 for 2 years (7,500/training) Technical Assistance and exchange visits @25,000 Related costs @5,000
Activity 1.2.1.4: Promoting the Use of Low Salinity Agricultural Wastewater		142,000	50,000	8,000	200,000	2 workshops @9,000 (4500/workshop) Infrastructure for treatment and storage @126,000 Equipment @50,000 Related costs @5,000 M&E @10,000
Output 1.2.2: Increased access to potable water among the target communities (20% women)	**160,000**	**230,000**	**130,000**	**20,000**	**540,000**	
Activity 1.2.2.1: Assessing and Identifying the Most Viable Water Solutions	50,000				50,000	Consultancy for studies @40,000 Validation workshop @10,000

Activity 1.2.2.2: Establishing/Updating Models for Water Collection for Human Consumption (Communal Wells and Boreholes)		120,000	110,000	10,000	240,000	Enumerators @10,000 (2 boreholes, 2 communal wells) Infrastructure development @ 210,000 O&M @10,000/year for 2 years M&E will be included from the M&E budget
Activity 1.2.2.3: Developing and Implementing Well-Management Systems	110,000	110,000	20,000	10,000	250,000	Enumerators @20,000 Infrastructure development @ 200,000 O&M @10,000/year for 3 years M&E will be included from the M&E budget
Component 2: Enhancing Resilience of Siwa Oasis Ecosystems to Climate Change Impacts					**1,765,000**	
Outcome 2.1: Operationalized Sustainable Land Management					**1,765,000**	
Output 2.1.1: Climate resilient Agricultural practices are adopted.	275,000	542,500	242,500	90,000	1,150,000	
Activity 2.1.1.1: Developing Community Adaptation Action Plans	50,000				50,000	Consultancy @20,000 3 Consultative Workshops @5,000 each 1 validation workshop @ 10,000 Edit and printing of CAAPs @5,000
Activity 2.1.1.2: Setting Up, Procuring Inputs, and Managing Demonstration Plots	200,000	265,000	55,000	30,000	550,000	Planning and Site Selection @50,000 Procurement of Inputs @220,000 3 Demonstration Plots @150,000 Management and Maintenance @100,000 Training and Capacity Building @30,000 M&E will be included from the M&E budget
Activity 2.1.1.3: Promoting Agro-sylvo-pastoral Practices (Integration of Trees and Crops with Livestock Production)		117,500	112,500	20,000	250,000	3 consultative workshops @15,000 (5,000/workshop) Procurement of Inputs @100,000 Establishment of Agro-sylvo-pastoral Systems @85,000 6 Training and Capacity Building @30,000 (5,000/training) O&M @10,000/year for 2 years M&E will be included from the M&E budget
Activity 2.1.1.4: Promoting Production and Use of Bio-Compost and Bio-Pesticides	25,000	160,000	75,000	40,000	300,000	Enumerators @ 20,000 3 workshops @15,000 (5,000/workshop) Procurement of Inputs and Equipment @155,000 3 trainings @ 15,000 (5,000/training) 3 onsite demonstration @45,000 Production and Distribution @50,000 (25,000/year) 2 years M&E will be included from the M&E budget
Output 2.1.2: Sustained Green belts developed.	**283,000**	**191,500**	**110,500**	**30,000**	**615,000**	
Activity 2.1.2.1: Establishing Climate Adaptation and Innovation Centers	107,000	31,000	1,000	1,000	140,000	Cost of upgrading main CAIC @36,000 Establishing/ upgrading 2 CAICs @30,000 (15,000/CAIC) Equipment & IT (climate monitoring equipment, computers& softwares, essential lab equipment for research and innovation, vehicles, motorbikes...) @ 70,000 Materials and supplies @1000/year for 4 years
Activity 2.1.2.2: Identifying/Establishing Farmers Clubs for Concrete SLM Application	30,000	32,500	2,500	5,000	70,000	6 Training and Capacity Building @30,000 (5,000/training) 3 Establishment of Farmers Clubs @30,000 Monitoring and Evaluation @5,000 Related costs @5,000
Activity 2.1.2.3: Establishing Community Tree Nurseries	45,000	66,000	8,000	6,000	125,000	3 meetings for community owned site selection @4,000/meeting 1 Main Nursery at CAIC @8,000 2 Community Nurseries @10,000 (5000/nursery) Procurement of viable seedlings @36,000 Procurement of equipment and inputs @35,000 3 Training and Capacity Building @15,000 (5,000/training) O&M @1,000/nursery/year for 3 years
Activity 2.1.2.4: Establishing Green Belts for the Stabilization of Sand Dune Movements (Mechanical and Biological)	81,000	22,000	59,000	18,000	180,000	Enumerators @ 10,000 3 Community consultations for Site Selection @12,000 (4,000/consultation) Materials for Mechanical Methods @80,000 Biological Methods @60,000 2 Training @8,000 (4,000/training) O&M @10,000 M&E will be included from the M&E budget
Activity 2.1.2.5: Introducing Soil Stabilization and Enrichment Techniques to Promote Agricultural Productivity	20,000	40,000	40,000		100,000	Enumerators @8,000 3 Community consultations for Site Selection @12,000 (4,000/consultation) Inputs and Equipment @40,000 Implementation of Soil Stabilization Techniques @40,000 M&E will be included from the M&E budget

Component 3: Diversifying Livelihoods through IGAs and Value Chain Addition					**1,120,000**	
Outcome 3.1: Promoted Climate-Resilient Livelihoods					**1,120,000**	
Output 3.1.1: Improved livestock production practices adopted.	**160,000**	**336,000**	**271,000**	**107,000**	**874,000**	
Activity 3.1.1.1: Supporting Access to Veterinary Services for Farmers and Communities	160,000	56,000	62,000	17,000	295,000	Cost of enhancing/upgrading 2 veterinary units @110,000 O&M of units @20,000 for 3 years Veterinary supplies and equipment @125,000 for 3 years Training of extension workers @10,000 for the first two years Related costs @10,000/year for 3 years
Activity 3.1.1.2: Promoting Production of Short-Cycle Livestock		210,000	99,000	60,000	369,000	Cost of establishing/upgrading 2 breeding centres @110,000. Cost of buying SCL breeds @220,000 for 3 years Cost of training &technical support@39,000 for 2 years
Activity 3.1.1.3: Enhancing Livestock and Pasture Management Systems (Breeding, Fodder, etc.)		70,000	110,000	30,000	210,000	Breeding Programs and Genetic Improvement @40,000 1 Training and Extension Services @10,000 Implement rotational grazing systems (design/ establish plans, fencing and infrastructure @40,000 Pasture rehabilitation @45,000 Supply of improved forage species @25,000 Sustainable fodder cultivation @25,000 Equipment and materials for fodder preservation @25,000 M&E will be included from the M&E budget
Output 3.1.2: Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs)	**63,750**	**355,000**	**388,000**	**313,250**	**1,120,000**	
Activity 3.1.2.1: Support business planning for alternative IGAs (Beekeeping, Ecotourism, Zero grazing, Handcrafts, etc...):	63,750		55,000	31,250	150,000	Consultancy for developing business model canvases, market analysis and plan development @ 40,000 stakeholder engagement @20,000 2 Training and capacity building @ 8750/ training for 2 years 2 mentoring programmes @ 20,000 Toolkits and starter kits @ 42,500 2 meeting with financial institutions @ 5,000/meeting
Activity 3.1.2.2: Establish revolving fund schemes for IGAs with a gender focus		190,000	200,000	180,000	570,000	Initial capital to support viable IGAs businesses for 3 years
Activity 3.1.2.3: Establish and support savings and credit co-operative society (SACCO) for Eco-tourism ventures		65,000	30,000	5,000	100,000	Initial Setup and Legal Framework for 6 savings groups @40,000 Capital for 6 SACCO establishment @50,000 M&E @ 10,000
Activity 3.1.2.4: Develop/upscale value chain market linkages for communities with key stakeholders and the private sector		100,000	103,000	97,000	300,000	6 meetings for Stakeholder Identification and Mapping @36,000 (6,000/meeting) 5 workshops @85,000 (17,000/workshop) Market linkage development @ 79,000 (5 agreements, 5 initiatives) Equipment and tools @40,000 3 marketing campaigns @10,000/campaign 1 set of promotional materials (includes brochures, flyers, and social media content) @30,000
Component 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts					**641,549**	
Outcome 4.1: Promoted CC Awareness & Knowledge at local, national and international levels					**641,549**	
Output 4.1.1: Improved understanding of stakeholders to integrate CC into Planning Processes.	**115,000**	**60,000**	**60,000**	**65,000**	**300,000**	
Activity 4.1.1.1: Conduct Baseline, Capacity Needs Assessment, and KAP Survey of All Stakeholders	75,000			25,000	100,000	Consultancy with team for baseline, CNA&KAP (@55,000 + support technicians @10,000) + 10,000 related costs, Follow up KAP at end of project @15,000 + related costs 10,000
Activity 4.1.1.2: Capacity Building for Extension Services on Climate Change Adaptation and water management Planning		30,000	20,000	10,000	60,000	
Activity 4.1.1.3: Design and develop communication strategy and action plan	40,000				40,000	Consultancy (Design and Development of Communication Strategy) @ 20,000 Creation of Supporting Materials @ 10,000 1 validation workshop @ 10,000
Activity 4.1.1.4: Disseminate project results and share lessons learned with national and international stakeholders, mainstreaming new approaches in local and regional planning		30,000	40,000	30,000	100,000	Development of Dissemination Materials @30,000 Conferences and Workshops @80,000 Online Dissemination and Webinars @ 10,000
Output 4.1.2: Raised Community Awareness on CC adaptation	**45,000**	**200,000**	**40,000**	**57,049**	**341,549**	
Activity 4.1.2.1: Develop training materials to support Community-Based Trainers (CBT)		60,000			60,000	Consultancy for developing training materials and modules, @20,000 + 10,000 related costs Design and Printing of Training Materials @10,000 Disseminate materials in local context @20,000

Activity 4.1.2.2: Enhance the institutional capacities to manage the CAICs.		30,000		30,000	60,000	6 Training Modules Development @2,500/module 4 training sessions @3,000/session Training materials @5,000 6 CVA & adaptation planning workshops @3,000/workshop Related costs @10,000
Activity 4.1.2.3: Train community beneficiaries and CSOs on climate resilient livelihood practices.	10,000	20,000	20,000	10,000	60,000	Enumerators @ 14,000 4 Community and CSO workshops @4,000/workshop Materials and equipment @10,000 4 Practical training @5,000/training
Activity 4.1.2.4: Conduct community campaigns on CC/water/health.	10,000	30,000	20,000	10,000	70,000	Campaign development plan (Material Development - flyers, posters, brochures- 5 Educational Videos/ Radio Program, Digital Campaigns…) @ 20,000 Translation and localization of materials @5,000 10 community workshops/ seminars @ 15,000 5 school programs @ 15,000 Equipment @ 15,000
Activity 4.1.2.5: Conduct inclusive planning and capacity building for community-based Ecotourism.	25,000	60,000		7,049	91,549	Consultancy @15,000 Validation workshop @ 10,000 2 workshops for selection and training @10,000 (5,000/workshop) Trainers @ 10,000 Materials and tools at 40,000 Related costs @ 7,049
Project Execution Cost (EE)	**150,000.00**	**150,000.00**	**150,000.00**	**150,000.00**	**600,000**	
Project Inception and launch	20,000					
Project coordination and Management Fees	50,000	70,000	70,000	70,000		
Operating costs	30,000	15,000	18,000	8,000		
Equipment	15,000	3,000				
Audit	2,000	2,000	2,000	2,000		
Monitoring and Evaluation	33,000	60,000	60,000	70,000		
Total Project Cost	**1,315,750.00**	**2,883,000.00**	**1,696,500.00**	**880,299.00**	**6,775,549**	
Project Cycle Management Fee (IE)	**174,000.00**	**150,451.00**	**150,000.00**	**150,000.00**	**624,451**	
Project coordination and Management Fees: Project management, Reporting, Outreach and knowledge sharing	**80000**	**77000**	**77000**	**79000**		Implementation and Coordination Management Fees: salaries and fees of experts in charge of the project for planning, daily management, reporting, communication& KM, project cycle management…
Operating costs	**20000**	**20000**	**20000**	**20000**		Assessment, supervision and travel expenses for monitoring: Costs of supervision missions, participation in steering committee meetings, and participation in workshops, M&E…
Equipment including infrastructure	**20000**	**2000**	**0**	**0**		Costs associated with the provision of equipment to the secretariat including computers, associated peripherals and monitoring tools Printing, photocopying, telecoms and other costs related to office operations…
Evaluations and Audit	**4000**	**14000**	**4000**	**14000**		External audits, Project completion, mid-term and final evaluation…
Fiduciary aspects	**50000**	**37,451**	**49000**	**37000**		Administration, finance, accountability, procurement, legal, financial management and quality insurance…
Amount of Financing Requested	**1,639,750.00**	**3,183,451.00**	**1,996,500.00**	**1,180,299.00**	**8,000,000**	

H. Disbursement schedule with time-bound milestones

Table 28 : Disbursement schedule with time-bound milestones

	Upon Agreement signature ($)	End of Y 1 ($)	End of Y 2 ($)	End of Y 3 ($)	Totals
Scheduled date	*January,2025*	*January,2026*	*January,2027*	*January,2028*	
Project Funds	1,465,750	3,033,000	1,846,500	1,030,299	**7,375,549**
Implementing Entity Fee	174,000	150,451	150,000	150,000	**624,451**
Totals	**1,639,750**	**3,183,451**	**1,996,500**	**1,180,299**	**8,000,000**

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government

Eng. Sherif Abdel Rehim, Head of the Central Department for Climate Change Egyptian Environmental Affairs Agency Ministry of Environment Egpyt	Date*: April 24th, 2024*

B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans of the Government of Egypt and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy and the Gender Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.

Mr. Nabil BEN KHATRA *– Executive Secretary of the Sahara and Sahel Observatory (OSS) as the Implementing Entity Coordinator*

Date: *February 9th,2025*	Tel.: +216 71 206 633 Email: nabil.benkhatra@oss.org.tn; boc@oss.org.tn

Project Contact Person: **Mrs. Khaoula JAOUI**

Tel.: +216 71 206 633
Email: Khaoula.jaoui@oss.org.tn

ANNEXES

1. Annex 1: Endorsement Letter

ADAPTATION FUI

Letter of Endorsement by Government

[of Egypt]

[23/4/2024]

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: afbsec@adaptation-fund.org
Fax: 202 522 3240/5

Subject: Endorsement for [Climate Change Adaptation to improve livelihoods in Siwa Oasis, CCAILSO]

In my capacity as designated authority for the Adaptation Fund in [Egypt], I confirm that (Climate Change Adaptation to improve livelihoods in Siwa Oasis, CCAILSO) project's proposal is in accordance with the government's national climate change strategy 2050 and Egypt vision for sustainable development 2030, priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Siwa Oasis, Egypt. The estimated cost of the mentioned project is (8 million USD).

Accordingly, I am pleased to endorse the above - mentioned project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the accredited Entity [Sahara and Sahel Observatory (OSS)] and executed by Ministry of Agriculture and Land Reclamation (Desert Research Center, Ministry of Environment.

Sincerely,

Mr. Sherif Abdel Rehim
Head of the Central Department for Climate Change
Egyptian Environmental Affairs Agency
Ministry of Environment

2. Annex 2: Gender Assessment and Action Plan

Rationale for the Gender Assessment

The purpose of this document is to make a diagnosis with a particular focus on drafting up a framework for the design and implementation of a gender-focused ***"Climate Change Adaption to improve livelihood in Siwa Oasis -CCAILSO"*** project that is in line with the Adaptation Fund´s own Gender Policy. The Siwa Oasis have fully endorsed the project due to current challenges in their area and have expressed support to undertake the proposed interventions. Understanding the different needs and capacities of women and men is critical to effective project implementation. It is against this background that a gender analysis was conducted to analyse the gender group differences in terms of their vulnerability, roles and responsibilities as well as challenges and opportunities; mitigate or gender mainstream into project activities and draw a gender-based action plan for project implementation. An overview of the main Gender-focused regulatory and socio-economic issues in Siwa Oasis is presented in this document. The information presented pertains to the gender situation in the Siwa and highlights the situation to as far as the proposed project site whenever access to relevant data makes it possible. Furthermore, the key problems that women have to tackle with in the four countries regarding climate change, and drought management are highlighted.

Methodology

The gender analysis was conducted using Participatory Rural Appraisal tools and techniques in 6 community consultative meetings/PRA sessions in the proposed project sites. The main purpose of these public consultation sessions was to seek the beneficiaries' points of view and to collect information for a better design of the project with a focus on involving vulnerable groups, farmers, women, NGO's and youth. This participatory approach aimed at ensuring effective representation of the project beneficiaries during preparation and planning stage; learning about the concerns of all stakeholders, including vulnerable groups (women, youth and men) in the design and implementation of the project as well as exchanging views on the financing and sustainability of the project. Women's presence at the consultation workshops helped to enrich the debate about challenges of women including access and income generating activity problems. Key Informant Interviews (KIIs) were also conducted with a total of 35 local leaders in the Siwa Oasis in which the project will be implemented. Other key informants were engaged during and after the workshop sessions. These methods were further supported by telephone interviews where possible. Therefore, although the data collected may not be statistically representative given the fact that the participants were few, the qualitative primary and secondary data gathered presents a reliable analysis and incorporation of the emanating gender issues into the proposed regional project

Findings of the Gender Assessment

Overall, in the climate change context, the role of women and other vulnerable groups in natural resources management is still limited. This results from the socio-cultural, economic and political constraints that impede the full participation of women and vulnerable groups in adaptation and mitigation measures against climate change aggravated impacts of drought in the proposed project sites. A gender assessment was undertaken in order to understand the differences and similarities in women and men's vulnerability to climate change and drought, their adaptive capacities in the face of climate change as well as their roles and participation in climate change and drought risk management measures that could be incorporated in the CCAILSO project. The assessment further revealed that huge inequality differences between men and women as presented in subsequent sections of this report.

The Demographic distribution of the population in Siwa

Table number (26) shows that the city of Siwa holds the largest share of the oasis population, representing approximately 74.94%. It is followed by Maraki, Aghurmi, Bahi El-Din, Abu Shuruf, and Umm El-Saghir, with percentages of about 8.7%, 6.96%, 4.8%, 2.5%, and 2.1%, respectively.

Table 29 : The relative importance of the population distribution in the cities and villages of Siwa Center in 2023-2024

Item	Number of households	%	Number of males	% Of village population	Number of females	% Of village population	Population	%
Siwa	4488.6	73.4	14574	53.2	12835	46.82	27409	74.9
Aghurmi	480.4	7.85	1276	50.2	1270	49.88	2546	6.96
Abu Shroff	151	2.46	487	52.9	432	47	919	2.51
Om Elsagheer	155.48	2.54	350	45.7	415	54.24	765	2.09

Al-maraqi	474.43	7.75	1711	53.7	1477	46.33	3188	8.72
Bahauddin	368.85	6	901	51.5	847	48.45	1748	4.78
Total	6118.8	100	19299	52.8	17275	47.23	36575	100

Source: Matrouh governorate, information and Decision Support Center, 2023-2024 .

As also shown in table number (1), the total population of the oasis is approximately 36.5 thousand people. Of these, 17.2 thousand are females, representing about 47.2% of the total population of Siwa Oasis. The number of males is about 19.3 thousand, representing approximately 52.8% of the total population of Siwa, for the year 2023-2024[20]. As illustrates the relative importance of the distribution of families across the villages in the Siwa district. It shows that 73.4% of the families reside in the city of Siwa, due to the concentration of government offices, services, and commercial markets there, compared to the other villages. Additionally, it is the largest area of old family settlements, with soil suitable for agriculture, among other factors that attract settlement. Following Siwa in the distribution are Maraki, Aghurmi, Bahi El-Din, Abu Shuruf, and Umm El-Saghir, with percentages of approximately 7.9%, 7.8%, 6%, 2.5%, and 2.5%, respectively. The table shown the indicates a higher percentage of females compared to male, which shows that the percentage of females is higher than that of males in all the villages except for Bahi El-Din. The number of females in the cities and villages of Siwa, Aghurmi, Abu Shuruf, Al-Jarah (Umm El-Saghir), and Maraki is approximately 11,061; 1,016; 698; 385; and 1,517, respectively, representing about 51.8%, 53.7%, 54.6%, 52.2%, and 51.9%, respectively. Meanwhile, the number of females in Bahi El-Din is lower than the number of males, constituting about 47.1% during the year 2022-2023. The table also illustrates the significant concentration of both genders in the Siwa district, indicating a greater opportunity for diversity in economic activities for both males and females. This concentration suggests that both genders are more likely to be influenced by the cultural integration occurring in the city, due to the variety of activities available, including commercial, tourist, service, marketing, and industrial sectors. This diversity makes it intriguing to delve deeper into gender studies in this city, considering how such diversity impacts the economic life of both genders in the Siwa Oasis.

Education in Siwa

Table number (27) shows that the total number of schools in Siwa is approximately 51, all equipped with computers. The total number of classrooms is 259, with about 8.4 thousand students enrolled. The highest percentage of students is in urban areas, representing about 76.7%, while rural areas account for about 23.8%. Females make up 73.8% of the student population in urban areas and 26.1% in rural areas, indicating lower educational opportunities in villages far from the city of Siwa. Additionally, the number of female teachers working in urban areas is around 54, compared to about 7 female teachers in rural areas.

Table 30 : Distribution of educational services in Siwa Center for 2023

Item	Urban	%	Rural	%	Total
Number of schools (school)	35	68.62	16	31.37	51
Number of chapters (Chapter)	194	74.9	65	25.1	259
Number of male pupils (pupil)	3764	79.06	997	20.94	4761
Number of female students (female student)	2732	73.83	968	26.16	3700
Total number of students	6496	76.77	1965	23.22	8461
Number of male teachers (teacher)	195	76.17	61	23.83	256
Number of female teachers (school)	54	88.52	7	11.47	61
Total number of teachers	249	78.54	68	21.45	317
Number of schools with a computer (school)	35	68.62	16	31.37	51

Source: Matrouh governorate, information and Decision Support Center, 2023-2024.

Table number (28) outlines the distribution of educational services in general education across the cities and villages of Siwa and its impact on female illiteracy and educational deprivation. It shows that while primary and preparatory schools are available in all villages and cities, basic and general secondary schools, as well as technical schools, are only found in the city of Siwa. This results in a deprivation of these types of education for females, as parents are reluctant to send their daughters to schools outside their immediate areas and often prefer early marriage for them. The same applies to Al-Azhar education, which is only available in the city of Siwa.

[20]Human Development Report, UNDP, 2007 in Aguilar, L., 2009

Moreover, literacy classes are scarce, with only one class in Siwa and two in the village of Maraki, while other villages have no literacy classes. This contributes to the prevalence of female illiteracy in these villages.

As for kindergartens, there are only three in the city of Siwa and one in Aghurmi, with none in the other villages. This situation reflects the role of women in providing comprehensive childcare at the preschool age, as it is difficult for mothers to leave their homes to take their children to kindergartens. Consequently, childcare has become a primary daily task for women in the villages of Umm El-Saghir, Maraki, Bahi El-Din, and Abu Shuruf.

Table 31 : Distribution of educational services in general education across the cities and villages of Siwa

Education Type	School	Siwa	Om Elsagheer	Al-maraqi	Bahauddin	Abu Shroff	Aghurmi	Total
General Education	One Classroom	0	0	1	0	1	0	2
	Primary	12	1	1	1	1	2	18
	Middle / Preparatory	7	1	1	1	1	1	12
	Basic School	3	0	0	0	0	0	3
	High / Secondary	1	0	0	0	0	0	1
	Technical High School	3	0	0	0	0	0	3
AL azhar Education	Primary	5	0	1	0	1	1	8
	Middle /Preparatory	3	0	0	0	0	0	3
	High / Secondary	2	0	0	0	0	0	2
	Readings	1	0	0	0	0	0	1
Other	Special needs	1	0	0	0	0	0	1
	Kindergartens	7	0	0	0	0	0	7
	Literacy classes	1	0	2	0	0	0	3
	Home baby	3	0	0	0	0	1	4

Literacy

The table number (29) shows that the number of males enrolled in literacy classes is higher than that of females, with no literacy classes available in the villages of Bahi El-Din and Umm El-Saghir (Al-Jarah), and no female attendance in literacy classes in the city of Siwa. The total number of individuals enrolled in literacy classes in the Siwa Oasis is approximately 81, with males making up about 51.9% and females about 48.1% of the total enrolees. This indicates that women's participation in eliminating illiteracy remains weak.

Table 32 : Number of enrolments in literacy classes in the city and villages of Siwa center during the year 2022-2023.

Item	Siwa	Aghurmi	Abu Shroff	Al-maraqi	Total	%
Males	13	11	5	13	42	51.9
Females	0	6	12	21	39	48.1
Total	13	17	17	34	81	100

Source: Matrouh governorate, Siwa center and City, Information and Decision Support Center, 2022-2023.

Demographic and Social Characteristics:

Age: Table number (30) shows that 27.8% of the sample is under 35 years old, approximately 52.8% are in the 35-45 age group, and only 19.4% are aged 45 and above.

Table 33 : Distribution of the sample according to the age of the subjects

Age Categories	Relative frequency
Less than 35	27.8
35-45	52.8
45 - 55	19.4
Total	100

Source: collected and calculated from the field study questionnaire 2024.

Educational Level of the Participants: Table number (31) reveals that the highest percentage of individuals in the sample have obtained basic education (which includes primary and preparatory education), accounting for approximately 52%. This is followed closely by the illiterate group, comprising

about 16% of the sample. Those with intermediate education qualifications constitute about 2.8% of the sample. There are no participants with university qualifications due to mothers' fear for their daughters' safety, as Marsa Matrouh, which is 360 km away from Siwa, poses risks.

Table 34 : Distribution of the sample according to the educational level of the subject

Categories	frequency	Relative frequency
Illiteracy	16	44.4
Basic education	19	52.8
Intermediate qualification	1	2.8
Total	36	100

Source: collected and calculated from the field study questionnaire 2024.

Reasons for Girls Not Completing University Education:

Table number (32) illustrates that one of the reasons for girls not completing university education is the distance from Siwa Oasis to the nearest university in Marsa Matrouh, which is about 300 km away. This reason accounts for approximately 50% of the opinions. Additionally, fear and concern of parents about allowing their daughters to leave due to customs and traditions represent about 33.3%. The least percentage, about 16.6%, is attributed to the girls' lack of desire for university education. These reasons hinder women's ability to adapt to the negative effects of climate change.

Table 35 : Relative importance of the reasons why girls do not complete university education

Reason	%
Distance and the lack of a university in the center of Siwa	50
Girls do not want to complete university education	16.6
Fear for girls from going out for university education (Customs and traditions)	33.3
Total	**100**

Source: collected and calculated from the field study questionnaire 2024.

4.3.3 Social Status of the Participants:

Table number (33) shows that the highest percentage of the research participants are married women, representing approximately 61.1% of the participants. Following them, divorced women represent the second-largest group, comprising 19.4%. Next are single women, representing 16.7%, and widows represent the smallest group, comprising about 2.8%.

Table 36 : Distribution of the sample according to the social status of the respondents

Categories	Frequency	Relative frequency%
Married	22	61.1
Separate	7	19.4
Widow	1	2.8
Single	6	16.7
Total	36	100

Source: collected and calculated from the field study questionnaire 2024.

Number of Children:

Table number (34) indicates that the highest proportion of the research participants have around 6 children, representing approximately 19.4%. Following them, about 5 children are the second-largest group, representing 13.1%. In the third position, approximately 4 children are reported by the participants, representing about 11.1%. The increase in the number of children in families reflects reproductive health and fertility, and their association with social norms in the gender dynamics in the Siwa Oasis. Furthermore, illustrates that the proportion of male children among the participants' offspring is the highest, representing approximately 51.7%, while the proportion of female children among the participants' offspring is 48.3%.

Table 37 : Number of children among the women studied

of Number children	frequency	Relative frequency %
1	3	8.3
2	2	5.6

3	3	8.3
4	5	13.9
5	4	11.1
6	7	19.4
7	2	5.6
8	1	2.8
no sons	9	25
Total	36	100

Source: collected and calculated from the field study questionnaire 2024.

4.3.4. Cultural Openness:

Table (35) shows the distribution of participants across these categories. The research results showed that the values expressing the degree of cultural openness among the research participants ranged from 0 to 15. The participants were classified into three categories based on the numerical values indicating their degree of cultural openness: High cultural openness: 5.6%, - Medium cultural openness: 38.9%, - Low cultural openness: 55.5%

Table 38 : Relative importance of an authority to control the direction of household spending

Categories	**%**
Men	80.6
women	19.4
Total	100

Source: collected and calculated from the field study questionnaire 2024.

From the above, it is evident that the vast majority of the research participants (94.4%) fall into the categories of medium and low cultural openness. This indicates the marginalization of these participants in rural development, necessitating intensive efforts to raise awareness and educate them so they become more capable of coping with the risks and threats of climate change affecting the region.

4.3.5 Regarding readiness for change,

The data showed that the values expressing the participants' readiness for change ranged from 0 to 8. Participants were classified into three categories based on their readiness for change:

- Low readiness for change: 52.8%
- Medium readiness for change: 44.4%
- High readiness for change: 2.8%

Table (11) illustrates the distribution of participants across these categories. From the above, it is evident that 97.2% of the research participants have low to medium readiness for change. This could be attributed to the prevalence of illiteracy and the low living standards of the majority of participants, making them more hesitant to embrace new ideas that address climate change.

Table (11): Relative importance of women's desire for economic participation in Siwa Oasis

Desire	**%**
They have the desire	83.3
They haven't desire	16.7
Total	100

Source: collected and calculated from the field study questionnaire 2024.

4.3.6. Regarding ambition levels,

The data indicated that the values expressing the level of ambition ranged from 2 to 19. Participants were classified into three categories based on the numerical values representing their level of ambition:

- Low ambition: 18.69%
- Medium ambition: 70.09%
- High ambition: 11.21%

Table (12) presents the distribution of participants across these categories.

Table (12): Relative importance of women's preference for their workplace in Siwa Oasis

Place of work	**%**
Prefer to work at home	80.6

Don't prefer to work at home	19.4
Total	100

Source: collected and calculated from the field study questionnaire 2024.

From the above, it is evident that 94.5% of the research participants exhibit low to medium levels of ambition. This can be interpreted in the context of their cultural and geographical isolation, as well as the continued influence of customs and traditions on their behaviour and aspirations. This represents one of the obstacles hindering women in Siwa from adapting to the negative impacts of climate change.

4.4.7 Regarding general

Regarding general awareness, the data revealed that the numerical values expressing this variable ranged from 0 to 18 degrees. Participants were classified into three categories according to their levels of general awareness:

-Low awareness: 50.0%, -Medium awareness: 47.2%, -High awareness: 2.8%

Table (13): Relative importance of women's work in handicrafts

Categories	**%**
Doing handicrafts at home	80.6
Don't do handicrafts at home	19.4
Total	100

Source: collected and calculated from the field study questionnaire 2024

Table (13) illustrates the distribution of participants across these categories. The preceding indicates that the majority of the respondents (97.2%) have low to moderate levels of awareness, reflecting a significant modesty in the overall awareness level of the respondents. This can be attributed to their limited exposure to various media outlets through which awareness of the different impacts of climate change is disseminated, and their relatively low openness to the outside world.

4.5 Social Relations According to Gender in Siwa Oasis:

4.5.1 Male Dominance and the Role of Women in Economic Participation in Siwa Oasis

Social relations between men and women are unequal in most societies, taking a gradual form, especially regarding the division of labour by gender in the household and formal work, as well as the practices they engage in other community activities. Gender relations in Siwa Oasis are based on the power derived from paternal authority in this tribal society and the social pressure exerted on females to maintain it. Gender is a socio-cultural concept that determines social relations and power between males and females, shaping their behaviour in society, the roles they play, social expectations, and cultural norms imposed on them according to the type of life. This significantly affects women's ability to access resources equally with men, making them more vulnerable to the negative effects of climate change economically, socially, and environmentally.

4.5.1.1 Male Dominance and Decision-Making Authority:

Power within the family is defined as the latent ability of one partner to influence the behaviour of the other, manifested in the ability to make influential decisions in the family's life. Men wield significant power not only within the family, especially with their wives and children, but also among all members of their tribe, referred to as the "tribal leader" or patriarch, where everyone must submit to his authority and decisions in many aspects of their lives, given the respect he commands. Male authority in Siwa focuses on determining social and economic relationships within the family. Research indicates that men's word is primary, and women do not dare to challenge or disagree with decisions made by men, stemming from religious commitment and obedience to their husbands. Data from Table (14) confirms that 80.6% of respondents stated that the husband controls the family budget. Women's economic role includes raising animals and poultry on the farm and utilizing their products in the production of farmer's ghee, farmer's cheese, and eggs, as well as manufacturing pickles and palm products. On the other hand, 19.4% of respondents have a role in controlling the budget and determining expenditure items, while the husband

is responsible for earning a living, leaving financial management, savings, and household affairs to the woman, while maintaining his social status and authority within the tribe.

Table (14) Relative Importance of Authority for Controlling Household Expenditure Categories:

Categories	%
Men	80.6
Women	19.4
Total	100

Source: Compiled and calculated from the 2024 field study survey

4.5.1.2 Economic Heritage of Both Genders:

When asked about women's employment during a visit by the research team, some men stated that women do not work in some tribes, while others accept their employment. Women in Siwa engage in weaving, carpet making, embroidery, and tailoring, only working when absolutely necessary. Customs and traditions dictate that women work inside the home, while fathers teach their sons farming, land service, date and olive harvesting, passing down their industry to their children. Women's significant contribution to all stages of agriculture is evident, especially in manual labour that requires patience and endurance, such as weaving, embroidery, tailoring, and handicrafts. Siwan women strive alongside their husbands in economic participation, taking various forms of work among both genders.

A - Characteristics of Women's Work Inside and Outside the Home:

Women work with the knowledge of men (whether father, husband, or brother), after obtaining their approval and ensuring that their work contributes to increasing the family income, covering expenses, and individual or family obligations. Some respondents expressed their desire to work to help prepare their daughters for marriage, pay off debts, or support their husbands financially. Some women work covertly at home to contribute to the family income, either through handicrafts, baking for others, sewing, making accessories, or manufacturing pickles, with their husbands helping to deliver the products to merchants or customers. The money they earn is given to their husbands, and wives are not allowed to work outside the home because it contradicts customs, traditions, and the husband's status within the tribe or family. Regarding women's desire for economic participation through starting their own projects to increase family income, Table (15) shows that approximately 83.3% of women in Siwa Oasis expressed interest in participating in small projects. This is a good indicator of women's desire for financial independence, supporting their ability to adapt to the negative effects of climate change, while about 16.7% of respondents were not interested in starting projects to increase their income or help with household expenses.

Table No. (15): Relative Importance of Women's Desire for Economic Participation in Siwa Oasis

Desire	%
Desire	**83.3**
Do not Desire	**16.7**
100	**Total**

Source: Compiled and calculated from the field study survey 2024

According to Table (16), approximately 80.6% of women prefer working from home in general. This preference can be attributed to combining work with family caregiving responsibilities for parents and children. Only about 19.4% of the respondents indicated a preference for working outside the home.

Table No. (16): Relative Importance of Women's Preference for Workplace Location in Siwa Oasis

Workplace Location	%
Prefer working from home	**%80.6**
Do not prefer working from home	**%19.4**
Total	**100**

Source: Compiled and calculated from the field study survey 2024

Regarding women's participation alongside men in the field of handicrafts, Table (17) indicates that approximately 80.6% of women engage in handicraft work at home. This also serves as a positive indicator of the ability of women in Siwa to pursue handicrafts with economic returns, enabling them to

adapt to the negative impacts of climate change. Meanwhile, around 19.4% of women do not engage in handicraft work at home.

Table No. (17): Relative Importance of Women's Engagement in Handicrafts

Categories	%
Engage in handicrafts at home	**80.6**
Do not engage in handicrafts at home	**19.4**
Total	**100**

Source: Compiled and calculated from the field study survey 2024

B. The Roles of Both Genders and Farming Work in Siwa Oasis

Women bear heavy burdens in facilitating their livelihoods alongside caring for their children, so they assist men in the production process. They help men in the village in cultivating dates and olives, which are the only two crops produced by the village, in addition to making palm frond products. They have been professionally involved in this since a young age, selling them to men outside the date and olive harvest season so they can come to the village with other needed goods.

Regarding women's participation in men's work in the fields (Al-Ghayt), Table (18) clarifies that 75% of women participate in men's work in the fields, while 25% do not work in the fields. Some of them do not own agricultural land. Women's work in the fields is considered a dual-purpose task. The first is assisting the father, husband, or brother during the olive or date harvest, and receiving a symbolic wage from the man as a financial reward for her during the harvest season. As for the second aspect, some women work and earn by collecting the fruits in exchange for each box collected. Consequently, women strive to achieve a daily target until the end of the harvest season. Likewise, men also work with them during this season. The harvest season is one of the most important times of the year for those seeking to increase their income. This is in addition to some handicrafts they do at home, which allows them to adapt to negative impacts and climate changes.

Table No. (18): Relative Importance of Women's Employment in Agriculture

Categories	%
Employment in agriculture	**%75**
Not employed in agriculture	**%25**
Total	**%100**

Source: Compiled and calculated from the field study survey 2024

C. The Relationship between Gender and Tourism in Siwa

Tourism in the Siwa Oasis has facilitated an openness to the outside world and the acquisition of new experiences, leading to some changes in the values and customs of the Siwan society. Additionally, modernity has influenced the community's access to modern means of communication, such as the internet, and a desire for social interaction. Globalization and other factors have also led to changes in some of their attitudes, albeit minimal, towards reconsidering gender inequality, especially concerning the husband's involvement in improving the family income and working alongside their wives on farms or engaging in household crafts. Moreover, women are now more inclined to work outside the home and exercise their political rights. However, there has been very little progress in granting other rights to Siwan women, such as leadership roles.

D. Gender Customs and Traditions in the Siwa Oasis

The customs and traditions of the Siwa Oasis differ from those of other inhabitants of the Western Desert in Egypt. The people of Siwa are keen on preserving their cultural heritage and ancestral rituals. Therefore, this study aims to identify the economic and social aspects of gender in the Siwan community, reflecting their identity, economy, culture, and social structure.

E. Notable Customs in the Siwa Oasis:

One of the prominent customs in the Siwa Oasis is the segregation of men and women in public spaces. Siwan customs do not permit women to go out unveiled, and married women wear a special garment called "Fouta al-Siwiyyin," covering them from head to toe. Single women wear headscarves or veils and rarely leave their homes alone, except for a few who attend university.

4.5.2. The Impact of Tourism on Traditional Gender Roles Perception

In recent times, some families have started to view tourism as a profitable and easy source of income. One of the men interviewed in Siwa believes that tourism is a lucrative source of income. With the advent

of tourism, various tourism-related jobs for men have emerged, such as naturalist tour guides, off-road vehicle drivers for travel, event coordinators, safari trip organizers, hotel reservation coordinators, hotel workers, eco-camp workers, and sand sculptors, among others. These opportunities have led some individuals to abandon traditional agricultural crafts for tourism. Previously, agriculture was an inherent and indispensable profession. Additionally, tourism played a significant role in encouraging men to pursue cooking as a profession.

Regarding women's involvement in tourism, the research team observed that some women engage in activities like sand sculpting and safaris specifically tailored for women. One of these women interviewed was from outside Siwa, seeking to improve her livelihood. They receive tourist groups, organize eco-camps, and perform tasks related to medical tourism, focusing mainly on sand sculpting, a job exclusively for women.

The research team also noticed that Siwan women working in handicrafts and artisanal products do not directly interact with tourists to showcase their products. Instead, male vendors in bazaars and exhibitions in the Shali area or intermediaries collect these products and market them for a nominal fee, exploiting some women.

Some men vehemently oppose women working in tourism, considering it a violation of tribal norms and traditions. However, generally, men in the oasis have begun to adapt to the features of modern tourism. They are focusing on improving reception methods, coordination, and changing lifestyles for some men in the tourism sector. Moreover, direct interaction with tourists from different nationalities visiting Siwa has led to a partial change in their culture. Some of them are beginning to accept the idea of unmarried girls working as long as they are of a suitable age.

1. *Gender vis-à-vis project activities*

This section provides information on the relationship between Gender and Climate Change as well as the impacts that droughts have on the proposed sites of the CCAILSO project. In addition, a description is of project-linked gender issues according to project components including drought Early Warning issues, capacity strengthening issues, issues with climate change adaptation actions and knowledge management issues.

Gender and Climate Change

Gender inequalities intersect with climate change-linked risks and vulnerabilities. Gender inequalities´ historical disadvantages, added to limited rights, limited access to resources and limited participation in decision-making processes make women highly vulnerable to climate change. Climate change is likely to aggravate the existing gender disadvantage patterns. Climate change-related initiatives are being deployed today at different levels; from the international to local level settings, going across regions and nations. As indicated in the preceding sections of this document, there is an ever- increasing awareness that climate change is a multi-sectoral development-linked problem. Until recently, climate change was being primarily thought of as an environmental problem, thus the Minister in Environment have full responsibility to address it. Whatever the sector and the (national, regional, or local) scope of planning, it is imperative that strategies are designed to ensure that measures taken in relation to climate change adaptations ensure full consideration of gender relations in order to foster equity and equality in whatever adaptation actions are to be implemented.

Gender Inequalities Intersect with Climate Change linked Risks and Vulnerabilities.

Climate change is not gender-neutral. Its impacts are felt differently by men and women, often exacerbating existing gender inequalities and creating new vulnerabilities. This intersection is particularly evident in places like Siwa Oasis, where traditional gender roles and limited access to resources for women amplify the risks posed by climate change.

Understanding the Intersection:

1. **Unequal Access to Resources and Opportunities:**
    - **Land Ownership:** In many societies, including Siwa, women have limited or no land ownership rights. This restricts their ability to adapt to climate change by diversifying crops, implementing sustainable land management practices, or accessing climate-resilient technologies.

- **Financial Resources:** Women often face barriers in accessing credit, loans, and financial services, hindering their ability to invest in climate adaptation measures or recover from climate-related losses.
- **Education and Information:** Limited access to education and information about climate change restricts women's understanding of the risks and their ability to participate in decision-making processes.

2. **Gendered Division of Labor and Responsibilities:**
   - **Water Collection and Management:** In Siwa, women are primarily responsible for collecting and managing water for household use. Climate change-induced water scarcity increases their workload and time spent on these tasks, limiting their time for education, income generation, or community engagement.
   - **Agricultural Labor:** Women play a crucial role in agriculture, often performing labour-intensive tasks. Climate change impacts on agriculture, such as reduced yields and increased pest outbreaks, increase their workload and threaten their livelihoods.
   - **Caregiving Roles:** Women are often responsible for caring for children, the elderly, and the sick. During climate related disasters, these responsibilities intensify, putting additional stress on women and limiting their ability to cope with the crisis.
3. **Social Norms and Cultural Practices:**
   - **Restricted Mobility:** Cultural norms in Siwa and other communities may restrict women's mobility, limiting their access to information, resources, and decision-making spaces related to climate change adaptation.
   - **Limited Decision-Making Power:** Women may be excluded from community decision-making processes, even though they are often most affected by climate change impacts.
   - **Gender Based Violence:** Climate change can exacerbate gender-based violence, as women and girls become more vulnerable during displacement, resource scarcity, and social disruption.

The Case of Siwa Oasis:

In Siwa, these intersecting vulnerabilities are evident:

- **Water Scarcity:** Women bear the brunt of water scarcity, spending more time and effort on water collection as resources dwindle due to climate change.
- **Agricultural Impacts:** Women's livelihoods are threatened by declining agricultural productivity, as climate change impacts date palm and olive yields, their primary sources of income.
- **Limited Participation:** Traditional gender roles and cultural norms restrict women's participation in decision-making processes related to water management and climate change adaptation.

Addressing the Intersection:

The CCAILSO project aims to address these intersecting vulnerabilities through:

- **Targeted Interventions:**
  - Improving women's access to water resources and sanitation facilities.
  - Promoting climate-resilient agricultural practices that benefit women farmers.
  - Supporting women's economic empowerment through IGAs and access to financial resources.
- **Gender-Sensitive Approach:**
  - Ensuring women's participation in project design, implementation, and monitoring.
  - Collecting and analysing gender-disaggregated data to understand the specific needs and vulnerabilities of women.

- Addressing cultural norms and promoting gender equality in all project activities.

Conclusion:

Climate change adaptation strategies must be gender sensitive to be effective. By recognizing and addressing the intersecting vulnerabilities of women, the CCAILSO project aims to build a more resilient and equitable Siwa Oasis for all.

Recommendations:

- Strengthen women's land and property rights.
- Increase women's access to financial resources and credit.
- Promote women's education and leadership in climate change adaptation.
- Challenge discriminatory social norms and cultural practices that limit women's opportunities.
- Integrate gender considerations into all climate change policies and programs.

By taking these steps, we can ensure that climate change adaptation efforts are inclusive and equitable, leaving no one behind.

Drought Early Warning and Gender Systems

Due to their social roles and different vulnerabilities in current productive and relational settings, men and women have different capacities and vulnerabilities in information dissemination. Therefore, disasters such as droughts affect them differently. In many contexts, men are better connected to early warning mechanisms, because they move in public spaces, and have access to diverse communication channels, informal community networks, and regularly interact with government officials. Women on the other hand to a higher proportion, have limited access to disaster risk-related information and knowledge in their communities, because their activities are more confined to homes and, therefore, have less mobility in the community, while their understanding of danger is focused on their homes and family networks. Women's voices are barely heard in risk reduction and decision-making processes, often because they do not have the capacity to attend awareness and prevention meetings because of their family-related obligations. The Inter- Governmental Panel on Climate Change (IPCC) is aware that, while women and girls have strengths and potentials as agents of change in actions to deal with climate change and in management of natural resources, these strengths are little recognized by society. In this particular case of Early Warning Systems, women should be recognized as key agents for information and response management. They are usually more informed of the needs and circumstances of family members, and can be vital in communication. The EWS planning activity should undertake affirmative actions to foster women´s involvement in the design and implementation of this system.

Planning and capacity-building activities

The CCAILSO project prioritizes gender equality as a core principle, recognizing that empowering women is essential for achieving sustainable climate change adaptation and improving livelihoods in Siwa Oasis. This section outlines the project's specific planning and capacity building strategies for promoting gender equality, ensuring that women are active participants and beneficiaries in building a more resilient oasis.

1. **Gender-Responsive Planning:**

- **Gender Analysis:** The project will conduct a comprehensive gender analysis during the full proposal development phase to understand the specific needs, roles, and vulnerabilities of women and men in relation to climate change impacts and adaptation strategies. This analysis will inform the design and implementation of all project activities.
- **Gender-Disaggregated Data:** The project will collect and analyze gender-disaggregated data throughout its lifecycle to track the participation and benefits of women in all project components. This data will be used to monitor progress towards gender equality goals and identify areas for improvement.

- **Gender-Responsive Budgeting:** The project will adopt a gender-responsive budgeting approach, allocating resources to activities that specifically address the needs and priorities of women. This will ensure that women benefit equitably from project interventions.
- **Gender-Sensitive Indicators:** The project's Results Framework will include gender-sensitive indicators to track progress towards gender equality outcomes. This will allow for ongoing monitoring and evaluation of the project's impact on women's empowerment.

2. **Capacity Building for Gender Equality:**

- **Targeted Training for Women:** The project will provide specialized training programs tailored to the needs of women in Siwa Oasis, focusing on:
  - **Climate-Resilient Agriculture:** Equipping women farmers with knowledge and skills in water-efficient irrigation, drought-tolerant crops, sustainable land management, and climate-smart agricultural practices.
  - **Income-Generating Activities (IGAs):** Enhancing women's skills in traditional handicrafts, ecotourism, and other income-generating activities, including business planning, marketing, and financial management.
  - **Leadership and Decision-Making:** Empowering women to participate in community decision-making processes related to climate change adaptation, water management, and resource allocation. This will include training in communication, negotiation, and advocacy skills.
- **Capacity Building for Institutions:** The project will work with local institutions, including WUAs, local councils, and government agencies, to:
    - Promote gender-sensitive policies and programs.
    - Increase women's representation in leadership positions.
    - Provide gender-responsive services to communities.
- **Engaging Men and Boys:** The project recognizes the importance of engaging men and boys in promoting gender equality. Activities will be designed to:
    - Raise awareness about gender roles and stereotypes.
    - Promote shared responsibilities in household chores and childcare.
    - Encourage men's support for women's participation in decision-making.

3. **Specific Activities for Gender Empowerment:**

- **Output 1.2.2:** Increased access to potable water among the target communities (20% women) - This output will directly benefit women by reducing their workload and time spent on water collection, freeing up time for other activities.
- **Activity 3.1.2.2:** Establish revolving fund schemes for IGAs with a gender focus - This activity will provide financial support specifically to women entrepreneurs, empowering them to start or expand their businesses.
- **Output 3.3.1:** Enhancing capacity of Siwan communities to facilitate public awareness and participation in planning and decision-making on climate-resilient livelihood practices in ecotourism - This output will ensure that women are actively involved in planning and decision-making processes related to climate change adaptation and ecotourism.

Conclusion:

The CCAILSO project's commitment to gender equality is reflected in its comprehensive planning and capacity building strategies. By empowering women and promoting their full participation, the project aims to build a more resilient and sustainable Siwa.

This activity involves setting up a Competitive Small Grant Scheme (CSGS) for undertaking innovative climate change adaptation interventions. The CSGS funds are aimed at supporting the populations facing risk in the project areas. Therefore, this activity is not focused on those areas most vulnerable population, but, rather, on population in dwellings of which they are owners and for which a relocation process is not foreseen. However, gender inequality could be exacerbated if the Fund does not provide for facilities for women's access to the scheme. A series of measures should be incorporated to ensure that both, men and women, have access to this scheme, taking into account that, traditionally, women have less access to control of economic resources.

Regarding possibilities for women accessing the CSGS, their access to the scheme and generally credit facilities is constrained by the:

- High interest rates: This constraint is not present in the proposed project, since no interests are charged by the Fund.
- Credit evaluation methodology: Based mainly on guarantee requirements needed, usually shown as a gender- specific restriction. such restriction is a reflection of lack of knowledge about the activities women perform, and the conditions in which women work, because many women do not own assets
- Small amounts of the funds that respond to short-term objectives, to solve specific problems. Due to this regulation, women are unable to make long-term strategic decisions.
- Factors outside the scope of credit institutions, a fact that hinders the relationship between women and credit. This is related to the greater effort that women must make with respect to the time they need to get to, for example, a branch of the credit institution, and then comply with all the procedures required. As stated in the survey quoted, women would use more informal credit sources. Therefore, a conclusion can be reached that there is a demand for loans from women, but few access opportunities. What women need is for funding systems to be adapted to women needs.

This report points out to a double negativity in terms of women and credit: Barriers to access to it and the conditions under women are granted a credit. The variables that limit access would be multiple, but they highlight four main hindrances: Social barriers, requirements for guarantees, size of the loan, and scarcity of credit outputs aimed at women. It is evident that the proposal design involving an CSGS to invest in adaptation actions will not have all the edges that can show those cases involving access to funding, which have been looked into in related literature. However, the barriers that even at this small scale can be raised to women's access to the tool should not be underestimated. The Gender Action Plan puts forward some guidelines to abide to mitigate these risks.

Alternative Income Generating Activities (AIGAs)

From the analysis made in the preceding section, it is evident that the main constraints faced by women in undertaking alternative income generating activities are:

- Regulatory Standards: Women tend to feel less skilled to perform complicated activities.
- Women have problems accessing networks and markets for the outputs that women manufacture.
- Women are less likely to get capacity-building and business development services.
- Women seem to have a greater risk aversion, or fear of applying for a loan. Likewise, they are less familiar and comfortable with larger credit instruments.
- Women's assets are systematically of lower value and size than men´s. However, women should normally provide many more guarantees than men to access credit.
- Traditional gender roles continue to disproportionately assign family and domestic responsibilities to women. This report raises the need for a stronger focus on fostering growth of women-headed enterprises than on establishing new businesses. Hence justifies the need for gender mainstreaming to be incorporated into project design. This document therefore, besides making a characterization of women enterprises under this outlook, brings forwards affirmative actions towards women participation in the design of AIG activities, and ensuring that women access them as beneficiaries.

2. **The Link Between Gender and Climate Change in CCAILSO project.**

The CCAILSO project recognizes the crucial link between gender and climate change in Siwa Oasis. Climate change impacts men and women differently, and women often face greater vulnerabilities due to existing social and economic inequalities. The project addresses this link through targeted interventions

and a gender-sensitive approach, aiming to empower women and promote gender equality in climate change adaptation.

Here's a breakdown of the link between gender and climate change in Siwa, as addressed by the CCAILSO project:

1. **Women's Vulnerability:**
   - Water Scarcity: Women in Siwa are primarily responsible for collecting and managing water for household use. Climate change-induced water scarcity increases their workload and time spent on water collection, impacting their health, education, and economic opportunities.
   - Agricultural Impacts: Women play a significant role in Siwan agriculture, particularly in small-scale farming and livestock rearing. Climate change impacts on agriculture, such as reduced crop yields and livestock productivity, disproportionately affect women's livelihoods and food security.
   - Limited Access to Resources: Women in Siwa often have limited access to land, credit, and decision-making power, making them more vulnerable to climate change impacts.
2. **CCAILSO Project Interventions:**

Component 1: Improving Water Resource Access and Management:

- Output 1.2.2: Increased access to potable water among the target communities (20% women) - This output directly addresses women's vulnerability to water scarcity by improving their access to safe drinking water, reducing their workload, and freeing up time for other activities.
- Activity 1.2.1.3: Capacity Building for Farmers on Irrigation Network Management - This activity targets both men and women farmers, equipping them with the knowledge and skills to manage irrigation networks efficiently, thus contributing to water conservation and reducing the impacts of drought.

Component 2: Enhancing Resilience of Siwa Oasis Ecosystems:

- Activity 2.1.1.2: Setting Up, Procuring Inputs, and Managing Demonstration Plots - This activity ensures women's participation in demonstration plots showcasing climate-resilient agricultural practices, providing them with opportunities to learn and adopt new techniques.
- Activity 2.2.2.1: Promoting the Production of Short-Cycle Livestock - This activity promotes livestock breeds that are more resilient to climate change, benefiting women who are often responsible for livestock management.

Component 3: Diversifying Livelihoods:

- Output 3.1.2: Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs) - This output focuses on diversifying income sources for women and youth, reducing their dependence on climate-sensitive agriculture and enhancing their economic resilience.
- Activity 3.1.2.2: Establish revolving fund schemes for IGAs with a gender focus - This activity provides financial support to women entrepreneurs, empowering them to start or expand businesses in non-agricultural sectors.

Component 4: Strengthening Knowledge and Adaptive Capacities:

- Activity 4.1.1.1: Conduct Baseline, Capacity Needs Assessment, and KAP Survey of All Stakeholders - This activity includes a gender-disaggregated KAP survey to assess the knowledge, attitudes, and practices of both men and women regarding climate change adaptation.

- Activity 4.1.1.2: Capacity Building for Extension Services on Climate Change Adaptation Planning - This activity ensures that extension services personnel are trained to provide gender-sensitive support to communities in adapting to climate change.

3. Gender-Sensitive Approach:

The CCAILSO project adopts a gender-sensitive approach throughout its implementation, ensuring that:

- Women are actively involved in decision-making processes at all levels.
- Project activities are designed to address the specific needs and vulnerabilities of women.
- Gender equality is promoted through capacity building, awareness-raising, and access to resources.

4. Expected Outcomes:

By addressing the link between gender and climate change, the CCAILSO project aims to achieve the following outcomes:

- Empowered Women: Women in Siwa Oasis will have increased knowledge, skills, and resources to adapt to climate change and participate in decision-making.
- Improved Livelihoods: Women's livelihoods will be more resilient to climate change impacts through diversified income sources and climate-smart agricultural practices.
- Enhanced Gender Equality: The project will contribute to greater gender equality in Siwa Oasis by reducing women's vulnerability to climate change and empowering them to participate in development.

Conclusion:

The CCAILSO project recognizes that addressing climate change effectively requires a gender-sensitive approach. By empowering women and promoting gender equality, the project aims to build a more resilient and sustainable Siwa Oasis for all.

Gender Action Plan in compliance with the AF gender principles

Other than a gender analysis based on secondary sources, gender issues have been addressed during consultations with stakeholders during the design of the CCAILSO full project proposal.

(Annex : consultative workshop reports- It was possible to confirm that all project-related actions aim at abating drought risk through enhancing social resilience. For this matter it is expected that women conditions shall improve in all cases. This report further confirms that none of the proposed project activities could be harmful to any social group on account of gender issues in a discriminatory manner that is based on legal, regulatory or customary reasons. However, the point should be stressed regarding the need to press on the incorporation of the gender approach in all activities, to ensure equal participation and equal access to the project benefits, and to take all precautions so that project does not exert any type of negative social or environmental impact based on gender issues. The actions suggested towards implementation of this project are described below.

Transversal actions throughout the Project

Those actions crossing all activities can be described under two main typologies: participation and capacity-building vis- à-vis Gender approach and representation.

Participation

Participatory processes and capacity-building instances should take place with an active involvement of both men and women. For this goal to be achieved, guidelines applicable to the entire Project should be ensured as follows:

- Use of an inclusive language in all instances of calls and dissemination activities, to explicitly address men and women.
- Establish meeting schedules (or any participation instance), bearing in mind possibilities for men and women participation.
- Willingness to give women a voice and ability to impact participatory processes, so women can make their needs visible. For example, splitting particular discussion groups so that women feel free and

confident to express their own views.

- Setting up ad hoc care areas so that women have the time to participate in meetings and activities (considering the sexual division of labour structure).
- Always draw sex-disaggregated data and results
- Include in the participative instances women's associations, technical personnel expert in gender issues, councils, units, areas or specific equality departments.
- *Gender Approach-addressed capacity-building and provision of inputs throughout the project*

In order for project-linked decision-makers, officials, and technical teams to effectively incorporate the gender approach into the former´s implementation, capacity-building instances should be incorporated that can be specific-exclusive capacity-building on the gender approach- or modules that are incorporated into some other capacity-building programmes scheduled within the framework of the project.

Gender mainstreaming should be present at all times -in any case, in a transversal manner- in all capacity-building instances, through the supervision and assistance of technical experts in the field who are attached to Executing Entities.

Gender Integration and Alignment with AF Gender Policy Principles

This table outlines the CCAILSO project's activities, highlighting their alignment with the Adaptation Fund's Gender Policy (AF GP) principles and demonstrating how the project promotes gender equality and women's empowerment in Siwa Oasis.

Table (19)Gender Integration and Alignment with AF Gender Policy Principles

Activity	Gender-Specific Components	AF GP P.	Actions	Responsible Parties	Timeframe
Output 1.2.2: Increased access to potable water among the target communities (20% women)	* Prioritize women as beneficiaries of improved water access. * Conduct needs assessments with women to understand their specific water challenges.	**P. 1:** Promote gender equality and women's empowerment.	* Construct/rehabilitate communal wells and rainwater harvesting systems in locations easily accessible to women. * Establish water management committees with at least 20% female representation. * Provide training to women on water conservation and hygiene practices.	* DRC (Project Management Unit) * Local Councils * Women's Groups	Throughout the project lifecycle
Activity 1.2.1.3: Capacity Building for Farmers on Irrigation Network Management	* Ensure equal participation of women and men in training sessions. * Tailor training content to address the specific needs and challenges of women farmers.	**P. 2:** Ensure women's full and effective participation in all stages of the project cycle.	* Conduct separate training sessions for women if needed, addressing cultural sensitivities. * Provide childcare support during training sessions to facilitate women's participation. * Develop training materials that are visually appealing and easy to understand for both men and women.	* DRC (Technical Experts) * Ministry of Agriculture (Extension Workers) * WUAs	Throughout the project lifecycle
Activity 2.1.1.2: Setting Up, Procuring Inputs, and Managing Demonstration Plots	* Allocate demonstration plots to women farmers. * Provide women with equal access to inputs, such as seeds, fertilizers, and tools.	**P. 3:** Ensure women's equal access to and control over resources.	* Conduct awareness campaigns to encourage women's participation in demonstration plots. * Provide training to women on climate-resilient agricultural practices. * Establish women-led farmer groups to manage demonstration plots.	* DRC (Project Management Unit) * Ministry of Agriculture (Extension Workers) * Women's Groups	Throughout the project lifecycle
Activity 2.2.1.2: Promoting Production of Short-Cycle Livestock	* Target women livestock owners for training and support. * Provide women with access to improved breeding stock and veterinary services.	**P. 4:** Ensure women benefit equally from project outcomes.	* Conduct training sessions on livestock management practices tailored to women's needs. * Facilitate women's access to micro-credit for livestock investments. * Establish women-led livestock producer groups.	* DRC (Technical Experts) * Ministry of Agriculture (Veterinary Services) * Women's Groups	Throughout the project lifecycle
Output 3.1.2: Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs)	* Prioritize IGAs that are suitable for women, considering their skills, cultural norms, and time constraints. * Provide training and support to women entrepreneurs.	**P. 5:** Promote women's economic empowerment.	* Conduct market research to identify viable IGAs for women. * Provide training in business planning, marketing, and financial management. * Establish women-led cooperatives for handicraft production and marketing. * Facilitate women's access to micro-credit for IGA investments.	* DRC (Project Management Unit) * Local NGOs * Women's Groups	Throughout the project lifecycle
Activity 3.1.2.2: Establish revolving fund schemes for IGAs with a gender focus	* Design the revolving fund scheme to be accessible to women, considering their specific needs and challenges.	**P. 6:** Address the specific needs and vulnerabilities of women.	* Simplify loan application procedures for women. * Provide flexible repayment options. * Offer financial literacy training to women.	* DRC (Project Management Unit) * Local Microfinance Institutions * Women's Groups	Throughout the project lifecycle
Output 3.3.1: Enhancing capacity of Siwan communities to facilitate public awareness and participation in planning and decision-making on climate-resilient livelihood practices in	* Ensure equal representation of women in community committees and decision-making bodies. * Provide training to women on leadership, communication, and advocacy skills.	**P. 7:** Promote women's leadership and decision-making power.	* Conduct awareness campaigns to encourage women's participation in community meetings and decision-making processes. * Provide training to women on climate change adaptation and ecotourism planning. * Support women's leadership development through mentoring and networking	* DRC (Project Management Unit) * Local Councils * Women's Gro	Throughout the project lifecycle

ecotourism			opportunities.		

Note: This table provides a sample of activities and their gender-specific components. The project will integrate gender considerations into all its activities, ensuring that women are empowered and benefit equitably from project interventions.

This table demonstrates the CCAILSO project's commitment to gender equality and its alignment with the Adaptation Fund's Gender Policy principles. By implementing these activities and adopting a gender-sensitive approach, the project aims to empower women in Siwa Oasis and ensure their full participation in building a more resilient and sustainable future.

- **Gender Actions Plan (by Outputs and Activities)**

3. This table outlines the CCAILSO project's Gender Action Plan (GAP), aligned with the Adaptation Fund's Gender Policy (AF GP) principles. It details specific actions, indicators, baselines, and targets to promote gender equality and women's empowerment in Siwa Oasis.
4. ***Table* (21) *The CCAILSO project's Gender Action Plan (GAP),***

Output/Activity	Action	AF GP Principle	GAP Actions	Indicators	Baseline	Target
COMPONENT 1						
Output 1.2.2: Increased access to potable water among the target communities (20% women)	Improve access to safe drinking water for women	Principle 1: Promote gender equality and women's empowerment.	* Construct/rehabilitate communal wells and rainwater harvesting systems in locations easily accessible to women. * Conduct awareness campaigns on water conservation and hygiene practices, targeting women specifically.	* % of women in target communities with access to safe drinking water within a 15-minute walk from their homes. * Time spent by women on water collection per day.	* 60% * 2 hours	* 90% * 1 hour
Activity 1.2.1.3: Capacity Building for Farmers on Irrigation Network Management	Enhance women's participation and knowledge in irrigation management	Principle 2: Ensure women's full and effective participation in all stages of the project cycle.	* Conduct gender-sensitive training sessions on irrigation network management, ensuring equal participation of women. * Provide childcare support during training sessions to facilitate women's attendance. * Develop training materials that are visually appealing and easy to understand for both men and women.	* % of women participating in irrigation management training. * % of women holding leadership positions in WUAs.	* 20% * 10%	* 50% * 30%
COMPONENT 2						
Activity 2.1.1.2: Setting Up, Procuring Inputs, and Managing Demonstration Plots	Ensure women's equal access to and control over resources for climate-resilient	Principle 3: Ensure women's equal access to and control over resources.	* Allocate demonstration plots to women farmers. * Provide women with equal access to inputs, such as seeds, fertilizers, and tools. * Establish women-led farmer groups to manage demonstration plots.	* % of demonstration plots managed by women. * % of women participating in decision-making regarding demonstration plot management.	* 15% * 25%	* 20% * 50%

	agriculture					
Activity 2.2.1.2: Promoting Production of Short-Cycle Livestock	Ensure women benefit equally from improved livestock production practices	Principle 4: Ensure women benefit equally from project outcomes.	* Target women livestock owners for training and support. * Provide women with access to improved breeding stock and veterinary services. * Facilitate women's access to micro-credit for livestock investments.	* % of women livestock owners participating in training programs. * % of women accessing improved breeding stock and veterinary services. * Average income from livestock production for women.	* 25% * 30% * $100 per month	* 50% * 60% * $200 per month
COMPONENT 3						
Output 3.1.2: Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs)	Promote women's economic empowerment through diversified income sources	Principle 5: Promote women's economic empowerment.	* Conduct market research to identify viable IGAs for women, considering cultural norms and time constraints. * Provide training in business planning, marketing, and financial management specifically for women. * Establish women-led cooperatives for handicraft production and marketing. * Facilitate women's access to micro-credit for IGA investments.	* % of women participating in IGAs. * % of women-owned businesses in the oasis. * Average income from IGAs for women.	* 30% * 10% * $50 per month	* 60% * 25% * $150 per month
Activity 3.1.2.2: Establish revolving fund schemes for IGAs with a gender focus	Ensure women's access to financial resources for IGAs	Principle 6: Address the specific needs and vulnerabilities of women.	* Design the revolving fund scheme to be accessible to women, with simplified application procedures and flexible repayment options. * Provide financial literacy training to women.	* % of women accessing loans from the revolving fund scheme. * Average loan size for women.	* 10% * $100	* 20% * $500
Output 3.3.1: Enhancing capacity of Siwan communities to facilitate public awareness and participation in planning and decision-making on climate-resilient livelihood practices in ecotourism	Promote women's leadership and decision-making power in climate change adaptation and ecotourism	Principle 7: Promote women's leadership and decision-making power.	* Ensure equal representation of women in community committees and decision-making bodies related to ecotourism. * Provide training to women on leadership, communication, and advocacy skills.	* % of women holding leadership positions in community committees and ecotourism organizations. * % of women participating in decision-making processes related to ecotourism.	* 15% * 20%	* 20% * 50

5. **Note:** This table provides a framework for the CCAILSO project's Gender Action Plan. Specific activities and targets may be adjusted during project implementation

based on ongoing monitoring and evaluation and community feedback.

6. This Gender Action Plan demonstrates the CCAILSO project's commitment to promoting gender equality and women's empowerment in Siwa Oasis. By implementing these actions and tracking progress through gender sensitive indicators, the project aims to ensure that women are active participants and beneficiaries in building a more resilient and sustainable future for the oasis.

- ## Gender consideration management

Gender considerations will be made at every stage and intervention of the proposed project gender will be a major consideration in for instance capacity building meetings or workshops, management committees such as the water management committees, management information sharing platforms, developing and formulating by-laws and ordinances for groundwater sources management in communities within the four selected countries, women should constitute at least 20% of each target group. Also, at every stage of providing inputs such as for early warning devices, soil and water conservation, climate- smart agricultural practices, range, and livestock management at least 20% of the women will be the sole beneficiaries. A gender analysis for project interventions is presented in the following.

Table 22: Gender consideration management during project implementation

Component/Output /Activity	Gender Aspects	Benefits	Risks	Strategies for Mitigation
Component 1: Improving Water Resource Access and Management				
Output 1.1.1: Developed/updated water resources management plans	* Equal participation of women in water management planning workshops and consultations. * Consideration of women's specific water needs and priorities in the plans.	* More equitable and sustainable water management practices. * Increased awareness among women about water conservation and management.	* Exclusion of women from decision-making processes due to cultural norms. * Plans may not adequately address women's specific water needs.	* Ensure at least 20% female representation in planning workshops and committees. * Conduct separate focus group discussions with women to gather their input. * Include gender-sensitive indicators in the water management plans.
Output 1.1.2: Strengthened water resources management in target communities	* Training and capacity building for women on water management practices. * Support for women-led water management initiatives.	* Increased knowledge and skills among women in water management. * Greater control over water resources by women.	* Limited access to training and resources for women. * Lack of support for women's leadership in water management.	* Provide targeted training and mentoring programs for women. * Allocate resources to support women-led water management initiatives. * Promote women's leadership roles in WUAs and other water management bodies.
Output 1.2.1: Irrigation water access among target community is increased	* Equitable access to irrigation water for women farmers. * Training and support for women in water-efficient irrigation techniques.	* Increased agricultural productivity for women farmers. * Improved food security for women and their families.	* Unequal distribution of irrigation water, favouring men. * Limited access to training and technology for women.	* Ensure equitable water allocation for women farmers. * Provide targeted training and demonstrations on water-efficient irrigation techniques for women. * Promote women's participation in WUAs and irrigation management committees.
Output 1.2.2: Irrigation water access among target community (20% women) is increased	* Prioritize women as beneficiaries of improved water access. * Design water infrastructure to be accessible and safe for women.	* Reduced time spent by women on water collection. * Improved health and well-being for women and their families.	* Water infrastructure may not be located in safe or accessible locations for women. * Lack of consideration for women's safety and comfort in water infrastructure design.	* Conduct safety audits and consultations with women to ensure water points are located in safe and accessible areas. * Design water infrastructure with features that enhance women's safety and comfort, such as separate facilities for women and adequate lighting.
Component 2: Enhancing Resilience of Siwa Oasis Ecosystems to Climate Change Impacts				

Output 2.1.1: Climate resilient Agricultural practices are adopted.	* Equal participation of women in training and demonstration activities on climate-resilient agriculture. * Consideration of women's specific needs and knowledge in the design and implementation of climate-resilient practices.	* Increased agricultural productivity and income for women farmers. * Enhanced food security for women and their families.	* Exclusion of women from training and decision-making processes. * Climate-resilient practices may not be suitable for women's farming systems or labour constraints.	* Ensure at least 20% female participation in training and demonstration activities. * Conduct separate training sessions for women if needed, addressing cultural sensitivities. * Design climate-resilient practices that are adaptable to women's farming systems and labour constraints.
Output 2.1.2: Green belts are developed and sustained	* Engage women in green belt establishment and management activities. * Provide training and resources to women on tree planting and maintenance techniques.	* Increased income opportunities for women through green belt-related activities. * Improved environmental conditions and reduced vulnerability to climate change impacts for women and their communities.	* Limited access to land and resources for women to participate in green belt initiatives. * Lack of recognition for women's traditional knowledge and skills in environmental management.	* Facilitate women's access to land and resources for green belt establishment. * Incorporate women's traditional knowledge and skills into green belt management practices. * Promote women's leadership roles in community-based green belt initiatives.
Component 3: Diversifying Livelihoods through IGAs and Value Chain Addition				
Output 3.1.1: Improved livestock production practices adopted.	* Target women livestock owners for training and support. * Provide women with access to improved breeding stock, veterinary services, and financial resources.	* Increased livestock productivity and income for women. * Enhanced food security and nutrition for women and their families.	* Limited access to training, resources, and markets for women livestock owners. * Cultural norms may restrict women's control over livestock assets and income.	* Conduct gender-sensitive training programs on livestock management, breeding, and disease control. * Facilitate women's access to improved breeding stock, veterinary services, and micro-credit. * Promote women's participation in livestock producer groups and market linkages.
Output 3.1.2: Enhanced community livelihood resilience through adoption of IGAs	* Prioritize IGAs that are suitable for women, considering their skills, cultural norms, and time constraints. * Provide training and support to women entrepreneurs in business planning, marketing, and financial management.	* Diversified income sources for women, reducing their dependence on climate-sensitive agriculture. * Increased economic empowerment and decision-making power for women.	* Limited access to information, training, and markets for women entrepreneurs. * Cultural norms may restrict women's participation in certain IGAs.	* Conduct market research to identify viable IGAs for women. * Provide targeted training and mentoring programs for women entrepreneurs. * Facilitate women's access to markets and business networks. * Address cultural barriers through awareness-raising campaigns and community dialogues.
Component 4: Strengthening Knowledge and Adaptive Capacities of Stakeholders to Climate Change Impacts				
Output 4.1.1: Improved understanding of stakeholders to integrate CC into Planning Processes	* Ensure equal participation of women in capacity building workshops and consultations on climate change adaptation planning. * Develop gender_sensitive communication materials and awareness raising campaigns.	* Increased knowledge and awareness among women about climate change and adaptation strategies. * Greater participation of women in decision-making processes related to climate change.	* Women may be excluded from workshops and consultations due to cultural norms or time constraints. * Communication materials may not be accessible or relevant to women.	* Ensure at least 20% female representation in workshops and consultations. * Conduct separate sessions for women if needed, addressing cultural sensitivities. * Develop communication materials that are tailored to women's needs and interests.

Output 4.1.2: Raised community awareness	* Conduct awareness_raising campaigns on climate change and adaptation, targeting women specifically. * Disseminate information through channels accessible to women, such as community radio and women's groups.	* Increased knowledge and awareness among women about climate change impacts and adaptation options. * Empowered women to take action to adapt to climate change and protect their families and communities.	* Women may have limited access to information channels due to literacy levels or cultural norms. * Messages may not be tailored to women's specific concerns and priorities.	* Develop culturally appropriate and gender_sensitive communication materials. * Disseminate information through channels accessible to women, such as community meetings, women's groups, and local radio programs. * Engage women as community leaders and communicators to reach other women.

This table highlights the CCAILSO project's commitment to integrating gender considerations into every aspect of its implementation. By proactively addressing potential risks and i mplementing mitigation strategies, the project aims to ensure that women are empowered and benefit equitably from climate change adaptation efforts in Siwa Oasis.

• Monitoring and evaluation (M&E) framework with Gender

This framework outlines the key indicators and data collection methods for monitoring and evaluating the CCAILSO project's progress towards its objectives, with a specific focus on gender equality and women's empowerment.

1. Overall Project Monitoring and Evaluation:

- **Objective:** Adapt Siwa environment to cope with climate changes in Siwa Oasis to improve livelihoods and raise the income of the final beneficiaries of the oasis.
- **Indicators:**
  - Number of vulnerable community members (disaggregated by gender) with increased capacity to implement adaptation projects.
  - Number of people (disaggregated by gender) with reduced risk to economic loss due to land and water quality degradation and extreme weather events.
- **Data Collection Methods:**
  - Baseline and endline surveys with households, disaggregated by gender.
  - Training attendance records, disaggregated by gender.
  - Project progress reports, including gender-disaggregated data on participation and benefits.

4. Component-Specific Monitoring and Evaluation:

Table 22 Monitoring and evaluation (M&E) framework with Gender

Component 1: Improving Water Resource Access and Management			
Output/Activity	**Indicator**	**Data Collection Method**	**Frequency**
Output 1.1.1: Developed/updated water resources management plans	• Number of water management plans developed/updated. Level of community participation (disaggregated by gender) in plan development.	• Review of plans and meeting minutes. • Stakeholder consultations and surveys	Annually
Output 1.1.2: Strengthened water resources management in target communities	• Number of WUAs with increased capacity in water management. % of women holding leadership positions in WUAs.	• Training attendance records, disaggregated by gender. • Interviews with WUA members.	Annually
Output 1.2.1: Increased irrigation water access and use in the target communities	• Area of land (in hectares) with improved irrigation access. % of women farmers with access to improved irrigation.	• Field surveys and mapping. • Interviews with farmers.	Annually
Output 1.2.2: Increased access to potable water among the target communities (20% women)	• % of women in target communities with access to safe drinking water within a 15_minute walk from their homes. • Time spent by women on water collection per day.	• Household surveys, disaggregated by gender. • Focus group discussions with women.	Baseline, Midterm, and Endline
Component 2: Enhancing Resilience of Siwa Oasis Ecosystems to Climate Change Impacts			
Output/Activity	**Indicator**	**Data Collection Method**	**Frequency**
Output 2.1.1: Climate resilient Agricultural practices are adopted	• Area of land (in hectares) under climate resilient agricultural practices. • % of women farmers adopting climate-resilient practices.	• Field surveys and mapping. • Interviews with farmers.	Annually
Output 2.1.2: Sustained Green belts developed	• Length of green belts established (in kilometers). • % of women participating in green belt establishment and management activities.	• Field surveys and mapping. • Focus group discussions with community members.	Annually
Component 3: Diversifying Livelihoods through IGAs and Value Chain Addition			
Output/Activity	**Indicator**	**Data Collection Method**	**Frequency**
Output 3.1.1: Improved livestock production practices adopted	• Number of livestock owners (disaggregated by gender) adopting improved practices. • Average livestock productivity (e.g., milk yield, meat production) for women and men.	• Training attendance records, disaggregated by gender. • Livestock production surveys.	Annually

Output 3.1.2: Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs)	• Number of community members (disaggregated by gender) participating in IGAs. Average income from IGAs for women and men.	• Household surveys, disaggregated by gender. • Focus group discussions with community members.	Annually
Component 4: Strengthening Knowledge and Adaptive Capacities of Stakeholders to Climate Change Impacts			
Output/Activity	**Indicator**	**Data Collection Method**	**Frequency**
Output 4.1.1: Improved understanding of stakeholders to integrate CC into Planning Processes	• Number of stakeholders trained on climate change adaptation planning. • Number of communities with climate change adaptation plans.	• Training attendance records. • Review of community adaptation plans	Annually
Output 4.1.2: Raised community awareness on CC adaptation	• % of community members (disaggregated by gender) aware of climate change impacts and adaptation options. • Number of community led climate change adaptation initiatives.	• KAP surveys, disaggregated by gender. • Focus group discussions with community members.	Baseline, Mid-term, and Endline

Gender- Monitoring and Evaluation:

- **Gender Impact Assessment:** A gender impact assessment will be conducted at the mid-term and endline of the project to evaluate the project's specific contribution to women's empowerment and gender equality.
- **Qualitative Data Collection:** Focus group discussions and key informant interviews with women will be conducted regularly to gather qualitative data on their experiences, challenges, and perceptions of the project's impact on their lives.

Reporting:

- **Gender Disaggregated Data:** All project reports, including progress reports and evaluation reports, will include gender disaggregated data to track the participation and benefits of women.
- **Gender Analysis:** Reports will include a gender analysis to interpret the data and identify any gender-related issues or trends.

Conclusion:

This M&E framework, with its emphasis on gender integration, will ensure that the CCAILSO project effectively monitors and evaluates its progress towards empowering women and promoting gender equality in Siwa Oasis. The data collected will inform project implementation, enabling adaptive management and ensuring that the project achieves its intended outcomes for both women and men.

3. Annex 3: Environmental and Social Management Plan (ESMP)

Summary of the ESMP

The Environmental and Social Management Plan (ESMP) study for the CCAILSO project aims to address the environmental, social, and economic impacts of adapting to climate change in the Siwa Oasis, a fragile ecosystem facing significant environmental challenges. The project's goal is to improve livelihoods by enhancing resilience to climate change while protecting and conserving the unique ecological and cultural heritage of the area.

The Siwa Oasis is a depression below sea level characterized by extremely dry conditions and minimal rainfall. The oasis faces chronic environmental problems exacerbated by climate change, such as severe drought, loss of biodiversity, poor soil productivity, and socio-economic challenges including poverty and unemployment. Misuse of irrigation water and weak drainage systems have further degraded agricultural soils, affecting plant and animal production.

The ESMP outlines the project's objectives to enhance the adaptive capacity of the oasis's residents and ecosystems. The project intends to improve water and land use, introduce drought- and salinity-resistant plant strains, raise environmental awareness, and empower women. These efforts aim to mitigate the adverse effects of climate change and promote sustainable development in the oasis.

The assessment methodology involves identifying sources of environmental and social impacts associated with the project, analysing the significance of these impacts, and proposing mitigation measures. The project must comply with 15 environmental and social principles of the Adaptation Fund, covering aspects like compliance with the law, access and equity, protection of natural habitats, and promotion of gender equality.

The potential negative impacts and corresponding mitigating measures include:

1. Compliance with the Law: Ensuring adherence to local and national regulations to avoid legal issues and project delays. Regular legal compliance audits and engaging legal experts are recommended.
2. Access and Equity: Implementing inclusive engagement strategies to ensure all community sectors, particularly marginalized groups, benefit equally from the project.
3. Marginalized and Vulnerable Groups: Conducting social impact assessments to identify and involve vulnerable groups in project planning and implementation.
4. Human Rights: Developing a human rights policy, providing training for project staff, and establishing a grievance mechanism to prevent human rights violations.
5. Gender Equality and Women's Empowerment: Ensuring gender-sensitive planning and promoting women's participation and leadership in project activities.
6. Core Labor Rights: Adhering to labour standards to ensure safe working conditions and fair wages, and establishing a monitoring system for labour rights compliance.
7. Indigenous Peoples: Engaging indigenous communities from the outset and ensuring their full participation in project activities to respect their rights and traditional knowledge.
8. Involuntary Resettlement: Avoiding involuntary displacement of communities. If resettlement is unavoidable, it should be conducted with full consent and adequate compensation.
9. Protection of Natural Habitats: Implementing habitat restoration and conservation measures to prevent degradation or destruction of natural habitats.
10. Conservation of Biological Diversity: Prioritizing native species in restoration efforts and implementing biodiversity conservation plans.
11. Climate Change: Promoting low-carbon technologies and practices, integrating climate resilience into project components, and monitoring greenhouse gas emissions
12. Pollution Prevention and Resource Efficiency: Implementing pollution prevention measures and promoting resource-efficient technologies and practices.
13. Public Health: Ensuring access to clean water and sanitation, implementing health and safety measures, and promoting public health awareness campaigns.
14. Physical and Cultural Heritage: Conducting heritage impact assessments and involving local communities in protecting heritage sites.
15. Lands and Soil Conservation: Promoting sustainable land management practices and implementing

soil conservation measures.

- The Environmental and Social Management Plan (ESMP) provides guidelines for effective management of environmental, social, and safety impacts. It includes activities, impact indicators, monitoring mechanisms, and responsible parties. The ESMP ensures that the project's implementation aligns with the Adaptation Fund's principles and promotes the sustainability of environmental and social outcomes.
- Overall, the ESMP for the CCAILSO project emphasizes the importance of integrating environmental and social considerations into climate adaptation efforts to enhance the resilience and sustainability of the Siwa Oasis and its communities. The project aims to serve as a model for addressing similar challenges in other vulnerable regions.

2. Introduction

This chapter aims to identify and analyse the environmental, social, and economic impacts of the project to adapt to climate change to improve livelihoods in Siwa Oasis (CCAILSO) on the prevailing ecosystem in the oasis, which is one of the clearest fragile ecosystems in the world because it contains overlapping and sometimes contradictory environmental components. To do this, the sources of impact inherent in the project were identified in addition to the various environmental components of the economic system and the ecosystem present in the study area, which is characterized by uniqueness and distinction. The standard environmental impact assessment methodology was relied upon, which includes evaluating the potential negative and positive impacts that have a direct or indirect impact on the components. environment within the project area.

4. Environmental and social risks

4.1. Methodology

This chapter aims to identify and analyse the environmental and socio-economic impacts of the project on the various ecosystems involved. To do this, the sources of impact inherent in the project are identified as well as the different environmental components of potential economic and ecosystem interests of the study area. Then, based on the impact assessment methodology, evaluate the potential negative impacts that have a direct or indirect effect on the environmental components present in the project area framing.

The general approach proposed to identify and analyse the significance of the impacts on the natural and social environment is based on a detailed description of the project and the environment. The description of the project makes it possible to identify the sources of impacts based on the technical characteristics of the infrastructures, equipment, activities as well as the methods and techniques used and the work program. The general description of the environment, in turn, makes it possible to understand the ecological, socio-economic and cultural context in which the project is located, to discriminate the environmental components that are the most sensitive to the project and to identify, as a preliminary, certain environmental issues related to the project.

The project description allows identifying sources of impacts based on the environmental components of the project area, including water, soil, vegetation, population activities, and the technical characteristics of infrastructure, equipment, and activities, in addition to methods and techniques. Used and working program. The general description of the environment, in turn, makes it possible to understand the environmental, social, economic, and cultural context in which the project is located, to distinguish the most sensitive environmental components of the project and to identify, as preliminary, some environmental issues related to the project.

For each target environmental component, the assessment process includes the following steps:

- Description of the initial environmental situation: It serves as a brief reminder of the environmental characteristics as they appear before the project is implemented.
- Describe the impact on ecosystems and populations, i.e. describe the expected changes according to the sources of the project's impact on ecosystems.

The environmental analysis method will be conducted in accordance with the environmental and social principles of the 15 compliance standards. In fact, as described above, the CCAILSO project has been submitted to request funding from the Adaptation Fund (AF). Among the requirements, it is important to emphasize respect and compliance with its environmental and social policy. The AF 15 principles of

environmental and social policy, covering aspects relating to natural resources, the physical environment, and the cultural and social environment, are presented as follows:

- *Principle 1: Compliance with the law*
- *Principle 2: Access and equity*
- *Principle 3: Marginalized and vulnerable groups*
- *Principle 4: Human rights*
- *Principle 5: Gender equality and women's empowerment*
- *Principle 6: Fundamental rights of women work*
- *Principle 7: Indigenous Peoples*
- *Principle 8: Involuntary resettlement*
- *Principle 9: Protection of natural habitats*
- *Principle 10: Biodiversity conservation*
- *Principle 11: Climate change*
- *Principle 12: Pollution prevention and resource efficiency*
- *Principle 13: Public Health*
- *Principle 14: Physical and Cultural Heritage*
- *Principle 15: Conservation of Land and Soil*

4.2 The environmental and social impacts and risks identified as being relevant to the CCAILSO project

Like any project that involves activities with strong interactions with ecosystems and the population, CCAILSO project could have environmental and social impacts. This project was developed in compliance with 15 principles of the Adaptation Fund Environmental and Social Policies. It is important to identify at this stage, the possible negative impacts in order to foresee the necessary mitigating measures. The table below sums up the impacts/risks evaluation against the AF Environmental and social principles.

The summary of the impacts/risks evaluation against the Adaptation Fund Environmental and Social principles for the Siwa Oasis project.

Table 2: Impacts/Risks Evaluation against AF Environmental and Social Principles

Checklist of E&S principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
1. Compliance with the law		*Yes. set up a mechanism to monitor compliance with laws and regulations in the implementation of the project.*
2. Access and equity		*Yes. mechanisms and approaches will be identified to ensure equitable access to project benefits*
3. Marginalized and vulnerable groups		*Yes, the E&S assessment of the project will be based on a participatory approach, incorporating consultations with communities to identify the best approaches for their inclusion.*
4. Human rights	No. No further assessment required	
5. Gender equality and women's empowerment		*Yes. Promoting gender equality and ensuring women benefit equally from project interventions.*
6. Core labour rights		*Yes. Project will ensure that Labour laws are considered in activity implementation especially during development and maintenance of water solutions, installation of small-scale irrigation systems and other concrete adaptation actions of the proposed project.*
7. Indigenous peoples	No. No further assessment required	

8. Involuntary resettlement	No. No further assessment required	
9. Protection of natural habitats		*Yes, Preventing negative impacts on natural habitats and implementing habitat restoration where necessary.*
10. Conservation of biological diversity		*Yes, Implementing measures to conserve biological diversity, including habitat protection and sustainable land use.*
11. Climate change	No. No further assessment required.	
12. Pollution prevention and resource efficiency		*Yes, Implementing pollution prevention measures and promoting resource-efficient practices.*
13. Public health	No. No further assessment required.	
14. Physical and cultural heritage		*Yes, Protecting physical and cultural heritage sites and ensuring that project activities do not negatively impact them.*
15. Lands and soil conservation		*Yes, Ensuring sustainable land use practices that conserve soil health and prevent degradation.*

4.3 Assessments Impacts/Risks Evaluation for CCAILSO Project Components and Activities Against AF Environmental and Social Principles:

- **Marginalized and vulnerable groups**: Requires additional assessment to ensure that these groups are adequately involved and benefit from the project, and that their specific needs are addressed.
  Project Activity: Involvement of local communities in decision-making processes.
  Risk: Marginalized groups might be excluded from decision-making.
  Mitigation: Conduct participatory workshops and ensure representation of marginalized groups.
- **Gender equality and women's empowerment**: Requires additional measures to promote gender equality, ensure women's participation, and address any potential gender disparities.
  Project Activity: Women's participation in water management committees.
  Risk: Women may not have equal access to decision-making power.
  Mitigation: Implement gender-specific training programs and enforce policies that promote women's leadership.
- **Indigenous peoples**: Additional engagement and management are required to respect and incorporate indigenous peoples' rights and ensure their involvement in the project.
  Project Activity: Engagement with indigenous groups
  Risk: Potential disregard for indigenous rights and traditional practices
  Mitigation: Establish consultation processes with indigenous leaders and integrate traditional knowledge into project planning. Project Activity: Engagement with indigenous groups
- **Involuntary resettlement**: Any potential resettlement must be carefully managed, with assessments to ensure it is voluntary and consensual, and that fair compensation and support are provided.
  Project Activity: Land allocation for project activities
  Risk: Involuntary displacement of local populations.
  Mitigation: Develop and implement fair resettlement and compensation plans
- **Protection of natural habitats**: Additional assessments are needed to ensure project activities do not negatively impact natural habitats and that conservation measures are implemented.
  Project Activity: Conservation of biodiversity-rich areas
  Risk: Degradation of natural habitats due to project activities
  Mitigation: Conduct environmental impact assessments and establish protected areas.
- **Conservation of biological diversity**: Requires biodiversity assessments and plans to mitigate negative impacts on local biodiversity.
- **Pollution prevention and resource efficiency**: Additional measures are needed to prevent pollution,

ensure efficient use of resources, and monitor environmental impacts.

- **Public health**: Requires assessments to identify and mitigate any negative impacts on public health, such as water contamination or disease spread.
- **Physical and cultural heritage**: Needs assessments to protect and preserve cultural heritage sites that could be affected by project activities.
- **Lands and soil conservation**: Requires soil health assessments and the implementation of sustainable land management practices to prevent soil degradation.

By identifying these areas where additional assessment and management are required, the CCAILCO project can better align with the Adaptation Fund's environmental and social principles, ensuring a comprehensive approach to risk management and sustainability.

5. **Environmental and social risk management measures in line with the Environmental and Social Policy of the Adaptation Fund**

The CCAILSO project environmental and social risks analysis indicate limited significant environmental or social impacts as per the Environmental and Social Policy of the Adaptation Fund. The impacts levels are evaluated to be low or medium risks; thus, the project is classified under Category B of risk. This means that the project activities have small-scale impacts, limited to the project area and easily mitigated through good environmental and social management practices.

Besides, the project will undertake environmental and social impact assessment reviews as applicable (depending on the scale of the project activities to be undertaken).

The Table Below is describe the possible negative impacts/risks of the CCAILSO project activities and the necessary mitigating measures in compliance with the 15 principles of the Adaptation Fund Environmental and Social Policies:

Table 3: E&S impacts/risks of the CCAILSO project activities and the mitigating.

AF Principle	Possible Negative Impacts/Risks	Mitigating Measures
1. Compliance with the law	Risk of non-compliance with local and national regulations, leading to legal issues and project delays.	Ensure thorough review of all relevant laws and regulations. Conduct regular legal compliance audits and engage legal experts.
2. Access and equity	Risk of unequal access to project benefits, particularly for marginalized groups such as women, indigenous peoples, and the poor.	Implement inclusive engagement strategies, prioritize participation from all community sectors, and monitor equitable distribution of resources and benefits.
3. Marginalized and vulnerable groups	Risk of excluding vulnerable groups from project benefits and decision-making processes.	Conduct social impact assessments to identify vulnerable groups, involve them in planning and implementation, and tailor activities to meet their specific needs.
4. Human rights	Potential for human rights violations if project activities inadvertently infringe on local communities' rights.	Develop and implement a human rights policy, provide training on human rights for all project staff, and establish a grievance mechanism for affected communities.
5. Gender equality and women's empowerment	Risk of reinforcing existing gender inequalities if women are not adequately included in project activities.	Ensure gender-sensitive planning and implementation, promote women's participation and leadership in all project activities, and provide gender awareness training for staff and stakeholders.
6. Core labour rights	Risk of violating labour rights through unsafe working conditions or unfair labour practices.	Adhere to national and international labour standards, ensure safe working conditions, and provide fair wages and benefits. Establish a monitoring system for labour rights compliance.

7. Indigenous peoples	Risk of disregarding the rights and needs of indigenous peoples, leading to conflicts and loss of cultural heritage.	Engage with indigenous communities from the outset, respect their rights and traditional knowledge, and ensure their full participation in project activities. Include indigenous representatives in the decision-making process.
8. Involuntary resettlement	Risk of involuntary displacement of communities due to project activities.	Avoid resettlement wherever possible. If unavoidable, ensure that resettlement is voluntary and conducted with full consent and adequate compensation. Provide support for livelihood restoration.
9. Protection of natural habitats	Risk of degradation or destruction of natural habitats through project activities.	Conduct environmental impact assessments, implement habitat restoration and conservation measures, and monitor the ecological impacts of project activities.
10. Conservation of biological diversity	Risk of negatively impacting local biodiversity through land use changes and introduction of non-native species.	Prioritize the use of native species in restoration efforts, implement biodiversity conservation plans, and regularly monitor biodiversity impacts.
11. Climate change	Risk of increased greenhouse gas emissions or reduced resilience to climate change impacts.	Promote low-carbon technologies and practices, integrate climate resilience into all project components, and monitor greenhouse gas emissions and climate impacts.
12. Pollution prevention and resource efficiency	Risk of pollution from project activities (e.g., use of pesticides) and inefficient use of natural resources.	Implement pollution prevention measures, promote resource-efficient technologies and practices, and regularly monitor pollution levels and resource use efficiency.
13. Public health	Risk of negative impacts on public health through water contamination, spread of diseases, or inadequate sanitation facilities.	Ensure access to clean water and sanitation, implement health and safety measures, and promote public health awareness campaigns. Conduct regular health impact assessments.
14. Physical and cultural heritage	Risk of damage to physical and cultural heritage sites through project activities.	Conduct heritage impact assessments, involve local communities in the protection of heritage sites, and implement measures to avoid or mitigate any adverse impacts on physical and cultural heritage.
15. Lands and soil conservation	Risk of soil degradation through unsustainable land use practices.	Promote sustainable land management practices, implement soil conservation measures, and monitor soil health regularly. Provide training on sustainable agricultural practices to local farmers and communities.

The table above provides an overview of potential negative impacts/risks and suggests appropriate mitigating measures for each principle to ensure that the Siwa Oasis project aligns with the Adaptation Fund's environmental and social policies.

5.1 Evaluating the potential environmental and social risks.

A table below is evaluating the potential environmental and social risks of the CCAILSO project activities, along with the positive impacts, mitigation measures, and predictions about the significance of residual impacts:

Table 4: Evaluating environmental and social risks of the CCAILSO project

AF Principle	Potential Negative Impacts/Risks	Mitigating Measures	Positive Impacts	Residual Impact (Post-Mitigation)
1. Compliance with the law	Risk of non-compliance with local and national regulations.	Conduct thorough legal reviews, engage with legal experts, continuous monitoring for compliance.	Ensures legal compliance and smooth project execution.	Low

2. Access and equity	Unequal access to project benefits.	Implement inclusive engagement strategies, prioritize marginalized groups.	Equitable distribution of resources and benefits. Promotes social inclusion and equality.	Low
3. Marginalized and vulnerable groups	Exclusion of vulnerable groups from project benefits.	Conduct social impact assessments, involve vulnerable groups in planning, tailor activities to meet their needs.	Improved living conditions and empowerment of marginalized and vulnerable groups. Enhanced social cohesion and inclusivity.	Low
4. Human rights	Potential infringement on local communities' rights.	Develop and enforce a human rights policy, provide training, establish a grievance mechanism.	Upholding human rights, promoting fair treatment and justice.	Low
5. Gender equality and women's empowerment	Reinforcing existing gender inequalities.	Ensure gender-sensitive planning, promote women's participation and leadership, provide gender awareness training.	Enhanced gender equality and empowerment of women, leading to better socio-economic outcomes for women. Increased women's participation in decision-making processes.	Low
6. Core labour rights	Unsafe working conditions, unfair labour practices.	Adhere to labour standards, ensure safe working conditions, fair wages, establish monitoring system.	Improved labour conditions, better worker welfare and productivity.	Low
7. Indigenous peoples	Disregarding the rights and needs of indigenous peoples.	Engage with indigenous communities, respect their rights, ensure their participation.	Preservation of cultural heritage, improved relations and trust with indigenous communities.	Low
8. Involuntary resettlement	Involuntary displacement of communities.	Avoid resettlement, ensure voluntary and consensual resettlement, provide adequate compensation and support.	Voluntary resettlement improves living conditions and minimizes social disruption. Enhanced community satisfaction and trust in the project.	Low
9. Protection of natural habitats	Degradation or destruction of natural habitats.	Conduct environmental impact assessments, implement habitat restoration and conservation measures.	Preservation and enhancement of natural habitats, leading to improved biodiversity and ecosystem services.	Low
10. Conservation of biological diversity	Negative impacts on local biodiversity.	Use native species, implement biodiversity conservation plans, monitor biodiversity impacts.	Conservation of biodiversity, promotion of ecological balance.	Low
11. Climate change	Increased greenhouse gas emissions, reduced climate resilience.	Promote low-carbon technologies, integrate climate resilience, monitor emissions and climate impacts.	Enhanced climate resilience, reduction in greenhouse gas emissions, promotion of sustainable practices.	Low
12. Pollution prevention and resource efficiency	Pollution from project activities, inefficient resource use.	Implement pollution prevention measures, promote resource-efficient technologies, monitor pollution and resource use efficiency.	Reduction in pollution levels, improved resource efficiency, and sustainable use of natural resources.	Low

13. Public health	Negative impacts on public health (e.g., water contamination, disease spread).	Ensure access to clean water and sanitation, implement health and safety measures, promote public health awareness campaigns.	Improved public health outcomes, reduced disease incidence, better quality of life.	Low
14. Physical and cultural heritage	Damage to physical and cultural heritage sites.	Conduct heritage impact assessments, involve communities in protection efforts, implement measures to avoid or mitigate impacts.	Preservation of cultural heritage, enhanced cultural pride and identity.	Low
15. Lands and soil conservation	Soil degradation through unsustainable land use practices.	Promote sustainable land management practices, implement soil conservation measures, monitor soil health, provide training.	Improved soil health, enhanced agricultural productivity, reduced soil erosion and degradation.	Low

This table provides a comprehensive overview of the potential risks, mitigating measures, positive impacts, and residual impacts after mitigation for the Siwa Oasis project, ensuring alignment with the Adaptation Fund's environmental and social principles.

6. Environmental and Social Management Plan (ESMP)

In accordance with the Environmental and Social Policy being enforced by the Adaptation Fund, and once all projects have been reviewed pursuant to the fifteen principles, and risks and impacts have been identified for each activity, the mitigation measures should be brought forward, together with the names of persons responsible for their implementation in the Environmental and Social Management Plan (ESMP). This Plan has been jointly prepared by the implementing entity team (OSS), National executing entity (DRC) .
This document highlights the following sections:

- E&S connecting the components and activities of the CCAILSO
- Environmental and social management plan
- Environmental Monitoring Program
- Capacity building program

The Environmental and Social Management Plan that has been drafted up for the project incorporates specific measures to prevent and mitigate adverse environmental and social risks and impacts that have been identified in all the project activities. Mitigation measures envisaged according to the relevant risks identified are indicated. Information is included herein pertaining organizations responsible for implementing these mitigation measures and ensuring they have indeed been applied. As a part to the Environmental and Social Management Plan, and prior to their implementation, all activities should go through an environmental and social risks´ screening process (table below) and, depending upon related findings, mitigation measures should be defined that are properly discussed and disseminated with local authorities and other relevant stakeholders.

6.1 E&S connecting the components and activities of the CCAILSO

The below table maps the connecting of the components and activities of the CCAILSO Project to the environmental and social principles outlined by the AF.

Output 1.1.1: Developed/updated water resources management plans	
1. Activity 1.1.1.1: Assessing and Identifying the Status of Surface and Groundwater Resources in Target Areas	
- Principle 12: Pollution prevention and resource efficiency: Ensuring sustainable water use and preventing contamination of water resources.	*- Principle 15: Conservation of Land and Soil: Protecting soil from erosion and degradation through efficient water management.*
2. Activity 1.1.1.2: Elaborating/Updating Water Resources Management Plan	

- Principle 1: Compliance with the law: Ensuring water management plans adhere to national and local regulations.	*- Principle 11: Climate change: Adapting water management plans to address climate variability and water scarcity.*
3. Activity 1.1.1.3: Enhancing the Capacity of National, Sub-national, and Local Institutions in Water Resources Management	
- Principle 2: Access and equity: Ensuring all community members have fair access to water resources.	*- Principle 4: Human rights: Strengthening institutional capacity to ensure equitable access to water.*
Output 1.2.1: Increased irrigation water access and use in the target communities	
1. Activity 1.2.1.1: Promoting and Enhancing the Irrigation Infrastructure System and Wastewater Drain Network	
- Principle 9: Protection of natural habitats: Ensuring infrastructure development does not harm natural habitats.	*- Principle 12: Pollution prevention and resource efficiency: Efficient use of water and prevention of wastewater pollution.*
2. Activity 1.2.1.2: Establishing Solar-Powered Small-Scale Irrigation Systems	
- Principle 11: Climate change: Reducing carbon footprint by using renewable energy sources.	*- Principle 5: Gender equality and women's empowerment: Enhancing women's access to sustainable irrigation for agriculture.*
3. Activity 1.2.1.3: Capacity Building for Farmers on Irrigation Network Management	
- Principle 2: Access and equity: Providing equitable training opportunities for all farmers.	*- Principle 13: Public Health: Ensuring safe water use practices to protect public health.*
4. Activity 1.2.1.4: Promoting the Use of Low Salinity Agricultural Wastewater	
- Principle 12: Pollution prevention and resource efficiency: Efficiently using wastewater to reduce freshwater demand.	*- Principle 10: Biodiversity conservation: Ensuring wastewater use does not harm local biodiversity.*
Output 1.2.2: Increased access to potable water among the target communities (20% women)	
1. Activity 1.2.2.1: Assessing and Identifying the Most Viable Water Solutions	
- Principle 5: Gender equality and women's empowerment: Focusing on women's access to potable water.	*- Principle 14: Physical and Cultural Heritage: Ensuring water solutions respect local cultural practices and heritage.*
2. Activity 1.2.2.2: Establishing/Updating Models for Water Collection for Human Consumption (Communal Wells and Boreholes)	
- Principle 13: Public Health: Ensuring clean and safe water for consumption.	*- Principle 7: Indigenous Peoples: Respecting the rights and needs of indigenous communities in water resource planning.*
3. Activity 1.2.2.3: Developing and Implementing Well-Management Systems	
- Principle 8: Involuntary resettlement: Ensuring that water management practices do not displace communities.	*- Principle 12: Pollution prevention and resource efficiency: Sustainable management of water wells to prevent over-extraction.*
Output 2.1.1: Climate resilient Agricultural practices are adopted	
1. Activity 2.1.1.1: Developing Community Adaptation Action Plans	
- Principle 11: Climate change: Developing strategies to adapt agricultural practices to climate impacts.	*- Principle 4: Human rights: Ensuring community participation in adaptation planning.*
2. Activity 2.1.1.2: Setting Up, Procuring Inputs, and Managing Demonstration Plots	
- Principle 10: Biodiversity conservation: Promoting agricultural practices that support biodiversity.	*- Principle 15: Conservation of Land and Soil: Demonstrating sustainable land management techniques to prevent soil degradation.*
3. Activity 2.1.1.3: Promoting Agro-sylvo-pastoral Practices (Integration of Trees and Crops with Livestock Production)	
- Principle 10: Biodiversity conservation: Integrating trees and livestock to enhance ecosystem biodiversity.	*- Principle 15: Conservation of Land and Soil: Preventing soil erosion through integrated land use.*
4. Activity 2.1.1.4: Promoting Production and Use of Bio-Compost and Bio-Pesticides	
- Principle 13: Public Health: Reducing health	*- Principle 12: Pollution prevention and resource*

risks associated with chemical pesticides and fertilizers.	*efficiency: Reducing reliance on chemical inputs through organic alternatives.*
Output 2.1.2: Sustained Green belts developed	
1. Activity 2.1.2.1: Establishing Climate Adaptation and Innovation Centers	
- Principle 14: Physical and Cultural Heritage: Integrating traditional knowledge with innovative climate adaptation practices.	*- Principle 11: Climate change: Promoting innovation in climate adaptation strategies.*
2. Activity 2.1.2.2: Identifying/Establishing Farmers Clubs for Concrete SLM Application	
- Principle 4: Human rights: Ensuring inclusive participation in farmer clubs.	*- Principle 9: Protection of natural habitats: Encouraging sustainable practices that protect local habitats.*
3. Activity 2.1.2.3: Establishing Community Tree Nurseries	
- Principle 10: Biodiversity conservation: Supporting reforestation and biodiversity through community nurseries.	*- Principle 15: Conservation of Land and Soil: Enhancing soil stabilization through tree planting.*
4. Activity 2.1.2.4: Establishing Green Belts for the Stabilization of Sand Dune Movements (Mechanical and Biological)	
- Principle 9: Protection of natural habitats: Creating green belts to prevent desertification and protect ecosystems.	*- Principle 15: Conservation of Land and Soil: Using vegetation to stabilize soil and prevent erosion.*
5. Activity 2.1.2.5: Introducing Soil Stabilization and Enrichment Techniques to Promote Agricultural Productivity	
- Principle 15: Conservation of Land and Soil: Implementing soil enrichment techniques to improve agricultural productivity.	*- Principle 12: Pollution prevention and resource efficiency: Promoting sustainable use of soil resources.*
Output 3.1.1: Improved livestock production practices adopted	
1. Activity 3.1.1.1: Supporting Access to Veterinary Services for Farmers and Communities	
- Principle 3: Marginalized and vulnerable groups: Providing veterinary services to underserved communities.	*- Principle 13: Public Health: Ensuring animal health to protect public health and food security.*
2. Activity 3.1.1.2: Promoting Production of Short-Cycle Livestock	
- Principle 11: Climate change: Enhancing livestock adaptation to climate variability.	*- Principle 2: Access and equity: Ensuring equitable access to improved livestock breeds.*
3. Activity 3.1.1.3: Enhancing Livestock and Pasture Management Systems (Breeding, Fodder, etc.)	
- Principle 10: Biodiversity conservation: Implementing pasture management practices that support biodiversity.	*- Principle 12: Pollution prevention and resource efficiency: Promoting efficient fodder use and sustainable grazing.*
Output 3.1.2: Enhanced community livelihood resilience through the adoption of Income-Generating Activities (IGAs)	
1. Activity 3.1.2.1: Support business planning for alternative IGAs (Beekeeping, Ecotourism, Zero grazing, Handcrafts, etc.)	
- Principle 5: Gender equality and women's empowerment: Encouraging women's participation in alternative IGAs.	*- Principle 7: Indigenous Peoples: Respecting indigenous practices in IGAs.*
2. Activity 3.1.2.2: Establish revolving fund schemes for IGAs with a gender focus	
- Principle 5: Gender equality and women's empowerment: Providing financial support to women-led IGAs.	*- Principle 6: Fundamental rights of women work: Promoting economic opportunities for women.*
3. Activity 3.1.2.3: Establish and support savings and credit co-operative society (SACCO) for Eco-tourism ventures	
- Principle 7: Indigenous Peoples: Ensuring eco-tourism ventures benefit indigenous communities.	*- Principle 14: Physical and Cultural Heritage: Promoting eco-tourism that respects and highlights local heritage.*
4. Activity 3.1.2.4: Develop/upscale value chain market linkages for communities with key stakeholders and the private sector	
- Principle 3: Marginalized and vulnerable groups: Supporting market access for vulnerable groups.	*- Principle 2: Access and equity: Ensuring fair market access for local producers.*

Output 4.1.1: Improved understanding of stakeholders to integrate CC into Planning Processes	
1. Activity 4.1.1.1: Conduct Baseline, Capacity Needs Assessment, and KAP Survey of All Stakeholders	
- Principle 1: Compliance with the law: Ensuring assessments comply with legal requirements.	*- Principle 4: Human rights: Involving all stakeholders in the assessment process.*
2. Activity 4.1.1.2: Capacity Building for Extension Services on Climate Change Adaptation Planning	
- Principle 2: Access and equity: Providing equitable training opportunities for all stakeholders.	*- Principle 11: Climate change: Building capacity to integrate climate change into planning.*
3. Activity 4.1.1.3: Design and Develop Communication Strategy Supported by Necessary Materials	
- Principle 4: Human rights: Ensuring clear and inclusive communication of climate adaptation strategies.	*- Principle 2: Access and equity: Making communication materials accessible to all community members.*
4. Activity 4.1.1.4: Disseminate project results and share lessons learned with national and international stakeholders, mainstreaming new approaches in local and regional planning	
- Principle 11: Climate change: Promoting the integration of successful adaptation approaches into broader planning processes.	*- Principle 1: Compliance with the law: Sharing best practices in accordance with legal frameworks.*

Overall Project Alignment

Each component of the Siwa Project is designed to be environmentally sustainable and socially inclusive, aligning with the 15 principles in the following ways:

1**. Compliance with the law**: Ensuring all activities comply with relevant laws and regulations.
2**. Access and equity**: Guaranteeing fair and equitable access to resources and opportunities.
3. **Marginalized and vulnerable groups**: Focusing on the inclusion and empowerment of these groups.
4. **Human rights**: Upholding and promoting human rights in all activities.
5**. Gender equality and women's empowerment**: Integrating gender considerations and promoting women's empowerment.
6**. Fundamental rights of women work**: Protecting women's labour rights in all initiatives.
7. **Indigenous Peoples**: Respecting and integrating indigenous knowledge and needs.
8. **Involuntary resettlement**: Avoiding or minimizing resettlement impacts.
9. **Protection of natural habitats:** Conserving natural habitats and biodiversity.
10. **Biodiversity conservation**: Promoting practices that protect and enhance biodiversity.
11. **Climate change**: Enhancing resilience and adaptive capacities to climate change.
12. **Pollution prevention and resource efficiency**: Implementing sustainable practices to prevent pollution and ensure resource efficiency.
13**. Public Health**: Improving public health through better resource management and environmental practices.
14. **Physical and Cultural Heritage**: Preserving cultural heritage through community engagement and education.
15. **Conservation of Land and Soil**: Promoting sustainable land and soil management practices.

6.2 Environmental and Social Management Plan (ESMP) for the CCAILSO Project

E&S management plan Based on the precautions and effective measures to be put in place to ensure good management of the environmental, social and safety impacts and the sustainability of the project, this plan gives the guidelines for an efficient consideration of environmental and social concerns. This Environmental Management Plan includes activities that are nothing more than the remedial measures proposed for the successful completion of the project in environmental and social terms. It has been presented here in tabular form with activities, impact indicators, types and mechanisms of monitoring as well as those responsible for monitoring and surveillance. The various measures presented here are to be added to the specifications of the proponent who will be prepared for the implementation of the project of integration of the measures of adaptation to climate change in the targeted countries, because, an integral part of the project. The implementation of this plan is coordinated by the OSS, the national Executing Entities (DRC) and local

Communities and authorities in collaboration with the technical structures in charge of the evaluation and rescue of the environment (respective within Egypt).
The Environmental and Social Management Plan (ESMP) for the CCAILSO Project outlines the necessary precautions and measures to ensure effective management of environmental, social, and safety impacts. The ESMP also aims to ensure the sustainability of the project by addressing environmental and social concerns efficiently. Below is a table summarizing the ESMP with activities, impact indicators, monitoring mechanisms, and responsible parties.

Table 5: Environmental and Social Management Plan

E&S Principles	Potential Impacts	Mitigation Measures	Indicators	Responsible Party
1. Compliance with the Law	Non-compliance with local and national regulations	Ensure all project activities comply with relevant laws	Number of compliance checks, legal audits	OSS, National Executing Entities
2. Access and Equity	Unequal access to project benefits	Implement inclusive policies and practices	Participation rates of marginalized groups	OSS, Local Community Leaders
3. Marginalized and Vulnerable Groups	Exclusion of vulnerable populations	Targeted outreach and support programs	Inclusion rate of vulnerable groups	Local NGOs, National Executing Entities
4. Human Rights	Violation of human rights	Adherence to human rights policies	Number of human rights training sessions	OSS, Local Human Rights Organizations
5. Gender Equality and Women's Empowerment	Gender inequality in project participation	Gender-specific programs and workshops	Gender participation rates, number of women in leadership roles	OSS, Women's Associations
6. Core Labour Rights	Violation of labour rights	Compliance with labour laws and fair employment practices	Labor rights compliance audits, worker feedback	National Executing Entities, Local Employers
7. Indigenous Peoples	Disruption of indigenous communities	Engage indigenous leaders in planning and implementation	Number of consultations with indigenous communities	OSS, Indigenous Community Leaders
8. Involuntary Resettlement	Displacement of communities	Avoid or minimize resettlement, provide fair compensation	Number of resettlement cases, compensation records	National Executing Entities, Local Authorities

9. Protection of Natural Habitats	Destruction of natural habitats	Implement conservation measures, restrict harmful activities	Area of protected habitats, biodiversity indices	National Environmental Agencies, OSS
10. Conservation of Biological Diversity	Loss of biodiversity	Promote biodiversity-friendly practices	Species diversity indices, habitat preservation reports	OSS, Local Conservation Groups
11. Climate Change	Increased greenhouse gas emissions	Promote renewable energy and energy efficiency	Emission reduction metrics, energy consumption reports	OSS, Local Energy Authorities
12. Pollution Prevention and Resource Efficiency	Increased pollution and resource depletion	Implement waste management and resource efficiency measures	Pollution levels, resource usage metrics	Local Environmental Agencies, National Executing Entities
13. Public Health	Negative health impacts from project activities	Ensure access to clean water and sanitation, promote health and safety	Health and safety records, water quality tests	Local Health Authorities, OSS
14. Physical and Cultural Heritage	Damage to cultural and historical sites	Identify and protect cultural heritage sites	Number of protected heritage sites, heritage impact assessments	Local Cultural Heritage Departments, OSS
15. Lands and Soil Conservation	Soil erosion and degradation	Implement sustainable land use practices, soil conservation measures	Soil quality tests, erosion rates	Local Farmers, Agricultural Extension Services

6.3 Environmental Monitoring Program

Environmental and social monitoring will be mainstreamed in the overall Monitoring and Evaluation (M&E) system of the CCAILSO Project. Environmental monitoring of sub-projects will be undertaken at different levels. EA In-house Environmental/Social Experts will be responsible for day-day supervision and monitoring of implementation of environmental and social safeguards and preparing routine Reports. Also trained persons at lower local government levels will, depending on the scale or scope of the projects, undertake the monitoring exercises in sequences and frequencies stipulated in the Project Implementation Schedule including where appropriate a Maintenance Schedule. The regulatory Agencies will mainly carry out “spot checks” to ensure that implementation of mitigation measures is done satisfactorily.
It is vital that an appropriate environmental supervision plan is developed with clear objectives to ensure the successful implementation of this ESMP.

Implementing Entity (IE)
OSS (Observatoire du Sahara et du Sahel): Responsible for overall coordination and implementation of the ESMP.
National Executing Entity (NEE)
DRC, National Executing Entities: Responsible for implementing specific project activities in collaboration

with local authorities and communities.

NGOs

Local NGOs and Community Leaders: Engage in community mobilization and ensure the inclusion of marginalized groups.

Local Farmers and Associations

Local Farmers and Associations: Play a key role in the practical implementation of agricultural and water management practices.

National Environmental Agencies

National Environmental Agencies: Monitor and enforce environmental protection measures.

Implementation and Monitoring

- Regular Monitoring: Conducted through field inspections, surveys, and feedback mechanisms to track progress and address issues promptly.
- Community Involvement: Continuous engagement with local communities to ensure their participation and address any concerns.
- Periodic Evaluations: Independent evaluations to assess the effectiveness of the ESMP and make necessary adjustments.

This plan ensures that environmental, social, and safety impacts are managed effectively, contributing to the sustainable development of the Siwa Oasis Project.

6.4 Capacity building program

The preparation, implementation and monitoring and evaluation envisaged in this project are based on a system of organization that involves the contribution of several categories of interventions, particularly the structures mentioned above. This will create the right conditions for better results. The table below shows the cost of the capacity building program for these actors.

Table 7: Stakeholders capacity building program

Topic	Target entities	Implementing entities	Indicators	Timing	Cost (USD)
Training on environmental monitoring	NEE	OSS	Nb of training sessions Nb of trained persons	Project start	20,000

Project Grievance Mechanism

The proposed project will utilize the existing OSS grievance mechanism to allow affected populations to raise concerns that are not complying with its social and environmental policies or commitments.

OSS has established a grievance mechanism through its procedures, which is an independent mechanism whereby a matter, resulting from a project financed or implemented by OSS may file a complaint. The grievance mechanism, which is made available to stakeholders in OSS website, is part of the environmental and social policy to address compliance as well as lodging USPs identified and grievance cases that may arise during implementation by OSS where a public guideline defines the complaint resolution mechanism.

It aims to establish an effective dialogue between those affected by the projects' it finances and all interested parties, to resolve the problem(s) the origin of a request, without seeking to assign responsibility or fault to any of these parties.

At the OSS (RIE) level: the grievance mechanism is coordinated and managed by OSS environmental and social committee (OESC). Communities and other stakeholders which will be affected by the project can submit complaints to OSS, the IE of the present project by: mail, email, fax or phone to the address indicated. Complainants may also refer the matter to the Ad hoc Complaint Handing Mechanism (ACHM) of the

Adaptation Fund if the IE is not responsive or are not content with the outcome of their complaint.

Sahara and Sahel Observatory Boulevard du Leader Yasser Arafat BP 31 Tunis Carthage 1080 Tunisia Tel: (+216) 71 206 633/634 Fax: (+216) 71 206 636 Email: doleances@oss.org.tn or boc@oss.org.tn	**Adaptation Fund Board Secretariat Mail stop: MSN P-4-4400 1818 H Street NW Washington DC 20433 USA Tel: 001-202-478-7347 Email: afbsec@adaptation-fund.org**

At the project level: The NEEs are the contact point for any project-related complaints from stakeholders in each country. The National project management with the support of the REE should respond promptly and appropriately with the support of the OESC. Where the complaint cannot be managed at the project level, the NEE or REE will direct the complainants to OSS for further action. The complainants will provide complete information in the form for proper assessment of the complaint(s). It will be the responsibility of the NEE and REE, under the control of OSS, to ensure that all relevant stakeholders are adequately informed about the grievance mechanism through awareness and sensitization campaigns highlighting the issue of potential USPs and how to address them . This mechanism will be made available and widely diffused during the launching workshops and the meetings and trainings. The guideline of grievance mechanism will be made available on the project and the national executing entity website. The procedures on how to submit the complaint are available on the website of the OSS or directly at Guide traitement doleances. If the OESC finds that a complaint is eligible, the OESC composes internal and/or external experts' team to investigate the case and proposes options for the complainant to consider.

Complaint Handling Process – Filling-in a complaint: Individuals or communities affected by project activities can submit complaints or claims through various forms and channels. To ensure accessibility, the methods for filing complaints will be diversified according to the context: At the national level: Complaints can be directed to OSS or the AF through the contacts provided, including via social media platforms. At the local level: Complaints can be submitted to local authorities or the NEE. The NEE's contact information will be made publicly available at the start of the project execution.

The mechanism will utilize all possible means and channels (both traditional and modern) to receive complaints or claims, whether anonymous or identified. These channels include, but are not limited to: telephone calls (widely used in the target area), self-referrals during supervision missions, observations made during meetings or field visits, social networks (e.g., WhatsApp), the project website, the project's email address, the OSS website, and mail via complaint boxes placed in the localities impacted by the project.

Receipt and registration of complaints: The NEE is responsible for ensuring the receipt and management of all complaints related to the project's activities and impacts. Upon receipt, complaints will be recorded, and a traceability procedure will be established. Complaints will generally be classified into two categories: (a) Non-sensitive complaints related to the implementation process, such as choices, methods, or results achieved; and (b) Sensitive complaints, which typically involve personal misconduct, including corruption, sexual abuse, or discrimination.

The NEE will formally acknowledge receipt of the complaint (via email or letter) within a maximum of one week. This acknowledgment will inform the complainant of the next steps and, if necessary, request clarifications or additional information to facilitate a better understanding of the issue.

Complaint handling: This process involves assessing the eligibility of a complaint to ensure that it is related to the project's activities or commitments. The goal is to establish a clear link between the issues raised and the project's impacts. The eligibility assessment will also determine whether the complaint should be addressed through the project-specific grievance mechanism or referred to other relevant mechanisms (e.g., whistleblowing channels).

In cases where complaints are unfounded, it is crucial to conduct thorough investigations to protect the project's reputation. This responsibility falls to the National Executing Entity (NEE). Unfounded complaints may include those lacking sufficient information, or those based on rumours or malicious intent, which could

disrupt the project's progress. Public complaints or accusations made to a wider audience that are deemed unfounded will be handled jointly by the Implementing Entity (IE) and NEE, potentially resulting in a formal statement.

For well-founded complaints, two types of responses are possible: (i) a direct response and action to resolve the issue, or (ii) a comprehensive audit, involving joint investigations, dialogues, and negotiations to reach a meaningful resolution. This may require expanding the team to include national and local experts.

Following the audit and investigations, a contextually appropriate and formal response will be provided to the complainant. This response should outline the procedures the NEE will follow to address the complaint or suggest the appropriate authorities to contact if the matter falls outside the NEE's responsibilities.

4. Annex 4: Cost Effectiveness Study

EXECUTIVE SUMMARY

The Climate Change Adaptation to Improve Livelihoods in Siwa Oasis (CCAILSO) Project aims to bolster the resilience of Siwa Oasis communities to climate change impacts. The project encompasses water resource management, agricultural productivity enhancement, and capacity building for climate adaptation. This comprehensive summary delves into the findings of the cost-effectiveness analysis for the project.

Context Analysis: Siwa Oasis is grappling with severe water scarcity and environmental challenges exacerbated by climate change. The CCAILSO project addresses these pressing issues through an integrated approach that combines sustainable water management, advanced agricultural practices, and community empowerment initiatives.

General Analysis:

Alignment with Regional Needs: The project's components are meticulously aligned with the unique needs of Siwa Oasis. The emphasis on water management, agricultural productivity, and community resilience directly responds to the region's vulnerabilities, ensuring a targeted and effective intervention.

Comparison with Similar Interventions: The project stands out when compared to other regional interventions due to its holistic approach. By integrating water management, sustainable agricultural practices, and comprehensive community training, the CCAILSO project offers a multi-faceted solution that other initiatives often lack.

Long-term Effectiveness: The long-term effectiveness analysis suggests that the CCAILSO project will yield sustainable benefits, significantly enhancing the region's resilience to climate change. In the absence of such interventions, existing challenges would likely worsen, underscoring the critical need for this project.

Specific Analysis of the CCAILSO Project Activities

Component 1: Water Resource Management

This component focuses on water resource management, addressing critical issues related to water availability and sustainability in agricultural and domestic use. The component budget of (US$) **2,375,000**, the benefit of the component is about is (US$) 4910000, while the Net benefit (US$) is about 2535000 US$, making it a cost-effective initiative for the component is about 0.48, The project is highly cost-effective, with a return on investment (ROI) of 2.07, which indicates that for every dollar spent, the project generates $2.07 in benefits. . The cost per beneficiary ($286) is moderate, given the vast improvement in land and water resources. The savings in water is about 2840000 M3 and the improvement in agricultural productivity by about 2330 F., add agriculture land by about 315 F., suggest a significant positive environmental impact, which, in turn, supports long-term community sustainability.

Component 2: Agricultural Productivity

Soil Stabilization and Enrichment Techniques: The project promotes soil stabilization and enrichment techniques such as contour ploughing, mulching, and cover cropping. These practices are designed to maintain soil health and enhance agricultural yields.

Budget and Returns: With a budget of $1,765,000, the expected returns are projected at $3,949,600. This positive return on investment highlights the cost-effectiveness of the agricultural interventions.

Cost-Effectiveness: The emphasis on sustainable agricultural practices ensures long-term productivity gains, making these interventions highly cost-effective rate 0.45.

The focus on sustainable agriculture through soil stabilization and enrichment techniques offers a favourable ROI of 2.24. The project has a significant impact on land productivity, improving 5,500 feddans and adding an additional 545 feddans for agriculture. The cost per beneficiary is consistent with that of the water resource management component, and despite

no direct water savings, the improved agricultural practices will likely have long-term benefits for soil and crop sustainability.

Financial analysis, it's important to emphasize that while the internal rate of return (IRR) before the project's interventions was relatively high, this was achieved at the expense of natural resource depletion and environmental degradation in the oasis. However, the expected outcomes after the project's interventions indicate a higher IRR, all while preserving the environment and protecting economic resources. This clearly reflects the project's economic viability, balancing both financial returns and sustainable resource management

Component 3: Community Capacity Building

- Training Programs for Farmers and Local Institutions: Comprehensive training programs focus on enhancing knowledge and practices related to water management and sustainable agriculture. These programs are designed to foster a culture of sustainability and resilience within the community.
- Budget and Returns: With a budget of $1,765,000, the expected returns are projected at $3,509,685. This positive return on investment highlights the cost-effectiveness of the agricultural interventions.
- Cost-Effectiveness: The emphasis on sustainable agricultural practices ensures long-term productivity gains, making these interventions highly cost-effective rate 0.57.
- Empowerment and Long-term Benefits: By empowering local communities with the necessary knowledge and skills, the project ensures the sustainability of its outcomes and the long-term resilience of the community.
- This component emphasizes building the capacity of local farmers and institutions. Although there are no direct physical outcomes (such as land improvement or water savings), the long-term economic and social benefits from the training programs and enhanced institutional capacity are reflected in the positive ROI (1.76). The cost per beneficiary is higher ($356.1) compared to the other components, but this is justified by the long-term benefits of knowledge transfer and sustainability through empowered local communities.
- **Financial analysis** : numerous economic feasibility studies were conducted for most activities related to this component, both before the project's interventions and to assess the expected impact after the proposed interventions.

Component 4: Livestock and Market Access

- Training for Livestock Management: Training programs for livestock management are designed to improve the efficiency and productivity of livestock farming, contributing to overall economic sustainability.
- Cost-Effectiveness: Investments in veterinary services and livestock training are expected to yield significant economic benefits, enhancing the livelihoods of local farmers and supporting community resilience.

  The table (42) shows the following: The cost of the component (US$) 641,549 while the benefit is (US$) 1,410,000.
- The focus on veterinary services and market access improvements for livestock farmers provides a high ROI of 2.2, the highest among the four components. The cost per beneficiary is significantly lower at $252.4, reflecting the direct and immediate economic benefits that this component offers. Enhancing livestock health and providing better market access will likely lead to improved economic stability for local farmers and a boost to the livestock economy in the region.

Overall CCAILSO Project:

The CCAILSO project demonstrates strong economic viability, with a return on investment of 1.72 across all components. The total cost of $8 million is justified by the wide-ranging benefits while the total benefit of 13.8 million, both direct (improved land and water resources) and indirect (enhanced community capacity and livestock market access). The net benefit of over $5.8 million highlights the project's ability to generate substantial economic gains for the local population, especially given the large number of beneficiaries (26,845). **Cost-Effectiveness:** With a cost-effectiveness rate of 0.58, the project is economically sound. The cost per beneficiary ($298.59) is reasonable given the scale and scope of the interventions, which cover water resource management, agricultural productivity, and community capacity building.

Land and Water Impact: The improvement of 7,830 feddans of land and the saving of 2.84 million cubic meters of water underscore the environmental and agricultural impact of the project. These outcomes contribute to the long-term sustainability of the region, ensuring that the community can continue to thrive in a resource-scarce environment.

Financial Analysis: The financial analysis indicates a positive benefit-cost ratio of 1.72. The NPV is positive with $2.56 million dollars and the internal rate of return is also positive with 75%. An important aspect to consider is that the additional benefits from implementing CRRP will continue into the future to occur on an annual basis. The proposed project is therefore cost-effective and worth the investment. The interventions in water resource management, agricultural productivity, capacity building, and livestock management ensure that the project addresses both immediate and long-term needs of the community, making it a sustainable and cost-effective initiative.

CONTEXT ANALYSIS

Siwa, spanning across 48,031.9 square kilometers, is home to a population of 36,575 individuals. Among them, 19,299 (52.8%) are male, while 14,275 (47.23%) are female, Siwa Oasis is an attractive destination for agricultural investment due to the availability of groundwater and fertile land. Approximately 32,000 people have settled permanently in the oasis to engage in investment opportunities, alongside the original inhabitants, in year 2022/2023.(Siwa information Center, 2024) The Siwa Oasis exemplifies a delicate desert ecosystem, prone to the impacts of climate change both presently and increasingly so in the future. This project aims to bolster the resilience of the Siwa ecosystem while simultaneously enhancing the livelihoods of the community in the face of these climate change challenges. It focuses on improving soil and water management systems, enhancing agricultural production, as well as promoting ecotourism. The project seeks to achieve several specific objectives: (i) Enhance water access and management through sustainable practices; (ii) Improve food security in response to climate change; and (iii) Strengthen local communities' resilience to climate change impacts by diversifying livelihood practices. To realize these objectives, the project is divided into four components:

Component 1: Improving water resource access and management for local communities:

This component aims to ensure sustainable water management to sustain the Siwa Oasis and support food security and livelihoods. It involves enhancing water distribution for agriculture and human consumption, increasing access, and building local capacity for water resource management.

Component 2: Enhancing resilience of Siwa Oasis ecosystems to climate change impacts:

Focusing on the vulnerable ecosystem, this component aims to improve resilience by adopting Sustainable Land Management (SLM) practices and diversifying livelihoods. The goal is to empower the community to adapt to climate change impacts and variability.

Component 3: Diversifying livelihoods through Income Generating Activities (IGAs) and value chain addition:

This component aims to improve the resilience of Siwa Oasis communities by diversifying livelihoods and adding value to local products. It focuses on creating alternative sources of income to reduce dependence on agriculture and enhance overall resilience.

Component 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts:
Recognizing the importance of knowledge and capacity-building, this component works on empowering local communities and institutions. It enhances communication and knowledge management, engaging government agencies, private enterprises, and communities to disseminate best practices and leverage local knowledge in the fight against climate change impacts.

Methodology

The Internal Rate of Return (IRR) is a financial metric used to evaluate the profitability of an investment or project. It is the discount rate that makes the net present value (NPV) of all cash flows (both incoming and outgoing) from a particular project equal to zero. Here is a step-by-step methodology for calculating the IRR:

Methodology for Calculating IRR

1. **Identify Cash Flows before and after the project intervention:**
    - List all expected cash flows associated with the project. This includes initial investment (usually a negative value) and subsequent net cash inflows and outflows over the project's duration, where a questionnaire form appendix 1
2. **Set Up the NPV Equation:**
3. **Find the IRR before and after the project intervention:**
    - The IRR is the rate (IRR) that makes the NPV equal to zero:

$$\sum_{t=1}^{n} \frac{B_t - C_t}{(1+r)^t} - I = 0$$

$$r = r_1 + \left[(r_2 - r_1) \times \frac{NPV_1}{NPV_1 - NPV_2} \right]$$

4. **Solve for IRR before and after the project intervention:**
    - Finding the IRR usually requires iterative methods as it is not possible to solve it algebraically for most cash flow series. Common methods include:

Methodology of the Cost Co-efficient Analysis of the CCAILSO Project

This analysis examines the cost coefficients of the Siwa Project (CCAILSO) based on the provided budget breakdown and rev. Cost coefficients represent the cost per unit of output or outcome and activities, Returns as well, providing insights into the project's efficiency and resource allocation.

1. **Identify Key activities:** We'll focus on the activities with quantifiable targets in the Results Framework.
2. **Total Benefit**: The total amount of benefit gained from the project or activity. This could be measured in various units depending on the context, such as number of beneficiaries, units of output, or other relevant measures of success. we add in Appendix 2
3. **Calculate Total Cost per Activities, the Returns and benefits:** Sum the budget allocated to each output/outcome across all project lifetime we add in Appendix 2

4. **Determine Unit of Measurement:** Identify the unit of measurement for each output/outcome target (e.g., number of people, hectares, tons).
5. **Calculate Cost Coefficient:** Divide the total cost per output/outcome and Activates by the target value.
6. **The Cost-Effectiveness Rate (CER)**: is a metric used to evaluate the cost efficiency of a project or activity by comparing the costs incurred to the benefits achieved. The general formula for calculating the Cost-Effectiveness Rate is: we add in Appendix 2

{Cost-Effectiveness Rate} = {Total Cost}/{Total Beneficiaries }

GENERAL ANALYSIS OF THE PROJECT

Alignment of Components with the Needs of the Siwa Oasis

The design of the CCAILSO Project is appropriate in the sense that it is designed to respond to the real needs of the population in a Siwa that the CCAILSO compounds and activities are designed to address the specific environmental needs and challenges of the Siwa Oasis ecosystem, promoting sustainability and resilience in the face of changing climate and socio-economic conditions tack in our account Siwa population and Gender.

Table 1. Alignment of the CCAILSO Project Components, Ecosystem, Population, and Gender

Ecosystem Component	Project Component	Activities	Siwa Population Considerations	Gender Considerations
Water Resources	Water Management	- Installation of irrigation systems - Improvement of water storage facilities - Rehabilitation of traditional water channels	- Ensure equitable water distribution - Engage local communities in maintenance	- Include women in water management committees - Provide training for women on water -saving techniques
Soil Quality	Sustainable Agriculture	- Training on sustainable farming practices - Introduction of organic farming techniques - Soil conservation measures	- Improve food security for local communities - Enhance agricultural productivity	- Support female farmers with resources and training - Promote women's participation in agricultural cooperatives
Biodiversity	Biodiversity Conservation	- Habitat restoration projects - Reforestation with native species - Protection of existing natural habitats	- Create green jobs for locals - Improve local air quality and aesthetics	- Ensure women have access to nursery jobs - Include women in decision-making for reforestation efforts
Vegetation	Reforestation and Afforestation	- Planting of drought-resistant trees - Establishment of community nurseries - Management of invasive species	- Build local capacity for climate resilience - Reduce vulnerability to climate impacts	- Train women in climate-smart practices - Ensure early warning systems are accessible to all genders
Climate Resilience	Climate Adaptation Strategies	- Implementation of climate-smart agriculture - Water harvesting techniques- Early warning systems for extreme weather events	- Boost local economy through tourism - Preserve cultural identity	- Involve women in cultural preservation activities - Promote women's roles in eco-tourism businesses

Cultural Heritage	Cultural Preservation	- Restoration of historical sites - Promotion of eco-tourism - Documentation and preservation of traditional knowledge	- Enhance economic opportunities - Strengthen community cohesion	- Offer gender-specific training programs - Support female entrepreneurs in crafts and tourism
Livelihoods	Community Development	- Capacity building and training programs - Development of sustainable tourism initiatives - Support for local crafts and industries	- Enhance economic opportunities - Strengthen community cohesion	- Offer gender-specific training programs - Support female entrepreneurs in crafts and tourism

Alignment of CCAILSO Project Components and Activities with Siwa Ecosystem, Population, and Gender

This section demonstrates how the CCAILSO project components and activities are specifically tailored to address the unique challenges and opportunities of the Siwa Oasis ecosystem, its population, and gender dynamics.

Component 1: Improving Water Resource Access and Management for Local Communities

- **Ecosystem Alignment:**
  - **Addressing Water Scarcity:** The project recognizes the oasis's dependence on limited groundwater resources and the exacerbating effects of climate change on water availability. Activities like promoting water efficient irrigation (1.21.1., 1.2.1.2, 1.2.1.3) and reusing treated wastewater (1.1.1.4) directly address water scarcity and contribute to sustainable water management.
  - Mitigating Waterlogging and Salinization: Recognizing the detrimental impacts of waterlogging and salinization on soil health and agricultural productivity, the project promotes improved drainage systems (1.3.4) and encourages the use of low-salinity agricultural wastewater (1.1.1.4, 1.1.2.4, 1.1.2.5).
  - Protecting Biodiversity: By enhancing water resource management, the project indirectly contributes to the conservation of Siwa's unique biodiversity, which relies on a healthy and balanced ecosystem.
- **Population Alignment:**
  - Community Engagement: The project emphasizes community participation in water management planning (1.1.1.3) and decision making, ensuring that solutions are locally appropriate and meet the needs of the Siwan people.
  - Improved Livelihoods: By increasing access to irrigation water (1.2.1) and safe drinking water (1.2.2), the project directly improves the livelihoods of farmers and communities, enhancing food security and overall well-being.
- **Gender Alignment:**
  - Equitable Access: The project ensures equitable access to water resources for both men and women,
    recognizing that women often face greater challenges in accessing water for domestic and productive uses
  - Women's Participation: Activities like capacity building for farmers (1.2.1.3) and community
    engagement (1.1.1.3) specifically target women, empowering them to participate in water
    management decisions.

Component 2: Enhancing Resilience of Siwa Oasis Ecosystems to Climate Change Impacts

- **Ecosystem Alignment:**
  - Sustainable Land Management: The project promotes sustainable land management practices (2.1.1) to enhance the resilience of the oasis's ecosystem to climate change impacts, such as drought, land degradation, and desertification.
  - Green Belt Development: Establishing green belts (2.1.2.4) serves as a natural barrier against sand dune encroachment, protecting agricultural lands and settlements.
  - Biodiversity Conservation: By promoting agro-sylvo-pastoral practices (2.1.1.3) and reducing activities that degrade biodiversity (2.1.2.2), the project contributes to the conservation of Siwa's unique flora and fauna.
- **Population Alignment:**
  - Food Security: By promoting climate resilient agricultural practices (2.1.1) and improving livestock production (2.2.1), the project enhances food security for the Siwan community.
  - Livelihood Diversification: The project encourages the adoption of alternative income generating activities (2.2.2) to reduce dependence on agriculture and enhance resilience to climate shocks.
- **Gender Alignment:**
  - Women's Role in Agriculture: The project recognizes the significant role of women in Siwan agriculture and ensures their participation in training and capacity building activities related to climate-resilient agriculture (2.1.1.2, 2.1.1.3).
  - Alternative Livelihoods for Women: The project promotes IGAs that are suitable for women, such as handicraft production and ecotourism (3.1.2), providing them with alternative income sources and empowering them economically.

Component 3: Diversifying Livelihoods through IGAs and Value Chain Addition

- **Ecosystem Alignment:**
  - Reducing Pressure on Natural Resources: By diversifying livelihoods beyond agriculture and tourism, the project reduces pressure on the oasis's limited natural resources, contributing to their sustainable management.
  - Promoting Sustainable Practices: The project encourages the development of IGAs that are environmentally sustainable, such as ecotourism (3.1.2) and the production of natural products (3.1.2.1).
- **Population Alignment:**
  - Economic Empowerment: The project empowers local communities, particularly women and youth, by providing them with alternative income sources and enhancing their economic resilience.
  - Improved Living Standards: By increasing income opportunities, the project contributes to improving living standards and reducing poverty in Siwa Oasis.
- **Gender Alignment:**
  - Women's Economic Empowerment: The project prioritizes women's economic

empowerment by promoting IGAs that are suitable for women and providing them with access to financial resources (3.1.2.2).

- Addressing Cultural Norms: The project recognizes the cultural constraints on women's participation in economic activities and designs IGAs that are culturally appropriate and acceptable.

Component 4: Strengthening Knowledge and Adaptive Capacities of Stakeholders

- **Ecosystem Alignment:**
  - Knowledge for Sustainable Management: The project promotes knowledge generation and sharing (4.1) to enhance the understanding of climate change impacts on the oasis's ecosystem and inform sustainable management practices.
- **Population Alignment:**
  - Community Awareness: The project raises awareness among local communities about climate change and its impacts, empowering them to participate in adaptation efforts.
  - Capacity Building: The project builds the capacity of stakeholders, including government agencies, NGOs, and local communities, to plan and implement climate change adaptation measures.
- **Gender Alignment:**
  - Inclusive Knowledge Sharing: The project ensures that knowledge sharing and capacity building activities are inclusive and accessible to both men and women.
  - Gender-Sensitive Adaptation: The project promotes gender resistive adaptation planning, recognizing that climate change impacts men and women differently.

Conclusion:

Therefore, the costs of the intervention are focused on building capacity, knowledge and opportunities in highly vulnerable communities, subject to severe deprivation that will certainly have immediate effects as a result of the CCAILSC project activities, as well as a long- term impact on people's own lives, the environment and socio-economic development.

The CCAILSO Project will directly benefit 8,695 people (17,150 indirectly) living in the Siwa, disaster risk reduction and environmental protection, through the development of 3 Components, all with a different focus but closely interlinked with each other.

The CCAILSO project is designed to be highly aligned with the specific needs and characteristics of the Siwa Oasis ecosystem, its population, and gender dynamics. By integrating environmental, social, and gender considerations into all project components and activities, the project aims to achieve sustainable and equitable development in the oasis, enhancing its resilience to climate change and improving the livelihoods of its inhabitants.

Comparison with similar interventions in the Region

Project duplication with other funding sources

The project will not duplicate existing efforts; instead, it will complement other development projects aimed at supporting smallholder farmers and vulnerable communities in building resilience to climate change. The listed projects below are complementary to the proposed project, featuring cross-cutting factors and Results-Based Management (RBM) across various regions of Egypt.

Table 2: Comparison with similar interventions in the Region

Project	Objectives	Synergies (duplication/complementarity)

"Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt" (Funded by GCF, implemented by UNDP,2017-2025, $US 73,807,000)	Targeting 5 coastal governorates of Port Said, Damietta, Beheira, Dakhalia, and Kafr ElSheikh in the Nile Delta, this project aims to reduce coastal flooding risks in Egypt's North Coast in the Lower Egypt area.	Complementarity between this project and the Siwa project, as both cover climate vulnerability yet different areas/zones of Egypt and different objectives, allow the government of Egypt to enhance inclusiveness and effectiveness of its response to climate change, where its two at-risk regions are being supported as well as promotion of lesson learning and experiences to ensure tangible results.
"GCF-EBRD Egypt Renewable Energy Financing Framework" (Funded by GCF, implemented by European Bank, 2017-2022, $US 852,300,000)	The project objective is to scale up renewable energy in Egypt through renewable energy integration and leveraged investments. The project is composed of two components: The first is a comprehensive technical assistance programme to enhance renewable energy integration, policies, and planning. The second component is to scale up investments to support the development and construction of renewable energy projects.	Complementarity between this project and the Siwa project, as both cover climate vulnerability yet different areas/zones of Egypt and different objectives, allow the government of Egypt to enhance inclusiveness and effectiveness of its response to climate change, where its two at-risk regions are being supported as well as promotion of lesson learning and experiences to ensure tangible results.
"Building Resilient Food Security Systems to Benefit the Southern Egypt Region "(Funded by Adaptation Fund, implemented by UN World Food Programme 2013-2017, US$ 6,904,318)	This project aims to improve the adaptive capacity of the South of Egypt in the face of anticipated reductions in food production due to climate change, through the introduction and use of water-efficient irrigation and other adaptive techniques; the establishment of greenhouses and agroforestry plots with subsurface irrigation, including nurseries for growing trees and new varieties; and the development of livestock and poultry breeding centers for the selection and reproduction of new heat-resistant varieties.	Complementarity between this project and Siwa project, as both cover climate vulnerability yet different areas/zones of Egypt, allow the government of Egypt to enhance inclusiveness and effectiveness of its response to climate change as well as replicability and upscaling, where its two at-risk regions are being supported.
"Building Resilient Food Security Systems to Benefit the Southern Egypt Region- Phase 2" (Funded by Adaptation Fund, implemented by UN World Food Programme 2021-2024, US$ 3,094,962)	The overall objective of this project is to build resilience of Southern Egypt farming communities in the face of climate change and variability risks to food security. The project will help vulnerable communities to increase their adaptive capacity by promoting solutions to 1) increase productivity of their staple crops such as wheat and maize; 2) diversify their production through intercropping, animal and fish production and agro-processing; 3) increase production through protected agriculture; 4) support the management of their water resources through low-cost water saving techniques and 5) loss reduction in extreme weather events through early warning.	Complementarity between this project and Siwa project, as both cover climate vulnerability yet different areas/zones of Egypt. **Synergies** will be sought in the form of experience sharing specially in the agricultural field (agropastoral activities, short cycle livestock, agricultural technics adapted to CC) as well as collaboration in raising awareness about climate change impacts and adaptation benefits.
GRID Connected Small-Scale Photovoltaic Systems (PVS) (Funded by GCF, implemented by United Nations Development Programme – UNDP, 2017-2022, US$ 33,796,364)	The objective of the project is to improve the energy efficiency of end-use equipment, specifically building appliances and lighting systems manufactured, marketed and used in Egypt. This is envisaged to be achieved through a combination of regulatory tools such as minimum energy performance standards and information labels, enhanced public awareness, capacity building and innovative and attractive financing mechanisms.	Complementarity between this project and the Siwa project, as both cover climate vulnerability yet different areas/zones of Egypt and different objectives, allow the government of Egypt to enhance inclusiveness and effectiveness of its response to climate change, where its two at-risk regions are being supported as well as promotion of lesson learning and experiences to ensure tangible results.

"Enhancing Climate Resilience of Smallholders in Middle Egypt" (Funded by GCF, implemented by World Food Program, will start in 2025)	Through this project, WFP extends its partnership with the Ministry of Agriculture and Land Reclamation to extend resilience to smallholders' communities in the old lands of Middle Egypt.	Complementarity between this project and Siwa project, as both cover climate vulnerability yet been executed in different areas/zones of the country, which allow the government of Egypt to enhance inclusiveness and effectiveness of its response to climate change.

Why the CCAILSO Project is Important

The Siwa project stands out due to its specific focus on the unique challenges faced by the Siwa Oasis, including water scarcity, soil salinity, and climate variability. Traditional farming methods in this region are often insufficient to address these issues effectively. By integrating advanced smart farming technologies, the project aims to optimize resource use, improve productivity, and promote sustainable practices. Additionally, the project emphasizes strong advisory support, ensuring that local farmers are educated and empowered to utilize these technologies effectively.

Key benefits of the Siwa project include:

- Improved Agricultural Yields: By introducing smart irrigation systems and salt-tolerant crop varieties, the project aims to enhance farm productivity to improve food security.
- Efficient Water Management: Advanced technologies will help optimize water use, crucial in an arid region like Siwa.
- Increased Climate Resilience: The project's focus on sustainability and resource management will help the local community adapt to climate change impacts.
- Economic Benefits: Enhanced agricultural productivity and resilience will boost the local economy and improve livelihoods.

In summary, the Siwa project is a vital component of Egypt's broader strategy to build resilience against climate change, complementing other regional initiatives and addressing specific local challenges.

SPECIFIC ANALYSIS OF PROJECT ACTIVITIES

Cost-Effectiveness of Component 1 : Improving Water Resource Access and Management

Outcome 1.1: Management capacity of water resources is enhanced

Output 1.1.1: Developed/updated water resources management plans

Activity 1.1.1.1: Assessing and Identifying the Status of Surface and Groundwater Resources

Table 3: Cost-Effectiveness Analysis Activity 1.1.1.1

Metric	Value (USD)
Total Cost	54,000
Total Estimated Return	105,000
Net Benefit	51,000
Cost-Effectiveness Ratio (CER**)**	0.51
Number of beneficiaries	50 Direct while 100 indirect
Cost Per beneficiaries	$360 per beneficiaries

Source: collected and calculated from table 1, 2 in Appendix3 and table 1 Appendix 4.

Activity 1.1.1.1 aims to enhance the understanding of water resources in Siwa, supporting informed decision-making and stakeholder engagement. With a budget of $54,000, the activity is expected to deliver significant returns in terms of data quality, policy influence, and community involvement, making it a cost-effective initiative for sustainable water management. The ratio 0.51 indicates that for every dollar spent, the activity is expected to yield approximately $1.94 in returns. The estimated quantitative impact includes assessing 800 water sources, influencing 10 new policies, and 50 direct stakeholders while indirect is about 100 beneficiaries.

Activity 1.1.1.2: Elaborating/Updating Water Resources Management Plan

Table 4: Cost-Effectiveness Analysis Activity 1.1.1.2

Metric	Estimated Value ($)
Total Costs	40,000
Total Estimated Benefits	105,000
Net Benefits	65,000
Cost-Effectiveness Rate (CER)	0.38
Number of beneficiaries	250 Direct while all community indirect
Cost Per direct benefit	$160 per direct beneficiaries

Source: collected and calculated from table 4, 5 in Appendix3 and table 1 Appendix 4.

The CER for Activity 1.1.1.2 is 38%, indicating that for every dollar spent, the activity is expected to yield benefits worth $2.63. This demonstrates that the activity is highly cost-effective, providing substantial benefits relative to its costs, the estimated quantitative impact includes Effective, 1 comprehensive plan, 10 actionable strategies, Effective, 1 comprehensive plan, 10 actionable strategies, and 800 stakeholders while the all community indirect beneficiaries represented is about 32,000 people have settled permanently in the oasis to engage in agriculture investment opportunities, alongside with about 15000 the original inhabitants is working in agriculture.

Activity 1.1.1.3: Enhancing the Capacity of National, Sub-national, and Local Institutions in Water Resources Management

Table 5: Cost-Effectiveness Analysis Activity 1.1.1.3

Metric	Estimated Value ($)
Total Costs	56,000
Total Estimated Benefits	120,000
Net Benefits	64,000
Cost-Effectiveness Rate (CER)	0.47
Number of beneficiaries	200 Direct while 600 indirect
Cost Per direct benefit	$70 per beneficiaries

Source: collected and calculated from table 7, 8 in Appendix3 and table 1 Appendix 4.

The CEA is 0.47 indicates that for every dollar spent, the activity is expected to yield approximately $2.14 in returns. There are 200 direct while 600 indirect beneficiaries from strengthened institutional capacity and improved governance frameworks, leading to sustainable water management practices in Siwa.

This investment aims to optimize the utilization of the $56,000 budget by focusing on capacity building, institutional reforms, and stakeholder engagement initiatives, ensuring effective and sustainable water resource management in Siwa.

Output 1.1.2: Strengthened water resources management in target communities.
Activity 1121: Identify and enhance institutional capacities of Water Users Associations (WUAs)"

Table 6: Cost-Effectiveness Analysis Activity 1.1.2.1

Metric	Estimated Value ($)
Total Costs	75,000
Total Estimated Benefits	100,000
Net Benefits	25,000
Cost-Effectiveness Rate (CER)	0.75
Water User Associations (WUAs)	318 (WUAs)
Comparative Analysis- cost per WUAs	235.85 per WUAs
Number of beneficiaries	40 Direct while 100 indirect beneficiaries
Cost Per direct beneficiaries	$536 per direct beneficiaries

***** Water point for private**,**
**Deep and government water points are used by 5 to 10 people and include a WUAs.
Source: collected and calculated from table 9, 10 in Appendix3 and table 1 Appendix 4.

This investment seeks to utilize the $75,000 budget effectively by enhancing the institutional capacities of WUAs, thereby promoting sustainable agricultural practices and ensuring long-term water resource management in the region.

The CEA of 0.75 indicates that for every dollar spent, the activity is expected to yield one dollar in returns. This suggests that the investment in enhancing the institutional capacities of Water Users Associations (WUAs) is justified by the anticipated returns. The balanced ratio shows that the project is expected to be sustainable and cost-effective, providing equal returns to the invested amount. This equilibrium suggests a well-planned allocation of resources with the potential for significant long-term benefits in irrigation performance, sustainability, and community empowerment.

Activity 1.1.2.2: Develop Water and Sanitation Health training modules.
Cost Effectiveness Analysis:

Table 7: Cost-Effectiveness Analysis Activity 1.1.2.2

Metric	Estimated Value ($)
Total Costs	50,000
Total Estimated Benefits	125,000
Net Benefits	75,000
Cost-Effectiveness Rate (CER)	0.40
Number of beneficiaries	250 Direct, 500 indirect beneficiaries
Cost Per direct benefit	$67 per beneficiaries

Source: collected and calculated from table 11, 12 in Appendix3 and table 1 Appendix 4.

The CER for Activity 1.1.2.2 is 0.40, meaning that for every dollar spent, the activity is expected to yield benefits worth $2.5. This demonstrates that the activity is highly cost-effective, providing substantial benefits relative to its costs, the estimated quantitative impact includes Effective, 250Directly, while indirectly500 beneficiaries, will also benefit, improving their health and nutritional status through enhanced water, sanitation, and hygiene practices, The estimated cost per is about 67 US$.

Activity 1.1.2.3: Strengthen communities' capacity to manage water resources.

Table 8: Cost-Effectiveness Analysis Activity 1.1.2.3

Metric	Estimated Value ($)
Total Costs	90,000
Total Estimated Benefits	150,000
Net Benefits	60,000
Cost-Effectiveness Rate (CEA)	0.60
Number of beneficiaries	300 Direct while 600 indirect
Cost Per direct benefit	$100 per beneficiaries

Source: collected and calculated from table 13, 14 in Appendix3 and table 1 Appendix 4.

The CER of 0.60 indicates that for every dollar spent, the activity is expected to yield about $1.67 in returns. This favourable ratio suggests that the investment in strengthening communities' capacity to manage water resources is highly cost-effective. The project is expected to generate significant returns, exceeding the initial investment, through improved water management, enhanced sustainability, and better public health and community engagement outcomes. This positive outcome indicates a well-planned allocation of resources with the potential for substantial long-term benefits for the community and the environment. The project aims to benefit local communities in Siwa by strengthening their capacity to manage water resources effectively, ensuring equitable access and sustainable use. The estimated cost per beneficiaries is about 100$.This investment seeks to maximize the impact of community-level interventions by addressing specific water management needs, fostering resilience, and promoting long-term sustainability in water resource management practices.

Outcome 1.2: Access to irrigation and potable water for target communities is enhanced

Output 1.2.1: Increased irrigation water access and use in the target communities

Activity 1.2.1.1: Promoting and Enhancing the Irrigation Infrastructure System and Wastewater Drain Network

Table 9: Cost-Effectiveness Analysis Activity 1.2.1.1

Metric	Value (USD)
Total Cost	710,000
Total Estimated Return	1.520,000
Net Benefit	810,000
Cost-Effectiveness Ratio	0.47
Number of beneficiaries	500 Direct, while 1,000 indirect
Cost Per direct benefit	$473 per beneficiary

Source: collected and calculated from table 15, 16 in Appendix3 and table 1 Appendix 4.

The CER is 0.47, meaning that for every dollar spent, there is a return of approximately $2.14. This positive net benefit and CER indicate that assessing and identifying the most viable water solutions is expected to be cost-effective, yielding significant returns on investment. The long-term benefits include increased agricultural productivity, with an estimated 1500 feddans seeing a 20% improvement in productivity, as well as the potential to cultivate an additional 125 feddans due to reliable water supply. Further benefits include a reduction in water loss, with improved infrastructure saving approximately 950,000 cubic meters of water per year. Lower levels of water contamination

will lead to healthier crops and a better environment, while job creation will enhance livelihoods, contributing to improved sustainability and community well-being

Activity 1.2.1.2: Establishing Solar-Powered Small-Scale Irrigation Systems

Cost-Effectiveness Analysis: compare the total costs of the activity against the estimated returns.

Table 10: Cost-Effectiveness Analysis Activity 1.2.1.2

Metric	Value (USD)
Total Cost	500,000
Total Estimated Return	980,000
Net Benefit	480,000
Cost-Effectiveness Ratio	0.51
Number of beneficiaries	250 Direct, 500 indirect
Cost-Effectiveness Ratio	$667 per beneficiary

Source: collected and calculated from table 17, 18 in Appendix3 and table 1 Appendix 4.

The CER for Activity 1.2.1.2 consist of infrastructure and equipment, including solar panels, irrigation systems, and water storage tanks, as well as installation, labor, and training. The installation of solar panels will support 20 water points, serving approximately 100 feddans. Similarly, small-scale drip and sprinkler irrigation systems will also support around 430 feddans. Additionally, 50 water storage tanks will be installed to ensure a consistent water supply, which will further contribute to the long-term sustainable development of the region.

The long-term benefits include a significant increase in agricultural productivity, with improved irrigation and water availability expected to boost productivity by about 35% in the target areas (100 feddans), saving approximately 420,000 cubic meters of water annually. There is also the potential to cultivate an additional 25 feddans, supported by a reliable water supply of about 630,000 cubic meters. Furthermore, the use of solar energy instead of conventional power will save approximately 1,200,000 kilo/watt/hours, contributing to environmental sustainability. The creation of jobs associated with these activities will enhance livelihoods, further promoting sustainability and community well-being.

The cost-effectiveness ratio (CER) for this activity is 0.51, indicating that for every dollar spent, there is a return of approximately $1.69. This positive net benefit and CER demonstrate that assessing and identifying the most viable water solutions is highly cost-effective, yielding substantial returns on investment.

Activity 1.2.1.3: Capacity Building for Farmers on Irrigation Network Management

Cost-Effectiveness Analysis: by compare the total costs of the activity against the estimated returns.

Table 11: Cost-Effectiveness Analysis Activity 1.2.1.3

Metric	Value (USD)
Total Cost	60,000
Total Estimated Return	160,000
Net Benefit	100,000
Cost-Effectiveness Ratio	0.38
Number of beneficiaries	200 direct and 400 indirect beneficiaries
Cost-Effectiveness Ratio	$100 per beneficiary

Source: collected and calculated from table 19, 20 in Appendix3 and table 1 Appendix 4.

The CER is 0.60, meaning that for every dollar spent, there is a return of approximately $2.67. The positive net benefit and CER indicate that this capacity-building activity is expected to be cost-effective, providing significant returns on the investment. The non-monetary benefits, such as improved knowledge and skills among farmers, enhanced confidence in managing irrigation systems, and long-term sustainability of water resources, further underscore the value of this activity. The capacity-building sessions are anticipated to have a profound impact on the local agricultural community, leading to improved irrigation management, increased agricultural productivity, and sustainable development in the Siwa Oasis.

Activity 1.2.1.4: Promoting the Use of Low Salinity Agricultural Wastewater

Table 12: Cost-Effectiveness Analysis Activity 1.2.1.4

Metric	Value (USD)
Total Cost	200,000
Total Estimated Return	525,000
Net Benefit	325,000
Cost-Effectiveness Ratio	0.38
Number of the beneficiaries	200 Direct and 500 indirect beneficiaries
Cost-Effectiveness Ratio	$386 per beneficiary

Source: collected and calculated from table 21, 22 in Appendix3.

The installation of solar panels will support 20 water points, serving approximately 100 feddans. Similarly, small-scale drip and sprinkler irrigation systems will cover around 100 feddans. Additionally, 20 water storage tanks will be installed to ensure a consistent water supply, contributing to the long-term sustainable development of the region.

The long-term benefits include a significant increase in agricultural productivity, with improved water management expected to enhance crop yields by approximately 10%. Increased fodder production will further support livestock, and there is potential to cultivate an additional 25 feddans, supported by a reliable freshwater supply of about 220,000 cubic meters. This is due in part to a reduced demand for freshwater through the use of treated wastewater. The creation of jobs associated with these activities will enhance livelihoods, further promoting sustainability and community well-being.

The cost-effectiveness ratio (CER) for this activity is 0.38, meaning that for every dollar spent, there is a return of approximately $2.63. This positive net benefit and CER indicate that promoting the use of low-salinity agricultural wastewater is expected to be highly cost-effective, yielding significant returns on investment.

Output 1.2.2: Increased access to potable water among the target communities (20% women)
Activity 1.2.2.1: Assessing and Identifying the Most Viable Water Solutions

Table 13: Cost-Effectiveness Analysis Activity 1.2.2.1

Metric	Value (USD)
Total Cost	50,000
Total Estimated Return	165,000
Net Benefit	115,000

Cost-Effectiveness Ratio	0.30
Number of the beneficiaries	50 Direct and 150 indirect beneficiaries
Cost-Effectiveness Ratio	$250 per beneficiary

Source: collected and calculated from table 23, 24 in Appendix3.

The long-term benefits for Activity 1.2.2.1 include a significant increase in Innovative Water Solutions, improved water management including Efficient Water Usage (Better water management practices leading to efficient water usage, improve 10%) enhanced water access resources for the community about 10 %, the long-term sustainable development of the region by Adoption of sustainable water management.

Cost-Effectiveness Ratio (CER): The CER is 0.30, meaning that for every dollar spent, there is a return of approximately $3.30. The positive net benefit and CER indicate that assessing and identifying the most viable water solutions is expected to be cost-effective, providing significant returns on the investment. The non-monetary benefits, such as improved water management practices, enhanced access to water resources, and community empowerment, further underscore the value of this activity.

Activity 1.2.2.2: Establishing/Updating Models for Water Collection for Human Consumption (Communal Wells and Boreholes)

Table 14: Cost-Effectiveness Analysis Activity 1.2.2.2

Metric	Value (USD)
Total Cost	240,000
Total Estimated Return	450,000
Net Benefit	210,000
Cost-Effectiveness Ratio	0.53
Number of the beneficiaries	300 Direct and 800 indirect beneficiaries
Cost-Effectiveness Ratio	$218 per beneficiary

Source: collected and calculated from table 25, 26 in Appendix3 and table 1 Appendix 4.

The primary costs for Activity 1.2.2.2 including Well Drilling by Drilling new wells and boreholes is about 10 water point for shallow wells (40 to 60 m), Borehole Construction by Constructing and upgrading boreholes, is about 8 water point for shallow wells (30 to 40 m), Equipment and Materials include Installing electric pumps for water extraction for water point and Installing storage tanks for collected water for water point.

The long-term benefits include a significant improve water access by Enhanced access to clean water for consumption and farming (1,000,000 m3), reduced waterborne diseases, improve water supply for subsistence farming practices with these activities will empowerment community, further promoting sustainability and community well-being.

The CER is 0.53, meaning that for every dollar spent, there is a return of approximately $1.88. The positive net benefit and CER indicate that assessing and identifying the most viable water solutions is expected to be cost-effective, providing significant returns on the investment, the non-monetary benefits such as improved health, community empowerment, and long-term sustainability are significant and valuable. The investment in reliable water collection systems is crucial for the overall well-being and development of the community.

Activity 1.2.2.3: Developing and Implementing Well-Management Systems

Table 15: Cost-Effectiveness Analysis Activity 1.2.2.3

Metric	Value (USD)
Total Cost	250,000
Total Estimated Return	405,000
Net Benefit	155,000
Cost-Effectiveness Ratio	0.62
Number of the beneficiaries	155 Direct and 300 indirect beneficiaries
Cost-Effectiveness Ratio	$549 per beneficiary

Source: collected and calculated from table 27, 28 in Appendix3 and table 1 Appendix 4.

The main costs for Activity 1.2.2.3 including Irrigation System Improvements by Upgrading existing irrigation canals and pipelines (1100 m), Wastewater Drain Enhancements by Strengthening and repairing drain networks (3000 m), Equipment and Materials include Purchasing new pumps, valves, other essential equipment, Acquisition of pipes, fittings, and related materials

The long-term benefits include a significant Increased Agricultural Productivit**y** by improved irrigation and water availability improve the productivity 300 feddan by 10 % and Expanded Cultivated Area by about 10 feddans depend on the reliable water supply reduce water loss by about (40,000 m3) through improved infrastructure, reducing contamination lead to healthier crops and environment and job creation, and long-term sustainability are significant and valuable. The investment in reliable water collection systems is crucial for the overall well-being and development of the community.

The CER is 0.62, meaning that for every dollar spent, there is a return of approximately $1.62. The positive net benefit and CER suggest that while the direct financial returns are positive than the costs, the non-monetary benefits such as enhanced community knowledge, long-term sustainability, and health improvements are significant. The investment in well-management systems is crucial for the overall well-being and development of the community.

Cost-effectiveness of components 2: Enhancing Resilience of Siwa Oasis Ecosystems to Climate Change Impacts

Outcome 2.1: Sustainable Land Management Practices Promoted
Output 2.1.1: Climate-resilient Agricultural practices are adopted
Activity 2.1.1.1: Developing Community Adaptation Action Plans

Table 16: Cost-Effectiveness Analysis Activity 2.1.1.1

Metric	Value (USD)
Total Cost	50,000
Total Estimated Return	90,000
Net Benefit	40,000
Cost-Effectiveness Ratio	0.56
Number of the beneficiaries	200 Direct and 400 indirect beneficiaries

Cost-Effectiveness Ratio	$250 per beneficiary

Source: collected and calculated from table 29, 30 in Appendix3.

The CER of 0.56 indicates that for every dollar spent, the activity is expected to yield about $1.80 in returns, it reflects a reasonably good return on investment, particularly considering the long-term benefits of enhanced resilience, sustainable land management, and biodiversity preservation. The investment in developing community adaptation action plans is essential for addressing the specific challenges faced in Siwa Oasis, leading to improved sustainability and community empowerment. This strategic approach aligns with government policies and is expected to generate substantial positive impacts over time.

Activity 2.1.1.2: Setting Up, Procuring Inputs, and Managing Demonstration Plots

Table 17: Cost-Effectiveness Analysis Activity 2.1.1.2

Metric	Value (USD)
Total Cost	550,000
Total Estimated Return	850,000
Net Benefit	300,000
Cost-Effectiveness Ratio	0.65
Number of beneficiaries	200 direct beneficiaries while 400 indirect
Cost-Effectiveness Ratio	$916.67 per beneficiary

Source: collected and calculated from table 31, 32 in Appendix3.

Commentary on the Cost-Effectiveness Analysis

The main costs for Activity 2.1.1.2. including land preparation by Clearing, levelling, and preparing land for about 40 F in four different areas, Procurement of Inputs (Seeds, fertilizers, tools, and equipment), and related materials.

The CER of 0.65 indicates that for every dollar spent, the activity is expected to yield about $1.55 in returns. This favourable ratio suggests that the investment in setting up, procuring inputs, and managing demonstration plots is highly cost-effective. The project is expected to generate significant returns, exceeding the initial investment, through improved agricultural productivity by increased yields and efficiency by 25% for the beneficiaries, which estimate that each beneficiaries will improve about 2 F. so will be improved about 2000 F directly as well add more agricultures land by about 40 Feddans in four different project areas, adoption of sustainable practices, enhanced climate resilience, and economic benefits. This positive outcome indicates a well-planned allocation of resources with the potential for substantial long-term benefits for the community and the environment. The demonstration plots will serve as practical learning environments, enabling farmers to observe and adopt innovative techniques to mitigate the effects of climate change and improve agricultural productivity.

Activity 2.1.1.3: Promoting Agro-sylvo-pastoral Practices (Integration of Trees and Crops with Livestock Production)

Table 18: Cost-Effectiveness Analysis Activity 2.1.1.3

Metric	Value (USD)
Total Cost	250,000

Total Estimated Return	579,600
Net Benefit	329,600
Cost-Effectiveness Ratio	0.43
Number of beneficiaries	300 direct beneficiaries while 700 indirect
Cost-Effectiveness Ratio	$250 per beneficiary

Source: collected and calculated from table 33, 34 in Appendix3 and table 2 Appendix 4.

Commentary on the Cost-Effectiveness Analysis

The cost-effectiveness ratio (CER) of approximately 0.71 indicates that for every dollar spent, the activity is expected to yield about $1.40 in returns. This favourable ratio suggests that the investment in promoting agro-sylvo-pastoral practices is highly cost-effective. The project is projected to generate significant returns, exceeding the initial investment, by improving soil quality across approximately 30 feddans and enhancing productivity on an additional 30 feddans of newly cultivated land. For the direct beneficiaries, each managing around 2 feddans, the overall impact is estimated to reach about 1,400 feddans.

The initiative will also contribute to water conservation, biodiversity improvement, increased agricultural productivity through higher crop yields and livestock production (by about 10%), and enhanced climate resilience. These positive outcomes indicate a well-planned allocation of resources with substantial long-term benefits for both the community and the environment. The integrated approach of combining trees, crops, and livestock is expected to create a resilient and productive farming system that can mitigate the impacts of climate change and enhance overall farm sustainability.

Activity 2.1.1.4: Promoting Production and Use of Bio-Compost and Bio-Pesticides

Table 19: Cost-Effectiveness Analysis Activity 2.1.1.4

Metric	Value (USD)
Total Cost	300,000
Total Estimated Return	655,000
Net Benefit	355,000
Cost-Effectiveness Ratio	0.46
Number of beneficiaries	200 direct beneficiaries while 400 indirect
Cost-Effectiveness Ratio	$500 per direct beneficiary

Source: collected and calculated from table 35 , 36 in Appendix3.

The CER of 0.46 indicates that for every dollar spent, the activity is expected to yield about $2.18 in returns. This favourable ratio highlights that the investment in promoting the production and use of bio-compost and bio-pesticides is highly cost-effective. The project is anticipated to generate substantial returns, surpassing the initial investment, by improving soil health across an estimated 200 feddans for direct beneficiaries. Additionally, the initiative will contribute to biodiversity conservation, cost savings on synthetic inputs, and increased agricultural productivity. The positive outcome of this activity reflects a well-planned allocation of resources, with significant long-term benefits for both the community and the environment. By reducing reliance on synthetic fertilizers and pesticides, this

approach enhances the overall sustainability of agricultural production in Siwa Oasis, supporting environmental health and economic resilience.

Output 2.1.2: Green belts are developed and sustained

Activity 2.1.2.1: Establishing Climate Adaptation and Innovation Centers

Cost-Effectiveness Analysis

Table 20: Cost-Effectiveness Analysis Activity 2.1.2.1

Metric	Value (USD)
Total Cost	140,000
Total Estimated Return	350,000
Net Benefit	210,000
Cost-Effectiveness Rate	0.40
Number of Beneficiaries	250 direct while 500 indirect beneficiaries
Cost-Effectiveness Ratio	$186.7 per beneficiary

Source: collected and calculated from table 37, 38 in Appendix3.

The CER of 0.40 indicates that for every dollar spent, the activity is expected to yield about $2.50 in returns. This favourable ratio underscores the value of investing in the construction and renovation of the two Climate Resilient Agriculture (CRA) centers. The project is projected to generate substantial returns, surpassing the initial investment, by enhancing agricultural yields through improved farming practices and crop resilience, estimated to increase by about 20% in target areas. Additionally, water resource management is expected to improve, with more efficient use and conservation of water resources by approximately 10% in these areas.

Beyond monetary gains, the project offers significant non-monetary benefits, including increased knowledge, skills, and resilience within the community to adapt to climate change. This investment is critical for fostering long-term resilience and sustainable development within the Siwa community.

Activity 2.1.2.2: Identifying/Establishing Farmers Clubs for Concrete SLM Application

Cost-Effectiveness Analysis

Table 21: Cost-Effectiveness Analysis Activity 2.1.2.2

Metric	Value (USD)
Total Cost	70,000
Total Estimated Return	450,000
Net Benefit	380,000
Cost-Effectiveness Rate	0.58
Number of Beneficiaries	200 direct while 400 indirect beneficiaries
Cost-Effectiveness Ratio	$116.7 per beneficiary

Source: collected and calculated from table 39, 40 in Appendix3.

The CER of 0.16 indicates that for every dollar spent, the activity is expected to yield about $6.43 in returns. This favourable ratio highlights the cost-effectiveness of investing in the construction and

renovation of the two Sustainable Land Management (SLM) centers. The project is anticipated to generate significant returns, exceeding the initial investment, through improved agricultural practices by enhancing productivity within the target group and promoting soil conservation. These benefits include reduced soil erosion and improved soil health across four different regions.

In addition to monetary gains, the project offers substantial non-monetary benefits, such as improved SLM practices, enhanced agricultural productivity, and long-term sustainability. These clubs are designed to promote sustainable agricultural practices, thereby enhancing the overall resilience and productivity of the farming community in the Siwa region.

Activity 2.1.2.3: Establishing Community Tree Nurseries

Table 22: Cost-Effectiveness Analysis Activity 2.1.2.3

Metric	Value (USD)
Total Cost	125,000
Total Estimated Return	295,000
Net Benefit	170,000
Cost-Effectiveness Rate	0.42
Number of Beneficiaries	200 direct and 400 indirect
Cost-Effectiveness Ratio	$208.3 per beneficiary

Source: collected and calculated from table 41, 42 in Appendix3.

The CER of 0.42 indicates that for every dollar spent, the activity is expected to yield about $2.36 in returns.

This updated cost-effectiveness analysis indicates that the net cost per direct beneficiary is $208.3 after accounting for the expected revenue from the activity. This demonstrates a significant improvement in the financial sustainability and effectiveness of establishing community tree nurseries within the Siwa Project.

Activity 2.1.2.4: Establishing Green Belts for the Stabilization of Sand Dune Movements (Mechanical and Biological)

Table 23: Cost-Effectiveness Analysis Activity 2.1.2.4

Metric	Value (USD)
Total Cost	180,000
Total Estimated Return	405,000
Net Benefit	225,000
Cost-Effectiveness Rate	0.44
Number of Beneficiaries	300 direct and 400 indirect
Cost-Effectiveness Ratio	$257.1 per beneficiary

Source: collected and calculated from table 43, 44 in Appendix3.

The initiative to promote the use of low-salinity agricultural wastewater is anticipated to have a significant impact on preventing sand dune encroachment, Land Protection for 300 F., Reduction in Land Loss due to Sand Dune Movements, Increased Agricultural Productivity through increase in crop yield due to improved soil stabilization and protection, Reduction in Sand Removal and Land rehabilitation through Estimated annual savings in sand removal, and Ecosystem Services (Enhanced Micro Climate and Ecosystem) through Estimated value of ecosystem services provided by green belts for about 300F, to protect the target regions.

The CER of 0.44 indicates that for every dollar spent, the activity is expected to yield about $2.25 in returns. This positive CER demonstrates that the activity not only recovers its costs but also generates a net gain, offering financial and environmental sustainability within the Siwa Project. Specifically, the net gain per beneficiary is $257.1, highlighting the substantial benefits of establishing green belts to stabilize sand dunes and combat desertification.

Table 24. Area loss in each LU classes, population displaced and loss of agriculture labour in each classification road map of sand dunes risk index.

Expected of the loss as a result of sand dunes movement risks as follows	
cultivated area loss (feddans)	78
Urban area loss (feddans)	3
building lost (building/Unit)	26
Roads Length loss (Km)	2
Drainage canals Length loss (Km)	0
Population Displaced (labour)	72
Agriculture labour loss (labour)	156

Sources: abo Ragab S. Al-S, 2015

Activity 2.1.2.5: Introducing Soil Stabilization and Enrichment Techniques to Promote Agricultural Productivity

Table 25: Cost-Effectiveness Analysis Activity 2.1.2.5

Metric	Value (USD)
Total Cost	100,000
Total Estimated Return	275,000
Net Benefit	175,000
Cost-Effectiveness Rate	0.36
Number of Beneficiaries	250 direct while 500 indirect
Cost-Effectiveness Ratio	$133.3 per beneficiary

Source: collected and calculated from table 45, 46 in Appendix3.

The CER of 0.36 indicates that for every dollar spent, the activity is expected to yield about $2.75 in returns. This cost-effectiveness analysis indicates that the activity not only covers its costs but also generates a net gain, benefiting the community by improving agricultural productivity by around 200 tons in target areas, Reduce in irrigation, Reduction Soil Degradation, enhanced soil fertility and structure for about 500 F. The net gain per beneficiary is $133.3, demonstrating the financial and environmental sustainability of introducing soil stabilization and enrichment techniques.

Cost-effectiveness of components3: Diversifying the livelihoods through IGAs and value chain addition to improve resilience of Siwa Oasis communities

Outcome 3.1: Long-term climate resilient livelihoods are promoted
Output 3.1.1: Livestock production practices are improved and adopted
Activity 3.1.1.1: Supporting Access to Veterinary Services for Farmers and Communities

Table 26: Cost-Effectiveness Analysis Activity 3.1.1.1

Metric	Value (USD)
Total Cost	295,000
Total Estimated Return	423,000
Net Benefit	128,000
Cost-Effectiveness Ratio	0.70
Number of Beneficiaries	300 direct while 600 indirect
Cost-Effectiveness Ratio	$327.78 per beneficiary

Source: collected and calculated from table 47, 48 in Appendix3.

The CER of 0.70 indicates that for every dollar spent, the activity is expected to yield about $1.43 in returns. Supporting access to veterinary services for farmers and communities in the Siwa Oasis is a strategically sound investment with substantial potential for financial, economic, and social returns. The initial investment of $295,000 is expected to yield significant benefits, making it a cost-effective initiative that aligns with sustainable development goals and enhances the economic resilience of the Siwa community.

Activity 3.1.1.2: Promoting Production of Short-Cycle Livestock

Table 27: Cost-Effectiveness Analysis Activity 3.1.1.2

Metric	Value (USD)
Total Cost	369,000
Total Estimated Return	536,000
Net Benefit	167,000
Cost-Effectiveness Ratio	0.69
Number of Beneficiaries	300 direct while 600 indirect
Cost-Effectiveness Ratio	$410 per beneficiary

Source: collected and calculated from table 49, 50 in Appendix3.

The CER of 0.69 indicates that for every dollar invested, the expected return is 1.45 Project lifetime. Promoting the production of short-cycle livestock in the Siwa Oasis is a strategically sound investment with substantial potential for financial, economic, and social returns. The initial investment of $369,000 is expected to yield significant benefits, making it a cost-effective initiative that aligns with sustainable development goals and enhances the economic resilience of the Siwa community.

Activity 3.1.1.3: Enhancing Livestock and Pasture Management Systems (Breeding, Fodder, etc.)
Cost-Effectiveness Analysis

Table 28: Cost-Effectiveness Analysis Activity 3.1.1.3

Metric	Value (USD)

Total Cost	210,000
Total Estimated Return	567,000
Net Benefit	357,000
Cost-Effectiveness Ratio	0.37
Number of Beneficiaries	300 direct while 600 indirect
Cost-Effectiveness Ratio	$233.33 per beneficiary

Source: collected and calculated from table 51, 52 in Appendix3.

This ratio indicates that for every dollar invested, the expected return is approximately 0.37 Project lifetime. the activity is expected to yield about $2.70 in returns. Enhancing livestock and pasture management systems in the Siwa Oasis is a strategically sound investment with substantial potential for financial, economic, and social returns. The initial investment of $210,000 is expected to yield significant benefits, making it a cost-effective initiative that aligns with sustainable development goals and enhances the economic resilience of the Siwa community.

Output 3.1.2: Community livelihoods resilience is enhanced through adoption of (IGAs)
Activity 3.1.2.1 Support business planning for alternative IGAs

Table 29: Cost-Effectiveness Analysis Activity 3.1.2.1

Metric	Value (USD)
Total Cost	150,000
Total Estimated Return	371,685
Net Benefit	221,685
Cost-Effectiveness Ratio	0.40
Number of Beneficiaries	200 direct while 400 indirect
Cost-Effectiveness Ratio	$250 per beneficiary

Source: collected and calculated from table 53, 54 in Appendix3.

This ratio indicates that for every dollar invested, the expected return is approximately 2.48 Project lifetime. Supporting business planning for alternative IGAs in the Siwa community is a strategically sound investment with substantial potential for financial, economic, and social returns. The initial investment of $150,000 is expected to yield significant benefits, making it a cost-effective initiative that aligns with sustainable development goals and enhances the economic resilience of the Siwa community.

Activity 3.1.2.2: Establish Revolving Fund Schemes for IGAs with a Gender Focus

Table 30: Cost-Effectiveness Analysis Activity 3.1.2.2

Metric	Value (USD)
Total Cost	570,000
Total Estimated Return	780,000
Net Benefit	210,000
Cost-Effectiveness Ratio	0.73
Number of Beneficiaries	500 direct while 800 indirect

Cost-Effectiveness Ratio	$438.46 per beneficiary

Source: collected and calculated from table 55, 56 in Appendix3.

This ratio indicates that for every dollar invested, the expected return is approximately 1.37 Project lifetime, with the activity is expected to yield about $1.37 in returns. Establishing a revolving fund scheme for IGAs with a gender focus is a strategically sound investment with substantial potential for financial, economic, and social returns. The initial investment of $570,000, with the largest portion allocated to direct support for beneficiaries, is expected to yield significant benefits. This makes it a cost-effective initiative that aligns with sustainable development goals and enhances the economic resilience of the Siwa community, particularly for women and youth.

Activity 3.1.2.3: Establish and Support Savings and Credit Cooperative Society (SACCO) for Eco-tourism Ventures

Table 31: Cost-Effectiveness Analysis Activity 3.1.2.3

Metric	Value (USD)
Total Cost	100,000
Total Estimated Return	242,000
Net Benefit	142,000
Cost-Effectiveness Ratio	0.41
Number of Beneficiaries	50 direct while 150 indirect
Cost-Effectiveness Ratio	$400 per beneficiary

Source: collected and calculated from table 57, 58 in Appendix3.

This ratio indicates that for every dollar invested, the expected return is approximately 0.41 Project lifetime. The activity is expected to yield about $2.42 in returns. The establishment of a SACCO for eco-tourism ventures in the Siwa community is a strategically sound investment with significant potential for financial, economic, and social returns. The initial investment of $100,000 is expected to yield substantial benefits, making it a cost-effective initiative that aligns with sustainable development goals.

Activity 3.1.2.4: Develop/Upscale Value Chain Market Linkages

Table 32: Cost-Effectiveness Analysis Activity 3.1.2.4

Metric	Value (USD)
Total Cost	300,000
Total Estimated Return	590,000
Net Benefit	290,000
Cost-Effectiveness Ratio	0.51
Number of Beneficiaries	250 direct while 500 indirect
Cost-Effectiveness Ratio	$400 per beneficiary

Source: collected and calculated from table 59, 60 in Appendix3.

This ratio indicates that for every dollar invested, the expected return is approximately 0.51 Project lifetime. the activity is expected to yield about $1.97 in returns. Developing and upscaling value chain

market linkages for the Siwa community is a strategically sound investment with significant potential for financial, economic, and social returns. The initial investment of $300,000 is expected to yield substantial benefits, making it a cost-effective initiative that aligns with sustainable development goals and the economic resilience of the Siwa community.

Cost-effectiveness of components 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts

Outcome 4.1: Knowledge and awareness of CC impacts at local, national and international levels is promoted

Output 4.1.1: Improved understanding of stakeholders to integrate CC into Planning Processes

Activity 4.1.1.1: Conduct Baseline, Capacity Needs Assessment, and KAP Survey of All Stakeholders

Table 33: Cost-Effectiveness Analysis Activity 4.1.1.1

Metric	Value (USD)
Total Cost	100,000
Total Estimated Return	140,000
Net Benefit	40,000
Cost-Effectiveness Ratio	0.71
Number of Beneficiaries	200 direct while 400 indirect
Cost-Effectiveness Ratio	$167 per beneficiary

Source: collected and calculated from table 61, 62 in Appendix3.

The CER) is 0.71 which meaning that for every dollar spent, there is a return of exactly $1.4. The non-monetary benefits, such as enhanced knowledge, improved capacity, and informed decision-making, underscore the value of conducting the baseline, capacity needs assessment, and KAP survey. Conducting the baseline, capacity needs assessment, and KAP survey is expected to have a substantial impact on the local community, providing crucial data and insights that will inform future climate change adaptation strategies and enhance the overall resilience and sustainability of the community in the Siwa Oasis.

Activity 4.1.1.2: Capacity Building for Extension Services on Climate Change Adaptation Planning

Table 34: Cost-Effectiveness Analysis Activity 4.1.1.2

Metric	Value (USD)
Total Cost	60,000
Total Estimated Return	130,000
Net Benefit	70,000
Cost-Effectiveness Ratio	0.46
Number of Beneficiaries	100 direct while 200 indirect
Cost-Effectiveness Ratio	$200 per beneficiary

Source: collected and calculated from table 63, 64 in Appendix3.

The CER is 0.46 meaning that for every dollar spent, there is a return of exactly $2.17. The non-monetary benefits, such as enhanced knowledge, improved adaptation strategies, and strengthened extension services, underscore the value of capacity building for extension services personnel in climate change adaptation planning.

Enhancing the capacity of extension services personnel is expected to have a significant impact on the local community, improving the quality and effectiveness of climate change adaptation efforts at

the grassroots level, and ultimately contributing to the overall resilience and sustainability of the Siwa Oasis.

Activity 4.1.1.3: Design and Develop Communication Strategy Supported by Necessary Materials

Table 35: Cost-Effectiveness Analysis Activity 4.1.1.3

Metric	Value (USD)
Total Cost	40,000
Total Estimated Return	170,000
Net Benefit	130,000
Cost-Effectiveness Ratio	0.24
Number of Beneficiaries	1000 direct while all community indirect
Cost-Effectiveness Ratio	$40 per direct beneficiary

Source: collected and calculated from table 65, 66 in Appendix3.

The CER is 0.32, meaning that for every dollar spent, there is a return of exactly $4.25. Designing and developing a communication strategy supported by necessary materials is expected to have a substantial impact on the local community, fostering stakeholder engagement, promoting ownership, and facilitating informed decision-making in climate change adaptation initiatives in the Siwa Oasis.

Activity 4.1.1.4: Project Results Dissemination & Lesson Sharing

Table 36: Cost-Effectiveness Analysis Activity 4.1.1.4

Metric	Value (USD)
Total Cost	100,000
Total Estimated Return	180,000
Net Benefit	80,000
Cost-Effectiveness Ratio	0.56
Number of Beneficiaries	300 direct while 600 indirect
Cost-Effectiveness Ratio	$111 per beneficiary

Source: collected and calculated from table 67, 68 in Appendix3.

The cost-effectiveness rate for Activity 4.1.1.4 is 0.56., indicating that for every dollar spent, the activity is expected to yield benefits worth $1.80. The cost-effectiveness rate indicates a favourable return on investment, suggesting that the activity is a viable and beneficial investment.

Output 4.1.2: Raised community awareness

Activity 4.1.2.1: Develop Training Materials to Support Community-Based Trainers (CBT)

Table 37: Cost-Effectiveness Analysis Activity 4.1.2.1

Metric	Value (USD)
Total Cost	60,000
Total Estimated Return	165,000
Net Benefit	105,000
Cost-Effectiveness Ratio	0.36
Number of Beneficiaries	300 direct while 600 indirect
Cost-Effectiveness Ratio	$67 per beneficiary

Source: collected and calculated from table 69, 70 in Appendix3.

The CER is 0.36, meaning that for every dollar spent, there is a return of exactly $2.75. The non-monetary benefits, such as enhanced training, improved practices, and efficient water management,

underscore the value of developing training materials to support community-based trainers. Developing training materials to support community-based trainers is expected to have a substantial impact on the local community, fostering enhanced agricultural and water management practices, increased productivity, and the adoption of sustainable practices in the Siwa Oasis.

Activity 4.1.2.2: Enhance the Institutional Capacities to Manage the CAICs

Table 38: Cost-Effectiveness Analysis Activity 4.1.2.2

Metric	Value (USD)
Total Cost	60,000
Total Estimated Return	150,000
Net Benefit	90,000
Cost-Effectiveness Ratio	0.40
Number of Beneficiaries	300 direct while 600 indirect
Cost-Effectiveness Ratio	$67 per beneficiary

Source: collected and calculated from table 71, 72 in Appendix3.

The CER is 0.75, meaning that for every dollar spent, there is a return of exactly $1.33. The non-monetary benefits, such as improved institutional capacity, increased community engagement, and effective CVAs, underscore the value of enhancing the institutional capacities to manage the CAICs. Enhancing the institutional capacities to manage the CAICs is expected to have a substantial impact on the local community, fostering improved management, increased community engagement, better coordination, and successful adaptation planning in climate change initiatives in the Siwa Oasis.

Activity 4.1.2.3: Train Community Beneficiaries and CSOs on Climate Resilient Livelihood Practices

Table 39: Cost-Effectiveness Analysis Activity 4.1.2.3

Metric	Value (USD)
Total Cost	60,000
Total Estimated Return	165,000
Net Benefit	105,000
Cost-Effectiveness Ratio	0.36
Number of Beneficiaries	300 direct while 600 indirect
Cost-Effectiveness Ratio	$67 per beneficiary

Source: collected and calculated from table 73, 74 in Appendix3.

The CER is 0.36, meaning that for every dollar spent, there is a return of exactly $2.75. The non-monetary benefits, such as enhanced resilience, improved livelihoods, and empowered CSOs, underscore the value of training community beneficiaries and CSOs on climate-resilient livelihood practices. Training community beneficiaries and CSOs on climate-resilient livelihood practices is expected to have a substantial impact on the local community, fostering enhanced resilience, improved livelihoods, increased community engagement, and the adoption of sustainable practices in the Siwa Oasis.

Activity 4.1.2.4: Conduct Community Campaigns on Climate Change (CC)/Water/Health

Table 40: Cost-Effectiveness Analysis Activity 4.1.2.4

Metric	Value (USD)
Total Cost	70,000
Total Estimated Return	130,000
Net Benefit	60,000
Cost-Effectiveness Ratio	0.54

Number of Beneficiaries	150 direct while 300 indirect
Cost-Effectiveness Ratio	$156 per beneficiary

Source: collected and calculated from table 75, 76 in Appendix3.

The CER is 0.54, meaning that for every dollar spent, there is a return of exactly $1.86. The non-monetary benefits, such as increased awareness, improved health behaviour, and enhanced community resilience, underscore the value of conducting community campaigns on climate change, water, and health. Conducting community campaigns on climate change, water, and health is expected to have a substantial impact on the local community, fostering increased awareness, improved health behaviour, and enhanced resilience to climate change impacts in the Siwa Oasis.

Activity 4.1.2.5: Conduct Inclusive Planning and Capacity Building for Community-Based Ecotourism

Table 41: Cost-Effectiveness Analysis Activity 4.1.2.5

Metric	Value (USD)
Total Cost	91,549
Total Estimated Return	180,000
Net Benefit	88,451
Cost-Effectiveness Ratio	0.51
Number of Beneficiaries	300 direct while 500 indirect
Cost-Effectiveness Ratio	$114 per beneficiary

Source: collected and calculated from table 77, 78 in Appendix3.

The CER is 0.51, meaning that for every dollar spent, there is a return of exactly $1.97. The non-monetary benefits, such as economic empowerment, skill development, and increased community engagement, underscore the value of conducting inclusive planning and capacity building for community-based ecotourism. Conducting inclusive planning and capacity building for community-based ecotourism is expected to have a substantial impact on the local community, fostering economic empowerment, skill development, and increased community engagement in the Siwa Oasis.

6. Cost-effectiveness of All the CCAILSO Project

Long-term Effectiveness: The long-term effectiveness analysis suggests that the CCAILSO project will yield sustainable benefits, significantly enhancing the region's resilience to climate change. In the absence of such interventions, existing challenges would likely worsen, underscoring the critical need for this project.

Table (42) Cost Effectiveness analysis of the CCAILSO project

Component	Cost US$	Benefit $	Cost-Effectiveness Ratio	Expected yield in returns (US$)	Cost per beneficiaries (US$)	Area of land improved (feddan)	water quantity (m3)	Add Agriculture (feddan)	water point
component 1	2,375,000	4,910,000	0.48	2.07	286	2,330	2,840,000	315	386
component 2	1,765,000	3,949,600	0.45	2.24	284.7	5500	50	545	
component 3	1,994,000	3,509,685	0.57	1.76	356.1				
component 4	641,549	1,410,000	0.45	2.20	95.0				
Totals	**6,775,549**	**13,779,285**	**0.49**	**2.03**	**252.4**	**7,830**	**2,840,050**	**860**	**386**
Project EC	600,000								
Project SM	624,451								
All	8,000,000	13,779,285	0.58	1.72	298.0				

Specific Analysis of Project Activities

Component 1: Water Resource Management

- Assessing Water Resources: Activities include the thorough assessment of both surface and groundwater resources. This foundational step ensures that subsequent interventions are based on accurate and comprehensive data.
- Developing Management Plans: The creation of detailed water resource management plans aims to optimize the use of available water, ensuring its sustainable distribution and utilization across agricultural and domestic needs.
- Enhancing Institutional Capacities: Strengthening the capacities of local and regional institutions involved in water management ensures that these entities can effectively oversee and sustain the project's water management initiatives.
- Cost-Effectiveness: These activities are highly cost-effective, given their potential to drastically improve water availability and quality, which are critical for both agriculture and community well-being.
- The table (42) show that, this component focuses on water resource management, addressing critical issues related to water availability and sustainability in agricultural and domestic use. The component budget of (US$) 2,375,000, the benefit of the component is about is (US$) 4910000, while the Net benefit (US$) is about 2535000 US$, making it a cost-effective initiative for the component is about 0.48, The project is highly cost-effective, with a return on investment (ROI) of 2.07, which indicates that for every dollar spent, the project generates $2.07 in benefits. . The cost per beneficiary ($286) is moderate, given the vast improvement in land and water resources. The savings in water is about 2840000 M3 and the improvement in agricultural productivity by about 2330 F., add agriculture land by about 315 F., suggest a significant positive environmental impact, which, in turn, supports long-term community sustainability.

Component 2: Agricultural Productivity

- Soil Stabilization and Enrichment Techniques: The project promotes soil stabilization and enrichment techniques such as contour ploughing, mulching, and cover cropping. These practices are designed to maintain soil health and enhance agricultural yields.
- Budget and Returns: With a budget of $1,765,000, the expected returns are projected at $3,949,600. This positive return on investment highlights the cost-effectiveness of the agricultural interventions.
- Cost-Effectiveness: The emphasis on sustainable agricultural practices ensures long-term productivity gains, making these interventions highly cost-effective rate 0.45.
- The focus on sustainable agriculture through soil stabilization and enrichment techniques offers a favourable ROI of 2.24. The project has a significant impact on land productivity, improving 5,500 feddans and adding an additional 545 feddans for agriculture. The cost per beneficiary is consistent with that of the water resource management component, and despite no direct water savings, the improved agricultural practices will likely have long-term benefits for soil and crop sustainability.

Financial analysis: In this context, numerous economic feasibility studies were conducted for most activities related to this component, both before the project's interventions and to assess the expected impact after the proposed interventions. These studies were compiled through the questionnaire form (Table 1, Appendix 1- in the cost effectiveness study-Appendix), which was collected in May 2024. The projects within this component were categorized as follows:

- Fruit Crop Production Projects (Appendix 2 in the cost effectiveness study-Appendix, Tables 2, 8, 9)
- Field Crop and Vegetable Production Projects (Appendix 2 in the cost effectiveness study,

Tables 3, 10, 11)

The internal rate of return (IRR) was estimated for fruit production crops in their current state, revealing that palm trees, olives, grapes, pomegranates, mangoes, and tangerines achieved high IRRs compared to other fruit crops. The rates were approximately 81.71%, 36.49%, 32.27%, 29.87%, 30.78%, and 26.93%, respectively. These figures demonstrate strong returns before any project interventions, although they also indicate potential negative environmental impacts.

Following the CCAILSO project's interventions, the IRR was re-evaluated, showing significantly higher returns for the same fruit crops. The revised IRRs were estimated at 147.17% for palm trees, 57.72% for olives, 49.86% for grapes, 48.86% for pomegranates, 41.08% for mangoes, and 38.33% for tangerines. Given these improvements, it is recommended that these fruit production projects be prioritized for early implementation to maximize benefits.

For field crops and vegetable projects, the return per dollar spent was initially assessed, and it was found that onions, beans, zucchini, cucumbers, and eggplants yielded strong returns. The estimated returns were $1.11, $0.86, $0.58, $0.49, and $0.51 per dollar, respectively. After incorporating CCAILSO project activities, these values increased, with onions returning $1.76 per dollar, beans $1.40, zucchini $0.81, cucumbers $0.77, and eggplants $0.67. As with fruit crops, it is advisable to prioritize these field crop and vegetable projects in the early stages of implementation due to their enhanced returns under the CCAILSO project framework.

At the end of the analysis, it's important to emphasize that while the internal rate of return (IRR) before the project's interventions was relatively high, this was achieved at the expense of natural resource depletion and environmental degradation in the oasis. However, the expected outcomes after the project's interventions indicate a higher IRR, all while preserving the environment and protecting economic resources. This clearly reflects the project's economic viability, balancing both financial returns and sustainable resource management.

Component 3: Community Capacity Building

- Training Programs for Farmers and Local Institutions: Comprehensive training programs focus on enhancing knowledge and practices related to water management and sustainable agriculture. These programs are designed to foster a culture of sustainability and resilience within the community.
- Budget and Returns: With a budget of $1,765,000, the expected returns are projected at $3,509,685. This positive return on investment highlights the cost-effectiveness of the agricultural interventions.
- Cost-Effectiveness: The emphasis on sustainable agricultural practices ensures long-term productivity gains, making these interventions highly cost-effective rate 0.57.
- Empowerment and Long-term Benefits: By empowering local communities with the necessary knowledge and skills, the project ensures the sustainability of its outcomes and the long-term resilience of the community.
- This component emphasizes building the capacity of local farmers and institutions. Although there are no direct physical outcomes (such as land improvement or water savings), the long-term economic and social benefits from the training programs and enhanced institutional capacity are reflected in the positive ROI (1.76). The cost per beneficiary is higher ($356.1) compared to the other components, but this is justified by the long-term benefits of knowledge transfer and sustainability through empowered local communities.
- **Financial analysis** : numerous economic feasibility studies were conducted for most activities

related to this component, both before the project's interventions and to assess the expected impact after the proposed interventions. These studies were compiled through the questionnaire form (Table 1, Appendix 1- in the cost effectiveness study-Appendix), which was collected in May 2024. The projects within this component were categorized as follows:

The small projects activities were divided into 3 groups: Appendix 2- in the cost effectiveness study-Appendix.

-Small projects Appendix 2, tables 1, 6, 7.

-Animal production projects. Appendix 2, tables 4, 12, 13.

-Eco-tourism projects. Appendix 2, tables 5, 14, 15.

For small projects, the estimation of the internal rate of return criterion for these projects in their current status showed that the projects achieved significant percentages of this rate, and the projects were ranked according to the results of this rate as follows: Making butter + white cheese, beekeeping, Siwa coffee, date jam, clothing (Al-Taraqa), fodders from palm waste, clothing (Al-Ishrah), fig jam, rice pudding industry, and drying tomatoes in proportions estimated at about 80.77 % 82.17 ، % 62.45 ، % 51.37 ، % 59.71 ، % 66.43 ، % 52.36 ، % 49.11 ، % 50.87 ، % respectively, the internal rate of return criterion for these projects was also estimated after the intervention of the CCAILSO project activities, where the ratios of this criterion amounted to the following : 134 % ، 103.28 % 100.11 ، % 94.60 ، % 90.69 ، % 87.90 ، % 83 ، % 78.5 ، 79.90 ، % 76.10 ، % respectively, which shows the marked improvement in the value of this criterion after the implementation of the CCAILSO project activities. It is preferable that such projects have priority in implementation at the very beginning of the work.

As for the livestock production projects, the internal rate of return criterion was estimated in its current status and it was found that: home poultry farming and poultry fattening achieved a high percentage estimated at 142.89% and 87.94%, respectively, and the internal rate of return criterion was re-estimated in the case of CCAILSO project intervention in its various activities, where the values of the internal rate of return criterion for these projects showed improvement, estimated at about 250.7% and 146.1%, respectively, compared to other livestock production projects. It is therefore preferable that these projects have priority in implementation at the beginning of the work.

As for ecotourism projects, the internal rate of return criterion for the project workshop for the production of artifacts and gifts from rock salt has been estimated in its current status, and it turned out that it achieves a reduced internal rate of return estimated at about 15.78%, and the internal rate of return criterion has also been re-estimated in the case of CCAILSO project intervention in its various activities, where an improvement was observed in the value of the internal rate of return criterion, estimated at about 26.99%, and although the value of this criterion has become average in the case of project implementation, this rate is considered acceptable from an economic or social point of view, as these projects provide opportunities for good job for women and youth compared to many projects The other one.

Through the economic analysis of previous projects, it was found through the field study that most of these projects are based mainly on the work of women and youth, and therefore the Siwa community needs to provide technical and financial support programs for these projects in order to promote them, which ultimately reflects on the residents of the Siwa community by improving their livelihoods.

At the end of the analysis, it's important to emphasize that while the internal rate of return (IRR) before the project's interventions was relatively high, this was achieved at the expense of natural resource depletion and environmental degradation in the oasis. However, the expected outcomes after the project's interventions indicate a higher IRR, all while preserving the environment and protecting

economic resources. This clearly reflects the project's economic viability, balancing both financial returns and sustainable resource management.

Component 4: Livestock and Market Access

- Veterinary Services Enhancement: The project includes the enhancement of veterinary services, providing essential support for livestock health and productivity. This involves the procurement of veterinary supplies, upgrading mobile veterinary units, and training veterinary staff.
- Market Access Improvements: Facilitating better market access for livestock products ensures that farmers can achieve better profitability and economic stability.
- Training for Livestock Management: Training programs for livestock management are designed to improve the efficiency and productivity of livestock farming, contributing to overall economic sustainability.
- Cost-Effectiveness: Investments in veterinary services and livestock training are expected to yield significant economic benefits, enhancing the livelihoods of local farmers and supporting community resilience.
  The table (42) shows the following: The cost of the component (US$) 641,549 while the benefit is (US$) 1,410,000.
- The focus on veterinary services and market access improvements for livestock farmers provides a high ROI of 2.2, the highest among the four components. The cost per beneficiary is significantly lower at $252.4, reflecting the direct and immediate economic benefits that this component offers. Enhancing livestock health and providing better market access will likely lead to improved economic stability for local farmers and a boost to the livestock economy in the region.

Overall CCAILSO Project:

The CCAILSO project demonstrates strong economic viability, with a return on investment of 1.72 across all components. The total cost of $8 million is justified by the wide-ranging benefits while the total benefit of 13.8 million, both direct (improved land and water resources) and indirect (enhanced community capacity and livestock market access). The net benefit of over $5.8 million highlights the project's ability to generate substantial economic gains for the local population, especially given the large number of beneficiaries (26,845). **Cost-Effectiveness:** With a cost-effectiveness rate of 0.58, the project is economically sound. The cost per beneficiary ($298.59) is reasonable given the scale and scope of the interventions, which cover water resource management, agricultural productivity, and community capacity building.

Land and Water Impact: The improvement of 7,830 feddans of land and the saving of 2.84 million cubic meters of water underscore the environmental and agricultural impact of the project. These outcomes contribute to the long-term sustainability of the region, ensuring that the community can continue to thrive in a resource-scarce environment.

Financial analysis:

Financial analysis for the cost-effectiveness of the project is shown in table 43. The financial profitability of the project investment is determined by reviewing the cost components of the project and by estimating the financial benefits obtained through project interventions based on the following financial appraisal techniques: i) cash flow ii) benefits cost ratio, iii) net present value (NPV), and iv) internal rate of return (IRR).

Table 43: Financial analysis for the CCAILSO project

A. Cost Components	Year 1	Year 2	Year3	year 4	Budgets(US$)

Component 1	374,000	1,198,000	585,000	218,000	2,375,000
Component 2	558,000	734,000	353,000	120,000	1,765,000
Component 3	223,750	691,000	659,000	420,250	1,994,000
Component 4	160,000	260,000	100,000	121,549	641,549
Project Execution Cost (EE)	150,000.00	150,000.00	150,000.00	150,000.00	600,000
Project Cycle Management Fee (IE)	174,000.00	150,451.00	150,000.00	150,000.00	624,451
Total Cost (A)	**1,639,750**	**3,183,451**	**1,997,000**	**1,179,799**	**8,000,000**
B. Financial benefits					
Component 1 Benefit	245,500	491,000	1,718,500	2,455,000	4,910,000
Component 2 Benefit	197,480	394,960	1,382,360	1,974,800	3,949,600
Component 3 Benefit	175,484.25	350,968.5	1,228,389.75	1,754,842.5	3,509,685
Component 4 Benefit	70,500	141,000	493,500	705,000	1,410,000
Total Financial Benefits (B)	**688,964.25**	**1,377,928.5**	**4,822,749.75**	**6,889,642.5**	**13,779,285**
Cash flow (B-A)	(950,786)	(1,805,523)	2,825,750	5,709,844	5,779,285
Benefit Cost Ratio (B/A)	0.42	0.43	2.41	5.84	1.72
Net Present Value (NPV)					2,562,463.51
Internal Rate of Return (IRR)					75%
Discount Rate					18%

The financial analysis indicates a positive benefit-cost ratio of 1.72. The NPV is positive with $2.56 million dollars and the internal rate of return is also positive with 75%. An important aspect to consider is that the additional benefits from implementing CRRP will continue into the future to occur on an annual basis. The proposed project is therefore cost-effective and worth the investment

The interventions in water resource management, agricultural productivity, capacity building, and livestock management ensure that the project addresses both immediate and long-term needs of the community, making it a sustainable and cost-effective initiative.

Conclusion

The CCAILSO project (Climate Change Adaptation to Improve Livelihoods in Siwa Oasis) has been thoroughly analysed for its cost-effectiveness and potential long-term benefits. This project stands out due to its comprehensive approach, addressing critical needs in water management, agricultural productivity, and community resilience.

Key Findings:

- Alignment with Local Needs: The project's components are meticulously tailored to address the unique challenges faced by the Siwa Oasis. The focus on sustainable water management, improved agricultural practices, and community training ensures a targeted response to climate-induced vulnerabilities.
- Holistic Approach: Unlike other regional interventions, the CCAILSO project integrates various activities to provide a multi-faceted solution. This includes water resource assessments, development of management plans, soil stabilization, livestock management, and extensive capacity-building initiatives.
- Long-term Impact: The analysis indicates that the project will yield sustainable and substantial benefits, significantly improving the resilience of Siwa Oasis communities to climate change. Without such interventions, the region's existing challenges would likely escalate, highlighting the necessity and urgency of this project.

- Economic Viability: The project demonstrates strong economic viability, with activities such as water and agriculture improvement, soil stabilization and livestock management showing positive returns on investment. This ensures that the resources are efficiently utilized, and the community reaps economic benefits alongside environmental sustainability.

Recommendations

To maximize the impact and ensure the successful implementation of the CCAILSO project, the following recommendations are proposed:

Enhanced Monitoring and Evaluation:

- Robust Mechanisms: Develop and implement comprehensive monitoring and evaluation (M&E) frameworks to track the progress of all project activities. This should include periodic reviews, impact assessments, and real-time data collection to identify areas needing adjustments.
- Performance Indicators: Establish clear performance indicators to measure the effectiveness of interventions. Regularly updating these indicators will help in assessing the project's progress toward achieving its goals.

2. Capacity Building:

- Continuous Training Programs: Invest in ongoing training programs for local communities, farmers, and institutional staff. These programs should cover advanced agricultural techniques, efficient water management practices, and climate adaptation strategies.
- Skill Development: Focus on developing skills that enable communities to manage resources sustainably. This includes technical training in water resource management, soil conservation, and sustainable farming practices.

3. Resource Allocation:

- Dynamic Allocation: Allocate resources dynamically based on periodic assessments. This involves re-evaluating budget allocations and shifting resources to activities showing the highest impact or those needing additional support due to emerging challenges.
- Efficient Use of Funds: Ensure that funds are used efficiently by prioritizing high-impact activities and minimizing administrative overheads.

4. Stakeholder Engagement:

- Building Partnerships: Foster strong partnerships with local, regional, and national stakeholders, including government bodies, NGOs, and community organizations. These partnerships can provide additional support, expertise, and resources.
- Stakeholder Meetings: Regularly convene stakeholder meetings to discuss progress, share insights, and gather feedback. This collaborative approach ensures alignment and support from all involved parties.

5. Sustained Community Involvement:

- Inclusive Planning: Involve local communities in all stages of project planning and implementation. This ensures that the interventions are culturally appropriate and address the actual needs of the community.
- Feedback Mechanisms: Establish feedback mechanisms to gather community input continuously. This helps in refining project activities and ensuring that they remain relevant and effective.

6. Documentation and Knowledge Sharing:

- Detailed Documentation: Document all project processes, successes, and challenges in detail. This comprehensive record will be invaluable for future projects and for stakeholders interested

in replicating the model.

- Dissemination of Lessons Learned: Actively disseminate lessons learned through workshops, conferences, and publications. Sharing these insights can help other regions facing similar challenges to implement effective climate adaptation strategies.

7. Sustainability and Scalability:

- Sustainable Practices: Ensure that all interventions promote sustainable practices that can be maintained by the community after the project ends. This includes low-cost, low-tech solutions that do not require extensive external support.
- Scalability Plans: Develop plans for scaling successful interventions to other regions. This involves creating adaptable models that can be customized to fit different environmental and socio-economic contexts.

By adhering to these recommendations, the CCAILSO project can achieve its objectives more efficiently and sustainably, ensuring long-term benefits for the communities in Siwa Oasis. The project's integrated approach, coupled with strategic resource management and robust stakeholder engagement, positions it as a model for climate adaptation initiatives in similar regions globally.

Click on the Appendices to view


APPENDIX 1.pdf


APPENDIX 2.pdf


APPENDIX 3.pdf

5. Annex 5: Consultation Reports

Consultation and field verification mission for the development of the SIWA project in Egypt

CONTEXT AND OBJECTIVE OF THE PROJECT

The Siwa Oasis is a natural depression located in the northern edge of the Western Desert. It is about 300 km south of the Mediterranean port town of Marsa Matrouh and lies between 29° N and 25.5° E, covering an area of about 800 km2. It stretches about 80 km in east-west direction is bounded by the Qattara Depression from the east, the Jaghbub Depression from the west, the Great Sand Sea from the south, and the El-Diffa Plateau from the north. The Siwa Oasis is covered by a variety of aeolian sands and sabkhas. The distinctive natural elements of the Siwa Oasis are saline lakes, which receive water from natural springs and from agricultural drainage.

The Siwa Oasis environment is an example of a fragile marginal desert ecosystem that has been affected and will be more severely impacted in the future by climatic changes. The overall objective of the proposed project is to strengthen the resilience of the Siwa Ecosystem while improving the community's livelihoods to CC impacts.

This proposed project will be implemented by OSS as the Adaptation Fund accredited entity and executed nationally by the DRC with the support and collaboration of the Ministry of Agriculture and Land Reclamation in Egypt.

The main actions to be deployed in the sites will eventually lead to a significant reduction of the impacts related to major climate hazards in the Siwa Oasis (particularly the Water and food security), to the improvement of the livelihoods and living conditions of the communities as well as to revitalize the ecosystem.

The proposed project targets to consolidate synergies and adopt resilient and innovative food security practices in order to strengthen the adaptive capacities of the community to combat climate change impacts in such fragile ecosystems through the following specific objectives:

- Improve water access throughout sustainable water management and irrigation systems,
- Improve food security for the beneficiary communities in response to CC and
- Enhance local communities' resilience to climate change impacts through diversification of livelihood practices.

Mission Objective

OSS as the implementing entity planned and executed a consultation and field verification mission as a crucial step in gaining a comprehensive understanding of the proposed project area. This activity grasped the context, challenges, and needs of the local communities where the mission's primary goal was to identify and verify the proposed adaptive measures at the local level, refining proposed activities, measures, and actions for the project development stage.

Through the mission, the overarching objective was to assess the specific needs of local communities during project site verification. Consequently, insights, proposals, and recommendations derived from various discussions will be incorporated into the consultation report and the funding proposal holistically. This report will be annexed to the project document, forming an essential component of the submission to the Adaptation Fund.

MISSION SYNOPSIS

Meeting with DRC President

On Sunday, February 25th, 2024, the OSS delegation paid a courtesy visit to Dr. Hosam Shawky, the President of the Desert Research Center (DRC) in Cairo, Egypt. The meeting included the participation of Dr. Samy Abo Ragab, Director of the economic and social department, Dr. Mahmad Cherif, a hydraulics expert, and Dr. Dalila Abou Zid, a gender expert from DRC. Dr. Abo Ragab led the presentation on DRC's structure, objectives, and highlighted some of the projects executed by the Center. Ms. Jaoui commended DRC's initiatives and achievements within Egypt, recognizing their

alignment with climate action goals and their relevance and alignment towards OSS 2030 strategy
Mr. Muhanji took the floor to introduce OSS, outline the mission's objectives, and present the CCAILSO Project. Emphasizing the importance of the consultation process, he stressed its role in aligning concrete project actions with the actual on-the-ground situation. This alignment aims to address local community needs, enhancing their resilience and adaptive capacity to climate change impacts.
It's worth noting that this mission has been organized to deepen understanding of the proposed project area's context, the needs of local communities, and the challenges they face. The goal is to identify adaptive measures at the local level, enabling the refinement of proposed project activities, measures, and actions.
Dr. Shawky, in his role as the President of the DRC, expressed acknowledgment of OSS's commitment to its member countries and the project initiatives. He recognized the significance of organizing this consultation mission with local communities in Siwa Oasis as an integral part of the project development process. Preceding this meeting, the OSS delegation, along with DRC representatives, had already travelled to the proposed project area to initiate the consultation process with the local communities in Siwa.



Pictures 1,2,3: Meeting with DRC president in Cairo

Consultation with Local Council and Communities' Representatives

On Wednesday, February 26th, 2024, the delegation gathered, presided over by Mr. Mohamed Bakr, the President of the Siwa Oasis Council. The attendees included the director of water resources management, the director of agriculture, a representative from the protected area administration, leaders, and representatives from oasis communities, as well as members from civil society organizations and associations. The primary objective of this assembly was to introduce the goals and initiatives of the CCAILSO project and to identify key challenges faced by local communities concerning the impacts of climate change. Additionally, the aim was to propose solutions based on

the experiences of communities within the region.
Mr. Bakr initiated the session by extending a warm welcome to the guests, expressing appreciation for the project's objectives and plan. He emphasized the anticipated positive role of the project in enhancing livelihoods in the oasis. Mr. Bakr urged collaborative efforts between the meeting parties and the delegation to address crucial issues such as natural resource management, including surface and groundwater concerns, soil salinity, and the subsequent decline in agricultural production, particularly in palm and olive cultivation.
Following the formalities and a round-table presentation (annex X), Dr. Abu Ragab outlined the purpose of the visit and the meeting, along with the delegation's program. He emphasized the project's primary objectives and the specific areas of intervention.
Ms. Jaoui, in her presentation, underscored the Sahara and Sahel Observatory's commitment to the project's development. She emphasized the importance of consulting local communities in this process to ensure that the project's activities effectively address the oasis problems related to the impacts of climate change.
Discussions presided the better part of the day where the executive leaders and administration representatives presented their contributions which focused on the following:

Water and irrigation management:

The oasis with its contradictions of Water scarcity as well as unusable water influx that consist the main problems of the local communities especially famers. The mission noted from the discussions:
Water salinity is considered as the main issues that affect agriculture as the main livelihood of the communities within the region.
Presence of different water systems within the Oasis such as:
Old ground water wells constructed by since more than 20 years (100 to 300m)
Wells constructed by famers (Maximum of 90 m)
Spring wells (roman wells)
The Egyptian government established 12 deep ground water wells (more than 1000m) alimented from the Nouba plate. The water extracted from these wells is mixed with low salinity drainage water and used for irrigation and in some places for human consumption.
Lack of access to water due to the non-functional wells and absence of other resources especially within Abu Sherouf area is affecting the agricultural practices.
Lack of capacity to manage the water wells flowing water. The water is left flowing even while non been used by farmers, and it is mixed with the more saline water of the drainages are considered as a waste of resources.
Addressing water shortages, and declining groundwater levels, as well as water salinity is the main problem facing the oasis farmers as most of them are using flood irrigation. Some of the initiatives in the region introduced other irrigation techniques such as drip irrigation.

Land rehabilitation and soil salinization:

Rehabilitation of saline soil and supporting the farmer within the process and technique was one of the discussion subjects in this meeting. Where the community leaders highlighted the need to rehabilitate the existing and establish model plot for land rehabilitation including soil salinization treatment, in order to disseminate the good practices and capacity build the farmers on these techniques.

Agriculture

The water and land issues outlined above have significantly impacted agricultural practices, a fundamental aspect of the communities' livelihoods within the Oasis. The mission identified, through discussions, that horticulture practices were largely abandoned in most areas due to the unsuitably high salinity of the water. This rendered it unsuitable for horticultural activities, affecting both olive and palm trees.
Additionally, stakeholders emphasized the urgent need to address agricultural pest control, specifically targeting the red palm weevil and date moth, which are prevalent within the oasis. Existing labs require support in terms of technical capacity and equipment to effectively manage and prevent

these pests.
Concerning agricultural practices, local stakeholders proposed key solutions during the meeting. They recommended establishing demonstration plots to showcase innovative agricultural methods, including the introduction of drought-resistant crop varieties. Furthermore, there was an emphasis on disseminating sustainable farming techniques through training and technical assistance to farmers, focusing on climate-smart agriculture methods. The overarching goal is to ensure food security within the oasis.
The issue of sand dune movement and the imperative to stabilize it was also discussed. Stakeholders suggested using saline water from drainage, unsuitable for agricultural practices, for stabilizing these dunes. This approach aims to find a practical use for water that would otherwise be considered problematic.
Preserving the local species of palm and olive trees specific to Siwa Oasis emerged as a critical concern. Stakeholders highlighted the importance of supporting Tircograma production laboratories to ensure the continued existence and well-being of these indigenous species.

Livestock

Enhancing animal and poultry production in the oasis emerged as a key topic during discussions with local leaders. This includes the introduction of high-quality sheep breeds to bolster the oasis's animal wealth, promoting poultry farming, establishing hatcheries, and reinforcing the capabilities of service students. Moreover, there is a focus on supporting the provision of fodder, particularly those derived from plant residues.

Revolving Fund

In the course of the meeting, the mission observed that local communities are currently deriving benefits from various revolving funds primarily administered by Civil Society Organizations (CSOs). The community emphasized the importance of supporting both agriculture and non-agriculture-related revolving funds, while also endorsing income-generating activities (IGAs) targeted at women and youth. It was noted that the standard management fees for these revolving funds are generally fixed at 17%.
The meeting concluded with stakeholders expressing their unwavering readiness to collaborate with the project. They are committed to achieving the ambitious goals set forth, which aim to address climate change and implement adaptation measures that enhance the livelihoods of the community within the oasis.

Pictures 4,5: Meeting with Local Council and Communities' Representatives

Local Communities' consultations

DRC Research Station in Siwa

The consultation of the local communities commenced with the delegation visit to DRC research Station in Siwa where the mission noted the different activities and facilities offered by the center to the local communities such as: compost, fodder, olive oil and flour production machines, storage facilities for dates and agricultural products, model plots, short lifecycle animals' production.
The importance and need to improve the services provided within this DRC center under the CCAILSO

project was noted in order to meet the communities needs and benefit from the center reputation within the Oasis.




Pictures 6,7,8: Visit to DRC research station in Siwa

The handcrafts center in Siwa

The mission visited the handcrafts center in Siwa where the mission noted the following:
The center has been established by the Egyptian government as an opportunity for the girls to learn activities Within the 5 setups of the center: (i) sewing setup; ii) traditional carpets; iii) palm leaves valorization; iv) Hand embroidery; and v) silver jewelry production set-up. The girls were organized on a group of 30 that receive a capacity building and the opportunity for application within the center facilities. The center products are generally organized within the showroom of the center.
Unfortunately, the center know is almost closed due the lack of resources and the sensitization of the communities about the activities within this center.




Pictures 9,10,11,12: Siwa handcrafts center

Visit to communities in Bahi Eldin

Following this, the delegation, along with representatives from DRC and the local administration, journeyed to the initial proposed project area within the CCAILSO Project. En route, the team paused at a pumping point where water infiltrated from the dikes surrounding the Siwa Lake was redirected to its original source. The implemented solution was assessed as inefficient for the long term, failing to address the problem or prevent water infiltration into the field. The inadequacy of this solution and the constructed dikes was underscored by a significant event the previous year. This event involved the destruction of the linkage point between the sand dunes and the dike due to erosion and high waves in the lake. Consequently, flooding occurred in the Bahi Eldin region, impacting agriculture across 120 Fadden and elevating soil salinity. Farmers were observed making efforts to cleanse the soil and reduce its salinity for agricultural suitability. The mission also visited the site of the incident, taking note of the ongoing rehabilitation efforts for the dike.

Subsequently, the mission explored various water structures, identifying the main issue in the Bahi Eldin region as being the high salinity of water and soil. Farmers in the area heavily depend on traditional wells for irrigation and land rehabilitation. Government initiatives to establish deep groundwater wells, fed from the Nouba plateau, were observed. The water extracted from these wells is combined with low salinity drainage water and utilized for irrigation and human consumption.

Agriculture in the region primarily revolves around palm trees, with a few olive trees planted. However, due to the recent incident, these trees have been adversely affected by the heightened salinity of the soil.

Picture 13,14: Agriculture land destroyed from breaking of lake banks / dykes causing flooding and increased soil salinity

Visit to DRC farm (model plot) in Ghazalat

The mission visited the DRC model lot in ghazalat community where it has been noted that this farm has been established firstly as initiative for fixation of sand dunes moments in the region. After that the place was transformed to a model plot where different species and types of trees was planted as demonstration for the farmers in the region. In mean time many of the farmers duplicated these demonstrations in the neighbor lands, benefiting from the sand dune fixation and the suitable water salinity in the region.

Visit to communities in Aghormi and farmers

The mission explored the Aghormi region, beginning at one of the 20 sites established by the Egyptian government. In this system, water extraction (2/3 ratio) is combined with suitably salinized water from agricultural drainages (1/3 ratio). The resultant water serves dual purposes, being utilized for both agricultural irrigation and potable water. Thanks to this water system, most farmers benefit from a two-day per week water supply in addition to their solar-powered private wells. Observing the situation in the region, the mission identified a need to expand the irrigation water network, leveraging the system's potential to benefit a larger number of community members.

During the visit, the mission explored a successful plot that thrived under the established water system to assess the project's potential actions. The landowner, a farmer, had successfully diversified his activities by cultivating various crops such as eggplant, onion, mint, and fodder for domestic use. Additionally, palm and olive trees were planted within his plot. The farmer expressed willingness to involve his land in project activities, including experiential visits and showcasing good practices in the region.

Picture 15, 16,17,18: Farmer in Aghormi and discussions on agriculture and water

Visit of communities in Bahi Eldin (korouched)

The mission proceeded to Bahi Eldin, where interviews with local farmers shed light on the primary issues facing the region, linked to i) Water Resource Challenges- The region grapples with a scarcity of water resources, attributed to the malfunctioning of aged wells constructed over 20 years ago. The lack of maintenance exacerbates the problem, allowing farmers access to water for only 1 to 2 hours every 14 days. This equates to approximately 420m3 for 310 Fadden; ii) Impact on Agricultural Practices - the scarcity of water significantly affects agricultural practices in the region. Horticulture is no longer viable due to soil salinity. Additionally, farmers reported a decline in date production over recent years. The prevalence of the red palm weevil has further exacerbated the situation, with treatment costs reaching around 9000 GDP per tree; and iii) Limited Access to Services - the remote location of Bahi Eldin poses challenges for farmers, leading to limited access to essential services such as veterinary support, compost facilities, and other agricultural-related amenities.

Despite these challenges, farmers expressed their eagerness to collaborate with the project and adopt proposed interventions within their plots. They emphasized a willingness to see these techniques succeed, including the implementation of irrigation techniques within a model plot as an initial step toward broader adoption in their fields.

Picture 19,20: Farmer and livestock keeper in Bahi Eldin (korouched)

Discussions with Women's Groups

The mission engaged in two meetings with women from multiple villages around Siwa, focusing on two main aspects. Firstly, discussions revolved around the challenges communities face due to the impacts of climate change on their daily lives. Secondly, the sessions explored the needs and requirements of these communities to benefit from income-generating activities, such as gaining

access to small ruminants and poultry.
The unique social dynamics of the Siwa community demand an inclusive approach and robust awareness campaigns to ensure that Income Generating Activities (IGAs) and other project outcomes are embraced and effectively managed by the beneficiaries. Discussions emphasized the importance of establishing women's groups to foster stronger action and ownership, thereby ensuring the sustainability of the small enterprises set up within the project.
In a separate meeting with the Siwa Community Development and Environment Conservation Association (SDMC), ongoing activities funded by a Revolving Fund were presented, highlighting their positive impact on Siwa's communities. The Association's Head outlined the small credit conditions and the sponsored activities, including farming, cattle breeding, and renewable energy. The Siwa project has the potential to establish a partnership with this organization, leveraging its understanding of local conditions to ensure the suitability of funded activities and the establishment of a revolving fund post-project closure.

Picture 21,22: Women's groups meetings

Visit to Siwa community development and environment conservation association

The meeting with the Siwa community development and environment conservation association was an opportunity to present the various ongoing activities being funded by a Revolving Fund and benefiting to the communities in Siwa. The Head of the Association presented the small credit conditions and the activities that could be sponsored such as farming, cattle breeding and renewable energy. The Siwa project can also develop a partnership with this organization to build on its knowledge of the local conditions and to ensure suitability of the funded activities as well as the revolving fund to be established after the project closure.

Picture 23: Visit to Siwa community development and environment conservation association

Administration of the initial Due Diligence (DD)questionnaire

The due diligence questionnaire as communicated to DRC to be field and annexed with the appropriate supporting document was a subject of a working session with the representatives from DRC where the OSS delegation members further provided clarification on some questions and explained the aim as well as the objectives and philosophy of the DD questionnaire. This DD also shed light on the operations and proposed institutional arrangements for the DRC.

Picture 24: Restitution Session at DRC Premises

Restitution session at DRC Premises

Upon returning to Cairo, a restitution session was arranged with the president of DRC, during which the delegation presented the primary outcomes of the consultation mission. Additionally, suggestions were put forth to refine the proposed activities, measures, and actions to be undertaken during the project development stage. The mission also presented an action plan and outlined the way forward, delineating the responsibilities of each party along with expected deadlines for deliverables.

The president of DRC underscored the importance of involving women in the activities of the DRC

station in Siwa. Emphasizing community behavioral change, he urged for a stronger focus on gender equality and women's empowerment through community-based Income Generating Activities (IGAs) to establish labelled products specific to the oasis. Furthermore, he recommended a particular emphasis on water management in agricultural practices to enhance food security within Siwa.
Proposals to incorporate scholarships, summer schools, and the establishment of seed and genetic banks within the project activities were also discussed and recommended.
The meeting concluded with the president expressing gratitude for the work accomplished on the ground. Both parties agreed to proceed with the development of the full project proposal, targeting the October board of the Adaptation Fund. This urgency is driven by the imperative need for actions in Siwa Oasis.

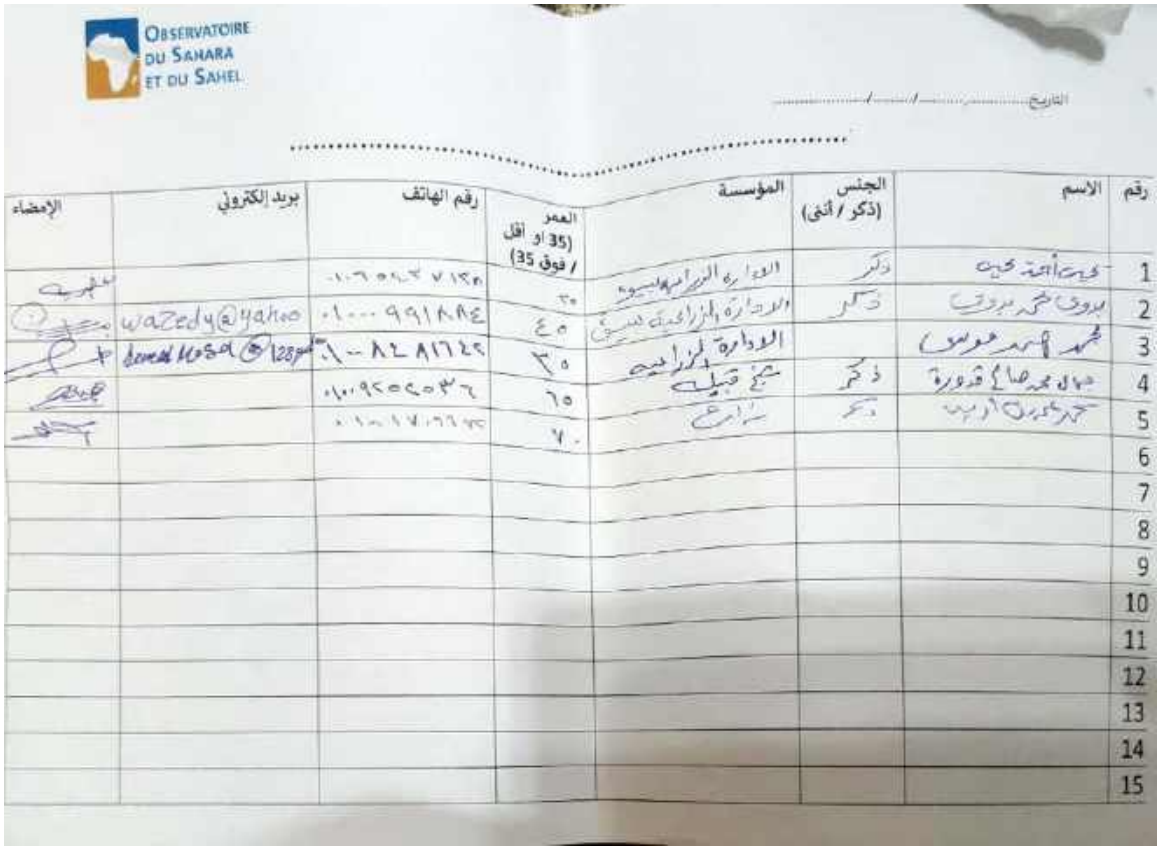

CONCLUSIONS AND RECOMMENDATIONS

Overall, the mission achieved its objectives and ensured a successful community consultation that was key action for the development of the project document.
At the end of the mission, the conclusions can be summarized as follows:
The community need to this project is considered as urgent in terms of Agriculture, land rehabilitation, water management and irrigation, IGAs and women empowerment;
More focus needs to be considered to highlight the climate change impacts on the actual situation of the ground
Some of the activities proposed in the latest CN shall be reviewed and more adapted to meet the community’s needs; and
A work plan has been developed for the next step within the upcoming period.
The next step to be taken by OSS will be to initiate the development of the full proposal document targeting the October Board of Adaptation fund.

ANNEXES

Observatoire du Sahara et du Sahel

م	الاسم	الجنس (ذكر / أنثى)	المؤسسة	العمر (35 او أقل / فوق 35)	رقم الهاتف	بريد إلكتروني	الإمضاء
1	[illegible]	ذكر	سكرتير عام مركز [illegible]	فوق ٣٥	٠١٠٩٩٩٩٤٠٦٢	Ahmedbeghi@yh	[illegible]
2	[illegible]	ذكر	[illegible]	٥٢	[illegible]	elshaikh70@hotmail	[illegible]
3	[illegible]		استاذ الدراسات [illegible]		01098151590	Dalia_DR@Hotmail	[illegible]
4	[illegible]	ذكر	شيخ [illegible]	٥٦	٠١٠٤٨٠٨٧٩٤٤	[illegible]	[illegible]
5	[illegible]		رئيس مجلس ادارة جمعية تنمية المجتمع	٦٢	٠١٠١٢٣٦٩١٨	Yafs2005@yahoo.com	[illegible]
6	[illegible]	ذكر	عضو مجلس [illegible]	٥٨	٠١٠٠٢٤٩٤٩٩٧		[illegible]
7	[illegible]	ذكر	مهندس [illegible]	٤٠	٠١٠٩٦٢١٦٥٨٢		[illegible]
8	[illegible]	ذكر	محمية سيوة الطبيعية	٤٢	٠١٠٦٨١٠٧٦٨١	baghilibrahim@yahoo.com	[illegible]
9	[illegible]	ذكر	[illegible]	٥٨	[illegible]		[illegible]
10	[illegible]	ذكر	مدير [illegible]	٥٤	[illegible]	[illegible]@yahoo.co	[illegible]
11	[illegible]	ذكر	شيخ [illegible]	٥٩	[illegible]		[illegible]
12	[illegible]	ذكر	رئيس وحدة محلية لقرية [illegible]	٥٢	٠١٠٦٦٩٠٦٩٩٦		[illegible]
13	[illegible]	ذكر	عضو مجلس [illegible]	٤٤	٠١٠٠٢٢٦٧٧٦٤٨		[illegible]
14	[illegible]	[illegible]	[illegible]	٥٥	٠١٠٦١٦٩٨٢٥	[illegible]@gmail	[illegible]
15							


OBSERVATOIRE DU SAHARA ET DU SAHEL

التاريخ ...../...../.....

رقم	الاسم	الجنس (ذكر / أنثى)	المؤسسة	العمر (35 او أقل / فوق 35)	رقم الهاتف	بريد إلكتروني	الإمضاء
1		ذكر					
2		ذكر				wazedy@yahoo	
3							
4		ذكر					
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Consultancy Report on the Visit of the OSS Delegation to Egypt – Desert Research Center

INTRODUCTION:

From February 24 to March 2, 2024, a delegation from the Sahara and Sahel Observatory (OSS) conducted a field mission to Egypt's Desert Research Center (DRC). The purpose of this mission was to enhance collaboration between the OSS and DRC, focusing on the ongoing Climate Change Adaptation to Improve Livelihoods in Siwa Oasis (CCAILSO) project. The mission was structured around meetings with local authorities, project stakeholders, and site visits to better understand the project's context and identify necessary interventions to adapt to climate change in Siwa Oasis.

CONTEXT ANALYSIS

Siwa, spanning across 48,031.9 square kilometers, is home to a population of 36,575 individuals. Among them, 19,299 (52.8%) are male, while 14,275 (47.23%) are female, Siwa Oasis is an attractive destination for agricultural investment due to the availability of groundwater and fertile land. Approximately 32,000 people have settled permanently in the oasis to engage in investment opportunities, alongside the original inhabitants, in year 2022/2023.(Siwa information Center, 2024) The Siwa Oasis exemplifies a delicate desert ecosystem, prone to the impacts of climate change both presently and increasingly so in the future. This project aims to bolster the resilience of the Siwa ecosystem while simultaneously enhancing the livelihoods of the community in the face of these climate change challenges. It focuses on improving soil and water management systems, enhancing agricultural production, as well as promoting ecotourism. The project seeks to achieve several specific objectives: (i) Enhance water access and management through sustainable practices; (ii) Improve food security in response to climate change; and (iii) Strengthen local communities' resilience to climate change impacts by diversifying livelihood practices. To realize these objectives, the project is

divided into four components:

Component 1: Improving water resource access and management for local communities:

This component aims to ensure sustainable water management to sustain the Siwa Oasis and support food security and livelihoods. It involves enhancing water distribution for agriculture and human consumption, increasing access, and building local capacity for water resource management.

Component 2: Enhancing resilience of Siwa Oasis ecosystems to climate change impacts:

Focusing on the vulnerable ecosystem, this component aims to improve resilience by adopting Sustainable Land Management (SLM) practices and diversifying livelihoods. The goal is to empower the community to adapt to climate change impacts and variability.

Component 3: Diversifying livelihoods through Income Generating Activities (IGAs) and value chain addition:

This component aims to improve the resilience of Siwa Oasis communities by diversifying livelihoods and adding value to local products. It focuses on creating alternative sources of income to reduce dependence on agriculture and enhance overall resilience.

Component 4: Strengthening knowledge and adaptive capacities of stakeholders to climate change impacts:

Recognizing the importance of knowledge and capacity-building, this component works on empowering local communities and institutions. It enhances communication and knowledge management, engaging government agencies, private enterprises, and communities to disseminate best practices and leverage local knowledge in the fight against climate change impacts.

Delegation Members:

The OSS delegation was composed of:
- Mrs. Khawla Jaoui, Head of the Climate Department
- Mr. Steve Muhanji, Project Coordinator
- Mr. Haitham Rejeb, Project Manager

The delegation was received by the DRC team represented by:
- Dr. Sami Abo Ragab, National Coordinator of the project
- Dr. Abdel Fattah El-Sheikh
- Dr. Dalia Abou Zeid

Meeting with Siwa City Council (February 26, 2024):

A significant meeting took place on February 26, 2024, chaired by Mr. Mohamed Bakr, President of the Siwa Oasis Council. Key representatives from the local government, NGOs, and community leaders attended the meeting. The main focus of the discussion was the climate-related challenges Siwa faces, such as increasing soil salinity, water management issues, and deteriorating agricultural productivity, particularly in palm and olive cultivation. Participants also discussed poverty alleviation strategies, the role of women in the community, and enhancing local capacities to cope with climate change.

The meeting concluded with key recommendations:

1. Improve water management systems, including expanding irrigation and establishing water storage basins.
2. Rehabilitate salt-affected lands using modern agricultural practices.
3. Support agricultural and animal production by introducing resilient crops and livestock.
4. Promote income-generating activities for women, such as handicrafts.
5. Conduct climate resilience awareness campaigns.

Minutes of the meeting held on Monday, February 26, 2024, in Siwa Oasis to discuss the needs of the Beneficiaries of the Siwa Oasis and the executive leadership regarding Climate Change Adaptation To improve livelihoods in the Siwa Oasis project (CCAILSO)

On Wednesday, February 26, 2024, a committee formed by a team from the Desert Research Center, represented by Dr. Sami Abo Ragab, the national coordinator of the project, Dr. Abdel Fattah El-Sheikh, Dr. Dalia Abou Zeid, and a team from the Sahal and Sahara Observatory, including Ms. Khaoula Jaoui, Mr. Steve Muhanji, and Mr. Haitham Rejeb, convened under the chairmanship of Mr. Mohamed Bakr, the president of the Siwa Oasis Council, along with several executive leaders from the oasis, representatives from civil society organizations and associations, as well as the head of the Siwa Oasis Station affiliated with the Desert Research Center. The purpose was to discuss the objectives and activities of the climate change adaptation project to improve livelihoods in the Siwa Oasis and to identify the main problems facing the oasis due to climate change and ways to adapt to them to enhance livelihoods in the oasis.

The session began with Mr. Mohamed Bakr welcoming the guests, commending the objectives and plan of the project, and its expected role in improving livelihoods in the oasis. He called on the executive leaders in the oasis to unite and collaborate to achieve the project's goals within the framework of enhancing natural resource efficiency and supporting practices to address environmental problems and climate change, including the rise in groundwater levels, soil salinity, and the decline in agricultural production in the oasis, especially palm and olive production, as well as

addressing poverty issues, supporting women heads of households, and supporting challenges facing handicrafts and rural women. Dr. Samy Abo-Ragab praised the cooperation of the people of Siwa, especially the Siwa City Council and the oasis's executive leaders, at various stages of the project. He emphasized the recommendations of the Minister of Agriculture, Mr. Sayed Al-Qasr, and Dr. Hossam Shouky, the president of the Desert Research Center, and the president of the Sahal and Sahara Observatory, regarding the need to focus on the people of the oasis and continue implementing the project.

The project coordinator highlighted that the project primarily aims to serve the people of Siwa and support the Siwa community in combating climate change through the project's adoption of a package of good practices in irrigation and agriculture, raising awareness of good practices to address climate change, supporting women heads of households and poor families, which will have a positive impact on the entire Siwa community. Ms. Jaoui, the head of the Climate Department at the Sahal and Sahara Observatory, emphasized the Observatory's keen interest in the Siwa project to assess its feasibility and importance for the oasis and to listen to the needs of the project's beneficiaries to ensure effective participation from all sectors and integrate all sectors into the project's activities and programs.

Then, the floor was given to the executive leaders and ministry representatives to express their opinions consult on the overall activities of the project, and adopt a comprehensive vision for the most important new practices that can be adopted to address climate change and improve livelihoods in the oasis and face the risk of climate change, which lies in the deterioration of water quality, soil salinity, loss of biodiversity, and the spread of unemployment and poverty. The discussions focused on the following elements:

- Support for activities related to improving water management and irrigation such as drip irrigation, including completing some additional areas, Implementing, establishing storage and mixing basins to improve irrigation water quality, supporting the transition to modern irrigation systems to save water, stabilizing sand dunes using good agricultural drainage water, supporting the use of agricultural drainage water in land reclamation, maintaining and developing some existing projects to control drainage pond levels.
- Rehabilitation of saline and salt-affected lands through supporting and developing some existing models, establishing advisory models for land rehabilitation and soil salinity treatment, cooperating with civil societies working in this field, collecting agricultural waste, and producing compost.
- Supporting the provision of water sources in the Abu Sherouf area, addressing water shortages, and declining groundwater levels, and supporting the use of solar energy in water production.
- Supporting the agricultural environment and preserving the good species of palm and olive trees in the Siwa Oasis by supporting tissue culture laboratories, especially with the significant breakthrough in land reclamation in the oasis and the urgent need for seedlings, providing models for vegetable and fruit cultivation that the oasis lacks and needs, supporting wheat cultivation in the oasis to bridge the gap in flour production in the oasis.
- Establishing a grain milling unit and providing the service at nominal prices, supporting pest control factories and palm tree red palm weevil where the existing factories need development, equipment, and technical labor.
- Providing guidance roles in pest control, especially the red palm weevil.
- Establishing agricultural clinics for agricultural pests, especially the red palm weevil and the date moth.
- Rehabilitation of date palm orchards as they are pollution hotspots and providing the required support for the Trichogramma lab combating the date moth, establishing a biological control lab, and launching the parasite.
- Introduce drought-resistant crop varieties and sustainable farming practices.
- Provide training and technical assistance to farmers on climate-smart agriculture techniques.

- Establish demonstration farms for showcasing innovative agricultural methods.
- Supporting and disseminating crop diversity: palm trees, olives, vegetables, fruits, grapes, and wheat.
- Working to achieve food security for the oasis residents by supporting plant production for main food crop
- Supporting animal and poultry production in the oasis, including introducing good breeds of sheep to support the oasis's animal wealth, supporting poultry farming, establishing hatcheries, and supporting capacities for service students, and supporting the provision of fodder, especially those based on plant residues.
- Supporting revolving funds and encouraging small projects and in-kind assistance.
- Dissemination of fish farming and providing small projects for fish production to fill the food gap in meat.
- Supporting women's activities in general, especially women heads of households, and providing opportunities for small projects through:
- Projects to provide sheep heads in cooperation with local community organizations and revolving funds.
- Supporting capacities in handicraft projects, including embroidery, weaving, copper and silver handicrafts, palm leaf furniture industries, and industries based on salt rocks, and opening markets for handicraft products.
- Supporting women heads of households and small projects and integrating women into the labor market.
- Focusing on supporting marketing for products.
- Community Resilience:
    - Conduct awareness campaigns on climate change adaptation strategies.
    - Establish community-based early warning systems for extreme weather events.
    - Facilitate knowledge sharing and exchange of best practices among local stakeholders.
- Encourage entrepreneurship and micro-enterprises through capacity-building programs and access to finance.

The attendees at the end of the meeting emphasized their full readiness to cooperate with the project management to achieve the ambitious goals that were raised, which contribute to addressing climate change and adaptation measures to improve livelihoods in the oasis.

Field Visits (February 26-29, 2024): Siwa Research Station

The OSS and DRC teams conducted field visits with Mr. Mohamed Bakr, the president of the Siwa Oasis Council, along with several executive leaders from the oasis, representatives from civil society organizations and associations, as well as the head of the Siwa Oasis Station affiliated with the Desert Research Center.across Siwa to assess local agricultural practices, water management infrastructure, and community resilience projects. Key visits included:

Visit to the Administrative Building:

The delegation inspected the various sections of the administrative building, noting the potential for utilizing its facilities during the project's implementation. These facilities include:

The Station Director’s Office, the Administrative Affairs Office, and a fully equipped meeting hall that can accommodate up to 50 attendees for meetings or training sessions.

The second floor serves as a residential area, comprising three rooms with a capacity of eight beds and a guest suite with three beds, a lounge, a kitchen, and a bathroom.

Siwa Research Station, affiliated with the Desert Research Center, has the scientific expertise necessary to train farmers and small families in various agricultural fields and artisanal industries related to the desert environment. This expertise aims to assist in improving livelihoods and achieving

a decent standard of living, provided the necessary financial support is available to carry out these activities.

Visit to the Station's Cold Storage Facility:

The delegation examined the cold storage facility and assessed its capacity and the services it provides to the local community in Siwa Oasis. The Siwa Research Station plays a crucial role in supporting the local farmers, particularly those involved in date farming. However, the station requires an expansion of its storage capacity to accommodate up to 100 tons. This increase is necessary to enhance the support for Egyptian date farmers in Siwa Oasis, ensuring better preservation and management of their produce.

Visit to the Medicinal and Aromatic Plants Garden:

The delegation explored the demonstration and experimental model for cultivating various medicinal and aromatic plants. These crops are intercropped with palm trees, which are irrigated using modern drip irrigation techniques. This method maximizes land use and water efficiency while increasing income and improving livelihoods under the challenging climate conditions of Siwa Oasis and the Western Desert of Egypt.

The Siwa Research Station aims to expand the cultivated area from 0.25 acres to 2 acres and establish 15 demonstration fields across the oasis, each covering 0.5 acres. These efforts are

intended to assess the economic performance and social benefits of these crops in Siwa Oasis, ensuring their viability and contribution to local development.

Olive Oil Pressing Unit:

The existing olive pressing equipment was identified as underperforming. The research station highlighted the need for a modernized press capable of processing 1 ton/hour to better serve local farmers

Visit to the Olive Press Unit:

The delegation reviewed the role played by the Desert Research Center researchers in providing technical support to olive farmers, from cultivation and breeding to production and processing. This includes both pickling and pressing olives at nominal costs and high quality. During the visit, it was noted that the current olive press at the station has a small capacity, processing only 150 kg per hour. The station management hopes to receive full support to acquire a high-quality olive press with a capacity of 1 ton per hour. This upgrade would significantly enhance the station's ability to support olive farmers in Siwa Oasis.

Visit to the Grain Milling Unit (Wheat, Barley, and Maize):

The delegation inspected the grain milling unit and learned about the efforts of the Desert Research Center to expand the cultivation areas of wheat and barley in Siwa Oasis, with the goal of transforming

Siwa into a productive hub for wheat. These efforts include:
Providing high-quality wheat and barley seeds that are well-suited to the region, covering an area of 350 acres.
Offering technical and advisory support throughout the agricultural process, from planting to harvesting, storage, and processing, along with organizing necessary training sessions.
While the station currently provides grain milling services at a nominal cost, the mill's capacity is limited. Therefore, there is a request to supply a higher-quality mill with increased capacity to better serve the farmers in Siwa.

Visit to the Date Seed and Palm Kernel Crushing Unit:

The delegation visited the unit responsible for crushing date seeds and palm kernels and observed the technical support provided to farmers for creating feed formulations for poultry and livestock, both at the station and for local farmers. To enhance the unit's efficiency and support farmers more effectively, the following upgrades are needed:
A larger, high-capacity crusher with advanced specifications.
A vertical, self-feeding feed mixer with a capacity of 1 ton per hour.
An automatic feed press with a capacity of 1 ton per hour.
These improvements would significantly boost the unit's ability to produce high-quality feed for livestock and poultry, benefiting the local farming community.

Visit to the Compost Production Unit:

The delegation reviewed the compost production unit and its capabilities in safely processing agricultural and agro-industrial waste into compost and its derivatives, which are essential for fertilizing crops and trees. This process is crucial for producing clean, organic fruits and vegetables.

However, the unit requires additional support and farmer awareness campaigns to encourage the proper disposal of agricultural waste. The following enhancements are recommended:

Organizing training sessions for farmers to educate them on the importance of preserving and recycling agricultural waste.

Expanding the station's activities by providing a high-capacity self-feeding waste shredder (20 tons/hour).

Supplying two 10 m^3 dump trucks to collect and transport waste from across the oasis to the composting facility at the station.

These improvements would boost compost production and contribute to sustainable farming practices in Siwa Oasis.

Visit to the Poultry and Livestock Farms:

The delegation explored the facilities dedicated to poultry and livestock production and learned about the role of Desert Research Center researchers in raising awareness on poultry and livestock farming, feeding, and production. To further support this sector, the following initiatives are recommended:

Training Programs: Organize training sessions for 250 young men and women from Siwa annually for three years, focusing on poultry and livestock farming techniques.

Feed Production Unit: Develop and expand the feed production unit at the station by providing the necessary machinery and raw materials to produce 45 tons of feed per month, supporting proper nutrition for poultry and farm animals.

Small-Scale Poultry Projects: Establish small projects for 220 underprivileged families each year. Each family would receive 50 laying hens (110 days old), a battery cage, and 220 kg of poultry feed. This project would meet household needs and generate a monthly income of approximately EGP 3,475.

Barqi Sheep Breeding: Create a herd of improved Barqi sheep at the station (100 pregnant ewes aged one year, plus 5 rams aged 18 months, along with necessary feed). Additionally, provide 15 improved rams (5 per village) to enhance the genetic quality of Barqi sheep in Siwa Oasis.

These steps will significantly contribute to improving livestock and poultry farming in the region.

Visit to the Handicrafts Center in Siwa Oasis:

The delegation visited the Handicrafts Center in Siwa Oasis to observe the traditional artisanal industries practiced by the local community. These industries play a vital role in preserving Siwa's cultural heritage and supporting the livelihoods of local artisans. The center offers training and production in various crafts such as embroidery, weaving, palm leaf furniture, and silver and copper handicrafts.

To further develop this sector and enhance its economic impact, it is recommended to:

Provide additional support for the marketing and promotion of these handicrafts, opening up new markets both locally and internationally.

Organize training programs to improve the artisans' skills, especially for women and youth, helping them produce higher-quality products.

Establish partnerships with NGOs and government entities to secure funding and resources that would support the growth of the handicraft industry, contributing to the economic empowerment of the local community.

The development of the handicrafts sector could significantly boost income for families in Siwa and help preserve its rich cultural traditions.


Field visits to identify the challenge of the sustainable development and related to the impacts of agricultural drainage in Siwa Oasis.

Essentially, the visits aim to evaluate how agricultural drainage is affecting the area and to identify the challenges of sustainable development.




A visit to groundwater wells: Involving officials from the Ministry of Water Resources and Irrigation, local leaders, and water authorities to assess water problems in the oasis, share proposed solutions with them, and integrate them into project activities.

Challenges of Sustainable water management

The oasis has recently been experiencing major challenges facing the sustainable development of the natural resources in the oasis. With the activity of the reclamation movement in the oasis and the influx of many investors to invest in the agricultural sector and the increase in the overexploitation of water and land resources, in addition to impact of the climate changes, the oasis suffers from a number of challenges as follow:

Water Resources Stress

Siwa Oasis depends on groundwater as the main and only source of water, and this water is derived from a number of non-renewable groundwater reservoirs, most notably the fractured limestone aquifer and the Nubian sandstone aquifer. New agriculture investments and Climate changes are expected to increase the water demands in Siwa Oasis. The temperature increase will increase the water

requirements of crops by 6 to 16 % at a temperature increase of 2 and 4 degrees, respectively. The Oasis is exposed to more evaporation (200-400 mm) by 2040, which imposes more demand on water resources in the region, which will negatively affect the quantities and quality of groundwater extracted from the present limited aquifer. On the other hand, flood irrigation is the common irrigation method in Siwa Oasis, especially in the old agricultural areas, which leads to a lot of water loss. The irrigation channels that carry water to the fields are also unlined and lead to more water loss in the area. This old, dilapidated system leads to a rise in ground water levels in the old lands, which in turn led to soil salinization and a decrease in land productivity. It is expected that with the increase in temperatures and the increase in the rate of evaporation, the problems within the oasis will exacerbate and may eventually lead to the disappearance of the historical oasis known today.

Soil water level rise

The soil water level in the oasis is rising steadily. The increase in the ground water level has been estimated by some studies conducted by the Desert Research Center in the oasis about 4.5 cm/year. This phenomenon is concentrated around the lakes and some low areas in separate areas of the oasis, where the rise in the soil water level leads to a decrease in the productivity of the acre of agricultural crops, and even if the water rises a lot, it leads to the destruction of the land and its transformation into bare marshes or highly saline water pools. The reasons for the rise in ground water in the oasis vary, but the most important of them is the wasteful exploitation of irrigation water, as flood irrigation is the prevailing method of irrigation in the oasis, the small drainage network, the poorly permeable clay soil that covers most parts of the oasis, as well as the presence of a solid, impermeable rocky layer under the soil layer that prevents water from penetrating downward. The project will focus on implementing a set of policies to alleviate this problem on the agricultural environment in the oasis

lake's level rise negative effect

Drainage water problem

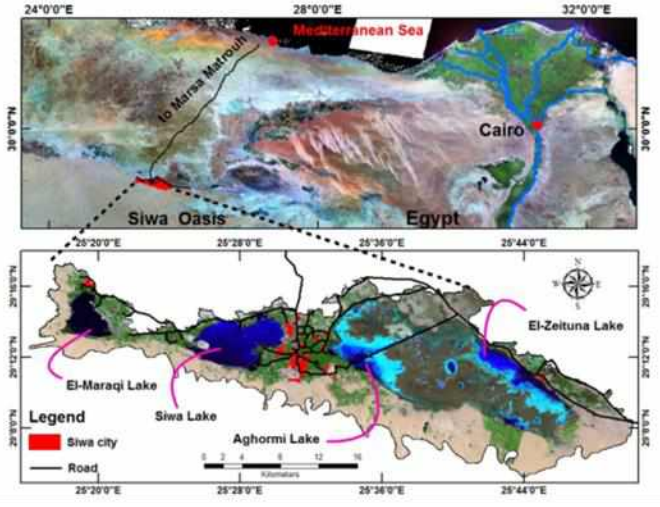
The problem of agricultural drainage in the oasis is the main problem. This problem began to appear at the end of the seventies with the growth of the agricultural area and the increase in the frequency of drilling groundwater wells in the oasis and developed in the eighties and exacerbated in the nineties until it reached the current critical situation, that threatens the existence of the oasis itself.

Some reasons of the drainage problem

Drainage waste water is formed in Siwa Oasis as a main product of irrigation practices in the oasis. The disposal of this water is necessary for the success of the agricultural process and for washing the soil of harmful salts. As a result of the severe saline nature agriculture lands resulting from the spread of the saline clay deposits in the oasis lands, which need continuous washing (irrigation water), the amount of drainage is to a large extent not commensurate with the area of the land served. Drainage water are collected from the cesspools and agricultural areas in the form of small branches “scarves” that combine with each other to form larger and larger drains until they pour into the drainage ponds (Al Maraqi, Siwa, Aghourmi and Al Zaytoun) .The water unbalance between the amount of water produced from wells and the amount of water consumed by agriculture (evapotranspiration) and ponds "evaporation", led to a rise in the level of soilwater and ponds at the same time. The programme will conduct with many primaries and practice many activities to contribute in mitigate this worse problem.

Soil Degradation and Salinization

The lands in Siwa Oasis deteriorate significantly, as part of the fertile agricultural lands turn into weak agricultural lands, and the lands may stop farming and turn into waste lands as a result of the concentration of salts in the soil sector. The reasons for this deterioration in the soil are due to the high level of ground water, the concentration of salts within the soil sector, the high rate of heat and evaporation, which requires more irrigation and therefore more concentration of water and salts in the soil sector. It is worth noting that the project will provide a set of practices to reduce the deterioration of agricultural land, including Encouraging the transition to improved irrigation systems, raising awareness of the concern for internal drainage (inside the farm), spreading types and strains of salinity-tolerant plants that have a great economic return. The project will adapt to the previously mentioned challenges by implementing the following actions through its first component:



تغير الغطاء الأرضي والتربة المتأثرة بالملوحة في واحة سيوة ، مصر (طاهر محمد حسن يوسف، 2017)

Component 1: Improving water resources access and management for local communities

Water, the paramount natural resource in the oasis, is primarily sourced from non-renewable groundwater. With the projected rise in temperatures due to climate change, there is an anticipated surge in water demand for both domestic and agricultural purposes in the oasis. The escalating temperatures caused by climate change are expected to heighten water demand, particularly for irrigation, exacerbating existing water drainage issues. This, in turn, may elevate water stagnation levels, diminish soil fertility, and escalate salinization. The primary objectives of this project component are twofold:

To improve access to enhanced irrigation techniques and systems.

To ensure access to safe drinking water for targeted communities and bolster water resource management.

To bolster the resilience of local communities, it is crucial to enhance water management practices and soil characteristics, alongside addressing the escalating water drainage dilemma. Consequently, efforts will focus on upgrading water access and management by promoting and augmenting irrigation infrastructure systems and wastewater drainage networks. Solar-powered small-scale irrigation systems and wastewater drainage networks will help reduce reliance on fossil fuels and mitigate drainage issues.

Outcome 1.1: Management capacity of water resources is enhanced

Ensuring the resilience of water resources is pivotal for sustaining the economic and ecological equilibrium of the Siwa Oasis. The management of water, both in surplus and scarcity, is central to discussions surrounding food security and livelihoods in the region. Achieving this goal hinges on three primary strategies: (i) improving water resource management plans, (ii) fortifying community-based water resource management, and (iii) guaranteeing expanded access to irrigation water and its efficient utilization within the targeted communities.

Output 1.1.1: Developed/updated water resources management plans

Siwa relies predominantly on groundwater, primarily sourced from several non-renewable reservoirs such as the fractured limestone aquifer and the Nubian sandstone aquifer. With climate change exacerbating pressure on water resources in the Oasis, effective management becomes paramount to sustain these vital resources, crucial for the health and livelihoods of the populace. This initiative seeks to enhance the capacity of various national authorities and local communities in coping with the escalating water demands within the Siwa Oasis.

Output 1.1.2: Strengthened water resources management in target communities.

Water resources management and especially the implementation of adaptation measures requires real adhesion with the involvement of communities especially at the grassroots level. The project will strengthen the community's capacity in order to ensure sustainable and equitable access to water.

Outcome 1.2 Access to irrigation and potable water for target communities is enhanced

The fluctuating hydrological patterns and erratic precipitation, primarily driven by rainfall, are exacerbating the frequency and severity of droughts, contributing to escalating water scarcity within the targeted communities. Addressing these interconnected water challenges requires bolstering the capacity of local communities to effectively manage water resources and related services. Emphasizing irrigation as a resilient agricultural technique holds promise for augmenting farmers' yields in the face of climatic uncertainties. This objective aims to secure fair and ample access to water resources, thereby improving food security and fostering prosperity among the Oasis community.

Output 1.2.1 Increased irrigation water access and use in the target communities

The challenges of water resources management, particularly extraction, and the impacts of climate change pose significant threats to the sustainability of Siwa Oasis. These issues have profound implications for agricultural development and the overall welfare of the population, especially in Egypt's arid and semi-arid regions. This initiative aims to increase access to water for irrigation to uphold agricultural productivity and ensure regional food security. Efforts to conserve water resources in the oasis will be grounded in an integrated management approach, focusing on reducing excessive water consumption. Improvements in irrigation water management will target three key levels: the water source, distribution channels, and irrigation practices. Initially, the CCAILSO project will address the first two levels of the irrigation cycle by promoting new irrigation methods and infrastructure, such as solar-powered pumping, and enhancing the maintenance of the drainage network to minimize wastage. For the third level of the cycle, capacity-building sessions will be conducted for farmers, focusing on the efficient management of irrigation networks and advocating the use of low-salinity wastewater, particularly for fodder production to support livestock. To accomplish the objectives outlined in this initiative, various activities will be implemented across different areas within the Siwa Oasis.

Output 1.2.2 Increased access to potable water among the target communities (20 women).
The project aims to evaluate and disseminate the most effective water solutions, along with establishing exemplary groundwater management systems.
These systems will be implemented at key public locations like schools and the Desert Research Station in Siwa. Not only will these models benefit the local communities by providing access to water, but they will also serve as demonstration centres for the showcased solutions. Emphasis will be placed on raising awareness about water demand and usage practices among the populace.
Field Visits to Farms: To identify the major problems and challenges faced by farms due to climate change, increased groundwater levels, soil salinity, and also issues related to unsafe disposal of agricultural waste when it is used for compost production (such as fires, agricultural pests, insects, and disease transmission).

The challenges posed to the agricultural sector by climate change

Decreasing of Crop Productivity

Agriculture is the main activity of modern Siwa, particularly the cultivation of dates and olives. Siwa Oasis cultivation is composed mainly of palm and olive trees (>85%) in addition to some cash crops and fruit trees (Agricultural Administration of Siwa Oasis, 2015). The presence of date palm symbolizes the oases in the desert. The existence and production of palm groves depends on the availability of water resources and especially underground water potential. The use of groundwater from the Post Nubian Aquifer, which has high groundwater salinity around 3000 to 7000 ppm, decreased yields of the two major cash crops, olives and date palms, by about 46% and 55%, respectively from 2000 to 2011. As a result, net revenue of both crops decreased more than 60% (Moghazy and Kaluarachchi, 2020). In addition, the production of palm groves has been significantly reduced during the last decades resulting from the spread of “red palm weevil.” Therefore, the deterioration of the socio-economic and environmental importance of the date palm is well established. The farmers expressed their dissatisfaction with the impact on the productivity of palms and olives as a result of exposure to cold and heat waves in the early growing stages, as well as salinization of irrigation water and soil.

Decreasing Of Animal Wealth

Animal diseases have increased and plant production has decreased significantly as a result of theirassociation with climate and high temperature. Studies indicate higher temperatures, increased mortality rates for laying hens while decreasing the number and quality of eggs. As well as a clear decrease in the reproduction rates of birds. Feed availability is also expected to be negatively affected due to the negative effects of climate change on productivity rates. In conclusion, temperature increases reduce Siwa’s level by at least 20% in its food production by 2040 as a result of the effects of climate variability, including losses from extreme weather events, reduced crop and livestock productivity, and increased demand for water and crops The lower the water use efficiency, the greater the spread of fires, pests and diseases, etc. This will already compound the economically stressed situation and food security of vulnerable small farmers in the area.
Farmers in Siwa are in dire need of agricultural extension services to provide them with training on the latest farming techniques and pest and disease control methods. By organizing training courses and distributing informative brochures and posters in simple language, farmers can be empowered to

improve their agricultural practices and protect their crops. The date palm, a vital resource for Siwa, is particularly vulnerable to the red palm weevil and other plant diseases, highlighting the urgent need for effective agricultural extension

One of the major issues is the provision of specialized olive seedlings for producing olive oil specific to Siwa and aimed at protecting them from extinction (such as Maraki, Wategan, Kornaki, and Koratina), as well as providing rare palm seedlings (such as Taqtaqet, Sawabe' Al-Aroosa, Chicken Jebil, Ghazal, and Aghram Izzal). Therefore, we propose the establishment of specialized nurseries, which would include 4 greenhouses (9 by 25 meters) for producing 40,000 olive seedlings per year, and 4 greenhouses (9 by 50 meters) for producing 1,000 palm seedlings per year.

The second component of the project aims to address the challenges facing agriculture in the region, exacerbated by climate change as following:

Climate change is significantly impacting agriculture in Siwa Oasis. Rising temperatures, prolonged droughts, and altered rainfall patterns are leading to soil degradation and decreased crop yields. To address these challenges, the project's second component will focus on implementing sustainable agricultural practices, such as water conservation techniques, drought-resistant crop cultivation, and agroforestry. Additionally, the project will provide farmers with training and resources to improve their resilience to climate change and enhance their agricultural productivity, thereby contributing to food security and rural development in Siwa Oasis. The second component of the project aims to address the challenges facing agriculture in the region, exacerbated by climate change.

Outcome 2.1: Concrete adaptation measures under Sustainable Land Management (SLM) Practices are operationalized

Sustainable Land Management (SLM) presents significant opportunities for both environmental conservation and the well-being of communities reliant on it. By adopting SLM practices, farmers can maximize the use of existing land resources in a sustainable manner, boosting productivity while safeguarding soil health. Moreover, SLM facilitates enhanced management of agro-ecosystem services across various production systems, alleviating strain on natural resources. Ultimately, SLM contributes to the improvement and long-term sustainability of economic productivity and environmental health.

Output 2.1.1 Climate resilient Agricultural practices are adopted.

The Siwa Oasis, selected as our project area, epitomizes some of the most vulnerable ecosystems facing the threat of extinction. It grapples with prolonged drought, land degradation, desertification, and the depletion of agricultural biodiversity. These challenges pose significant hurdles in achieving food security and alleviating poverty. Moreover, alongside natural adversities such as high temperatures, wind erosion, and shifting sand dunes, the region contends with soaring energy costs, ineffective water management, and unsustainable agricultural methods, all contributing to soil degradation and diminishing crop yields and income. The project aims to introduce innovative solutions to bolster the resilience of local communities against these adversities. We propose the establishment of Climate Adaptation and Innovation Centers (CAICs) at the Desert Research Centre Station in Siwa due to their existing infrastructure that will require minimal upgrading. Additionally, we advocate for the adoption of agrosilvopastoral practices. These measures aim to enhance the adaptive capacities of the communities, addressing the effects of CC and fostering sustainable development in Siwa.

Output 2.1.2. Sustained Green belts developed.

This initiative focuses on enhancing the capabilities of community committee members and local communities in advocating for and adopting climate-resilient practices. Its goal is to assist community committee members in establishing green belts to stabilize sand dune movements, employing both mechanical and biological methods. These green belts will act as protective barriers, safeguarding communities and agricultural lands from the impacts of sand dune movement. Ultimately, this effort aims to foster improved Sustainable Land Management (SLM) and Climate Resilience Agriculture (CRA) practices within the region

Community meetings were held with women in the oasis to gather their insights on the challenges

they face and to solicit their feedback on the project's proposed solutions.
Siwa Oasis, a predominantly rural area, has a total population of approximately 36,500 people, of which 17,200 are females, representing about 47.2% of the total population. The remaining 19,300 are males, making up approximately 52.8% of the population (data for 2023-2024).
As illustrated by the relative distribution of families across the villages in the Siwa district, 73.4% of families reside in the city of Siwa itself, primarily due to the concentration of government offices, services, and commercial markets there.
The data also demonstrates a significant concentration of both genders in the Siwa district, indicating greater opportunities for economic diversity for both males and females. This concentration suggests that both genders are more likely to be influenced by the cultural integration occurring in the city, given the variety of available activities, including commercial, tourist, service, marketing, and industrial sectors. This diversity makes it particularly intriguing to delve deeper into gender studies in this city, considering how it impacts the economic lives of both genders in Siwa Oasis.
Social relations between men and women in Siwa Oasis are unequal, rooted in the patriarchal structure of the tribal society and the social pressure exerted on females to maintain traditional gender roles.
While women may engage in various economic activities, their participation is often limited by societal norms and expectations. Many women work covertly at home, contributing to family income through handicrafts, baking, sewing, or other small-scale ventures. While some women may participate in agricultural work alongside men, their involvement is often constrained by societal expectations and limited access to resources.
The CCAILSO project recognizes the importance of gender equality in addressing climate change and improving livelihoods in Siwa Oasis. By empowering women and promoting their active participation in decision-making processes, the project aims to build a more resilient and equitable oasis for all.
By implementing these recommendations, the CCAILSO project can contribute to fostering gender equality and enhancing the resilience of Siwa Oasis in the face of climate change
in the gender study under the title of the Gender consideration management we can recognize the CCAILSO project Gender considerations will be made at every stage and intervention of the proposed project gender will be a major consideration in for instance capacity building meetings or workshops, management committees such as the water management committees, management information sharing platforms, developing and formulating by-laws and ordinances for groundwater sources management in communities within the four selected countries, women should constitute at least 20% of each target group. Also, at every stage of providing inputs such as for early warning devices, soil and water conservation, climate- smart agricultural practices, range, and livestock management at least 20% of the women will be the sole beneficiaries. A gender analysis for project interventions is presented in the following.

Click on the link to view mission pictures and PDF reports

CCAILSO Project Pictures and complete annex reports

6. Annex 6: AF core indicators breakdown excel

Link for the AF core indicators breakdown excel.