



Part I: Project Information

GEF ID

10998

Project Type

FSP

Type of Trust Fund

GET

CBIT/NGI

CBIT No

NGI No

Project Title

Innovative approach to protect ouadis through the promotion of non connected mini-grid solar energy in 3 municipalities (Mao, Kekedena and Nokou) of Kanem region-Chad

Countries

Chad

Agency(ies)

UNEP-119478

Other Executing Partner(s)

National Agency of Domestic Energy and Environment of the Ministry of Environment, Fisheries and Sustainable Development, with support from the National Great Green Wall Agency and NGO-Baga-sola

Executing Partner Type

Government

GEF Focal Area

Multi Focal Area

Sector

Renewable Energy

Taxonomy

Influencing models, Strengthen institutional capacity and decision-making, Demonstrate innovative approaches, Deploy innovative financial instruments, Convene multi-stakeholder alliances, Stakeholders, Type of Engagement, Partnership, Participation, Information Dissemination, Consultation, Indigenous Peoples, Beneficiaries, Communications, Awareness Raising, Education, Public Campaigns, Strategic Communications, Civil Society, Non-Governmental Organization, Academia, Community Based Organization, Private Sector, Individuals/Entrepreneurs, Large corporations, Local Communities, Gender Equality, Gender Mainstreaming, Gender-sensitive indicators, Sex-disaggregated indicators, Women groups, Gender results areas, Access to benefits and services, Knowledge Generation and Exchange, Access and control over natural resources, Capacity Development, Participation and leadership, Integrated Programs, Capacity, Knowledge and Research, Innovation, Targeted Research, Knowledge Generation, Workshop, Training, Knowledge Exchange, Peer-to-Peer, Conference, Learning, Indicators to measure change, Theory of change, Adaptive management, Focal Areas, Land Degradation, Climate Change, Climate Change Adaptation, Climate resilience, Complementarity, Private sector, Adaptation Tech Transfer, Climate Change Mitigation, Energy Efficiency, Renewable Energy

Rio Markers**Climate Change Mitigation**

Principal Objective 2

Climate Change Adaptation

No Contribution 0

Biodiversity

No Contribution 0

Land Degradation

Principal Objective 2

Submission Date

6/23/2023

Expected Implementation Start

9/1/2024

Expected Completion Date

7/31/2027

Duration

48In Months

Agency Fee(\$)

280,681.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
LD-1-4	Reduce pressures on natural resources from competing land uses and increase resilience in the wider landscape	GET	1,645,370.00	11,000,000.00
CCM-1-1	Promote innovation and technology transfer for sustainable energy breakthroughs for decentralized power with energy usage	GET	1,309,164.00	10,500,000.00
Total Project Cost(\$)			2,954,534.00	21,500,000.00

B. Project description summary

Project Objective

To protect the integrity and productivity of Ouadis ecosystems and ameliorate access to renewable energy through the use of the benefits of Solar Energy in 3 Municipalities of the Kanem region of Chad

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 1: Restoration of degraded Ouadis ecosystem through appropriate SLM gender-responsive practices	Technical Assistance	1.1: The ecosystem integrity of the Ouadis ecosystem is enhanced through the rehabilitation of 3,000 ha degraded land	<p>1.1.1 Ouadis restored using 5 good gender-responsive SLM practices (mechanical control of sand dune, biological sand dunes fixation; drip irrigation technics, mulching; herbaceous seeding):</p> <p>1.1.2 Climate resilient Agricultural practices adopted</p> <p>1.1.3 Gender-responsive land use plans in at least 3 pilot ouadis developed and implemented using good SLM practices and solar energy</p>	GET	1,273,775.00	7,000,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 2: Investment to support local communities (men and women) access to solar energy for irrigation and economic benefits	Investment	2.1: Investment in high capacity solar water pumps to provide water for both women and men production systems which integrate best SLM practices and access to solar energy for multiple benefits	2.1.1 Solar water pumps infrastructures to benefit both women and men (boreholes, Solar panels, Batteries, network of irrigation tapes) established in at least 3 pilot ouadis in 3 Municipalities of Kanem	GET	1,140,069.00	8,000,000.00
Component 2: Investment to support local communities (men and women) access to solar energy for irrigation and economic benefits	Technical Assistance	2.2 Gender-responsive power purchase agreements enhance the participation and empowerment of women while aligning objectives between Cooperatives and the Societe Nationale d'Electricite (SNE)	2.1.2 Gender-responsive power purchase agreements are negotiated and agreed upon between the cooperatives and possible buyer including the Societe Nationale d'Electricite (SNE)	GET	80,000.00	2,000,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 3: Establishment of long-term gender responsive Knowledge management and monitoring system of Ouadis ecosystems	Technical Assistance	3.1. Men and women from Chad and Kanem region including those involved in ouadis, natural resources management and energy sector are actively engaged and exposed to the potential best SLM practices for Ouadis restoration and introduction of solar energy	<p>3.1.1 Policy brief and guidelines to promote the use and scaling up of good SLM practices for Ouadis restoration and Solar water pumps developed and disseminated</p> <p>3.1.2 Communication and knowledge products generated by the project and uploaded in a dedicated Portal on the project host website to facilitate access and disseminated at local, national and regional levels through different channels.</p> <p>3.1.3 Gender-responsive indicators for monitoring impact of SLM practices and use of</p>	GET	170,000.00	2,449,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
			Solar pumps to restore Ouadis ecosystems and generate energy for mini-Grid developed and necessary data for monitoring regularly collected through a long term monitoring system			
Monitoring and Evaluation	Technical Assistance	4.1 Relevant indicators including gender are monitored and reported. 4.2 Efficient Monitoring and Reporting	4.1.1 Project is adequately monitored through well-established indicators including for gender-responsive monitoring and evaluation system	GET	150,000.00	1,000,000.00
Sub Total (\$)					2,813,844.00	20,449,000.00
Project Management Cost (PMC)						
			GET	140,690.00		1,051,000.00
			Sub Total(\$)	140,690.00		1,051,000.00

Project Management Cost (PMC)

Total Project Cost(\$)

2,954,534.00

21,500,000.00

Please provide justification

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Recipient Country Government	National Agency for Domestic Energy and Environment - Government and Municipalities annual budget allocation	In-kind	Recurrent expenditures	1,500,000.00
Recipient Country Government	National Agency of the Great Green Wall - Pastor Project under One Plannet Summit materialised pleage	Grant	Investment mobilized	8,300,000.00
Recipient Country Government	National Agency of the Great Green Wall	In-kind	Recurrent expenditures	3,700,000.00
Civil Society Organization	Action pour la Recherche et le D?veloppement Durable	Grant	Investment mobilized	8,000,000.00
Total Co-Financing(\$)				21,500,000.00

Describe how any "Investment Mobilized" was identified

The investments mobilized are mainly from special Government institutions with specific financing mandate or from the Government and its bilateral partners which are operating in the project areas. Preliminary discussions took place between the GEF operational Focal Point and the National Agency for Domestic Energy and Environment, which is the executing partner of the project. These investments mobilized include: i) \$1,500,000 from National Agency for Domestic Energy and Environment: it receives its funding from Government budget and minicipaities and create enabling condition of deployment of renewable energy at rural level. Its investment is mobilized through the municipalities in support of the local development plans; ii) \$ 12 million from the National Agency of the Great Green Wall: Following the One Plannet Summit the GGW initiative mobilised projects from donors to support countries to implement their national GGW objectives. One of this project is the Pastor project. The project sites are included in Chad GGW areas and the National Agency following meetings committed to pull resources to support the Ouadis restoration activities and promote solar energy deployment at local level as it is already doing in some municipalities;

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNEP	GET	Chad	Land Degradation	LD STAR Allocation	1,645,370	156,310	1,801,680.00
UNEP	GET	Chad	Climate Change	CC STAR Allocation	1,309,164	124,371	1,433,535.00
Total Grant Resources(\$)					2,954,534.00	280,681.00	3,235,215.00

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments?**No**

Includes reflow to GEF?**No**

F. Project Preparation Grant (PPG)

PPG Required **true**

PPG Amount (\$)

100,000

PPG Agency Fee (\$)

9,500

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNEP	GET	Chad	Land Degradation	LD STAR Allocation	56,000	5,320	61,320.00
UNEP	GET	Chad	Climate Change	CC STAR Allocation	44,000	4,180	48,180.00
Total Project Costs(\$)					100,000.00	9,500.00	109,500.00

Please provide justification

PPG development costs are consistent with Country project development conditions and requirements.

Core Indicators

Indicator 3 Area of land and ecosystems under restoration

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
1500.00	3000.00	0.00	0.00

Indicator 3.1 Area of degraded agricultural lands under restoration

Disaggregation Type	Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 3.2 Area of forest and forest land under restoration

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 3.3 Area of natural grass and woodland under restoration

Disaggregation Type	Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
Natural grass	1,500.00	3,000.00		

Indicator 3.4 Area of wetlands (including estuaries, mangroves) under restoration

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 4 Area of landscapes under improved practices (hectares; excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
1200.00	2500.00	0.00	0.00

Indicator 4.1 Area of landscapes under improved management to benefit biodiversity (hectares, qualitative assessment, non-certified)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
Indicator 4.2 Area of landscapes under third-party certification incorporating biodiversity considerations			
Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Type/Name of Third Party Certification

Indicator 4.3 Area of landscapes under sustainable land management in production systems

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
1,200.00	2,500.00		

Indicator 4.4 Area of High Conservation Value or other forest loss avoided

Disaggregation Type	Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 4.5 Terrestrial OECMs supported

Name of the OECMs	WDPA-ID	Total Ha (Expected at PIF)	Total Ha (Expected at CEO Endorsement)	Total Ha (Achieved at MTR)	Total Ha (Achieved at TE)

Documents (Please upload document(s) that justifies the HCVF)

Title	Submitted

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)	1264322	1284866	0	0
Expected metric tons of CO ₂ e (indirect)	0	0	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)		20,544		
Expected metric tons of CO ₂ e (indirect)				
Anticipated start year of accounting		2024		
Duration of accounting		20		

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)	1,264,322	1,264,322		
Expected metric tons of CO ₂ e (indirect)				
Anticipated start year of accounting	2024	2024		
Duration of accounting	20	20		

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)				

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)

Indicator 11 People benefiting from GEF-financed investments

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	1,500	1,500		
Male	1,500	1,500		
Total	3000	3000	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

The Area of land restored has been estimated at 3,000 ha after confirmatory assessment of the target project areas during the project preparation phase. Similarly, 2,500 ha have been estimated for land use plans based on the average size of the three Ouadis that have been targeted for the plans. Regarding the Greenhouse Gas Emissions Mitigated, the amount (1,284,866 tCO₂) is a summation of two sources (1,264,322 tCO₂ and 20,544 tCO₂): from the use of solar panels and land rehabilitation, respectively. The solar panel GHG emission reduction was based on the emission ratio to be avoided of 0.3kgCO₂eq/kWh by similar solar systems installed in the Sahel region. Ref: Analysis of the Development of Renewable Energies/Mini-Grids in the IPPCC Directive 2006 Level 1- Sahel. The estimated 20,544 metric tons CO₂ have been based on the updated numbers of hectares to be restored under component 1, and calculated using the Nationally Determined Contribution Expert Tool (NEXT). Developed by FAO with support from the French Development Agency and the German Ministry of Food and Agriculture, NEXT that has been developed to provide estimation of climate mitigation potential of strategies against a reference. The tool uses the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (2006), the 2013 Supplement to the 2006 IPCC (IPCC, 2013), and the Refinement to the 2006 IPCC (IPCC, 2019).

Part II. Project Justification

1a. Project Description

Chad is a large Sahelian landlocked country with over 16 million inhabitants. With Libya in the north, Sudan in the east, Central African Republic in the south, and Cameroon, Niger and Nigeria in the west, Chad encompasses 3 distinct geographic zones. These are the Sahara desert, the Sahelian zone and the Sudanese belt. The Sahara Desert in the north, the arid Sahelian region in the center of the country, and the relatively fertile Sudanese belt in the south. The Sahara desert covers almost half of the country however only inhabited by less than 5% of the population. The combination of rainfall and groundwater broadly defines livelihood zones, from pastoral nomadism and transhumant herding to agro-pastoralism and agricultural cultivation.

The agriculture sector dominates the country's economy. In 2020 the agriculture sector contributed nearly 52% to the country's GDP, followed by the services sector (43.6%) and the industrial sector (12%). Chad's main export is petroleum with 92% of total exports, followed by gold, insect resins and oilseeds. Overall, 80 % of the population is engaged in smallholder farming and heavily relies on agriculture for food security and livelihoods. Therefore, concerns are rising about the effects of climate change including rising temperatures, reduced water availability and the occurrence of floods and other extreme weather events. Agricultural production in Chad is primarily subsistence based and rain-fed.

Despite this dominance of the agriculture sector, food insecurity is a serious concern which is likely to be exacerbated by climate change. It is estimated that 1.4 million people (that is 1 out of 10) Chadians are chronically food-insecure. There are no recent data on poverty, but it is estimated to have risen as a result of the COVID-19 pandemic, which disproportionately affected the most vulnerable. In the latest data, from 2018, 42.3% of the population was in poverty, of whom 49.7% were in rural areas, and is engaged in subsistence farming and herding activities for both household food security and income, with limited access to services and markets, for women farmers in particular. Despite economic uplifts, the country remains one of the poorest countries in the world, counting as a Least Developed Country (LDC). Chad ranks 140 out of 144 countries in the Global Gender Gap Index. It ranked 187 out of 189 countries in the 2020 human development index with a Human Development Index (HDI) value of 0.398, thus being one of the poorest and most deprived countries in the world. According to the latest Chad Household Consumption and Informal Sector Survey (2018-2019), approximately 42% of Chadians, or 6.5 million people, including 3.4 million women and 3.1 million men, live below the national poverty line of \$1.2 per day. About 15% of the population (2.4 million people) were in extreme poverty, i.e., unable to meet their basic nutritional needs of 2,300 kilocalories per day. Nearly 89% of poor households are in rural areas, while only 3% are in the capital, N'Djamena. Four main factors explain this poverty: (i) a lack of economic diversification; (ii) low productivity in the rural sector; (iii) exposure to shocks; and (iv) low levels of human capital. The COVID-19 pandemic exacerbated the already socioeconomically fragile national context, pushing the country back into a second recession in 2020-2021.

Some of the development challenges include weak and inequitable management of public resources, low productivity in the agricultural sector, and weak women's empowerment opportunities. On the environment front, the country faces serious threats of climate change impacts, and environmental degradation is driven by both natural and anthropogenic factors. The main causes of land degradation in Chad include, inter alia, demographic growth, conflicts and wars with expanded refugees' settlements, inappropriate soil management, deforestation, shifting cultivation, insecurity in land tenure, variation of climatic conditions and intrinsic characteristics of fragile soils in diverse agro-ecological zones. Regarding the power sector in Chad, it is characterized by low energy access rates which are as low as 2% in the rural areas, and high reliance on fossil fuel and biomass to cover the growing energy needs. The limited access to electricity and the high production costs of thermal electricity by the national electricity company, Soci?t? Nationale d'Electricit? (SNE), as well as the absence of an interconnected national grid resulting in isolated production facilities supplying different cities, means that electricity is expensive with high costs being an obstacle to the economy's effectiveness.

Addressing challenges associated with resource degradation and energy access, the project is designed to protect the integrity and productivity of Ouadis ecosystems and ameliorate access to renewable energy through the use of the benefits of Solar Energy in 3 Municipalities of Kanem region of Chad. It is designed around three components, namely: restoration of degraded Oadis ecosystem through appropriate SLM gender-responsive practices (Component 1); investment to support local communities (men and women) access to solar energy for irrigation and economic benefits (Component 2) ; and establishment of long-term gender-responsive knowledge management and monitoring system of Ouadis ecosystem (Component 3). The implementation of these component will deliver on important environmental and socioeconomic benefits which include the following: 3,000 ha of Ouadis ecosystem protected using good SLM practices that benefit for both men and women; 1,284,866 tCO2 emission avoided (1,264,322 tCO2 from solar panel emission reduction, and 20,544 tCO2 ecosystem restoration of 3,000 ha); and 3,000 persons including 1500 men and 1500 women will benefit directly from the SLM activities and energy produced.

describe any changes in alignment with the project design with the original pif

Detail	Original PIF	CEO changes and justification
Component	Component 1: Promotion of gender sensitive best SLM practices to protect Ouadis ecosystems	Component 1 rephrased as "Restoration of degraded Ouadis ecosystem through appropriate SLM gender-responsive practices" in response to STAP comment to focus the component on land restoration and strengthen the alignment with the project objective.
	Changes at output level have been in terms of number, structure and rephrasing:	

Detail	Original PIF	CEO changes and justification
	<p>1.1.1. A gesnder responsive comprehensive and documented land degradation dynamic and appropriate good restoration practices in Ouadis ecosystems in 3 Municipalities of Kanem Region and a peer-r eviewed article elaborated and published in well known scientific journals</p>	<p><i>1.1.1 3 Ouadis restored using 5 good gender-responsive SLM practices (mechanical control of sand dune, biological sand dunes fixation; drip irrigation technics, mulching; herbaceous seeding).</i> For an output, it has been rephrased to remove 'are' and 'and full participation of 1500 female and 1500 men belonging to cooperatives through local NGOs under the leadership of the decentralized offices of the department of environment?' part has been deleted but included in the description in the output. This output has already been put as the first one, considering its relevance to the scope of component 1.</p>
	<p>1.1.2. Gender sensitive Land use plans of at least 3 pilot ouadis are developed and implemented using good SLM practices and solar water pumping system</p>	<p><i>1.1.2 Climate resilient Agricultural practices adopted.</i> This output has been introduced at CEO endorsement to strengthen the role of Climate resilient agriculture in the land rehabilitation agenda of the project ? building on the fact that agriculture is an important socioeconomic activity in the project area. The previously 1.1.2. is now included</p>

Detail	Original PIF	CEO changes and justification
Output	<p>1.1.3. 3 Ouadis are restored with the use of at least 5 good gesnder responsive SLM practices (mechanical control of sand dune, biological sand dunes fixation; drip irrigation technics, mulching; herbaceous seeding) and full participation of 1500 female and 1500 men belonging to cooperatives through local NGOs under the leadership of the decentralized offices of the department of environment</p>	<p><i>1.1.3 Gender-responsive Land use plans in at least 3 pilot ouadis developed and implemented using good SLM practices and solar energy.</i> For that output, it has been rephrased to remove ?are,? but also, given their closeness to previous outputs 1.1.1 and 1.1.2, these have been rephrased and merged.</p>
	<p>2.1.1. Solar water pumps infrastructures to benefit both women and men (boreholes, Solar panels, Batteries, network of irrigation tapes) are established in at least 3 pilot ouadis in 3 Municipalities of Kanem; Societe Nationale d'Electricite</p>	<p><i>2.1.1 Solar water pumps infrastructures to benefit both women and men (boreholes, Solar panels, Batteries, network of irrigation tapes) established in at least 3 pilot ouadis in 3 Municipalities of Kanem;</i> As an output, it has been rephrased to remove ?are.?</p>

Detail	Original PIF	CEO changes and justification
	<p>2.1.2. Women and local communities cooperatives are structured and capacitated to manage the Solar Water pumps infrastructures.</p> <p>2.1.3. Gender sensitive Power purchase agreements are negotiated and agreed upon between the cooperatives and the possible buyers including Societe Nationale d'Electricite (SNE)</p>	<p><i>2.1.2 Gender-responsive power purchase agreements are negotiated and agreed upon between the cooperatives and possible buyers including the Societe Nationale d'Electricite (SNE).</i> This was the third output at PIF stage, however, two outputs have been merged into one.</p> <p>Outputs 2.1.2 and 2.1.3 have been merged as there were areas of overlap in the way they were phrased at PIF stage</p>
	<p>3.1.1. Gender responsive policy brief to promote the use of good SLM practices and Solar water pumps developed and disseminated;</p> <p>3.1.2. Gender responsive guideline for upscaling the use of Solar water pumps for Ouadis restoration and Solar power mini-grid are developed and disseminated</p>	<p>New 3.1.1 Policy brief and guidelines to promote the use and scaling up of good SLM practices for Ouadis restoration and Solar water pumps developed and disseminated.</p> <p>Outputs 3.1.1 and 3.1.2 were closely related in scope at PIF, and therefore, have been merged and rephrased at CEO endorsement.</p>

Detail	Original PIF	CEO changes and justification
	3.1.3. Gender responsive communication and knowledge products are generated by the project uploaded in a dedicated Portal on the project host website and disseminated at local, national and regional levels through different channels	New 3.1.2 Communication and knowledge products generated by the project and uploaded in a dedicated Portal on the project host website to facilitate access and disseminated at local, national and regional levels through different channels
	3.1.4. Gender disaggregated Indicators for monitoring the impact of SLM practices and use of Solar pumps to restore Ouadis ecosystems and generate energy for mini-Grid are developed and necessary data for monitoring are regularly collected through a long term monitoring system	<p>New 3.1.3 Gender-responsive indicators for monitoring impact of SLM practices and use of Solar pumps to restore Ouadis ecosystems and generate energy for mini-Grid developed and necessary data for monitoring regularly collected through a long term monitoring system.</p> <p>This previously output 3.1.4 at PIF is now 3.1.3 'disaggregated' is replaced by with 'responsive' and 'are' id deleted from the output before the principal verb 'developed.'</p>
		This has been rephrased as output 3.1.3 at CEO ? see above.
		This output is deleted at CEO because the output is redundant and not strong enough alone as it is already implied in output 3.1.3
Carbon emissions	1,264,322 t CO2	1,284,866 tCO2 emission avoided from solar emission reductions (1,264,322 t CO2) and 20,544 t CO2 emission avoided thanks to sustainable land management practices on 3,000 ha of agricultural production landscapes, calculated using the Nationally Determined Contribution Expert Tool (NEXT).

Detail	Original PIF	CEO changes and justification
Core indicators and other GEBs	Area of land restored (Hectares): 1,500 ha	Area of land restored (Hectares): 3,000 ha
	Area of landscapes under improved practices (excluding protected areas)(Hectares): 1,200 ha	Area of landscapes under improved practices (excluding protected areas)(Hectares): 2,500 ha
	600 ha of Ouadis production system (women and men agricultural land) protected	This has been deleted and has now been subsumed in the 3,000 ha of production landscape to be restored that will benefit both men and women.
GEF resource allocation (all the changes have been necessitated due to the changes in outputs.	Component 1: \$1,183,725	Component 1: \$1,273,775
	Component 2 ?investments? = \$830,069 Component 2 ?Technical assistance? = \$100,000	Component 2 ?investments? = \$940,069 Component 2 ?Technical assistance? = \$80,000 This change has been prompted by the merging of some outputs as mentioned above.
	Component 3: investments = \$400,000 Component 3: Technical assistance = \$300,000	Component 3: \$520,000 (all Technical assistance).

1a. *Project Description*. Elaborate on: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description); 2) the baseline scenario and any associated baseline projects; 3) the proposed alternative scenario with a brief description of expected outcomes and components of the project; 4) alignment with GEF focal area and/or Impact Program strategies; 5) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing; 6) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and 7) innovativeness, sustainability and potential for scaling up. ?

Chad, a large landlocked Sahelian country of over 16 million inhabitants, covers an area of 1,284,000 km² of which 98.1% is land and 1.9% is water, consisting mainly of 5 lakes including Lake Chad. The country is bordered to the north by Libya, to the east by Sudan, to the south by the Central African Republic and to the west by Cameroon, Niger and Nigeria. It encompasses 3 distinct geographic zones. These are the Sahara desert, the Sahelian zone and the Sudanese belt. The Sahara Desert in the north, the arid Sahelian region in the center of the country, and the relatively fertile Sudanese belt in the south. The Sahara desert covers almost half of the country however only inhabited by less than 5% of the population. The Sahel accounts for 28% of the country's land area with a population of ~33% (or 5.3 million people). The Sudanese belt though covering only 25% of the country's land area, is home to 63% (or 10.1 million people) ? thereby having the highest concentration of the population. The combination of rainfall and groundwater broadly defines livelihood zones, from pastoral nomadism and transhumant herding to agro-pastoralism and agricultural cultivation. Chad's population is young, and average life expectancy is about 51 years. Also, the country is swiftly urbanizing, and the city population is projected to reach 27% of the total population by 2030. It should be noted that 5% of the population constitutes of refugees and internally displaced persons who have fled regional and domestic conflicts.

Food insecurity is a serious concern which is likely to be exacerbated by climate change. It is estimated that 1.4 million people (that is 1 out of 10) Chadians are chronically food-insecured. There are no recent data on poverty, but it is estimated to have risen as a result of the COVID-19 pandemic, which disproportionately affected the most vulnerable. In the latest data, from 2018, 42.3% of the population was in poverty, of whom 89.7% were in rural areas, and 65% are engaged in subsistence farming and herding activities for both households food security and income, with limited access to services and markets, for women farmers in particular.

According to the latest World Bank report of Chad, the country has made significant progress in reducing poverty over the past 15 years. Nevertheless, it remains one of the poorest countries in the world, counting as a Least Developed Country (LDC).[1]¹ Chad ranks 140 out of 144 countries in the Global Gender Gap Index. It ranked 187 out of 189 countries in the 2020 human development index with an HDI value of 0.398, thus being one of the poorest and most deprived countries in the world. According to the latest Chad Household Consumption and Informal Sector Survey (2018-2019), approximately 42% of Chadians, or 6.5 million people, including 3.4 million women and 3.1 million men, live below the national poverty line of \$1.2 per day. About 15% of the population (2.4 million people) were in extreme poverty, i.e., unable to meet their basic nutritional needs of 2,300 kilocalories per day. Nearly 89% of poor households are in rural areas, while only 3% are in the capital, N'Djamena. Four main factors explain this poverty: (i) a lack of economic diversification; (ii) low productivity in the rural sector; (iii) exposure to shocks; and (iv) low levels of human capital. The COVID-19 pandemic exacerbated the already

[1]

socioeconomically fragile national context, pushing the country back into a second recession in 2020-2021.

According to the African Development Bank, Chad's current account is projected to return to a deficit, of 1.2% of GDP in 2023 and 4.4% in 2024, due to increased imports of high-cost food products. In January 2023, the International Monetary Fund approved the first and second reviews of the extended credit facility approved in December 2021, worth \$570 million. Possible headwinds include deteriorating living conditions among poor households due to global inflation and high exposure to the impacts of climate change, oil price volatility, and political and security shocks.[2]²

The agriculture sector dominates the country's economy. In 2020 the agriculture sector contributed nearly 52% to the country's GDP, followed by the services sector (43.6%) and the industrial sector (12%).² Chad's main export is petroleum with 92% of total exports, followed by gold, insect resins and oilseeds³. Overall, 80 % of the population is engaged in smallholder farming and heavily relies on agriculture for food security and livelihoods. Therefore, concerns are rising about the effects of climate change including rising temperatures, reduced water availability and the occurrence of floods and other extreme weather events. Agricultural production in Chad is primarily subsistence based and rain-fed.

The country is endowed with natural resources, as well as renewable and non-renewable energy resources, the exploitation of which help bring in foreign direct investments into the country. Chad has substantial natural resources and thus a large stock of environmental capital, including oil and gas deposits, minerals, and solar and wind energy potential, as well as Lake Chad, which constitutes an important regional ecosystem for the survival of the neighboring population.[3]³ However, since 2015, the country has been experiencing an unprecedented economic and financial crisis resulting in a continuous deterioration of the State's financial resources linked to the drastic fall in the price of oil, the country's main export earner. This situation has strained the financial ability of the State to forcefully respond to the impacts of climate change and pursue a more rigorous national sustainable development agenda. Similarly, the provision of public services in various areas rural development are underdeveloped due to lack of financial resources. Chad currently serves as a destination for migrants and refugees, 70 %⁴ of whom are from Sudan. Other major countries of origin include the Central African Republic (19 %) and Cameroon (7 %). The provision of social services is further constrained by regional instability that lead to unprecedented influx of refugees in a country that is already struggling to make its socioeconomic ends meet.

Although Chad has had relatively few COVID-19 cases, its economy has been hurt by the global consequences of the pandemic. In 2020 real Gross Domestic Product (GDP) contracted by 0.6%, compared with growth of 3% in 2019 and 2.4% in 2018. The recession is mainly the result of a temporary suspension of oil production, the main engine of the economy, and the closure of borders to contain the pandemic, which caused a slowdown in trade. Growth is projected to reach 5% in 2022, driven by a

resumption of industrial activities?particularly in cotton ginning, oil production, and the textile industry. But, despite this prospect, Chad faces enormous challenges to human development and service delivery, especially in rural areas. Nonetheless, as set out in its ?Vision 2030, The Chad we want?, it is committed for an emerging country with a middle-income economy, generated by diverse and sustainable growth sources and value adding activities.

Some project related Development Challenges and Key Constraints to Poverty Reduction Identified in the Systematic Country Diagnostic

Development Challenges	?	Key Constraints
Weak and inequitable management of public resources	?	Insufficient budget stability
	?	Lack of community-driven development strategies or capacity to implement projects and settle disputes
	?	Insufficient use of clean energy for heating and cooking
Low productivity in the agricultural sector	?	Insufficient use of techniques for sustainable management of natural resources (land, water) for crops and livestock
	?	Lack of organization and integration of poor farmers around market-based clusters in value chains
	?	Lack of agricultural insurance mechanisms
Women?s empowerment	?	Women?s weak land tenure
	?	Women?s insufficient time for economic activities

Sources: IMF 2011, 2013, 2015, 2016, and 2019.

Land Degradation context: According to the Land Degradation Neutrality (LDN)Chad National report, degraded areas have been estimated at 428,000 km?, or 33.43 per cent of the total area (Chad, 2015). Open forests declined by 29 per cent between 1975 and 2013, a loss of 4,700 km2 (CILSS, 2016). Agricultural expansion is largely responsible for the decline in vegetation cover between 1975 and 2013, with an average rate of expansion of five per cent. At the country level, cultivated areas increased by 190 per cent between 1975 and 2013 (CILSS, 2016). The reduction of the area of Lake Chad from 25,000 km2 to 2,500 km2 between 1963 and 2008 has had a negative impact on the quality of life of

communities, biodiversity, and heightened the risks of migration and conflict. Priority targets to achieve LDN include: (i) Restoration of four per cent of 4,326,860 ha of degraded forests through actions of protection, the fight against bush fires and control of transhumance for an investment of USD 16,995.79 million; ii) Fight against water and wind erosion on less than one per cent of 827,975 ha of degraded wetlands with an investment of USD 14.72 million; iii) Restoration of 44 per cent of 65,778,170 ha of barren land and other degraded lands through reforestation, agroforestry, water erosion control and transhumance control with an investment of USD 4,156.67 million (Chad, 2015).

Access to scarce natural resources has generated fierce competition and conflict in Chad. Successive and prolonged periods of drought have caused livestock production to shift from the north into sedentary farming areas of the south, causing conflict between the groups. Herders heading south early in the year damage unharvested crops, and trample newly-seeded land at the beginning of the rainy season as they return north. Farmers with bore-wells risk being overrun by livestock. The groups fight for control of wild plantations of gum arabic, which herders have traditionally used for generations and local sedentary groups have recently discovered are valuable (World Bank 2003; ADF 2004; AUC 2008).

Climate Hazards and Climate Change context:

Climate change is a major problem for Chad. The country is highly exposed to the resulting adverse effects of climate change. The estimated financing needed to adequately respond to climate change is \$16.4 billion over 2020-30, or \$1.5 billion a year. Chad has set up a Special Fund for the Environment, but private climate finance remains very low despite substantial potential.[4]⁴ Therefore, the vulnerability of the country context in the face of climate change is very serious.

Indeed, the country's natural resources are already exposed to anthropic pressure that greatly exceeds their capacity. Overexploitation and the unsustainable use of biological resources owing to extreme poverty and demographic pressures (i.e. waves of refugees and a growing population) are the main factors of loss. Pressure on terrestrial ecosystems and biodiversity is exerted through poorly managed pastoral systems, deforestation, land clearing and bush fires for agriculture, and the proliferation of pests and invasive species. The concomitance of this pressure with the negative effects of climate change (e.g. weakened productivity, reduced natural regeneration, etc.) only aggravates degradation in terms of both vegetation dynamics and spatial occupation, which was reduced from 23.1 million ha in 1990 to 21.7 million ha in 2005. The influx of people into affected areas, timber exploitation and the need for pastures and farmland have led to high rates of deforestation; Chad lost 1.54 million ha (i.e. 25%) of forest cover between 2001 and 2016. The overexploitation of wood resources for domestic use combined with climate change has led to deforestation in over 90% of the national heritage and has caused some plant species to go extinct between 1970 and the present. Biodiversity loss in Chad has been greatly affected by

recurrent droughts and extensive desertification. The effects of climate change on this sector are reflected in:

- ? the fact that vegetation is limited to the lowlands, outwash plains and outcrops of the water table in the north; it is also highly vulnerable to extreme weather conditions
- ? increased dieback of woody plants and soil cracking in the Sahelian zone - a relative reduction in the number of large trees, mainly in the Sudanian zone
- ? the disappearance of certain animal and plant species, especially aquatic species
- ? degradation of ecosystems and ecosystem services, especially wetlands and river systems that risk transforming into other ecosystems
- ? rising temperatures and increased droughts, which could also influence the renewal of forest systems and may lead to irreversible deforestation
- ? an increase in the risk of invasive species becoming established - an increase in the risk of forest and bush fires.[5]⁵

Chad is characterized by land degradation and erratic climate conditions. The climate is generally hot and dry. Temperatures have continuously increased in Chad since the beginning of the 1980s, and different climate scenarios show an increase in the average annual temperature of 0.8 °C in South, 1.2 °C in the Center and 1.3 °C in the North by 2020 compared to 1981-2010. With regards to precipitation, different models show a variation of average annual rainfall of -15 to + 9 mm per month (-28 to + 29%) by 2090. Moreover, Chad's NDC highlights that the country is affected by more intense and prolonged droughts, which are accelerating the extension of Saharan and Sahelian deserted zones, that have spread 150 km South over the last ten years. This phenomenon is also greatly contributing to the shrinking of the country's largest lake, Lake Chad, which has reduced in size from 25,000 km² in 1960 to less than 2,500 km² today. Increased desertification in Chad, a country categorized as extremely vulnerable to climate change, is causing reduced farming and pasture areas, decrease of soil fertility leading to high crops losses, food insecurity, malnutrition, livestock producers and farmers migration, resulting in an increase of existing inequality and discrimination amongst certain populations. It is hypothesized that recent declines in agricultural production (2000-2001, 2004-2005, 2009-2010) are due to the increasingly intense droughts. In fact, rise in temperatures associated with increased variability of rainfall causes malfunctions of agricultural seasons, disturbances in crop life cycles and deterioration of agricultural production. It is estimated that the agricultural sector in the country will suffer the greatest losses compared to the rest of the world, losing between 2% and 4% of its GDP (Mendelsohn et al., 2000, Boko et al., 2007).

With regards to climate change mitigation, the sector contributing the most to emissions generation is the forestry and land use representing 57.94% of total emissions in Chad. It is followed by the agriculture sector (because of slash-and-burn agriculture, bush fires and overgrazing) with 41.05%. Without sustainable mitigation measures, GHG emissions would double within 15 years (NDC 2015), with the sectors projected to be the drivers of this phenomenon being agriculture / livestock, land-use and forestry and energy. Even if GHG emissions in Chad are relatively low compared to those generated in developed countries, there is significant emission reduction potential from agriculture, land use and forestry and energy sectors.

Climate models show that it is very likely that temperatures in Africa will increase during the 21st century by an average of 3 to 4°C, or 1.5 times more than the global average. This temperature increase will be greater in arid continental regions. The results on the projections of changes in precipitation and temperature on the basis of 29 global models of the CMIP6 experiment by 2030 compared to the most optimistic scenario (RCP4.5 or representative profile of the evolution of gas concentrations greenhouse effect) and the pessimistic scenario or RCP8.5, indicate a significant increase in surface temperatures relative to the period 1981 to 2010.

The projections of rainfall variations for the 2030, 2050 and 2100 horizons presented in the Second National Communication show great variability depending on the areas of the country. They predict little or no change in total rainfall in the south of the country, but anticipate a sharp decrease in the Sahelian zone and in the southern part of the Saharan zone. This is estimated at (-20%) in 2030 and could reach (-70%) in 2100 compared to the 2000-2009 average. The North could on the contrary experience, according to these projections, an increase in rainfall.

Another more recent analysis reports that the median of the projections shows an increase in mean annual precipitation of 32 mm under RCP2.6 and 50 mm under RCP6.0 by 2080, compared to year 2000.²⁹ It should be noted that precipitation projections are highly uncertain due to high natural variability from year to year and due to large uncertainty and differences between models.

Episodes of heavy precipitation are expected to increase in intensity in many parts of the world because when the atmosphere is warmer, its capacity to hold water vapor increases. Some climate projection models for Chad predict an increase in the number of days of heavy rainfall, which would increase from 7 per year in 2000 to 9 per year (RCP2.6) and 10 (RCP6.0) in 2080.

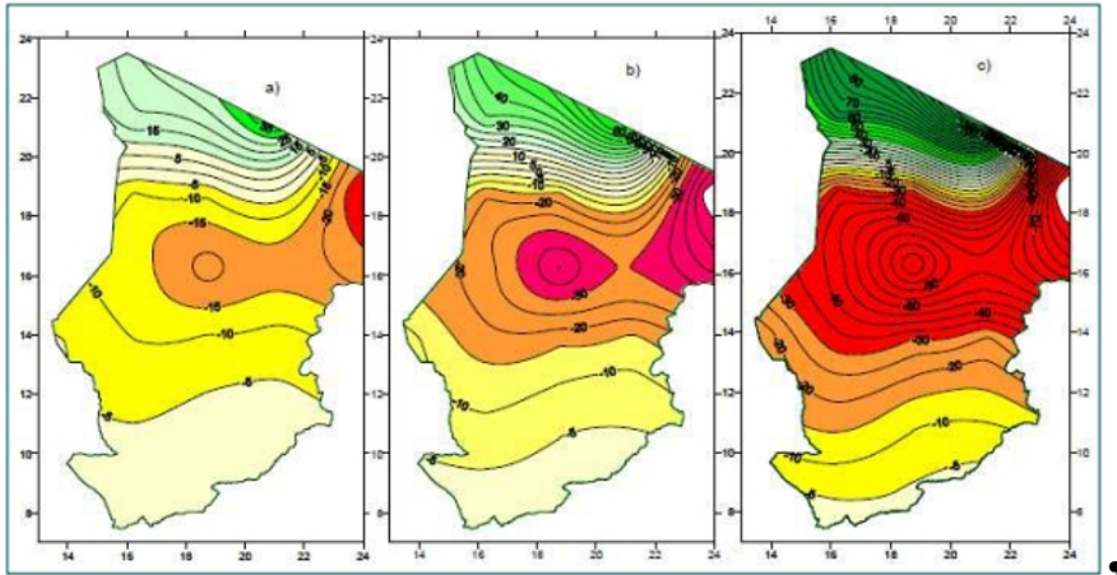


Figure 1. Rainfall deviation for the 2030 (left), 2050 (centre) and 2100 (right) horizons compared to 2000-2009 (source DMN and BRACED, 2019).

The temperature simulations of the Second National Communication therefore show increases throughout the national territory by 2030, 2050 and 2100. The increases thus expected would be on average:

- ? Around 1.2°C by 2030, 2.2°C in 2050 and 4.1°C in 2100, in the Saharan zone (between 16° and 24° North);
- ? Around 1.3°, 2.4°C and 4.5°C, respectively for horizons 2030, 2050 and 2100, in the regions between the 10th and 16th parallels;
- ? Around 1.2°C in 2030, 2.2°C in 2050 and 4.2°C in 2100, in the Sudanian zone.

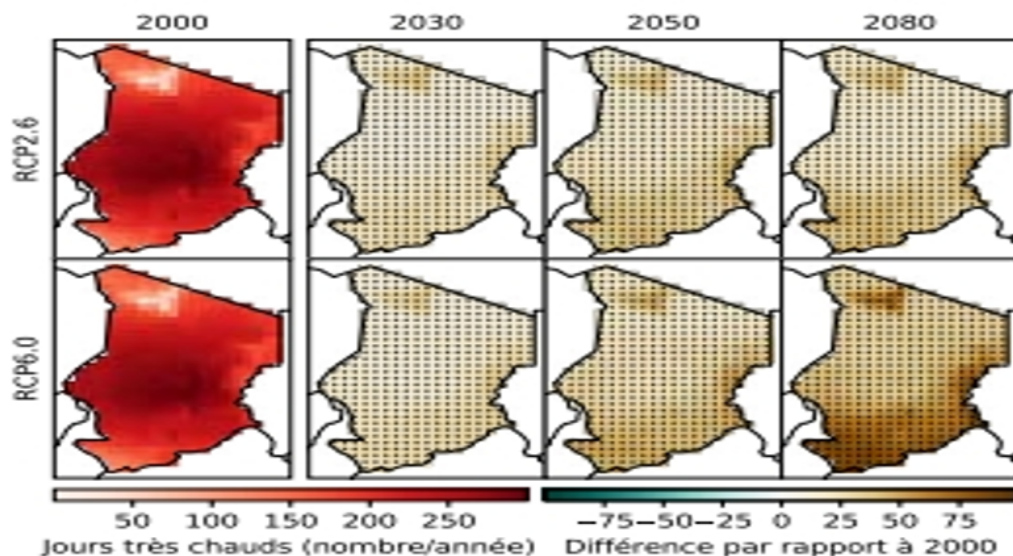


Figure 2. Projection of the annual number of hot days in Chad (sources GIZ, 2021)

Under its NDC, Chad reaffirms its determination to contribute to the global effort to reduce GHG emissions and reinforce its resilience to climate change, implementing coherent programmes which will enable it to become an emerging country by 2030, while favouring low-carbon development. Chad's NDC proposes increasing the renewable electricity supply from 0 to 750GWh/year by 2030. To achieve this, Government-identified priorities which include developing renewable energies for the agriculture and pastoral sectors; interconnection of the Chad-Cameroon power grids to supply Chad with hydrogenated energy; developing wind energy; a cross-country power grid (between adjacent cities) and a national transmission line; and the use of butane gas and promotion of efficient domestic energy (Republic of Chad, 2015).

Chad is ranked 207th emitter out of 210 countries worldwide and appears to be one of the countries that sequester more GHGs than it emits. The sector "Land use and land use change and forests" emits the most with 57.94% of total emissions. It is followed by the agriculture sector (slash-and-burn agriculture, bush fires and overgrazing) with 41.05%. Regarding the Energy and Waste sectors, emissions represent only 1% of total GHG emissions (Second National Communication of Chad, 2012). It is predicted that without sustainable mitigation measures, GHG emissions would double within 15 years (INDC, 2015). Sectors projected to be the drivers of this doubling of emissions include energy, agriculture / animal husbandry, land use and forestry, and waste, among others. A combination of mitigation and sequestration options would reduce GHG emissions by around 30% and increase sequestration capacities by around 40% compared to the "business as usual" scenario. A combination of mitigation and sequestration options would result in an emission reduction in the range of 18.20% to 71% depending on the scenario. The largest challenge to overcome is the move, between now and 2030, from a development model based on oil revenue, to a model based on a more diversified economy with sustainable utilisation of resources and an energy transition.

Chad with its renewables resources (water, forestry, land, etc.) is rich in potential power-generation capacity, including geothermal, biomass, wind and solar energy resources, which vary depending on the bioclimatic zone (solar from 4.5 to 6.5 kWh / m² / day and over the entire territory, wind power from 4 to 7 m / s in the North, and biomass in the South).

Solar Energy context: According to the solar radiation map of Africa produced by the **Photovoltaic Geographical Information System (PVGIS) web site** which provides free and open access to Maps, by country or region, of solar resource and PV potential, Chad enjoys remarkable sunshine throughout its territory. Solar radiation received daily is of the order of 6 kWh / m² on a horizontal surface. The number of hours of sunshine per year varies from 2,850 hours in the South to 3,750 hours in the North. However, as the rest of the continent, the country remains largely poor in energy supply and consumption. The energy deficit is worse in rural and semi urban communities. Per capita electricity consumption is one of lowest in the world and tariffs are among the highest. Chad electricity access rate is respectively 6.4% at the national level, 20% in urban areas and 0.6% in rural areas. The average annual electricity consumption per capita in Chad is estimated at 47 kWh , while that of Central Africa is 109 kWh / pc. For comparison purposes, other African countries South of the Sahara annual electricity consumption is 525 kWh / pc, while globally it is 3.031 kWh / pc. This reality constitutes, a huge constraint for its socioeconomic and cultural development. Chad's energy consumption mix is dominated by thermal. Renewable resources, primarily in the form of hydroelectricity, only contributed 8 percent.

Chad's electric grid is limited to N'Djamena and suffers frequent outages. Power generation remains highly localized. The National Electricity Company SNE lacks technical and human capacity to meet growing demand because of aging infrastructure and lack of financing. This energy situation shows that if the country follows an energy strategy based on conventional fuel sources, it could lead to significant increases in the country's GHG emissions. Therefore, it is important to use the country's renewable energy resources instead of fossil fuels. This is particularly the case in rural electrification schemes, where locally available renewable energy resources can be tapped into. Mini-grid solutions have thus been targeted to provide electrification in rural areas as one of the ways to help achieve universal electrification by 2030. Chad has published its INDC targets, which include activities to improve environmental management through tree planting and pursuing a low carbon development pathway to reduce greenhouse gas emissions and contribute to addressing climate change. The proposed activities are all targeted on moving away from an oil-based economy to one based on more sustainable models of renewable energy. The government approved a National Electricity Emergency Plan in July 2020 that sets out plans for mini-grids in 102 smaller cities across the country. It also set the objective, by 2030 to achieve (i) an electricity access rate of 53% nationwide; for (ii) a rural access rate to electricity at 20% and (iii) a 20% share of renewable energies in production national electricity starting from a current situation capped at, 6.4%, 0.6% and 1% respectively.

Chad has enormous potential in terms of investment opportunities in the sector of renewable energies (solar, wind, biomass). A company called Solaire Sahel for the manufacturing photovoltaic system

among others to solve the problem of electrification especially in the provinces and rural areas. The company has started production of Solar Panels in the country and the region. It should be noted that an unlimited amount of glass sand is available, which is the main material for the manufacture of solar panels. In addition, Chad records, in the north, from 2850 to 3750 hours of sunshine per year with an overall intensity of radiation from 4.5 to 6.5 kWh/m² per day. Chad is also one of the Sahelian countries where the use of wind energy is less difficult. Indeed, the average speed of calm winds varies from 2.5 m / s to 5m / s from south to north.

The current economic growth path set out at 6.1% in 2021 and 5% in 2022 while realistic is a carbon-intensive one. The country has a multiphased approach to universal access of electricity. The focus of phases will range from off-grid electrification to on-grid electrification and to regional power markets, with each subsequent phase building on the outputs of preceding ones. Under the current phased approach, it is noted that Greenhouse gas (GHG) emissions would continue to increase. This is particularly relevant in Phase 1 where all projects of the National Electricity Emergency Plan are all thermal project.

Greenhouse gas (GHG) emissions would continue to increase, if the current economic activities are to continue at its present rate as described in Phase 1 below of the Energy Access Plan where all projects of the National Electricity Emergency Plan are all thermal project. It is expected that the GHG emissions of Chad are expected to rise from 18 million tCO₂eq to 28 million tCO₂eq between 2020 and 2030 in the business as usual scenario. Adopting a low emissions path will be achieved by various means, including increasing its renewable electricity supply from 0 to 750 GWh/year in 15 years from the 2015 baseline.

Current renewable energy projects include: i) The World Bank \$295 million grant from the International Development Association (IDA)* to help Chad expand its access to energy. The Chad Energy Access Scale Up Project (PAAET) approved in May 2022. and it aims to increase access to electricity and clean cooking solutions via expansion of the main power grid and mini-grids, standalone solar systems, deployment of improved stoves, and natural resource management; ii) the Djermaya Solar[6]6: Located 30km north of the country's capital, N'Djamena, the Djermaya Solar project has been developed by InfraCo Africa, through Anergis[7]7, with its partner Smart Energies[8]8. Denham Capital[9]9 recently entered the project as long-term investors through Neo Themis[10]10. Djermaya Solar will be developed in two phases totalling 60MW and is the first solar project to be designed, financed, built and operated by an independent power producer (IPP) in Chad. The project will also pioneer utility-scale energy storage in th country, incorporating a 4MWh Battery Energy Storage System (BESS), 18km transmission line and a substation funded with ?6.35 million of concessional debt from the EU-Africa Infrastructure

Trust Fund (EU-AITF)[11]¹¹; and the iii) Sahel Solaire is operating since 2019 and has started production of Solar Panels in the country and the region.

Waste disposal in Chad: Waste management in Chad faces significant challenges, resulting in inadequate waste collection, disposal, and recycling practices. The country's waste management infrastructure is limited, particularly in rural areas, leading to uncontrolled dumping and open burning of waste, posing risks to human health and the environment.

In urban centers, waste collection services are often insufficient, resulting in the accumulation of garbage in public spaces and residential areas. The lack of proper waste disposal facilities leads to the contamination of soil, water bodies, and air, contributing to pollution and the spread of diseases. Chad also struggles with a lack of awareness and education regarding waste management. Many communities lack knowledge about recycling, separation of waste, and the potential environmental impacts of improper waste disposal.

Efforts to address waste management challenges are gradually taking shape. The government, in collaboration with international organizations, is working on waste management projects to improve infrastructure, establish waste collection systems, and raise public awareness. These initiatives focus on promoting sustainable waste management practices, including recycling and composting. However, significant gaps remain, and further investment is needed to strengthen waste management systems throughout the country. This includes enhancing waste collection services, establishing recycling facilities, and implementing proper waste disposal methods. Education and awareness campaigns should also be prioritized to promote responsible waste management behaviors at the community level.

Ultimately, achieving effective waste management in Chad requires a comprehensive approach that encompasses infrastructure development, institutional capacity building, public participation, and policy frameworks to ensure the sustainable management of waste and minimize its negative impacts on human health and the environment ? these are currently insufficient in some cases, and absent in most.

Introduction to the Projet Site: The Kanem Region:

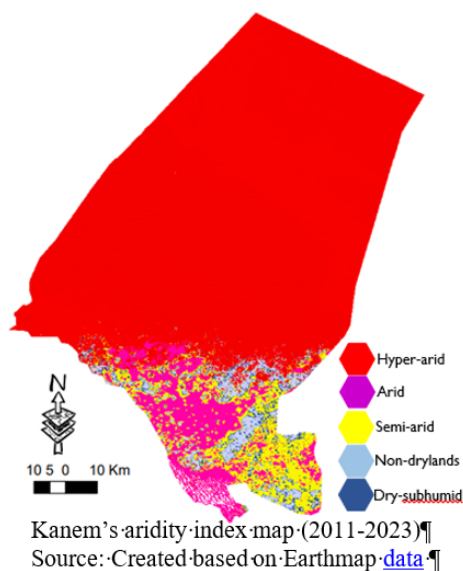


Figure 3. Kanem's aridity index map (2011-2023)

Source: Created based on Earthmap [data](#)

In Chad, the Kanem region, located northeast of Lake Chad and on the border with Niger, is a typical Sahelian agro-ecological context, of which pastoral herding is the main economic activity. Climatic changes have resulted in a higher frequency of severe annual rainfall deficits, leading the region to suffer from chronic food insecurity.[12]¹² More than half of the region is hyper-arid, posing serious challenges to agricultural activities, including pastoralism ((see Figure 3 for the map showing the aridity index). Because of its importance, pastoral systems should hold in this context a key-role in the socio-economic development of the region, being the basis of the livelihoods of households and providing the meat needed on the national and sub-regional markets. To enable this development, investments and support will be necessary, needing in turn a thorough understanding of the constraints and opportunities of the system.

In terms of population dynamics, the region has a population estimated at 306 693 (2020 statistics).[1] The major language spoken is Kanembu, with almost 98% of the people being sedentary farmers, and only about 2% could be categorised nomadic. Kanem is the principal agricultural segment in the whole country, producing cotton and groundnuts, the two main cash crops of the country. There are a variety of local crops such as rice also grown in the region. The project will seek to directly impact the lives of 300,000 out of 306 693 in Kanem, that is , ~98% based on 2020 estimations.

[1] UNDESA (n.d). Integrated [Plan](#) for Chad's Water Development and Management

The region's chronic food and nutrition crisis in the Sahel is a big challenge. For example, the Kanem region has some of the most critical nutritional indicators in the Chadian Sahel with 56% of its population being in the state of food insecurity. The region is subject to recurring environmental shocks such as drought and locust plagues. Farmable land (the Ouadis) are affected by silting and the decrease of the water table.

It is essential to combine the improvement of cultivation practices and techniques with effective management of facilities and environment in order to save fertile land for agriculture. Structural vulnerabilities, linked to low investments in basic social services, are aggravated by destabilising events such as the Lake Chad crisis. Despite favourable access to ground water, access to water remains a challenge in the Kanem region. Since the break-out of crisis in the Sahelian strip as well as climatic warming and the arrival of refugees, the regions of the Lake and the Kanem have endured problems with access to the drinking water, proper hygiene and sanitation, and education and protection of the environment. During a joint mission in the regions of the Lake and the Kanem in February 2018 by UNDP country Office and national NGOs, notably Humanitarian and Development NGOs, various needs including access to energy for domestic use and water pumping systems were identified. The existing boreholes require rehabilitation or maintenance but still will not meet needs, creating a necessity to have supplementary points of water. The investments required for the extraction of ground water limit its availability and contribute to inter-community tensions.

Recent (May 2023) UNEP, the Agency for Domestic Energy and the National Great Green Wall Agency, mission in Kanem confirm that the key environmental challenges in the region include:

- Ouadis being dumped by sand with negative impacts on socioeconomic activities of women
- Water availability to support gardenings and pastoralism activities: concentration of animals at scarse water points increase land degradation and is also source of conflicts between communities
- Decrease of rainfall with impact on food production
- Animal pressure on Ouadis as only available water points

A mapping of remaining pockets of water sites in the Kanem-region with the objective of establishing solar energy water pumping based mini grids technologies for securing agricultural production by strengthening the protection of the Ouadis through the enhancement by water control systems, for productive uses such as market gardening, crop diversification and post harvest systems for agriculture products, could be very effective to address continued land degradation and climate change impacts that is impacting this region.

The project will be working in three (3) municipalities of Kanem region (Mono, Kekedena and Mokou). The Ouadis system in these municipalities are presented in Annex A. In each of the municipalities 10 Ouadis will be selected for landscape restoration and among the 10 Ouadis, One (1) Ouadis will be selected in each municipality to install Borehole and Solar panels to pump water for irrigation and the potential energy excess to be used in the mini-grid for distribution.

Root Causes of Land Degradation:

Outcomes of land degradation are ecologically, economically, and socially negative. Degradation disrupts ecosystem functions, processes, integrity, and services; diminishes food, livelihood, and income security; and undermines capacities to adapt to climate variability and other shocks and stresses. The rural poor often disproportionately bear the burden of these negative impacts, particularly where they depend on the natural resource base to survive. Identifying ways to improve land productivity and sustainability for smallholder farmers who are often most negatively affected by land degradation is a central challenge in reversing declining per capita food availability.[13]¹³

The main causes of land degradation in Chad include, inter alia, demographic growth, conflicts and wars with expanded refugees' settlements, inappropriate soil management, deforestation, shifting cultivation, insecurity in land tenure, variation of climatic conditions and intrinsic characteristics of fragile soils in diverse agro-ecological zones. The land degradation process is driven by both climate (direct) and human (indirect) factors. The Climate change drivers of land degradation include changes in temperature, rainfall intensity, windstorms and changes of the distribution and intensity of extreme weather events. Change in rainfall regimes drive changes in vegetation cover and composition and trigger processes such as erosion of agricultural soils. Soil erosion rates for example, tend to increase with increasing mean annual rainfall. Human drivers of land degradation in Africa include demographic growth, grazing pressures, agricultural practices, agricultural expansion, forest clearing and fuel wood harvesting. The degradation of soil quality due to cropping, made worse by climate change, results in a loss of productive potential of the land, driving conversion of non-agricultural land, such as forests to agriculture. Reduced productivity of most agricultural crops will continue to drive land-use changes in Chad. In arid, semi-arid and dry sub-humid areas of Africa, land degradation due to erosion and salinization is exacerbated by poor agricultural practices (in particular poor management of irrigation and fertilization). Poor agricultural practices are also at the root of soil acidification. Acidification increases with the duration of land use, especially in ferruginous and ferralitic soils, which are the most prevalently cultivated.

Overview of the climate change situation, scenarios, including future projects, of the project area

The province of Kanem is one of the 23 provinces of Chad and is located in the west of the country and whose capital is Mao. It covers an area of 72,365 km² with an estimated population of 470,275 inhabitants in 2020 (RGPH 2). It is located in the Sahelian strip of Chad between 14° 7' 10" longitude

North and 15° 18' 48" latitude East, is the hinterland of Lake Chad, where the violence of armed groups not -States have forced movement restrictions and reduced cross-border trade. Breeding, agriculture, trade, exploitation of soda and handicrafts are the main activities of the population of this Province. Despite the enormous potential of this Province, food and nutritional insecurity has become chronic because of repetitive climatic hazards (drought, heat wave, violent winds and floods). The sectors most affected by these hazards are: the Water, Agriculture, Livestock, Health, Commerce, Environment/Fisheries and Education sectors. The climatic hazards have triggered important changes. They have caused population movements towards the most fertile areas where agricultural land is now replacing the old pastures. This has created undue pressure leading to the loss of pasture, the drying up of wells including ponds, the loss of livestock, quick spread of both crop and zoonotic diseases, the increase in the threats of locusts and bush fires, the destruction of habitats and enclosures, and wind and water erosion. These factors have increased both food and nutrition insecurity (FAO/ANGGW, 2022).

This situation makes the Province one of the most vulnerable and unstable to climate change in the whole country (ERC, 2021). In addition, the pressure exerted on natural resources (water, land, plant cover, etc.) is becoming more important, especially with the increase in populations. This situation causes conflicts between local communities and returning migrants, farmers and herders and between sedentary and nomadic herders. However, with the rains becoming increasingly rare, unusual and unpredictable, farmers, agro-pastoralists and pastoralists are forcing themselves to change their behaviors, patterns and timing of agricultural and livestock activities in order to adapt. and mitigate climate change (ERC, 2021).

Climate trends in Kanem province from 1991 to 2020

a. Temperatures: The Province of Kanem is characterized by maximum temperatures ranging from 30 to 42°C and minimums between 10 to 25°C. The hottest months are March, April, May and June when the highs reach 37 to 42°C. On the other hand, the coldest months are January, February and November and December. There is also a period of relative cold in August with a maximum temperature of 30°C and a minimum of 19°C. The analysis shows that there is no significant difference between the temperatures observed in the commune of Mao, Nokou and Mondo (figure 1), because these communes are not so far from each other. The temperature anomalies observed over the series of the last thirty years (1991 to 2020) show a cooling during the first five years and also a very marked increase during the years 1996 to 2007 with an alternation of warm year with cold year. The trend is slightly up. The minimum temperatures varied in the same way, but the trend is constant.

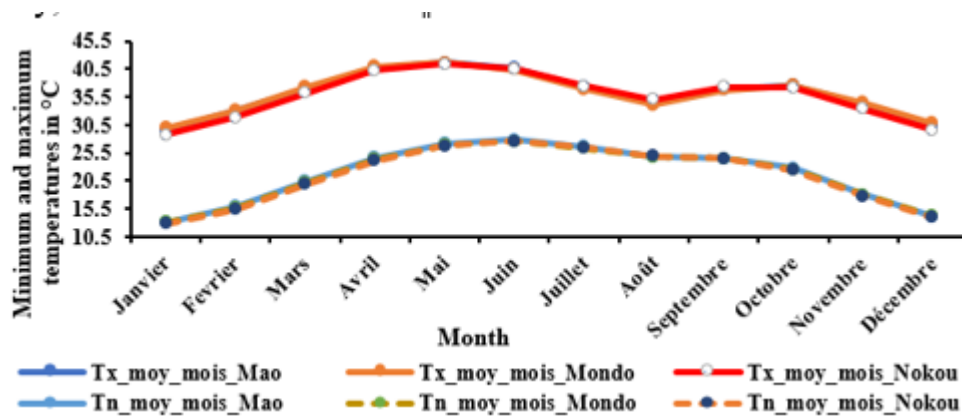


Figure 4: showing variation in monthly minimum and maximum temperatures in Kanem from 1991 to 2020.

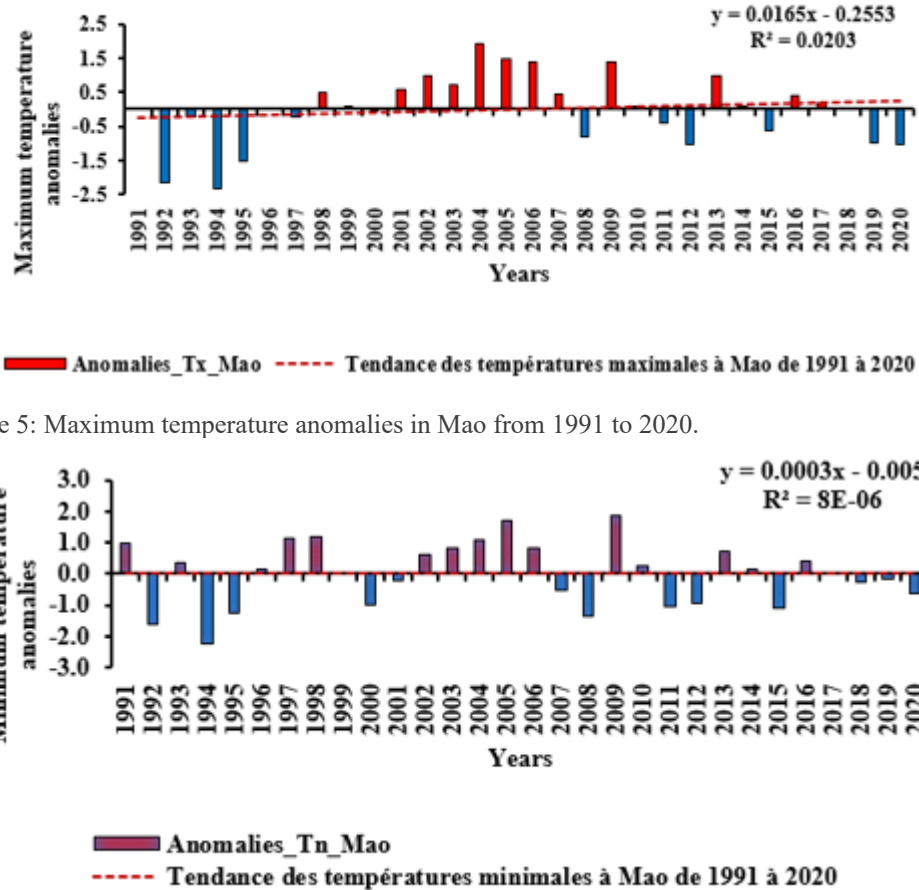


Figure 5: Maximum temperature anomalies in Mao from 1991 to 2020.

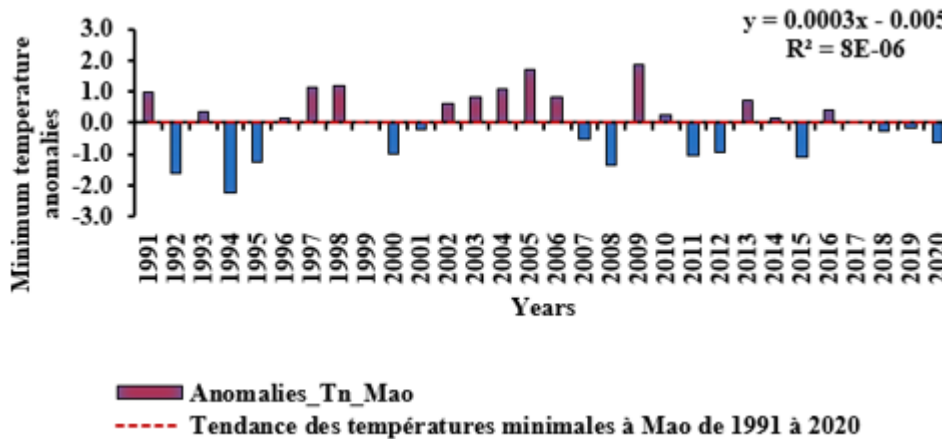


Figure 6: Minimum temperature anomalies at Mao from 1991 to 2020.

b. Rainfall: Rainfall in the Province of Kanem is characterized by annual accumulations varying between 100 to 350 mm with three months of useful rains. The rainy season begins in June and ends in September. The rainiest months are the months of July and August where the monthly accumulations range between 80 to 120 mm.

The interannual evolution of rainfall is marked by an alternation of dry and wet years. Overall, it can be seen that the rainfall trend has been on the rise since 2005 to the present day in all three Communes of Mao, Mondo and Nokou. The standardized precipitation indices show that the first two decades of the series (1991 to 2010) are almost years of drought except for a few years of the series such as 1993 and 1994 in Nokou, 2008 and 2009 in Mao which are wet years (see figures below)

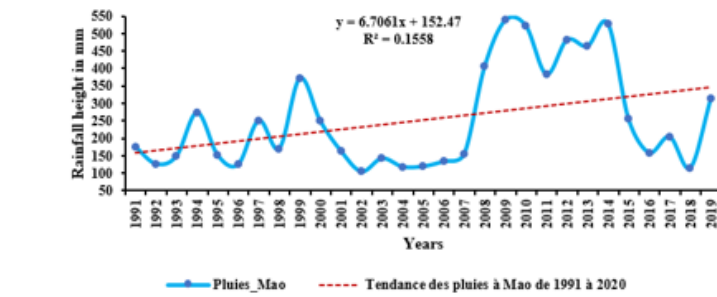
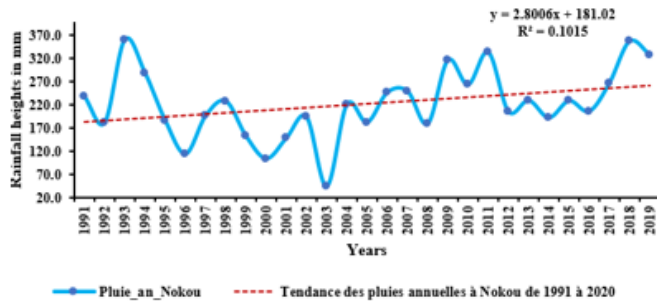
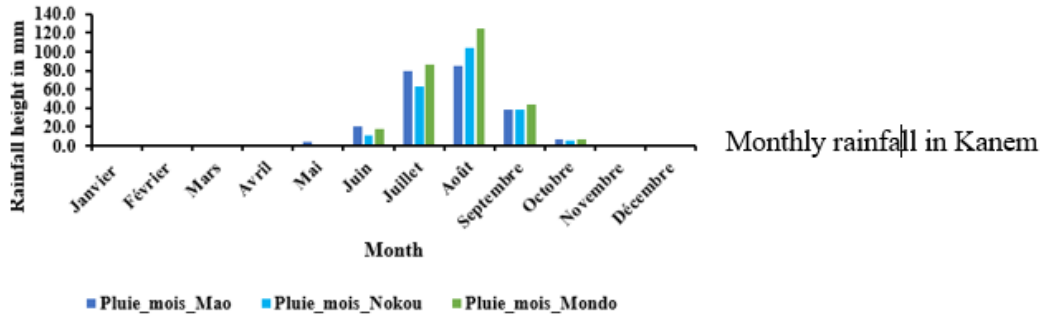
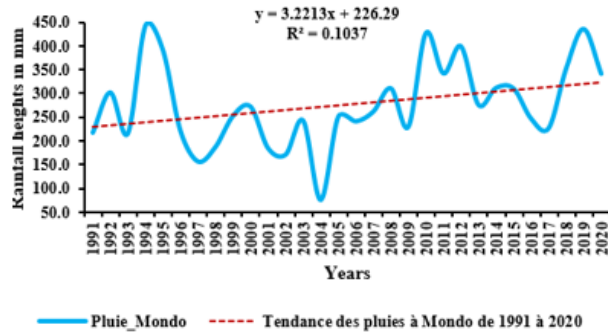


Figure 7: Monthly Rainfall in Kanem

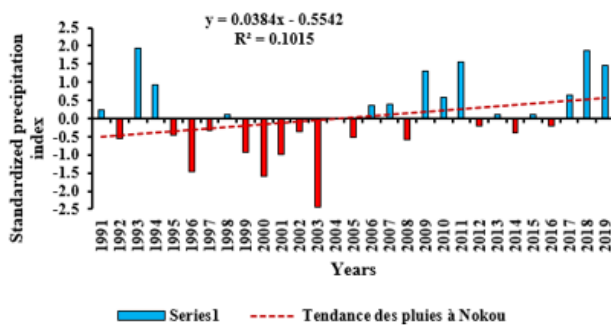
Figure 8: Interannual evolution of rainfall in Nokou from 1991 to 2020

Figure 9: Interannual evolution of rainfall in Mao from 1991 to 2020

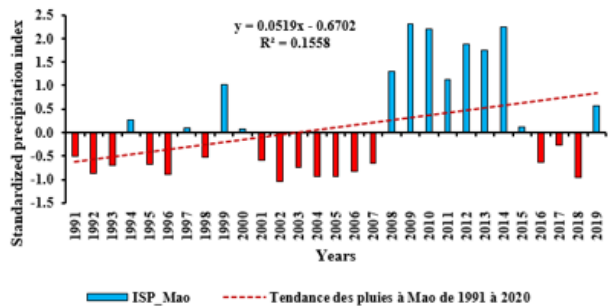


Interannual evolution of rainfall in Mondo from 1991 to 2020.

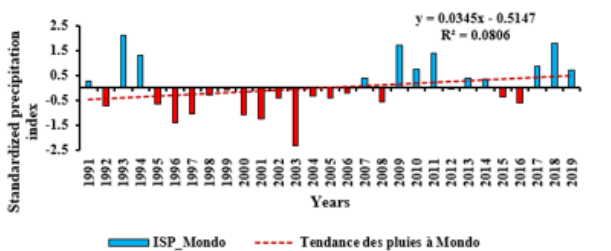
Figure 10: Interannual evolution of rainfall in Mondo from 1991 to 2020



Standardized precipitation index in Nokou from 1991 to 2020



Standardized precipitation index in Mao from 1991 to 2020



Standardized precipitation index in Mondo from 1991 to 2020

Figure 11: Standardized precipitation index in Nokou from 1991 to 2020

Figure 12: Standardized precipitation index in Mao from 1991 to 2020

Figure 13: Standardized precipitation index in Mondo from 1991 to 2020

c. *Wind*: The wind regime in the province of Kanem is marked by an average daily speed which varies between 3 to 4 m/s. The months with strong winds are January, February, November and December. It is the dry and cold Harmattan which blows from the North-East, while the hot and humid Monsoon blows from the South-West during April to October of each year.

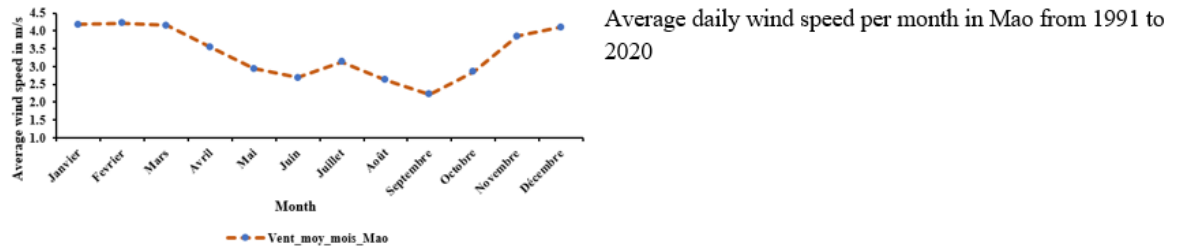


Figure 14: Average daily wind speed per month in Mao from 1991 to 2020

d. *Scenarios*: The RCP 2.6, RCP 4.5 and RCP 8.5 emission scenarios indicate that the annual average temperatures will increase compared to the reference period 1981-2010. For the period 2011-2040, the analyzes showed that the maximum temperatures would be between 37.85°C to over 45.69°C for the RCP 2.6, between 38.06°C to over 46.62 °C for RCP4.5 and between 39.11°C to over 49.09°C for RCP8.5. Projections indicate a relatively uniform increase in temperature over the whole of Kanem province. These analyzes also show that the minimum temperatures, for the same period (2011-2040), would be between 13.62°C to more than 28.13°C for RCP 2.6, between 13.63°C to more 28.8°C for RCP4.5 and between 13.68°C to more than 30.46°C for RCP8.5.

For the projections of daily maximum temperatures for the period 2041-2070, we note temperatures that vary little compared to that of the period 2011-2040

The climate projections of the 5 th assessment report of the IPCC specific developed for Chad for the RCP 4.5 (optimistic or realistic greenhouse gas emission scenario) and the RCP 8.5 (pessimistic scenario) foresee in 2050 compared to the period 1981-2010, conclude that precipitation will increase over the whole country by up to 20-30%. The northern half of the country will be wetter than the southern half. It is noted that the RCP8.5 scenario predicts much better rainfall conditions compared to the RCP 4.5. On the other hand, these projections are associated with large uncertainties ranging from (-25 to + 25%) in the southern zones of the country, to - 50 + 100% in the Sahelian zones to -100 to + 100 in the arid regions.

Although precipitation projections differ considerably, there is a tendency for less predictability at the beginning and end of the rainy season, with a delayed onset of the rainy seasons. In fact, some studies (Biasutti and Sobel, 2009 , as cited in Daron, 2014) find that the total duration of the rainy season may be reduced in parts of Africa, which in turn could reduce the period of vegetative growth.

Root Causes of Greenhouse Gas Emissions

Current Power Generation and Production: The power sector in Chad is characterized by low energy access rates which are as low as 2% in the rural areas, and high reliance on fossil fuel and biomass to cover the growing energy needs. The limited access to electricity and the high production costs of thermal electricity by the national electricity company, Soci?t? Nationale d'Electricit? (SNE), as well as the absence of an interconnected national grid resulting in isolated production facilities supplying different cities, means that electricity is expensive with high costs being an obstacle to the economy's effectiveness. Chad is the third largest country in the Central Africa subregion, where the medium and low voltage are the most expensive (178 CFA per KWh of low voltage). The decrease in the production cost per KWh by SNE and hence of the consumer price to be accessible (100F/KWh) is foreseeable neither in the short nor in the medium term. Energy supply is a real problem in Chad due to the large deficit it has in energy production. The country uses diesel fired power plants for a large part of the produced electrical energy. Apart from the capital N'Djamena which totals almost 80% of electricity production in the country, there are only very few electrified cities and secondary centers with independent distribution networks. A large portion of non-electricity energy needs is still covered by biomass, which has led to the depletion of forests over the years. Electricity supply further represents an opportunity for land conservation in the Sahel country such as Chad where energy poverty leaves the communities with no other alternative for cooking or heating water than to burn biomass from Savannahs. For instance, 90% of the forests in Chad have been cleared between 1970 and 2019, mainly to cover basic energy needs. 90% of the energy used is provided by firewood and charcoal, 6-7% by petroleum products and 3-4% by thermal sources. In 2000, the Government launched a program in N'Djamena to replace the use of wood fuels through the use of butane gas. The majority of Chadian households (69 %) use electricity for lighting and 11% of households use it as cooking fuel. Over 80% of electricity is consumed by households in the capital N?Djamena. The population also uses biomass as an energy source and the Soci?t? Sucr?re du Tchad ? Sugar Company of Chad (CST) ? uses bagasse to produce energy. The predominance of wood fuels in the energy supply and the coverage of a quality basic service of electricity in a continuous way are still and will remain for a long time a challenge. Aware of this situation, Chad launched in 2012 a comprehensive program for renewable energy. Thus, to make energy accessible to a majority of the population and especially to promote renewable energy, the Government established the Agency for Renewable Energy Development (ADER).

Electricity grids: Existing electricity networks across Chad were not designed to integrate non-dispatchable renewable energy. With power distribution infrastructures that are operating at the edge of acceptable voltage ranges, connecting additional variable renewables such as solar or wind to these distribution grids requires careful consideration. In addition, the lack of interconnection between national grids make it impossible to dispatch renewable energy generation surplus across the countries, thus widely limiting the uptake of a national or regional solar market and private sector investments.

Energy Access: A significant proportion of the population in Chad is made of isolated communities who live far from national electricity grids. Expanding the grid to these communities is significantly more

expensive and time consuming than deploying decentralized solutions. As mentioned above, the rate of access to electricity in rural areas is very low, at less than 1%. Despite the important fossil fuel sources and excellent solar radiation, the rate of access to electricity in Chad is among the lowest in world 6.4% against 48% in subsaharan Africa[14]14. The lack of a modern energy solution in rural areas favors the use excessive wood fuel. These energy sources rich in monoxide carbon are very harmful to health. By 2030, the objective of the government is to achieve (i) an electricity access rate of 53% nationwide; for (ii) a rural access rate to electricity 20% and (iii) a 20% share of renewable energies in production national electricity starting from a current situation capped at 6.4%, 0.6% and 1% respectively. By 2023, within the framework of the Emergency Plan for Access to Electricity, the objective is to install an output power estimated at 1056.61 MW, for the energy needs of about 6,898,568 inhabitants thus bringing the rate of access to electricity to 38.12%. Therefore more than 6 million people will need to be electrified with decentralised solutions across the country. Chad has already identified several decentralised electrification projects to connect some of these households, including in the Kanem Province.

Long-term solution and Barriers

The long-term solution planned through this project is to have adequate understanding of land degradation dynamic in Ouadis ecosystems in order to identify appropriate SLM practices which can be supported through the promotion of solar energy to facilitate access to water for irrigation and for domestic use in the mini-grid system as contribution to the national objective of 6 million people with electricity by 2023 in the country and in the Kanem Province. To achieve the project objectives the following barriers need to be addressed by the project:

Barrier 1: *Lack of application of Ouadis ecosystems specific SLM technologies for restoration to address land degradation.* In Chad, forest products constitute 94% of the total export in Chad and ranked fourth in terms of real GDP growth rate (3.77%).[15]¹⁵ It has been noted that the country's natural resources are already exposed to anthropic pressure that greatly exceeds their capacity. Overexploitation and the unsustainable use of biological resources owing to extreme poverty and demographic pressures (i.e. waves of refugees and a growing population) are the main factors of loss. Pressure on terrestrial ecosystems and biodiversity is exerted through poorly managed pastoral systems, deforestation, land clearing and bush fires for agriculture, and the proliferation of pests and invasive species. The concomitance of this pressure with the negative effects of climate change (e.g. weakened productivity, reduced natural regeneration, etc.) only aggravates degradation in terms of both vegetation dynamics and spatial occupation, which was reduced from 23.1 million ha in 1990 to 21.7 million ha in 2005. The influx of people into affected areas, timber exploitation and the need for pastures and farmland have led

to high rates of deforestation.[16]¹⁶ The inherent vulnerability of soils to degradation under various land-use options also limits the level of application and success of good land management practices.

The land resources Chad are facing a sharp deterioration in its productive potential, the result of a climatic situation

generally unfavorable over the past 30 years and rapidly increasing land pressure increase due to significant population growth leading, among other things:

- o Depletion of land capital;
- o Reduction or disappearance of fallow land;
- o Overexploitation of biological resources;
- o Overgrazing;
- o Reinforcement of the desertification process.

Moreover, the fact remains that calamities such as droughts, floods, food insecurity and the spread of predators are seriously affecting biological diversity and lead to the reduction of living space.[17]¹⁷

It is therefore expedient to have area- and case-specific technological packages for land degradation interventions. In addition, there is continued high reliance on inefficient biomass fuel technologies. The national government with support from partners has identified through a participative process hot spots of land degradation which include the Ouadis of Kanem. Various SLM technologies have been piloted in various part of the country. Furthermore, the international partners have done a comprehensive work of capitalization of good SLM practices which are categorized according to ecological situations. These SLM practices have been also been compiled to respond on integrated approach and strategies to generate multiple benefits. The need for water for irrigation by organized communities groups (women and men cooperatives) to ameliorate agricultural production will be most effective if coupled with establishing ecological infrastructures for SLM using solar energy. The excess energy will be use to generate revenue for local communities (both men and women).

Barrier 2: Lack of support for the initial investment to access solar panels for irrigation water pumps to address land degradation in Ouadis : Experience elsewhere established that solar pumps are decidedly preferable to expensive-to-run diesel pumps used by men and women farmers for irrigation so far, but also better than subsidized grid-power from power company. However, high capital investment in solar panels as major deterrent as farmers are not willing to take the risk at the beginning as they are neither sure whether solar pumps will deliver enough water nor whether Power Company will actually pay for

the surplus power farmers evacuate to the mini-grid. When both men and female farmers are convinced of many benefits of Solar Power as a Remunerative Crop (SPaRC), farmers will be willing to invest more in solar pumps. The project will learn more from *The Dhundi Solar Pump Irrigators' Cooperative Enterprise (SPICE) of India to promote the concept of Solar Power as a Remunerative Crop (SPaRC)*. *The GEF fund will be use to remove the barriers of initial investment for solar power for organised farmers cooperative. Also, the project will support the process of developing the Power Purchase Agreement between the both men and female farmers cooperatives and the National Power Electricity Compagny under the leadership of Agence pour l'Énergie Domestique et l'Environnement.*

Barrier 3: *Insufficient knowledge management, monitoring and evaluations of land degradation dynamic and the use of solar power for multiple usages:* According to UNCCD Knowledge hubs, SLM plays a pivotal role in the commitments to combating desertification, land degradation, and drought (DLDD), and is a vital element to the achievement of LDN, by avoiding or reducing land degradation. The knowledge Hub presents resources on SLM, including best practices in SLM technologies, and how they can be applied to certain land uses to combat DLDD and contribute to climate change mitigation and adaptation. ?The selection of appropriate SLM practices and approaches is an important step in ensuring the effectiveness of land management and restoration.? (FAO). Based on WOCAT tools and methods, various knowledge products have been produced in cooperation with various partners. These knowledge products help people involved in sustainable land management (SLM) identify suitable technologies and approaches, determine priority areas for intervention, and make informed decisions at the local/ landscape/ watershed, (sub-)national, and global level. The current project offer an opportunity to learn and work on specific Ouadis ecosystem, therefore possibility of generating knowledge products with due consideration of women, men and vulnerable groups specific needs, and which will be scaled up in other Ouadis in Chad and other parts of the world notably in neighbouring Niger , northern Nigeria and north Africa countries.

1) **Baseline scenario or any associated baseline programme/projects**

Both the Government of the Chad and the international donor community acknowledge that the lack of a modern energy solution in rural areas favors the use of excessive wood fuel, and that the lack of investments in the region to address land degradation will lead to continued degradation, fragmentation and loss of ouadis ecosystems, exacerbate social conflict and land disputes, reduced agricultural productivity and consequent impact on food security. Thus, the baseline include several projects (ongoing and planned) on renewable energy and land degradation in the country. These projects could become source of co-financing fo this project. In addition, projects which have gender-related information which are useful for this project and/or be an opportunity for collaboration have been be assed and the gender entry points identified and consider in the final project design, these include learning from the EmPower project implemented by UNEP ROAP. The baseline projects include:

o **The Chad National Development Plans (PND 2017 ? 2021; 2022-2026 and 2027-2030)** are the reference document for the government and its partners interventions and has the objective of launching the Chad emergence in a stability. More specifically, it aims at: i) ensure a peaceful Chad country respected and implicated in regional and international arena; ii) give the opportunity to any citizen to access water and health, to habitat, to energy and mobility; and iii) build a dynamic Chad, economically strong and respectful of the environment.

o **The government established the National Land Observatory in 2001** to build a foundation for development of a land policy. The observatory is built around a cluster of institutions presided over by the Prime Minister and the principal operator, the University of N'djamena. The objective is to improve knowledge and understanding of land-related problems to support the development of relevant land policies and legislation. No results achieved by the Observatory have been reported yet. The project will explore possibilities to strengthen the observatory, particularly to address the Ouadis ecosystems specific issues.

o **A phased National Electricity Emergency Plan implementation 2021-2023 was developed.** The Phase 2 include eleven projects, among which three solar projects: the 32 MW Djeremaya Solar project in N'djamena Total Budget: XAF 34, 607 040 000 from Private partner; the IRINA solar project covering six (6) cities: Kelo, Moussoro, Guegou, Amdjarass, Massenya et Baktchoro; Total Budget: XAF 18 billion (Abu Dhabi Fund), , and the BID / SNE (Solar) project covering the following cities: Mongo, Ati, Am-timan, Oum-Hadjer, GOZ BEIDA: Total Budget: XAF 14, 976 000 000 from a private partner.; iii) Phase 3 include the execution of 3 projects during the period 2022-2023, among which the following renewables energy projects: the project of a 200 MW Photovoltaic Solar Power Plant, in the suburbs of the city of N'djamena: Total Budget XAF 139, 000 000 000 ; the establishment of a Solar Equipment Production Unit (UPES) around N'djamena: Total budget XAF 15,930 000 000 ; The construction project of a 100 MW wind power plant in East of Ennedi at Amdjarass: Total budget: XAF 98.400.000.000 from private partner. The current project will contribute to the implementation plan and close collaboration will be developed with the program coordination to take advantage of what the collaboration can leverage for all the 2 initiatives.

o **Energy Policy Letter 2018:** The Letter indicates the Government of Chad Republic objectives for the energy sector for the period of 2018- 2030. It highlights the different government strategies oriented toward an energy mix and a policy based on the efficient energy management. The Letter also defines the approaches and the actions to be conducted to achieve the vision of the High Authorities on energy sector. At the international level, the Letter includes the objectives of the Central Africa Region Strategie of Rural Renewable Energy for All (CEEAC/CEMAC SE4ALL) and the Sustainable Development Goals. The objectives of the Letter which the project will directly contribute will include: (a) energy mix

which will increase the contribution of renewable energy in the current production; (b) development of rural and peri-urban electrification; (c) promotion of utilization of solar and bioenergy thermal energy; (b) amelioration of the Governance of the energy sector.

o **The Desert to Power initiative:** The Desert-to-Power initiative is an ambitious and innovative partnership of 11 Sahel region countries belonging to the Great Green Wall Initiative: Senegal, Nigeria, Mauritania, Mali, Burkina Faso, Niger, Chad, Sudan, Ethiopia, Djibouti and Eritrea. It is a huge desert solar initiative to make Africa a renewable power-house. This solar project is set to stretch across the Sahel region and expected to connect 250 million people with electricity by tapping into the region's abundant solar resource. It aims to develop and provide 10 GW of solar energy by 2025 and supply 250 million people with green electricity. At least 90 million people will be connected to electricity for the first time, lifting them out of energy poverty. Construction of the project will also create jobs and help attract private sector involvement in renewable energy in the region. The African Development Bank Bank has committed to mobilize \$25 billion for climate finance by 2025.

o **The UNDP/GEF Regional Project for the GEF Africa Minigrids Program (AMP):** its objective is to support various African countries that are part of AMP (national child projects) and other national stakeholders in the Africa minigrid market more generally to increase energy access through increased deployment of renewable energy minigrids via a customized suite of knowledge tools; technical and operational expertise; convening platforms (communities of practice); communications; and mainstreaming of data and digital tools and solutions. The project will learn from and apply relevant tools of the Africa Minigrid.

o **The World Bank Regional Off-Grid Electricity Access Project to Promote Solar Products in Western and Central Africa** which covers 19 countries in Western and Central Africa, 15 of which are members of ECOWAS (Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo), as well as Cameroon, the Central African Republic, Chad, and Mauritania. . The project objective is to support activities to accelerate the deployment of stand-alone solar products. It seeks to harmonize policies and standards as well as business procedures to develop a regional market of stand-alone solar products, support entrepreneurs in business acceleration activities, and provide credits and grants for the deployment of stand-alone solar home systems. The project is expected to contribute to human capital development by electrifying public health centers and schools which are needed to improve health and education outcomes. It will support job creation, for instance in the farming communities which can use solar water pumps for irrigation, solar milling equipment for product transformation, and solar refrigerators to bring products to market. The project will support the small and innovative business enterprises through solar home systems and will make an impact in economic recovery following the COVID-19 pandemic.

o **The Sahel Women's Empowerment and Demographic Dividend (SWEDD) Project funded by the WB/IDA:** It is a regional project covering 7 countries: Benin, Burkina Faso, Chad, Ivory Coast, Mauritania and Niger. It aims at empowering women and young girls and improve their access to quality education and reproductive, child and maternal health services. The parent project was approved in 2014 and became effective (in Chad) on May 22, 2015. The project was restructured in January 2019 to extend the closing date for 48 months from December 31st, 2019 to December 31st, 2023. Additional financing for this project in the amount of US\$9 million equivalent to the Republic of Chad was approved for this period. This project will provide important baseline on capacity-building programs development for women for the proposed project, and a partnership will be developed with SWEDD to improve women's access to Ouadis for market gardening, etc. as well as on various Renewable Energy capacity building trainings that are planned as part of this project.

o **The Project: "Development of drinking water supply, sanitation and pastoral hydraulic works in the Kanem region"** (2021-2024). Total Budget: 76 million. It aims to improve the living conditions of border populations in the Kanem region through better access to drinking water, sanitation and pastoral water services. The project is implemented by the Consortium Action Contre la Faim (ACF) as lead partner and a local NGO called: Sahelian Alliance for Applied Research and Sustainable Development. This project will provide important baseline to the present project Component 2 by providing co financing of 76 million to the proposed project.

o **The Joint Programme for the Sahel in Response to the Challenges of COVID-19, Conflict and Climate Change - SD3C:** This program is designed in response to the challenges of COVID-19, conflicts and climate change (SD3C) and is implemented in the Sahel (including the Chad Kanem region) and Senegal. It aims to assist smallholders, particularly women and young smallholders living in border areas, to consolidate their livelihoods. It is expected to bring about a reduction in poverty of approximately 10 per cent in the programme area and to boost social, economic and trading activity in areas plagued by lawlessness and subject to climate variability and impacts that put smallholders' resilience to the test. The program is implemented in partnership with IFAD, FAO and the World Food Program (WFP) - and the G5 Sahel. It will run for six years and in two phases (phase 1: 2021-2023 and phase 2: 2024-2026). The program will provide the G5 Sahel countries and Senegal with total financing of US\$180.4 million from IFAD and the Green Climate Fund to implement SD3C. The programme for Chad covering the following Departments: (i) Departments of Wayi and Mamdi in the Province of Lake; (ii) Department of North Kanem in the Province of Kanem and (iii) Department of Haraze Albiar in the Province of Hadjer Lamis, have an estimated cost of US\$25 million, and will be operationalized by FAO and WFP under the coordination of IFAD's Strengthening Productivity and Resilience of Agropastoral Family Farms Project ? REPER

o **Programme to Build Resilience to Food and Nutrition Insecurity in the Sahel (P2RS) funded by AfDB (2015-2035):** Its specific objective is to increase, on a sustainable basis, agro-sylvo-pastoral and

fishery productivity and production in the Sahel. The programme has so far been implemented through four projects each implemented over a five-year period (2015-2020: Phase 1) in three components, namely: (i) Rural Infrastructure Development; (ii) Value Chains and Regional Markets Development; and (iii) Project Management. Phase 2 (2021-2025) of this project is at final stage of formulation, and could become an additional source of co-financing for this project

o **The World Bank \$295 million grant from the International Development Association (IDA) to help Chad expand its access to energy.** The Chad Energy Access Scale Up Project (PAAET) is approved in May 2022 and it aims to increase access to electricity and clean cooking solutions via expansion of the main power grid and mini-grids, standalone solar systems, deployment of improved stoves, and natural resource management. It will expand electricity access in the capital city of N'Djamena and in 12 secondary cities in which the national power company, Soci?t? Nationale d'Electricit? (SNE), operates mini-grids, and provide access to electricity services in additional secondary cities and villages, including those located near refugee camps. Public and private investments will strengthen the country's electricity generation, storage, and distribution capacity.

o **Djermaya Solar[18]18: Located 30km north of the country's capital, N'Djamena, the Djermaya Solar** project has been developed by InfraCo Africa, through Anergi[19]¹⁹, with its partner Smart Energies[20]²⁰. Denham Capital[21]²¹ recently entered the project as long-term investors through Neo Themis[22]²². Djermaya Solar will be developed in two phases totalling 60MW and is the first solar project to be designed, financed, built and operated by an independent power producer (IPP) in Chad. The project will also pioneer utility-scale energy storage in the country, incorporating a 4MWh Battery Energy Storage System (BESS), 18km transmission line and a substation funded with ?6.35 million of concessional debt from the EU-Africa Infrastructure Trust Fund (EU-AITF)[23]²³. InfraCo Africa has also leveraged US\$854,000 of grant funding from the Private Infrastructure Development Group (PIDG) Technical Assistance (PIDG TA)[24]²⁴ to support legal and environmental advisory services and an additional US\$1.5million capital grant. Djermaya Solar also benefits from strong support from the Government of Chad and the project company, Djermaya CDEN Energy (DCE), has signed a 20-year Power Purchase Agreement with SNE to supply Chad's national electricity utility. The Government of Chad and DCE have also signed a Put and Call Option Agreement and a Fiscal and Customs Agreement as part of the project financing approach required to commence construction in early 2022. Djermaya Solar is expected to begin delivering power to Chad's national grid in 2023

o **Sustainable Management of Water Resources:** The objective is to improve the management of surface water resources in the Ouadis and increase the population's access rate to drinking water. Key activities will include: (i) Fight against droughts, (ii) Fight against silting up and siltation of points and rivers, (iii) Promotion of local water governance, (v) Integrated water and ecosystem management.

o **Development and Sustainable Management of Ouadis.** The objective is to promote non-timber forest products and fight against the degradation of Ouadis. The project will carried out Promotion of forest species of economic interest (date palm etc.), (b) Development and implementation of a development and management program for the Ouadis,, (c) Promotion of reforestation and other forest plantations, (d) Fight against bush fires and, (e) Fight against deforestation, occupations and anarchic exploitation of Ouadis.

o **Clean energy development (GDT).** The project aims at Promoting clean energy sources as a source of domestic energy. The project will increase in the supply of clean energies and popularization of the related technology; promotion of incentives for the adoption of clean energies; promotion of private investments in the production of clean energies, strengthening of national technical capacities in the field of clean energies.

o **Strengthening the resilience capacities of populations in the face of risks and natural disasters.** The project aims at strengthening the adaptation capacities of populations in the face of risks and natural disasters. The project will support formulation, implementation and monitoring-evaluation of a national capacity building program for resilience in the face of natural disasters.

In terms of lessons, IAPROMSOK will build on the following projects that have just recently closed or are about to close.

Program name	Main objective	Expected results	Beneficiary province	Period covered	Budget	Funding sources
Project for the Development of Resilience and the Fight against Food Insecurity in Chad (PDRLIAT)	Contribute to the reduction of food insecurity and strengthen the resilience of vulnerable populations in Chad (12 provinces)	1. Improve the livelihoods of the targeted rural population by increasing the productive capacity of their assets; 2. develop the capacity to adapt to climate change; 3. improve the capacity of decision-makers to manage food crises.	Borkou, Ennedi East, Ennedi West and Tibesti; Hadjer Lamis , Lac, Chari-Baguirmi, Kanem, Bahr el Gazal, Batha, Ouadda?, Sila , Wadi Fira and Gu?ra.	2015-2020	Islamic Development Bank (IDB): USD 28 million; Status : 'million USD. (14 billion CFA)	IDB State

Program name	Main objective	Expected results	Beneficiary province	Period covered	Budget	Funding sources
Program for Strengthening Resilience to Food and Nutritional Insecurity in the Sahel (P2RS)	Contribute sustainably to poverty reduction and improved food and nutritional security, by increasing productivity and agro-sylvo - pastoral production	Development of 345 ha of village irrigated perimeters and 116 ha of degraded land; 100 km of transhumance corridors restored; 20 village water points, 30 pastoral wells, 3 pastoral boreholes and 3 ponds; 5 rural markets, 2 slaughter areas and 10 vaccination parks; 8 health huts, 20 input shops and 20 livestock feed shops; 20 multifunctional platforms, 8 literacy centers and 30 drying and packaging units. 1,000 literate, 80% of whom are women; 30 traders' associations, of which 40% are women and 30% young people, are supported in market access techniques; 100 youth initiatives are supported.	Kanem and Bahr Ghazal	2016-2022	African Development Foundation (ADF) : UA 9.77 million Government/Beneficiaries: 2.03% (15%) UA [1]11.49 million (8,697,930,000 FCFA)	ADF , Government and Beneficiaries

Program name	Main objective	Expected results	Beneficiary province	Period covered	Budget	Funding sources
Project Operationalization of the Seed Sector in Chad (OFST) PROFI -SEM	Improve seed quality and quantity	provide quality and suitable seeds	23 counties	2018-2021	CFAF 3,630,000,000	Swiss Confederation, State

Program name	Main objective	Expected results	Beneficiary province	Period covered	Budget	Funding sources
Strategic plan: Chadian Institute of Agronomic Research for Development (ITRAD) and Livestock Research Institute for Development (IRED)	Strengthen the system of Agricultural Research-Development	<p>Establishment of infrastructure (biotechnology laboratory) and R&D equipment (national / regional)</p> <p>Training of young researchers (10 MSc ? 2 years & 5 PhD ? 3 years) ?</p> <p>Specialized short training courses and exchanges of researchers and technicians (PPAO collaboration)</p> <p>R&D networks of the CNS / CRE of the WAAPP and institutions of the CGIAR system (eg . dry cereals, etc.), including the introduction of technologies and improved plant / animal genetic material (eg . small ruminants, peri-urban</p>	23 counties	2018-23	10,135,809,851 FCFA	State and partners

Program name	Main objective	Expected results	Beneficiary province	Period covered	Budget	Funding sources
		<p>milk sector , fish farming);</p> <p>R&D programs on the targeted sectors (participatory varietal selection, sustainable technologies for soil and water management (R&D station & in the farming environment)</p> <p>R&D financing systems (eg . FIRCA in CI)</p> <p>Production of basic and pre-basic seeds for plant sectors (+ seed treatment equipment)</p> <p>Production of improved animal seeds (cattle with dairy potential and goat breeds)</p> <p>(Complementary) support for national seed certification</p>				

Program name	Main objective	Expected results	Beneficiary province	Period covered	Budget	Funding sources
Lake Chad Inclusive Economic and Social Recovery Project (RESILAC)	Enabling the resilience and autonomy of populations, especially young people, ready to invest in the economic recovery of the region, this project is being deployed over 4 years in 4 geographical areas	Strengthening human capital and social cohesion in a crisis and post-crisis context Secure management of access to natural resources Promotion of the local economy and youth employment, by strengthening value chains Capitalization and restitution of effective methods.	Diffa, Borno , Far North Cameroon and Lake Province, with 90,000 direct beneficiaries and 1,600,000 indirect beneficiaries.	2018-2021	5,000,000 euros (3,279,785,000 FCFA)	EU, AFD , State
Support Program for Local Development and Inclusive Finance in Chad (PADLFIT)	Contribute to the promotion of entrepreneurship and job creation for women and young people in rural and peri-urban areas	Promoting local economic development; Access to financial and non-financial services (savings, credit, money transfer, insurance, training) for the entire population, particularly disadvantaged groups such as women and young people living in rural, landlocked and remote localities.	23 regions of the country	2018-2022	40 billion FCFA	State , UNDP

In summary, during the PPG, stage, the Agency for Domestic Energy and Environment, the Executing Agency of the Project, has conducted with support of thematic consultants? exchanges with many projects and institutions working on the project thematic areas to assess their experience. The lessons learned relevant for this project, particularly with regards to the business model for the deployment and maintenance of the solar panels, the use of energy, sustainable irrigation practices, ownership within the community, creation of jobs are related to the fact that most successful micro projects were those handled by women and local communities. Those actions which demonstrated very good success were those targeting women. The most important Economic Interest Groups (EIGs) both in terms of number and the functionality were those belonging to women. The women EIGs were the most important in terms of volume of the loan and they were the one which reimbursed very well. The recommendation from the previous projects evaluations included the need to link the EIGs with the markets and to create network of EIG for better capacity gain.

Based on the above lessons learned, the proposed business model envisages the utility mini-grid own by local communities cooperatives who will be responsible for their maintenance and operation under the guidance of the EA and support of specialised entities. However, this model and many others will be assessed and discussed with stakeholders to agree on the most promising and viable model. To ensure its sustainability, the business model will be flexible and will allow for a gradual increase of private sector or local government participation in future mini-grid projects. The Power Purchase Agreement is expected to generate revue stream for cooperatives.

Overall, the design of the project is conscious of the fact the willingness to pay business for financially constrained communities could be a burden. Burdening communities further with financial obligation would counter the core rationale to improve people?s access to clean sources of energy for better socioeconomic opportunities. Thus, the business model will be pro-poor people and will be reflective of the willing to pay to ensure affordability and accessibility for low-income communities while maintaining financial sustainability. In Kanem, the monthly installment payment is estimated at (1,000 to 5,000 FCFA or \$1.65 to \$8.25). The propensity to pay is estimated at 41%, while the solvency is at 75% and solvency potential is at 31%.[1] This model as envisaged for this project will involve the following key elements:

? *Community engagement*: Engage with local communities to understand their energy needs, preferences, and willingness to pay for electricity services. Incorporate their input into the design and implementation of the mini-grid system.

? *Affordable pricing structure*: Develop a pricing structure that is affordable for low-income households, with flexible payment options such as pay-as-you-go or tiered pricing based on energy usage. Offer subsidized rates for those in extreme poverty while ensuring revenue sufficiency for operational costs.

? *Income generation opportunities*: Integrate income-generating activities, such as productive use appliances or micro-enterprises, powered by the mini-grid system. This not

only enhances the economic viability of the project but also creates livelihood opportunities for local residents (see socioeconomic classification on p.34).

? *Financial inclusion:* Partner with local financial institutions to provide microfinance or installment payment options for households to purchase solar equipment or access electricity services. This promotes financial inclusion and enables even the poorest households to afford clean energy solutions (see socioeconomic classification on p.34).

? *Capacity building and local ownership:* Empower local communities through training programs on system maintenance, management, and entrepreneurship. Foster local ownership by involving community members in decision-making processes and creating opportunities for employment within the project.

? *Social impact monitoring:* Implement robust monitoring and evaluation mechanisms to track the social impact of the mini-grid system on poverty reduction, education, health, and gender equality. Use this data to continually refine and improve the business model to better serve pro-poor objectives.

By adopting this people-centered approach, the mini-grid solar system business model in Chad can effectively address energy poverty while promoting economic development and improving the quality of life for marginalized communities. Drawing on the findings of the Mini-Grid baseline study for this project and the envisaged Power Purchase Agreements, the mini-networks for pumping will be classified among self-producers. According to Article 30 of Law 036 relating to the electrical energy sector in Chad, as self-producers, the Mini-Grids may be authorized to sell their excess electrical energy to the operator holding a transmission or distribution license (such as Societe Nationale d'Electricite (SNE)) or to an eligible consumer (community members in Kanem). The terms and conditions for the sale of the surplus are set by the Minister in charge of Energy, on the proposal of the Regulator. Self-consumption installations of less than one (1) MW are exempt from the Producer License.[2]

At the operational level, In the cooperative model, the community is responsible for operating and managing the mini-grid. This requires local technical skills to intervene when needed. In addition, to ensure the sustainability of mini-grids that will be installed, tariffs to cover maintenance and depreciation costs must be adopted in common agreement with the operators. This requires an assessment of project area operators' incomes and their ability to pay for mini-grid services.

The analysis of their income allows us to identify three (3) categories:

- ? Poor: less than 60,000 FCFA (\$99);
- ? Medium: between 60,000 and 75,000 FCFA (\$99 and \$124);
- ? Rich: between 75,000 to 100,000 FCFA (\$124 and \$165).[3]

According to socio-economic data, most people are poor and middle level whose financial capacity does not cover even their basic needs, they are sometimes forced into debt to make ends meet.

To this end, the model of a consortium of two (2) local NGOs, one national and the other international, already having experience in the operation of mini-grids would be adaptable. Together with the local communities, a mini-grid management committee will be set up which will be responsible for collecting operating royalties during the life of the mini-grids, which will allow ensure the maintenance and replacement of equipment after its amortization.[4]

-

Potential uses of energy

-

Mini-grids are certainly intended primarily for water pumping, but there may be an expansion into potential uses such as households for income-generating activities, shops for small businesses, crafts and a few lampposts for public lighting.

To determine the daily needs of each village, the number of households and their consumption must be taken into account.

The villages exploiting the wadis are of two types according to the number of inhabitants:

- ? Small village: less than 1,000 people;
- ? Average village: between 1,000 to 3,000 people; and
- ? Large village: from 3,000 to 5,000 inhabitants.

Most of the villages sampled during PPG were demographically sparsely populated and largely medium-sized. Depending on the size of each village, we can determine the demand which is the sum of the consumption of different households.

Depending on income quintile and household electrical needs, four categories of consumption have been defined as follows:

- ? *Category 1*: it is made up of the poorest households corresponding to the basic needs of lighting (3 lamps) and the whitening of a mobile phone;
- ? *Category 2*: these are average poor consumption households with 5 lamps, a mobile phone charger and a television;
- ? *Category 3*: with an average level, these households use 5 lamps, a fridge, a television set and a fan; and
- ? *Category 4*: these are wealthy households who use 5 lamps, 2 fans, 2 televisions, a fridge and an air conditioner

Table showing the Household Consumption Categories

? Equip ment	Type 1 household		Household type 2		Household type 3		Household type 4	
	? Qu antity	? Du ration of use (h/day)	? Qu antity	? Du ration of use (h/day)	? Qu antity	? Du ration of use (h/day)	? Qu antity	? Du ration of use (h/day)
? Lamp s	3	6 a.m.	5	6 a.m.	5	6 a.m.	5	6 a.m.
? Phon e charger	1	2 hours	1	2 hours	1	2 hours	1	2 hours
? TV	0	0	1	4 a.m.	1	4 a.m.	2	4 a.m.
? Fan	0	0	0	0	2	8 a.m.	2	4 a.m.
? Fridg e	0	0	0	0	1	8 a.m.	1	8 a.m.
? Daily energy (kWh/day)		1		2		3		8

It can be seen that the households visited are of type 1 whose daily energy demand is estimated at less than 1 kilowatt hour per day.[5]

[1] Project baseline study, ?Renewable energy/mini-grid development analysis report.

[2] Project baseline study, ?Renewable energy/mini-grid development analysis report.?

[3] The US equivalent figures based on [ex.com](https://www.ex.com) February 2024 exchange rates (1\$=605 FCFA)

[4] Project baseline study, ?Renewable energy/mini-grid development analysis report.

[5] Project baseline study, ?Renewable energy/mini-grid development analysis report.

2) **Proposed alternative scenario with a brief description of expected outcomes and components of the project**

Access to water in the Kanem area is very limited. 40% of hydraulic water pumps are in poor conditions and 20% out of use. When they are available, ground water is extracted through electric water pumps, which use diesel to fuel their systems. However, these systems not only require costly, regular servicing and the purchasing of fuel, they emit carbon dioxide polluting the atmosphere. Mini grids based on renewable sources of energy, as an alternative scenario, will contribute to the government of Chad objective to providing electricity and energy services to rural areas, and improving their standard of living through income generation activities.

The proposed alternative project will be complementary to the baseline initiatives as it addresses barriers that are specifically related to the investment in decentralized Solar Water pumpings plants fo productive uses. It will not be a duplication of the UNDP Mini grid project , but it will benefit from the tools and knowledge developed by the regional project. The Proposed alternative scenario has a goal to advance the implementation of LDN measures and the National Electricity Emergency Plan, notably in the Kanem Region, taking this area into phase 2 and 3 of this Plan. It will specifically accelerate investments in renewable energy. Investments in the sector will facilitate access to energy. It is recalled here that access to reliable energy enhances livelihoods, reducing dependency on destructive land-use practices. In sum, energy access not only expedites land rehabilitation but also fosters a holistic approach to environmental restoration by enabling sustainable and more efficient land management techniques. The project will bring about an alternative scenario that combines both pilot and investment projects that will realise SLM using proven technologies, additional renewable energy capacity and targeted capacity building training, resulting in transformational change in the electricity supply situation in the Kanem region.

The project objective is to protect the integrity and productivity of Ouadis ecosystems and ameliorate access to renewable energy through the use of the benefits of Solar Pumping systems in 3 Municipalities of Kanem region of Chad. This objective will be delivered through the following project components:

Component 1: Restoration of degraded Oadis ecosystem through appropriate SLM gender-responsive practices

In the Sahel, the reduction in rainfall in recent years has resulted in a descent of isohyets towards the south, causing a reduction in useful routes for pastoralism. This accentuates the precarity of livelihoods of both crop and pastoral communities. It should be noted that in arid environments such as the northern Sahel, sendentary farming is viewed as a poor adaptation strategy than nomadic pastoralism. In Kanem, floristic diversity is ensured by the Ouadis where

the water balance is more favourable. It is within these depressions that the local populations obtain their timber supplies and practice subsistence farming. Herders therefore settle near these sites while modifying their transhumance circuit and the composition of their livestock. These areas are dedicated to agriculture, livestock rearing, and natural resource extraction which define the socioeconomic lifeline of communities. The Ouadis are therefore under strong pressure that generates conflicts among different land but also water resources users.

Under component 1, IAPROMSOK recognises that gender equality and women's empowerment are crucial elements of sustainable land management. In Chad, women constitute a substantial portion of the agricultural workforce and play significant roles in natural resource management. However, they often face gender-based disparities in access to land, credit, education, and decision-making processes. Integrating gender considerations into sustainable land management efforts involves ensuring women's equal participation, providing training and resources tailored to their needs, and recognizing their knowledge and expertise in agricultural and environmental practices. Empowering women in land management can enhance productivity, improve food security, and foster more inclusive and sustainable development outcomes. By promoting sustainable land management practices and integrating gender considerations, Chad can achieve more resilient agricultural systems, protect natural resources, enhance food security, and advance gender equality, ultimately contributing to sustainable and inclusive development.

The project acknowledges the benefits of gender-responsive land management. Incorporating a gender lens in land management initiatives brings multiple benefits. It helps address women's specific needs, enhances their access to productive resources, and strengthens their resilience in the face of climate change. Engaging women in decision-making processes leads to more effective and sustainable land management strategies, as their perspectives contribute to a better understanding of local realities and priorities. Moreover, empowering women in land management improves household income, promotes social equity, and contributes to overall community well-being.

Component 1 is designed recognizing the agricultural, livestock rearing and natural resources extraction context as below:

- o Agriculture: Agriculture is a primary economic activity in the project area, with crops such as millet, sorghum, maize, and cotton being cultivated. However, farmers face challenges such as inadequate access to modern farming techniques, limited irrigation infrastructure, and vulnerability to climate change impacts like droughts and desertification.

o **Livestock Rearing:** Generally, Chad has a significant pastoral sector, with communities relying on cattle, sheep, goats, and camels for their livelihoods. However, livestock farmers face challenges such as inadequate veterinary services, water scarcity, and conflicts over grazing lands. Climate change and disease outbreaks also pose risks to livestock health and productivity.

o **Natural Resource Extraction:** Rural communities engage in activities like fishing, hunting, and gathering of non-timber forest products. However, unsustainable practices, overexploitation, and lack of regulation can lead to depletion of resources, loss of biodiversity, and conflict over access to resources. Also of importance in Ouadis is the colonization of water bodies by invasive plants particularly thypha, which lead to poor fish production and disparition of edible plants species causing treats to pastoralism.

Implicit in the aforementioned aspects is the fact that the project area in general and in the Ouadis in particular, the drivers of degradation are natural and man-made phenomena. Extreme temperatures, the scarcity of rainfall, sand encroachment, pressure on ecosystems through the extraction of resources for various uses (firewood, pasture, crop fields, etc.) overgrazing and land degradation by tramping of the surrounding areas of ouadis. The scarcity of rains has led to the degradation of surface water resources and lowered the level of the water table. Over 99% of the surveyed population during the project preparation phase practice subsistence and commercial agriculture. Six (06) Ouadis in the commune of Mao and one (01) in the commune of Nokou are totally arid, that is to say no water stagnates at the bottom even in the rainy season. This lack of water makes the Ouadis ecosystem very fragile.

In the fragile Ouadis ecosystem given the natural and anthropogenic factors, soils are an essential, non-renewable natural resource that provides essential goods and services to ecosystems and human life. They play a fundamental role in the production of agricultural products, animal feed, cooking fuels, water filtration and nutrient cycling. Unsustainable land use, natural hazards and increasingly devastating climatic effects are degrading soil resources and endangering the livelihoods of vulnerable populations. Sustainable soil management is a way of combating soil degradation processes, which ensures both the productive potential of soils and the maintenance of their long-term environmental functions. Good land use will depend on the collective action of multiple stakeholders, in an inclusive, gesnder responsive and sustainable way.

Recognising the factors at play in degrading the Ouadis ecosystems that are strategic resources for rural socioeconomic livelihood streams but also for the generation of global environmental benefits, the project through component 1 will seek to invest in appropriate SLM practices to restore degraded ecosystem.

Component outcome:

1.1 The integrity of the Ouadis ecosystem is enhanced through the rehabilitation of 3,000 ha degraded land

Component outputs:

o 3 Ouadis restored using 5 good gender-responsive SLM practices: Under this output, 1500 female and 1500 men belonging to cooperatives and local NGO under the leadership of the decentralised offices of the department of environment will directly benefit from project support to restore degraded land in 3 Ouadis. The output recognises that women represent the majority of farmers in areas most seriously affected by desertification, land degradation and drought. Despite their crucial role in agriculture and food production, women often have only limited rights to the land they cultivate, which prevents them from effectively controlling soil degradation and making it more fertile. Women are also often unable to influence natural resource management decisions and practices in their communities, and they have less access to information, extension services and education than men. Besides the gender-responsive SLM practices, the project will include fostering awareness, promoting gender-responsive policies, strengthening women's capacity through training and extension services, and creating opportunities for their meaningful participation in decision-making processes.

o Climate resilient Agricultural practices adopted: Under this output, the project will seek to support investments in techniques such as agroforestry, conservation agriculture, crop diversification, and water management strategies (including water harvesting), climate-smart livestock management, sustainable irrigation systems, and improved soil conservation methods to contribute to land rehabilitation efforts to help build resilience to climate change impacts. Strengthening early warning systems, promoting climate information services, and providing farmers with access to climate-resilient seeds, technologies, and training further support sustainable land management will also be supported. The project recognises that by integrating climate resilience into agricultural practices and related activities, Chad can enhance food security, adapt to changing climatic conditions, and promote the sustainable use of land and natural resources.

o Gender-responsive Land use plans in 3 pilot Ouadis developed and implemented using good SLM practices and solar energy: Land use plans and sustainable land management play a vital role in promoting responsible and efficient use of land and natural resources. This is particularly

important in Kanem region given its vulnerability and arable land scarcity and conflictual competition among resource users. Developing comprehensive land use plans helps guide decisions related to land allocation, zoning, and resource management. Sustainable land management practices, including agroforestry, soil conservation, watershed management, and integrated land and water management, contribute to preserving ecosystem services, enhancing agricultural productivity, and mitigating climate change impacts. Associated activities include capacity building, community engagement, awareness campaigns, and policy implementation. During the consultations with the local stakeholders during the PPG, it has been indicated that Kanem region has already a Kanem Regional Development Plan (PDR Kanem -Plan de Dvpt Regional) as well as the Communal Development pLan (PDC- Plan de Dvpt Communal). It is recommended by the stakeholders that the project should aim at updating the PDR and PDC to mainstream environment conservation and restauration activities. By implementing land use plans and sustainable land management, the Kanem region can achieve balanced land utilization, protect biodiversity, improve food security, and promote long-term environmental sustainability. Output 1.1.3 will be linked to and support outputs 1.1.1 and 1.1.2 strengthening the coherence among them.

Overall, the component recognises that to support local communities' access to solar energy for irrigation and economic benefits, investments should focus on infrastructure development, technical training, and financial assistance for solar equipment. Additionally, initiatives should prioritize gender inclusivity, ensuring women have equal access to resources, training, and decision-making processes. By investing in solar energy for irrigation, Chad can foster sustainable agriculture, reduce poverty, and promote gender equality, contributing to overall socio-economic development.

Component 2: Investment to support local communities (men and women) access to solar energy for irrigation and economic benefits

Under component 2, IAPROMSOK acknowledges that investments to support local communities' access to solar energy for irrigation can have significant socio-economic and environmental benefits in Chad, benefiting both men and women. Related to this project, the socio-economic and environmental benefits are in the following forms:

? Increased agricultural productivity: Solar-powered irrigation systems provide a reliable and sustainable energy source for pumping water, enabling farmers to cultivate their lands year-

round. This leads to increased crop yields, improved food security, and enhanced income opportunities for both men and women engaged in agricultural activities.

? Empowering women: In Chad, women play crucial roles in agricultural production. Access to solar energy for irrigation can reduce their drudgery by replacing manual labor with more efficient technologies. This allows women to expand their farming activities, diversify their crops, and participate in income-generating activities beyond subsistence farming, leading to economic empowerment and improved livelihoods.

? Environmental sustainability: Solar energy for irrigation is a clean and renewable energy solution that reduces reliance on fossil fuels and minimizes greenhouse gas emissions. By promoting sustainable practices and reducing the environmental footprint of irrigation activities, solar energy contributes to environmental conservation and climate change mitigation.

? Community resilience: Solar-powered irrigation systems provide communities with greater resilience in the face of climate change and water scarcity. By harnessing solar energy, communities can mitigate the impacts of erratic rainfall patterns, droughts, and unreliable power supply. This resilience enhances the adaptive capacity of both men and women farmers and reduces their vulnerability to climatic shocks

As indicated earlier, experience elsewhere established that renewable mini grids are decidedly preferable to expensive-to-run diesel pumps used by farmers for irrigation so far, but also better than subsidized grid-power from power company. However, high capital investment in solar panels is a major deterrent as farmers are not willing to take the risk at the beginning as they were neither sure whether mini grids to power solar pumps will deliver enough water nor whether Power Company will actually pay for the surplus power farmers would evacuate to the mini-grid. Renewable-powered mini-grids have high upfront infrastructure and installation costs and finding funding for mini-grids is challenging. With limited budgets for rural electrification, governments are attempting to bridge this investment gap with innovative public, private, and blended investment arrangements. The project will learn and use the experience of the World Food Programme (WFP) in Chaouir in Guera region of Chad. Participating families worked on their plots of land, while the World Food Programme provided all necessary materials to develop a vegetable garden with the plan to supply the local school. Since 2018, the World Food Programme is implementing an integrated package of activities, focusing on scaling up gardening capacity, area under production and on integration between garden production, the school and resilience activities at household level. In early 2019, water-management structures have been established in Chaouir, including a high capacity solar-water pump, and the community garden has been expanded to a total of 4 hectares. This is enabling a yearly production of at least 24 tons of fresh vegetables and more than 10 tons of staples (mostly sorghum and millet), increasing food availability for the community. The garden is currently producing nearly 30 varieties of vegetables, allowing to diversify households' and school children's diet and to tackle micro-nutrient deficiencies. The evaluation of the UNDP project in the project area, indicated that the most successful micro projects were those handled by

women. Those actions which demonstrated very good success were those targeting women. The most important Economic Interest Groups (EIGs) both in terms of number and the functionality were those belonging to women. The women EIGs were the most important in terms of volume of the loan and they were the one which reimbursed very well. The women indicated that because of the project support they were able to gain their financial independence. The recommendation from the project evaluation included the need to link the EIGs with the markets and to create network of EIG for better capacity gain. The current project will learn from this experience to focus its work with women.

The project intervention will be innovative by focusing not only the livelihood aspects but also land restoration and access to clean energy in the 3 municipalities. The outputs to be generated from the component will relate to the setting up of solar water pumps infrastructures (boreholes, Solar panels, network of irrigation tapes in at least 3 pilot ouadis in 3 Municipalities of Kanem. Out the main 4 types (monocrystalline, polycrystalline, PERC, and thin-film) and the 2 standards sizes (60-cell and 72-cell) of the Solar Panels available on the markets the best type will be selected based on the experts guidance and stakeholders needs. Women and local communities cooperation will be structured and capacitated to manage the Solar Water pumps infrastructures; and power purchase agreements will be negotiated and agreed upon between the private sector (Societe Nationale d'Electricite), the National Agency for Domestic Energy and Environment) and local cooperatives. The entire set up will be structured to benefit from previous experiences with the project management unit fully involved in procurement processes and capacity development as an important project activity. The procurement process will be based on the national procurement procedures and will be managed by the procurement unit of the NEA. Besides providing policy guidance, the electricity company will purchase surplus electricity to feed the main national grid to the benefit of more citizens beyond the project area. The proposed approach was based on the exchange and discussions with the National Agency of Domestic Energy and Environment; lessons from past experience of some partners in the project areas (especially the World Bank and World Food Program); some stakeholders from energy sectors and review of available literature on the topic.

The proposed business model envisage the utility mini-grid own by local communities cooperatives who will be responsible for their maintenance and operation. This business model is envisaged based on the past experiences of other interventions in the region of Kanem. However, this model and many others will be assessed and discussed with stakeholders to agree on the most promising and viable model. To ensure its sustainability, the business model will be flexible and allow for a gradual increase of private sector or local government participation in future mini-grid projects. The Power Purchase Agreement is expected to generate revenue stream for cooperative. A thematic study has been conducted to analyse the ability and willingness of end user to pay with the revenue/tariffs based on the end user utilisation of energy generated. Potential uses of energy is key for the expansion of mini-grids. As such, identification of potential uses of energy in the selected communities is key in the model to be

adopted. The role of the private sector which will be mainly the state-owned National Electricity Company will be to buy the excess energy produced which it may commercialise for households or for other commercial purposes like shops. As a result of previous interventions in the project areas, some cooperatives are already established and some will be established based on community needs and criteria.

Component outcome

2.1 Investment on high capacity solar water energy provide water for both women and men production systems which integrate good SLM practices and access to solar energy for multiple benefits.

2.2 Gender-responsive power purchase agreements enhance the participation and empowerment of women while aligning objectives between Cooperatives and the Societe Nationale d'Electricite (SNE)

Component outputs

o 2.1.1 Solar water pumps infrastructures to benefit both women and men (boreholes, Solar panels, Batteries, network of irrigation tapes) established in 3 pilot Ouadis in 3 Municipalities of Kanem: Under this output, the project will invest in pieces of infrastructure to provide reliable and sustainable access to water for various purposes. Women and men can utilize these resources to enhance agricultural productivity, increase crop yields, and improve food security but also access to better drinking water quality that will reduce incidences of water-borne diseases. Furthermore, water ponds will be created at adequate location to provide drinking water for animals. These water ponds will be designed in such a way that they will allow enough resting space for animals which will produce dung to be use for increased soil fertility by using the manure. Additionally, the availability of solar-powered water pumps reduces the burden of manual labor for both genders, empowering women and allowing them to engage in income-generating activities beyond subsistence farming. This initiative supports sustainable agriculture and pastoralism, promotes gender equality, and contributes to the socio-economic development of the communities in Kanem. Under this output, technical activities but also technical capacity support will include:

o Borehole Installation: Boreholes will be drilled to access groundwater, ensuring a sustainable water source for irrigation and for livestock. The installation process will involve selecting appropriate locations and employing drilling machinery and expertise to construct the boreholes.

o Solar Panel Installation: Solar panels will be installed to harness solar energy, providing power for the water pumps. This activity will include mounting the panels in optimal positions to maximize sunlight exposure and connecting them to the pumping system.

o **Battery Setup:** Batteries will be installed to store excess solar energy for use during periods of low sunlight. This activity will involve selecting and installing appropriate battery systems that can efficiently store and discharge energy as needed.

o **Network of Irrigation Tapes:** An irrigation network will comprise tapes or hoses to be established to distribute water efficiently across the fields. This will include laying out the network, connecting the irrigation tapes, and ensuring proper water flow and distribution to support crop growth.

o **Training and Capacity Building:** Comprehensive training programs will be conducted to educate both women and men on the operation and maintenance of the solar water pump systems. This will empower local communities to manage the infrastructure effectively and troubleshoot minor issues. Women and local communities cooperatives will be structured and capacitated to manage the solar water pump systems. This activity will be embedded in the exit and sustainability strategy of the project.

By implementing these activities, the solar water pump infrastructures facilitate year-round access to water for irrigation, pastoralists, enabling both women and men to enhance agricultural and livestock productivity, improve food security, and engage in income-generating activities. Additionally, this initiative promotes gender equality, reduces drudgery, and contributes to sustainable development in the Kanem region of Chad.

Box 1: Information on the cost estimate of Solar Pumps and SLM activities

The targeted pilot Oases are large and provide high potential for multiple activities with a large number of population. Currently the Solar System being established per municipality in Chad is around XAF 500 million (\$1million). This amount covers both the Solar Energy infrastructures (the panels, the batteries, and the wire network) and irrigation infrastructures (borehole, the tanks, the platform to support the tanks and the pipes). Based on the experiences in some pilot sites established by the Great Green Wall National Agency in Chad, it appears that only One Solar system may not be enough for One Oasis because of the competing use by large herds of animals including for migrant pastoralists. The System visited during the PPG shows a kind of Organisation which allows the animals to use the system in the half of the day and other half reserved for women gardening and domestic uses. To overcome this limitation, the project envisages to installed system with enough panels or in some cases installing more than 1 system for One Oasis.

The SLM activities to be conducted in Communal Plans are planned to be intensive and sufficiently enough to create impact within the communities. The cost per ha for Land Restoration is estimated at \$277/ha during WB/GEF SAWAP program but recent information indicates that this cost is now as high as \$600 per ha because of many factors including cost operations the area is sandy and fuel consumption can be more than 3 times the normal consumption, insufficient labor as most those that can be hired have moved to other areas where Gold mining seems to be more attractive. In addition, ClimateSmart Agriculture to be promoted will be enough to create impacts and to cover large number of communities and women. The restoration of Oasis will not only be in 1 Oasis per Municipality, but extended to the Oasis where communities continue to exploit but face challenges related to Salinization and other restriction factors like lack of compost and adapted crops species. The remoteness of the area also will required facilitating products access to markets or alternatively conservation of products for better price at the best periods of the year. All the above increase the cost of promoting productivity in the project areas.

o 2.1.2 Gender-responsive power purchase agreements are negotiated and agreed upon between the cooperatives and possible buyers the Societe Nationale d'Electricite (SNE): (It should be noted that municipalites also they have the legal statut to run local power supply in Chad). The project recognises that power purchase agreements (PPAs) for renewables delivers green energy efficiently to organizations that seek sustainability benefits. The project will support a negotiation process that will include identifying relative impacts during the project's implementation but also vital negotiation pricing patterns that permit practitioners to deliver win-win outcomes. The project will support a PPA framework for sustaining and attracting additional private investments, promoting renewable energy development, and expanding access to electricity in Chad. By creating a transparent and supportive environment, the country will foster sustainable power generation and meet its energy goals while diversifying its energy mix and reducing reliance on fossil fuels

Component 3: Establishment of long-term gender-responsive Knowledge management and monitoring system of Ouadis ecosystemsmen and women

Chad faces multiple environmental challenges. As has been noted, these challenges are of natural but also anthropogenic nature. Regression in the vegetation cover, the progressive advance of the desert, the decrease in biodiversity, the degradation of arable agricultural land, hydro-morphological alterations, the silting up of hydro-systems, and the increased fragility of the populations have all been observed in Chad. Degraded areas in the country have been estimated at 428,000 km², or 33.43% of the total area; largely linked to overgrazing, wind erosion, fuelwood and timber and mining activities. As the triggering factors of ecosystem evolve, natural or anthropogenic, it will remain important to have a system in place to monitor how the factors are impacting the performance of ecosystems to provide environmental goods and services. This helps to inform decision makers, including direct resource users who are mainly rural communities.

Through long-term ecosystem monitoring, scientists and decision-makers can track changes, detect potential threats, and develop evidence-based strategies to sustainably manage and conserve ecosystems by, for example, investing in appropriate sustainable land management practices. It enables the identification of emerging issues, guides conservation priorities, and contributes to the overall understanding of ecological dynamics and the impacts of human activities on ecosystems.

It is acknowledged that concerted efforts to standardise documentation and evaluation of SLM are certainly justified in light of the billions of dollars spent annually on implementation of SLM practices. New efforts towards SLM should build on existing knowledge from within a location itself or from similar environments elsewhere. Identifying and assessing scattered knowledge about SLM and making it broadly available requires a standardised and harmonised methodology for comprehensive data collection, knowledge management, and dissemination such as the one developed by World Overview of Conservation Approaches and Technologies (WOCAT), Land Degradation Assessment in Dryland Tools (LADA), and DEvelopment of a System of Indicators for a Resource efficient Europe (DESIRE). Standardised information provides important evidence for users at the local, national, and global levels. Successful use of a shared methodology and its joint adaptation to additional or changing needs requires a strong commitment of both men and women involved in SLM. SLM has multiple ecological, economic, and social benefits that reach far beyond its potential for reducing land degradation and desertification. SLM also addresses global concerns such as water scarcity, resource use efficiency, energy supply, food security, poverty alleviation, climate change, and biodiversity conservation. When taking into account these multiple benefits, investments in SLM are completely justified and may require funding schemes from private and public sectors, especially when involving small-scale land users and marginalised people.

Based on the above, the project, through the component 3 will capitalize on the available knowledge on good SLM practices applicable to Ouadis ecosystem. The project will take the advantage of the peer-to-peer learning networks such as the Africa Mini-Grids Community of Practice to try and tackle the issue of identifying the best ecosystem management options. The outcome from the component 3 will be :. The outputs to be generated will include:

Component outcome:

3.1 Men and women from Chad and Kanem region including those involved in ouadis, natural resources management and energy sector are actively engaged and exposed to the potential best SLM practices for Ouadis restoration and introduction of solar energy.

Component outputs:

o 3.1.1 Policy brief and guidelines to promote the use and scaling up of good SLM practices for Ouadis restoration and Solar water pumps developed and disseminated: This output will be important in the context of this project to provide concise and targeted information to policymakers, highlighting the benefits and evidence-based approaches for implementing sustainable land management practices and utilizing solar water pumps. The brief will outline policy recommendations, financing mechanisms, and regulatory frameworks necessary to support widespread adoption. Additionally, guidelines will offer step-by-step instructions for implementing and replicating successful practices, ensuring consistency and quality. By disseminating the policy brief and guidelines, the project will facilitate knowledge transfer, guide decision-making, and encourage the adoption of sustainable land management practices and solar water pump technologies, leading to ecosystem restoration, improved livelihoods, and sustainable development.

o 3.1.2 Communication and knowledge products generated by the project and uploaded in a dedicated Portal on the project host website to facilitate access and disseminated at local, national and regional levels through different channels: Communication and knowledge products are essential for sharing information and promoting widespread understanding. In this project, products (such as reports, case studies, videos, and infographics) will be uploaded onto a dedicated portal on the project host website. This portal will serve as a central hub where stakeholders can easily access and download the materials. To ensure broad dissemination, the knowledge products will be shared at local, national, and regional levels through various channels, including workshops, conferences, newsletters, social media platforms, and collaborations with local partners. This multi-channel approach maximizes the reach and impact

of the project's findings, facilitating knowledge exchange, capacity building, and informed decision-making among stakeholders involved in natural resources management in Chad and beyond. By facilitating knowledge exchange, different stakeholders will be part of the ecosystem monitoring infrastructure.

o 3.1.3 Gender responsive Indicators for monitoring impact of SLM practices and use of Solar pumps to restore Ouadis ecosystems and generate energy for mini-Grid developed and necessary data for monitoring regularly collected through a long term monitoring system: Through this output, the project will support the country with the development and implementation of a robust long-term monitoring system. Through this system, Chad will be positioned to more effectively assess the impact of SLM practices and the use of solar pumps and their contribution to ecosystem restoration and energy generation, respectively. The collected data will inform evidence-based decision-making, facilitate adaptive management, and support the sustainable development of Ouadis ecosystems and energy systems in the country. Among other relevant aspects, the project will consider the following as part of indicator development and data collection:

o Ecological Indicators: Indicators such as vegetation cover, soil erosion rates, water quality, and biodiversity indices can assess the ecological impact of SLM practices and ecosystem restoration efforts.

o Energy Generation Indicators: Monitoring the energy generated renewable mini grids and its contribution to mini-grids involves tracking energy production, consumption patterns, and the number of households or businesses connected to the system.

o Socio-economic Indicators: Indicators such as agricultural productivity, income levels, employment opportunities, and access to energy services can gauge the socio-economic benefits derived from SLM practices and solar pump utilization.

o Data Collection and Long-Term Monitoring: Establishing a long-term monitoring system requires regular data collection through field surveys, remote sensing technologies, and community-based monitoring. This includes setting up monitoring stations, employing trained personnel, and implementing data management protocols.

o Stakeholder Engagement: Engaging local communities, researchers, and policymakers in data collection and monitoring activities fosters ownership, builds capacity, and ensures the relevance and accuracy of the collected data.

3.1.4. Project is adequately monitored through a well gender responsive established monitoring and evaluation system. The project will establish an M&E system which will be the key framework for performance management and monitoring. Key indicators will be monitored

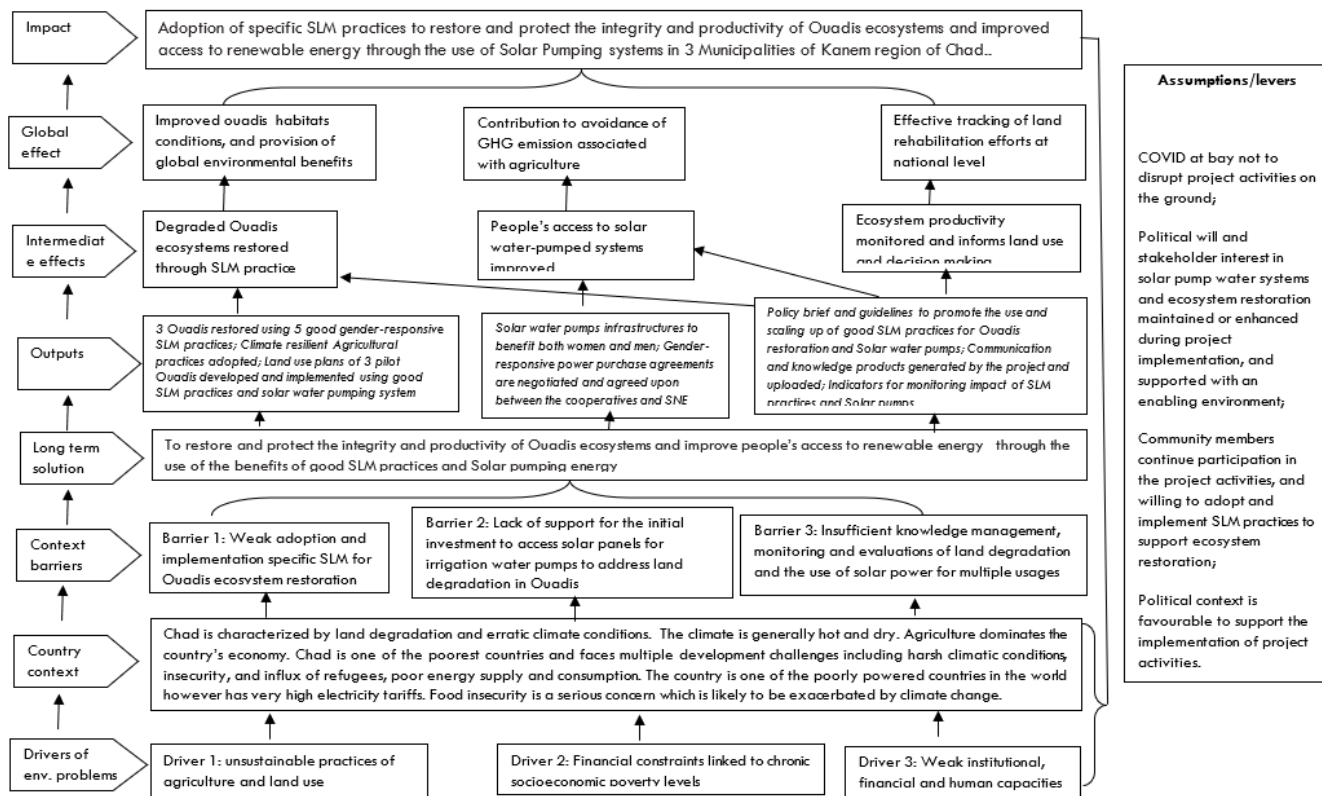
toward the set project targets. Middle Term review and the final project evaluation will be carefully plan and this will also to generate lessons learned.

The project Theory of Change

The Theory of Change for the project as detailed in this alternative scenario therefore, is embedded in the country's context broadly, and specifically in the project target area by understanding the drivers of environmental challenges in a socioeconomic context that is characterised by land degradation and erratic climate conditions yet dominated by agricultural and pastoral activities. Food insecurity is a serious concern which is likely to be exacerbated by climate change. Additionally, the context has poor energy supply, one of the poorly powered countries in the world yet has very high electricity tariffs. Addressing these complex challenges of access to renewable energy and to restore the integrity of ecosystems that shape socioeconomic activities, the country faces serious barriers in terms of Insufficient knowledge management, monitoring and evaluation of land degradation and the use of solar power for multiple usages, lack of support for the initial investment to access solar panels for irrigation water pumps to address land degradation in ouadis and weak adoption and implementation of SLM for ouadis ecosystem restoration. Therefore, the long term vision to address this complex set of challenges needs to focus on restoring and protecting the integrity and productivity of Ouadis ecosystems and improve people's access to renewable energy using solar pumping systems.

To realise this goal, the project proposes investments in activities related to land rehabilitation, installations of solar powered water pumps and technical assistance to create an enabling environment for operationalizing ecosystem restoration and renewable energy for making water resources more available and accessible for sectors that underpin rural livelihoods. In this Theory of Change, the focus on these aspects will lead to improved ecosystem integrity, better access to water resources using renewable energy source and effective monitoring system to support the country's effort in land rehabilitation and net zero agenda. The impact which reflects and links with the project's context is that improved access to renewable energy through the use of Solar Pumping systems in 3 Municipalities of Kanem region of Chad and adoption of SLM practices restore and protect the integrity and productivity of Ouadis ecosystems. This Theory of Change of the project with its pathways as detailed above is summarized in the graph below.

IPOPrONOG's Theory of Change



3) Alignment with GEF focal area and/or Impact Program strategies

This proposed project is fully consistent with the GEF 7 Land Degradation and Climate Change Focal Areas. It is aligned to LD-1-4: Reduce pressures on natural resources from competing land uses and increase resilience in the wider landscape and CCM1: promote innovation and technology transfer for sustainable energy breakthroughs, through its development of decentralized renewable power with energy storage. The project will contribute to the country LDN targets and to the transformation of the energy sector, taking the Kanem region into phase 2 and 3 of the National Electricity Emergency Plan. Since this project will develop low-carbon renewable energy minigrids supported by innovative business models that can be scaled-up, it also aligns with the objective to focus on the demonstration and early deployment of innovative technologies to deliver sustainable energy solutions that control, reduce or prevent GHG emissions? (117).

4) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCE, SCCF, and co-financing

Baseline scenario: Chad suffers from multiple environmental threats ? both natural and anthropogenic ones. Also, the country has very low levels of access to energy, estimated at 2%, and less than 1% in rural areas such as Kanem. The vast majority of the people therefore rely on carbonThe Ouadis landscape in Kanem region is characterized by the degradation physically visible through the sand dunes surrounding the Ouadis and this constitutes a continuous threat to the humid depression areas of the Ouadis where all the productive activities take place. There is increasing land pressure from agriculture, burgeoning population growth, loss of biodiversity, overgrazing, inter-community conflicts for resources mostly exacerbated by migrants, and the continuous silting and pollution of the water bodies. These highlight the limitations of current management systems to harmonize resources, adequately exploit the irrigation potential and improve value chains, especially in the ouadis. Furthermore, the mismanagement of production lands exacerbate desertification and poverty. Without the GEF support, land use from agricultural production systems lead to land degradation, further compromising the productive capacity of the Ouadis to provide for the ecosystem services that are required. As it is established, energy access to support production systems and socioeconomic activities, is important to bring about local development even at micro level, the situation of energy access in project area is very low and without GEF investment, the barriers to access to initial investment for renewable energy will be a challenge. This complex set of socio-economic and climate change challenges are exacerbated by the fact that populations in the zone are growing.

In sum, food and nutritional insecurity are chronic because in Kanem due to repetitive climatic hazards (drought, heat wave, violent winds and floods); making the province one of the most vulnerable and unstable to climate change in Chad. Due to population growth, water, land, plant cover, and other natural resources are under immense pressure of exploitation ? and conflicts among local communities and returning migrants, farmers and herders and between sedentary and nomadic herders over scarce resources are a common phenomenon. To cope and survive both natural and anthropogenic factors, farmers, agro-pastoralists and pastoralists have to adapt with measures that include migration and timing of agricultural and livestock activities. For more details on the baseline elements and scenario, please check the section on the ?Overview of the climate change situation, scenarios, including future projects, of the project area.?

Building on the baseline projects, the most important expected contributions include lessons from partners such as the World Bank and UNDP through their projects on electricity and Mini-Grid in Chad. Lessons regarding community engagement, stakeholder capacity development (including identifying capacity gaps to better tailor capacity development programs), private sector appetite in renewable energy sources and modes of engagement, and policy landscape and government ownership and institutional governance mechanisms. Discussions have been had with project management units during PPG, and these will continue ? this will shorten the learning curve, but also help to have ?something to start with? on the ground, both from the project team and also from the government and other stakeholders. Additionally, beyond lessons, continued engagements will remain important for additional financing (cofinancing) to sustain activities, including those ones related to water monitoring.

All these aspects will be built in the sustainability and scaling up strategies ? which will be critical in achieving the envisaged impact and sustaining it in terms of coverage and depth in Kanem and beyond.

The performance of the project will itself be a selling point for additional resources from other partners beyond local, domestic sources to escalate access to clean energy while reaping associated socioeconomic and environmental benefits. More details on the specific sustainability and scaling up strategies are mentioned in the sections for sustainability and scaling up potential.

Lack of investments in the region will therefore, mean that the status quo as summarized above will continue in the 3 municipalities of Kanem region leading to i) continued degradation, fragmentation and loss of ouadis ecosystems; ii) exacerbation of social conflict and land disputes as result the presence important migrant populations; iii) reduced agricultural productivity and consequent impact on food security that may worsen the vicious poverty-natural resource dependency cycle, among others.

The GEF support scenario: Under the GEF support scenario, the project will lead to the rehabilitation and restoration of the landscape that is at the core of socio-economic wellbeing of communities (both men and women) and limit the rate of carbon emissions from land use change and use of energy production from GHG emission sources. The rehabilitation of Ouadis as proposed in this project will improve the productive capacity of the landscape. The GEF support scenario will help to improve the management of resources in the Kanem to address environment challenges that the zone faces. The improvement of resource management in the Ouadis is premised on restoring and rehabilitating the degraded land. Improved management will also help to address land degradation challenges in the Ouadis as well as contributing to carbon emission reduction from biomass and use of diesel fuel to produce energy for domestic use. It will also contribute to mitigate carbon emissions totaling 1,284,866 tCO₂ emissions (1,264,322 t CO₂ avoided from solar emission reductions and 20,544 t CO₂ emission avoided thanks to sustainable land management practices on 3,000 ha of agricultural production landscapes), while assuring food security through improved post-harvest handling and job creation. With the GEF funding, this project will therefore address key issues focusing on land degradation through deforestation, livelihood insecurity, social conflict, human-animal conflict and promotion of agricultural production system that pose minimal threat to biodiversity loss in Ouadis ecosystems. GEF-funded interventions will consolidate ongoing projects and government interventions. Therefore, the GEF strategic incremental cost for this project is rationalized on the basis that the GEF resources will conserve ouadis ecosystem and strengthen institutional and individual capacities to improve ouadis ecosystems management while empowering rural communities (both women and men) with sensitization programs and put them at the centre of the protection efforts of resources of global environmental value as well as socio-economic benefits at local and national levels. The GEF support will allow identification and promotion of good sustainable land management practices including agroforestry and other agricultural value chains, which will help boost soil quality and land productivity, while conserving and enhancing carbon stocks. Without the GEF resources, the observed trends in Ouadis degradation and the lack of institutional capacities, unsustainable agricultural production systems, among others, will continue leading to the further loss of global environmental goods and loss of socio-economic opportunities for both women and men at local level.

5) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCE/SCCF)

IAPROMSOK is designed to, overall, protect the integrity and productivity of Ouadis ecosystems and improve access to renewable energy. One aspect of this effort to protect ecosystem is land rehabilitation which can improve ecosystem services for multiple benefits. The project outcomes collectively contribute to the provision of essential ecosystem services such as clean air, clean water, pollination, soil fertility, and climate regulation, thereby benefiting both human well-being and the overall health of the environment. In the design, the project will contribute to improved conservation of Ouadis ecosystems, improve ecosystem management and land-use practices, thereby reducing the current trend of desertification, deforestation and forest degradation, and animal-human conflicts. Increased productivity on existing farming and pastoral land will equally reduce the need for expanding farmlands, thus reducing Carbon emissions from land use change and agricultural production. More specifically the project will lead to:

- o Enhanced soil health and fertility: Land rehabilitation techniques such as reforestation, soil erosion control, and sustainable agricultural practices can improve soil health and fertility. Restoring vegetative cover helps reduce soil erosion, while practices like agroforestry and cover cropping contribute to soil organic matter accumulation and nutrient retention. Healthier soils support agricultural productivity, water infiltration, and nutrient cycling, leading to improved crop yields and sustained ecosystem services.
- o Enhanced water resources: Land rehabilitation measures can positively impact water resources by preventing soil erosion, increasing water retention capacity, and improving water quality. Restored vegetation reduces runoff, minimizing soil sedimentation in rivers and streams. This helps maintain water availability during dry periods and reduces the risk of flooding during heavy rainfall events. Additionally, restored riparian zones and wetlands act as natural filters, improving water quality by trapping pollutants and sediment.
- o Climate change mitigation and adaptation: Land rehabilitation plays a crucial role in mitigating climate change and building resilience. Restored forests and ecosystems act as carbon sinks, sequestering atmospheric carbon dioxide and helping to mitigate greenhouse gas emissions. Furthermore, rehabilitated lands with improved vegetation cover can enhance climate resilience by reducing the vulnerability to extreme weather events, regulating water flow, and providing habitats for diverse species.

Under component 1, the project will use different gender-responsive SLM practices and technologies including mechanical control of sand dune using thypa as materials for restoration at the same time controlling this invasive species, biological sand dunes fixation; drip irrigation technics, mulching; herbaceous seeding ? contributing to fostering soil health, boosting agricultural productivity, and restoring degraded lands to enhance food security and resilience to climate change in Chad. The project will support conservation agriculture, afforestation with drought-resistant tree species, and improved soil fertility techniques to bring 3,000 ha of degraded under rehabilitation. Agroforestry integrates trees into farming systems, enhancing soil structure and providing additional income from tree products. Soil fertility is improved through organic matter addition, crop rotation, and reduced chemical inputs. Water harvesting and drip irrigation technologies maximize efficient water use.

Additionally, the project will support land use plans in the three targeted Ouades. Based on their individual sizes, the land use plans will be over 2,500 ha.

Additionally, land rehabilitation initiatives that focus on restoring degraded habitats can lead to an increase in biodiversity. For this project, particularly it will be achieved through the fight against invasive species as typha will be controlled to free the water bodies and create survival condition of useful species including fish and other palatable plants for pastoralism. By restoring natural vegetation and implementing conservation measures, rehabilitated lands can support the return of native plant and animal species. This, in turn, enhances ecological balance, promotes pollination, and strengthens ecosystem resilience.

The baseline is that, without this proposed GEF intervention, the fossil fuel use will continue unabated in the Kanem area, resulting in significant amount of CO₂ emissions in the atmosphere. By supporting the development of renewable energy source, this project will contribute to reduction in the GHG emissions from the country's energy sector since most of the demand is currently met through fossil fuel use and biomass. If successfully implemented, the replication potential of this project is very high, so that further reductions in CO₂ emissions can be expected.

More specifically, the project will generate the following environmental and social benefits:

- o Reduction of the current trend of desertification, deforestation and forest degradation, and animal-human conflicts;
- o 3,000 ha of Ouadis Ha of Ouadis ecosystem protected using good SLM Practices that benefit both men and women;
- o 600 ha of Ouadis production system (women and men agricultural land) under land use plans;
- o 3,000 persons including 1500 men and 1500 women will benefit directly from the SLM activities and energy production;
- o Solar Energy Water Pumping - non connected mini grids systems to support women and men income generation activities, and reducing drudgery experienced by mostly women when they have to travel long distances to fetch water; and
- o 20,544 t CO₂ emission avoided thanks to sustainable land management practices on 3,000 ha of agricultural production landscapes (see the output of the Nationally Determined Contribution Expert Tool (NEXT) ? see figure below).

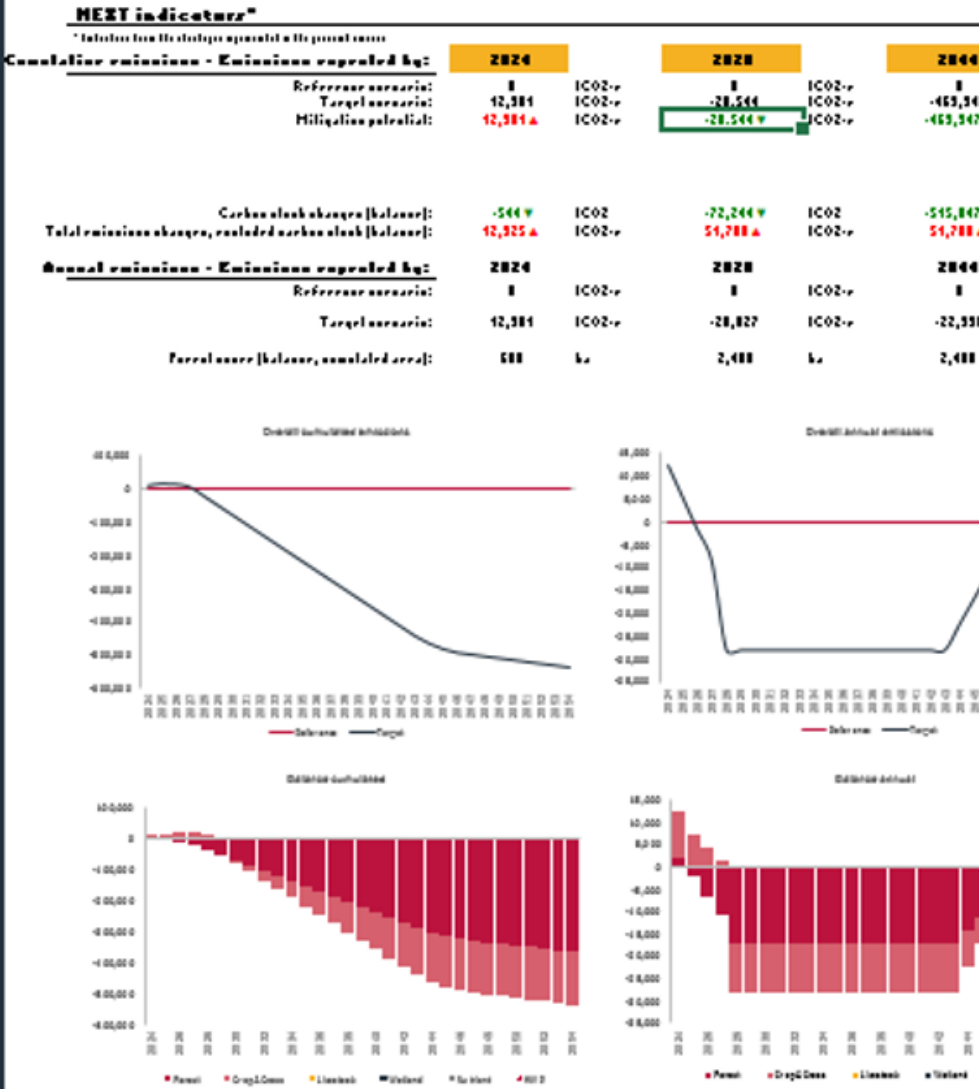


Figure 15: Figure showing estimated tCO₂e emissions to be avoided based on the Nationally Determined Contribution Expert Tool

6) Innovation, sustainability and potential for scaling up

Innovation: The Project innovation is its objective of combining the combating land degradation through promotion of SLM which will make use of Solar energy for pumping water for irrigation and use of the access in mini-grid system to support energy access for local communities men and women. The project will provide affordable renewable electricity to off-grid area for productive uses. The combined effects of decreasing electricity costs and improved economic conditions will be the increased affordability and capacity to pay for renewable electricity by end users. The increasing demand driven by low cost of electricity will catalyze further investments in renewable minigrids

thereby creating a momentum for scaling up investments and contributing to higher levels of rural electrification. The project approach of using SLM and irrigation is providing multiple co-benefits as the facilitating water access to pastoralists; it will not only solve the water need for livestock but also create condition for increase soil fertility from the animal using the water ponds which be either shifted from time to time or organise cowdung collection for manure. The orientation of herds toward designated areas will also avoid soil erosion due to large stock of animals on single place.

Sustainability: Adopting SLM practices with use of local communities as labor to restore their own land will ensure their commitment and will build their capacity to embark in sustainable management of Ouadis ecosystems in the country. The ownership of the intervention by local communities and authorities is an important sustainability element. Consultations during the PPG give hope for ownership of future interventions. Solar Water Pumping, or photovoltaic water pumping (PVP), provides a viable alternative from electric water pumps, which use diesel to fuel their systems. In recent years, the cost of solar technology has dropped tremendously. Prices for the solar panels used in these systems have dropped up to 80%. In addition, these panels last around 25 years, requiring little maintenance throughout this time. These factors have made Solar Water Pumping an extremely viable way to expand energy access across developing countries and communities women and men, while creating a strong resistance to shifts in rainfall caused by climate change or unreliable seasonable patterns, as evidenced in the Kanem area. Local organized groups namely the cooperative will be created or strengthened in order to empower them for the management of the water and electricity infrastructures to be created. This will create community led local enterprises which will be generating benefits that will be an important incentive for sustainability as it is demonstrated in a similar case in India, as has already been alluded to in the document. The sustainability approach will include also the disposal and or recycling of solar panels. The approach also provide financial sustainability as the infrastructure to be established will be managed by cooperative which will establish a management model which will generate revenue to face any cost to be incurred for maintenaing the insfrastructure.

Also, it is understood and as noted, the project will continue engaging different partners for additional resources, lessons and best practices to strengthen sustainability of the project outcomes ? that is, beyond capacity development and alignment with government policy and development priorities. Therefore, during the implementation phase, the project will be proactive in terms of creating and strengthening a sustainability path by strategic engagements with partners. This will also constitute the exit strategy that build on capacity development of beneficiaries, sustainable financial resources and partnerships through stakeholder engagement- minimizing disruptions and maximizing long-term sustainability.

Cost-effectiveness: The project will build on lessons from other similar projects, and will also community capacities to run and maintain the equipment. The alternative scenario would have been to start a project without any point of reference and without any lessons to draw from. This would lengthen the learning process, but also requiring more training ? making the project comparatively lengthier and more expensive. Also, hiring expert service for running and doing repair works would be more expensive compared to building local capacities to do what an outsider expert technician would do.

It should also be mentioned that the project will focus on procuring high quality solar panel with a longer lifespan. This might be more financial initial investment, however, it will prove cheaper in the longer term. This is because the solar panel won't have to be bought from time to time. In sum, the cost-effectiveness of the project will be demonstrated in three ways: local capacity development; partnerships with other development partners and projects to build on their experiences and lessons; and to invest initial resources in procuring high quality equipment ? avoiding the ?cheap is expensive? trap.

Scaling up: The ouadis in Kanem are many and with various potential for boosting food and pastoral productions as dividend of restauration activities to protect and promote Ouadis ecosystems. The approach is planned as pilot, and lessons learned will be utilised to scale up the approach both with the Kanem and beyond, particularly to be used as vehicle to implement Great Green Wall activities. The local authorities and communities leaders are convinced that if the approach is well conducted, it will bring about revolution in Kanem as the well know vulnerable region can become one of the food production zone of the country as the multitude of Ouadis can be managed to scale up the approach. The neighbouring Niger and northern Africa countries have a lot of Ouadis where the approach can also be scaled up.

By adopting an approach that targets the productive sectors, this project will create a critical mass of market activities that will support broader replication of the systems for basic rural electrification in the country. Lessons from this project could be used for promoting SLM practices which include generation of renewable energy systems in other isolated areas throughout the country. Furthermore, the project is building on experience of previous intervention including building on existing local cooperative and also is planning to have as active partner the Societe Nationale D'Electricity which has a national mandate on electricity access but also which has include renewable solar energy as one of its pillars for promoting energy access to all. The model to be developed will have a chance of being replicated and by being enched in the existing institutions the project sustainability will be ensured.

The project design is cognizant of the link between sustainability and scaling up potential of the project outcomes. In this regard, as noted above under sustainability, the strategic engagement with partners that include donors - bilateral and multilateral institutions - will serve to explore proactively mechanisms for scaling up project achievements, including pursuing domestic resources, additional cofinancing to spur scaling up, both in terms of geographical coverage and depth or number of beneficiaries to be positively impacted. The Project Coordinator will be instrumental in this aspect of exploring potentials and mechanisms of collaborations to support scaling up.

[1] World Bank, ?World Bank Open Data,?. Online available: <https://data.worldbank.org>

[2] African Development Bank (2023). Chad Economic Outlook

[3] African Development Bank (2023). Chad Economic Outlook

[4] African Development Bank (2023). Chad Economic Outlook

[5] Chad (n.d) First National Climate Change Adaptation Plan of [Chad](#)

- [6] <https://infracoafrica.com/pioneering-djermaya-solar-project-attracts-new-lenders-to-chad/>
- [7] Anergi Africa Development Ltd ([AADL](#))
- [8] Smart Energies: smart [futures](#)
- [9] Denham Capital is is a global energy transition investment [Firm](#)
- [10] Neo [Themis](#) develops and invests in economically and environmentally sustainable power assets for a better life in Africa
- [11] The EU-Africa Infrastructure Trust Fund ([EU-AITF](#)) has been supporting investment in infrastructure in Sub-Saharan Africa through blending long term loans from participating financiers with grant resources from Donors, in water, energy, transport, ICT sectors
- [12] Mian-oudanang et al. (2015). Charaterization of pastoral herding in Kanem (Chad). *International Journal of Livestock Production*
- [13] Dallimer et al. (2018). Who uses sustainable land management practices and what are the costs and benefits? Insights from Kenya. *Journal of Land Degradation and Development*.
- [14] World Bank Press release 24th March 2022.
- [15] Yalew. A.W. (2015). The Perplex of Deforestation in sub-Saharan Africa. *Journal of Tropical Forestry and Environment*
- [16] Chad (n.d) First National Climate Change Adaptation Plan of [Chad](#)
- [17] Government of Chad. (2016). Strategie Nationale et Plan d'Actions sur la Diversite Biologique ([NBSAP](#)). 2^{me} edition
- [18] <https://infracoafrica.com/pioneering-djermaya-solar-project-attracts-new-lenders-to-chad/>
- [19] Anergi Africa Development Ltd ([AADL](#))
- [20] Smart Energies: smart [futures](#)
- [21] Denham Capital is is a global energy transition investment [Firm](#)
- [22] Neo [Themis](#) develops and invests in economically and environmentally sustainable power assets for a better life in Africa
- [23] The EU-Africa Infrastructure Trust Fund ([EU-AITF](#)) has been supporting investment in infrastructure in Sub-Saharan Africa through blending long term loans from participating financiers with grant resources from Donors, in water, energy, transport, ICT sectors.

[24] PIDG Technical Assistance (TA) plays a central role in enabling PIDG to enhance the impact of its projects and to initiate multi-company programmes and centrally-driven initiatives that are not specific to a particular company and that align with PIDG's strategic objectives

[26] Charbonnier Virginie. (1999). Practices of pastoral societies in Kanem: Role of Ouadis and ligneous trees in securing pastoral uses. *Mmoire DESS: Management of agrosilvopastoral systems in tropical areas*

[27] Seema Arora-Jonsson. (2011). Virtue and vulnerability: Discourses on women, gender and climate change. *Journal of Global Environmental Change*

[28] Cronkleton *et al.* (2021). Using Participatory Approaches to Enhance Women's Engagement in Natural Resource Management in Northern Ghana. *Journal Sustainability*

[29] Thematic study of this project

[30] Marios Stanitsas and Konstantinos Kirytopoulos. (2023). Sustainable Energy Strategies for Power Purchase Agreements (PPAs). *Journal Sustainability*

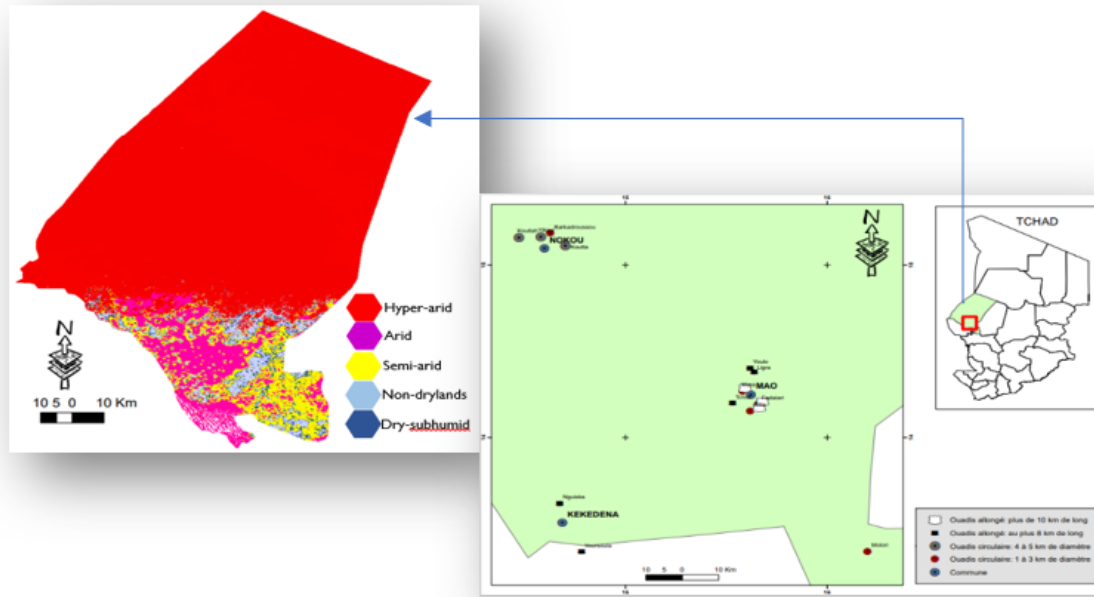
[31] PAN/LCD (2003)

[32] Tools for Better SLM Knowledge Management and Informed Decision-Making in Addressing Land Degradation at Different Scales: The WOCAT?LADA?DESIRE Methodology. by Liniger Hanspeter, Schwilch Gudrun, Mekdaschi Studer Rima, Providoli Isabelle⁴, Bunning Sally, Biancalani

Riccardo, van Lynden Godert

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.



The project sites involve 3 municipalities with the following municipalities:

- ? Mao : Lat: 14.1211600 / Lon : 15.3103000
- ? Kekedena - NR 13°50 ' 550, E 14°50 ' 000
- ? Nokou- NR 14°5827' 550, E 14°7813 ' 000

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

No

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities Yes

Private Sector Entities Yes

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

Stakeholder engagement of this project is premised on the understanding that it ensures the inclusion of diverse perspectives, knowledge, and interests in decision-making processes, leading to more informed and effective outcomes. By involving local communities, indigenous groups, NGOs, and government agencies, stakeholder engagement fosters ownership, promotes transparency, and enhances social acceptance. It enables the identification of potential conflicts, encourages collaboration, and builds partnerships for sustainable resource management. Furthermore, stakeholder engagement facilitates the sharing of traditional knowledge, fosters capacity building, and promotes equitable distribution of benefits. Overall, it enhances project legitimacy, reduces risks, and supports the long-term success and sustainability of natural resources management initiatives.

The development of this project has been enriched but also is a product of a participatory approach that has created space for stakeholder engagement; bringing together key actors in Chad, including communities as beneficiaries and active participants in project activity implementation and monitoring. Various meetings, technical consultation meetings with experts from the various aligned government ministries and relevant sectors, and communities in the proposed project sites, including women and young people, have resulted in a consensus on the problems and challenges but also on the measures to be adopted – ensuring consistency with development aspiration of local communities and development priorities of the country at the national level. The following partners are already supporting the Government of Chad in rural electrification: World Bank (WB), Agence Française de Développement (AFD), United Nations Development Program (UNDP), European Union (EU), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). This project will engage with these partners to ensure synergies and complementarities. In the process of the Project development, under the leadership of the GEF Operational Focal Point, UNEP conducted some in-country consultations with some institutions including Civil Society Organisations (CSOs). Key partners consulted throughout the project implementation include: The Ministry of Petroleum, Mines and Energy, The National Electricity Company, ADERM (Agence pour le Développement de l'Électrification Rurale et de la Maîtrise de l'Énergie), Ministry of the Environment, Water and Fisheries, the Ministry of Economy and Development Planning, the Ministry of Finance and Budget, the Ministry of Urban Planning and Housing, the Kanem Regional and municipal authorities, etc.

As noted, consultations and stakeholder engagement have been continued through the CEO document development stage, building on the PIF stage because the engagement of various stakeholders driven by country-specific needs and opportunities is critical in advancing transformational change. During the project preparation phase a stakeholder analysis has been conducted to reaffirm, identify and map key stakeholders (including local and international partners), their level of influence, and stake in the project to support the project's communication strategy to inform and guide how information and knowledge will be shared and disseminated with both external and internal stakeholders.

The project will engage the following typology of stakeholders to achieve its development objective to (i) reduce pressures on natural resources from competing land uses; (ii) increase the resilience of the wider landscape; and finally (iii) promote innovation and technology transfer through sustainable energy breakthroughs for decentralized power by promoting best practices of Sustainable Land Management (SLM) to protect the ecosystems of Ouadis; investing to support local community access to solar energy for irrigation and economic benefits; and establishing a long-term monitoring system for OuOuais ecosystems.

- o **Promoter:** comprising Ministry in charge of the Environment, Project Owner, Delegated Project Owner, IGMV
- o **Companies:** comprising companies holding works contracts, subcontractors and suppliers, public or private operators

- o **Central administrations:** comprising Central administrations: Ministry in charge of the Environment, represented by the Domestic Energy and the Environment (AEDE), Ministry in charge of water, Ministry in charge of Agriculture; Sultanate
- o **Deconcentrated administrations and thematic institutions:** Devolved delegations from the Ministries of Environment, Agriculture, Planning, CPA, NGOs, CSOs, ANADER
- o **Decentralized administrations:** Administration of the Departments of Central Kanem and Nokou, CDA, Urban Communes of e Mao and Nokou, Environmental Inspectorate, ANDER Sub-sector, the Heads of Cantons
- o **Communities:** Village chiefs, Imams of Mosques, OCB, local populations, elders;
- o **Civil Society Organizations:** These will include professional associations and groups, international and national NGOs, as well as professional unions, Provincial branch of CELIAF, provincial branch of the CNCPR.

Based on the comparative advantage of stakeholders that have been engaged through the process of project development, the following stakeholders will take an active role in the project:

<i>Names</i>	<i>Mandates</i>	<i>Anticipated Roles in the Project</i>
<i>Technical Departments of the ministries in charge of Environment, Forest, livestock, agriculture, mining, rural development, energy etc.</i>	<ul style="list-style-type: none"> ? Advise on environment, agriculture, livestock production and management issues and in charge of policies development ? Sustainable Management of Water Resources ? Development and Sustainable Management of Ouadis ? Clean energy development ? Strengthening the resilience capacities of populations in the face of risks and natural disasters. 	<ul style="list-style-type: none"> ? Contribute to improving the management of surface water resources in the Ouadis and increase the population's access rate to drinking water ? Take lead of stakeholders mobilisation ? Awareness raising activities

<i>Names</i>	<i>Mandates</i>	<i>Anticipated Roles in the Project</i>
<i>Office (Directorate) of Planning, Studies, Monitoring and Evaluation Ministry of Environment, Fisheries, and Sustainable Development</i>	<p>? Provide technical assistance and strategic oversight of environmental project management; ensure programme quality and delivering policy advice to the Minister of Environment, Fisheries and Sustainable Development on the project Management.</p> <p>? Participate in and provide support to project design activities including development of project theories of change and strategic frameworks; Conducting program analysis or special studies, Supporting or leading evaluation teams.</p>	<p>? Implement monitoring systems and designing monitoring tools</p> <p>? Develop data collection tools</p> <p>? Monitor project activities, outputs and progress towards anticipated results</p> <p>? Work with data platforms, databases and select technologies to capture and organize data</p> <p>? Member of the project Steering Committee</p> <p>? Program analysis and special studies to be done in a gender responsive manner as well as to ensure that there will be sex-disaggregated targets and gender-related indicators and results as part of the project monitoring and data collection etc.</p>
<i>The Association for the Development of the Region of Baga-sola, ADERBA</i>	<p>? Encourage and promote sustainable and profitable development by promoting local initiatives at local level</p> <p>? Establishment of the spirit of community solidarity and self-promotion;</p> <p>? Promote engagement of the population and their involvement in the socio-economic development process;</p> <p>? Contribute to the fight against ethnic and inter-community conflicts.</p>	<p>? Awareness raising on sustainable development issues;</p> <p>? Participate as a partner in reforestation and desertification control activities.</p>
<i>The National Agency of the Great Green Wall of Chad</i>	<p>? Implement activities contributing to the implementation of the Great Green Wall at National level</p> <p>? Support Institutional capacity building;</p> <p>? Strengthening of the financial resource mobilization strategy;</p> <p>? Development of the projects to be implemented by the Agency.</p>	<p>? Participate in the implementation of the project activities to fight desertification, to restore and enhance the potential of arid and semi-arid zones</p> <p>? Project steering committee</p> <p>? Cofinancing mobilization</p>

<i>Names</i>	<i>Mandates</i>	<i>Anticipated Roles in the Project</i>
- <i>National Agency for Rural Development (ANADER):</i>	<ul style="list-style-type: none"> ? Support the intensification and diversification of agricultural, animal, fishery and forestry production; ? Promote the agro-sylvo-pastoral and fisheries sectors and popularize the products resulting from research; ? Ensure the production and dissemination of agro-sylvo-pastoral and fisheries statistics; ? Support the formation, emergence and structuring of organizations of rural producers; ? Provide advisory support to organizations of rural producers in the area of ??management, upkeep and maintenance of works and agro-sylvo-pastoral and fisheries equipment 	<ul style="list-style-type: none"> ? Plays its role as its institutional mandate in support of the project
<i>Sakhal NGO</i>	<ul style="list-style-type: none"> ? Active in Rural Area and support communities in difficult situation 	<ul style="list-style-type: none"> ? Project potential partners to execute activities on the ground ? Support awareness raising on Oadis protection
<i>Local Associations/CBOs</i>	<ul style="list-style-type: none"> ? Organization of local communities ? Take lead on the local development activities involving local communities ? Sensitization ? Represent local communities 	<ul style="list-style-type: none"> ? Contribute to the awareness raising campaign ? Execute some activities at local level with involvement of local people
<i>Opinion Leaders and Traditional leaders</i>	<ul style="list-style-type: none"> ? Representation ? Contribute to awareness raising ? Facilitate local communities engagement 	<ul style="list-style-type: none"> ? Contribute to the awareness raising of the project activities ? Support involvement of local communities ? Contribute to Advocacy

<i>Names</i>	<i>Mandates</i>	<i>Anticipated Roles in the Project</i>
<i>Decentralized Administration</i>	<ul style="list-style-type: none"> ? Represent Government at Local Level ? Support policies implementation ? Contribute to awareness campaign 	<ul style="list-style-type: none"> ? Support project implementation at local level ? Represent Government interest in the project at local level
<i>Gender-related governmental agencies/CSO</i>	<ul style="list-style-type: none"> ? Define and guide gender related policies development and implementation 	<ul style="list-style-type: none"> ? They will have a role in the Project Steering Committee to oversee the implementation of the gender-related interventions and the achievement of gender-related results

As already mentioned, the project development process was deliberate about engaging different stakeholders to ensure interests of various stakeholders are taken into account. The table below summarises some of the points of engagement with stakeholders and findings themed around knowledge about climate change; the use and integrity of land; Wadi protection; and the solar pump and mini grid ? consistent with the development challenges and priorities in the project area, but also the focus of them project.

Knowledge about climate change: Regarding knowledge of the climate in three communes of Kanem, the survey showed that 83% of household respondents recognise that the climate is changing and know about the phenomenon while 17% expressed ignorance about it. The 83% indicated very strong heat in the dry season, very cold from December to the end of February, and rainfall disruptions during the rainy season. So far communities indicated the impacts of climate change on market gardening, rainfed and livestock activities ? pointing out to the drying up of crops, insufficient pasture, and difficulty in irrigation following the drop in the water table. In response to the impacts of climate change and the level of knowledge which informs choices and behaviour, beneficiaries identified training in knowledge building as critical in decision-making processes regarding agricultural activities. Beneficiaries further proposed solutions and built consensus around attenuating and adapting to the impacts of climate change through acquisition of motorized pumps, boreholes, reforestation, use of traditional wells, solar panels, among others.

Land: In the Kanem region, land that is exploited in the Ouadis is in the hands of owners or heirs of grandparents, parents, grandsons and husbands. About 83% of communities engaged during the assessment confirmed that they live and use the Ouadis that they own, confirming some level of tenure security which is an enabling environment for project success. Regarding women in relation to the possession of Ouadis, out of the 28/30 women surveyed own Ouadis by inheritance from grandparents, parents, grandsons and husbands; which gives a percentage of 93.33% of possession of the Ouadis against 6.66% of non-possession. Therefore, it must be said that women are very involved in the activities of the Ouadis.

In Kanem, those responsible for the Ouadis/lands are, among others, the village chiefs, the sultan, the heirs and the chief of the Ouadis. According to the survey, 22 out of 30 people or 73.33% declare that the responsibility for the land belongs to the village chief and 8 out of 30 or 26.66% belongs to the sultan, heir and chief of the Ouadis. This shows that the appropriation of Ouadis / land is difficult for a non-natives, but it should be noted that the chief does not have full power to grant Ouadis to whomever he wants but plays an administrative role. In conclusion, the heritage of the Ouadis is transmitted from generation to generation. For the destination of women's products, 27 out of 30 or 90% is directed in most cases to markets for consumption by the population. This shows that the conservation of market garden products poses a problem. This is why out of the 30 households surveyed, 3/30 keep their products intended for household consumption. So it is important that in this project, the aspect of conservation and processing are well developed to allow women to export their products to other provinces for a good market.

Regarding the management of women's receipts, out of 23/30 or 76.66% of households, declared that it is they themselves who manage the receipts from the sales of their products, on the other hand, 7/30 or 23, 33% say that the receipts for their products are managed by the groups, cooperatives and their husbands.

The usefulness of the receipt of women's products is manifested in the purchase of production materials, seeds, treatment products to carry out the activities well without forgetting the schooling of children, medical care, clothing and consumption. Thus out of the 25/30 or 83.33% surveyed, 5/30 of the women did not react in relation to the usefulness and probably it would be the husbands who answered 16.66%. For this new project that is coming, women are becoming essential partners for the success of the project.

Ouadi protection: In the three communes of Kanem, it is useful to know that the traditional protection of the Ouadis has always existed. This is why the survey revealed that 29/30 or 96.66% protect the Ouadis and on the other hand 1/30 or 3.33% declare that they do not protect the Ouadis. Traditional protection is marked by the construction of dead hedges, thorny fences and the sowing of seeds of certain tree species. This project will therefore build and amplify traditional practices by proposing land conservation measures that are consistent with traditional practices. Communities highlighted measures that are consistent with the use of fences and hedges, among others for the protection and the fight against siltation within the Ouadis.

These living hedges will be maintained by the beneficiaries of the sites. This protection of the Ouadis is a pledge of protection of the cultures and protection of the Ouadis and therefore gives the success of the project. Regarding the production of seedlings, 29/30 or 96.66% declared that they know how to produce seedlings for the protection of the Ouadis against 1/30 or 3.33% who do not know. With this project, the beneficiaries

will be strongly trained in the production of seedlings (*Senegal acacias*, *jujube*, *prosopus*, *acacias albida* and others for the restoration, protection of the Ouadis and the fight against silting. These activities will be carried out by the beneficiaries of the Ouadis themselves with support from project technicians, thus reducing greenhouse gas emissions.

From the point of view of training on seedling production, the survey showed that out of 30/30 or 100% say they are ready to take part in training on seedling production techniques. This shows the enthusiasm of the beneficiaries for the production of plants. The project will ride on the enthusiasm to provide the beneficiaries with technicians for their training. Thus they will better master the different techniques of production of the plants. They will take ownership of this action for the rest of the project.

On the side of the maintenance of the plants, 30/30 or 100% of the respondents testify that they are close to the maintenance of the plants. After the training on the production of the plants, it is the phase of planting and maintenance. This operation will be carried out by the beneficiaries themselves, supported by project technicians. They will dig holes followed by burying the plants. Maintenance consists of watering the plants three times a week (cf. Plant monitoring sheet) and removing weeds. They will plant its seedlings inside and around the fence, in the Ouadis for restoration, protection and the fight against sand encroachment. If its activities are carried out well, the project will be 100% successful.

Solar pump and mini grid: 77% of surveyed community members against 23% indicated basic knowledge about solar pumps. This shows that most of the household know about the solar pump. This is critical, particularly regarding the sustainability of the project in terms of operational management, maintenance and handling of the solar pump. The project will further support the beneficiaries in their knowledge of the pump for irrigation and the mini-network through various training courses. According to communities, selected members within their communities with the ability to learn technical aspects of solar pumps will be requested to be trained in solar pump maintenance. This will help to keep the solar pumps working and thus benefiting communities but also the environment.

Communities exchanged about the management of pumps, and pointed to the pumps monitoring committee, the water towers committee and the technical committee for setting up crop plots in selected ouadis. Given this active local level institutional dynamics and development aspirations, the project's sustainability will be within the propitious environment. With its different organizations, there will be a good use of solar pump and mini network. Through its strategies, the pumps will be used wisely in favour of production. Additional sensitization will be required to accompany the process of pump installations in the villages so that communities develop shared values in the use and maintenance of the systems to support their production and link to water tanks which remain critical, particularly to provide water for domestic use but also domestic animals (goats, sheep, oxen, camels, poultry) which are necessary for the economy in the communes. This will allow women to organize the breeding of poultry, goats and sheep and donkeys. In the end the planting of trees is not the end, but rather a means. Therefore, solar pumps and water tanks have an important gender dimension to support giving women equitable access to socioeconomic opportunities and reverse some of the traditional practices that keep women at the peripheries of socioeconomic life in communities.

The engagement with stakeholders will remain an on-going process to ensure the built momentum during the project preparation is maintained through the project implementation process. The project will work towards ensuring that stakeholders in Chad and Kanem Province including those involved in wadi, natural resource management and the energy sector are actively engaged and exposed to appropriate SLM practices for wadi restoration as well as the use of solar energy.

It should be reminded that there are other stakeholders working in the same project areas. The stakeholders who provide support to producers in the project area are international NGOs and United Nations System institutions that support market gardeners in a humanitarian context. Under the impetus of the Technical and Financial Partners, the NGOs have chosen to be part of the dynamics of transition towards development. This dynamic was driven by the humanitarian community in 2017 through the new way of working (New Way of Working ? NWoW) which encourages development actors and the Government to coordinate to better articulate integrated programming and encourage humanitarian

interventions and coherent development plans in the same geographical areas so as to guarantee a continuum to maximize the impact of the available resources.

The donors who finance the projects in the project area are: the European Union, the French Development Agency, the German Ministry for Economic Cooperation and Development (BMZ), the World Food Program (WFP) and the USAID. These are tabulated as below:

Stakeholders in the project area	Communes	Areas
The World Food Program (WFP)	Mao, Kekedina, Nokou	Implementation of resilient projects through local NGOs in the Ouadis
The United Nations Food and Agriculture Fund (FAO)	Mao	Same
The International Organization for Migration (IOM)	Kekedena	Development of market gardening in the Ouadis for the benefit of returnees from Libya, Nigeria and CAR
SOS-Sahel	Mao, Nokou	Promotion of Mini Irrigation Networks with Solar Energy High Labor Intensity (HIMO)
FREXUS project of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	Mao Nokou Kekedena	Improving Security and Climate Resilience in a Fragile Context through the Water-Energy and Food Security Nexus
ACF France	Mao	Support for market gardening and livestock production
Association for Research and Development of Kanem (ARDEK)	Mao	Education Peaceful cohabitation Training
Association for Integrated Development in the Sahel (ADIS)	Mao	Education and Health
Association for the Economic and Social Development of the Lake (ADESOL)	Mao Kekedena Nokou	Resilience small irrigation Capacity Building

It should be reminded that the private structures will also be important stakeholders in the implementation of this project. These referred to the following tabulated:

Category	Stakeholder	Entity	Role description
Private/para-public sector	Private construction sector and design and control offices	Construction companies, subcontractors and control office	Implementation of infrastructure works. Monitoring and control of infrastructure works.
	Concessionaires or linear network operators	SNE, STE	Management of various networks.
	Input suppliers	local traders	Resellers of essential products for the production, processing and packaging (packaging) of the various products. They get their supplies in Cameroon and Sudan via N'Djamena or Ab'ch? with seeds, phytosanitary products, fertilizers, small tools, motor pumps and spare parts.
	Craftsmen	Ironworkers/masons/well drillers	Bring together men and women in the different trades that can support the sectors. These are ironworkers, masons, craftsmen drilling wells for agricultural use, blacksmiths, etc., who can contribute indirectly to the development of value chains.
	Seed producers	Seed growers federations	Producers and sales of certified seeds
transport union	Syndicate of Heavy Carriers of Kanem Province	Provincial Heavy Duty Carriers Union	Defending the interests of jumbo carriers Organ of solidarity and mutual aid between the members Defending the interests of carriers

Local authorities	<p>Commune of Mao, Central Kanem Department</p> <p>Municipality of Nokou, North Kanem Department</p> <p>Municipality of Kekedina</p>	Communes whose Ouadis are under their supervision	<p>Management of the local environment.</p> <p>Municipal planning and development.</p> <p>Economic and social development.</p> <p>Management of the environment and natural resources.</p> <p>Collection of fees on the communal perimeter.</p> <p>Social facilitation</p> <p>Issuance of civil status documents and legalization of deeds</p>
Civil society organizations	<p>Organizations</p> <p>Local government (NGOs) operating in the Ouadis in the 3 communes of Kanem Province;</p> <ol style="list-style-type: none"> 1. Ministry of Women and the Protection of Early Childhood 2. ARDEK 3. ADESOL 	Local associations, civil society organization working in the project intervention areas	<p>Provision of policy guidelines and guidance on government priorities for women and other vulnerable members of communities to strengthen gender-mainstreaming in the project.</p> <p>Defense of community interests.</p> <p>Organization of beneficiaries</p> <p>Intervention in the litigation management process.</p> <p>Support for the implementation of the communication plan and social support.</p> <p>Management of local community mobilization</p> <p>Raising awareness and building the capacity of beneficiaries</p>

local chiefdom	Village chiefs & Local dignitaries (Authorities nuns, notably)	village chiefs Imams	Allocation of land to be developed and signatories of memorandums for the allocation of land to landless households Intervention in the litigation management process. Management of the mobilization of local communities. Mobilization of the population Regulation of the smooth running of the process and the possible management of conflicts
Media	Radios, televisions and newspapers	Local radios, public and private televisions at the national level and written press at the national level	Dissemination of information in the Project area and beyond. Communication channels.
Project Leader	PMU	Project Management Unit	Coordination of the implementation of project activities in accordance with the required deadlines and arrangements Stakeholder information and involvement Assurance of compliance with commitments made in connection with stakeholders Ensures that the needs and interests of the populations are taken into account Ensure the transparency of the process Management and monitoring of the grievance mechanism

The outcomes of this project document, as alluded to, is a a product various iterations and interactions with different stakeholders who have been met at national and subnational levels.

Below are some lists of participants and photos at stakeholder engagement meetings:

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

Select what role civil society will play in the project:

Consulted only;

Member of Advisory Body; Contractor;

Co-financier;

Member of project steering committee or equivalent decision-making body; Yes

Executor or co-executor;

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

In general, some progress on women's rights has been achieved. However, work still needs to be done in Chad to achieve gender equality. A thematic study for this project confirms that the promotion of gender equality in Chad has made it possible to strengthen political and legal texts in recent years to better address gender and social inequalities, but the reality on the ground is far from respecting the texts in force.

Women's access to land is dependent on the agro-ecological zones which are regulated by customary rules, marital status and economic power. The main mode of access is the use of the family domain. In general, women have access to land but do not have control over it. They face challenges to access to polders and Ouadis that are owned by traditional chiefs and they have limited resources for off-season market gardening. They pay a fee to have the right to exploit spirulina.

Women are very often users of degraded agro-pastoral zones around Ouadis, for grazing small ruminants or for growing rainfed crops such as pearl millet. Ouadis areas and pastoral lands are under the control of male heads of households and clan leaders. Although they are the primary users, women do not have control over water and are little involved in fishing. They also have poor access to inputs, equipment and innovations. Yet, women account for 75% of production. In addition to domestic chores, they devote a significant portion of their time to production, processing and marketing activities. They are poorly represented in decision-making circles in the farming sector. Women are also poorly represented in local governance bodies such as traditional, administrative and military authorities, according to the Country Strategy Paper 2010-2014. However, one positive sign is the support of gender equity at the High Level of Government which will help to reverse the contextual situation.

One of the objectives of the project is to establish practices that promote gender equality in SLM activities. These activities must be formulated taking into account the social and cultural characteristics specific to the project intervention area, while bearing in mind the need to involve men and women equally. In Kanem, women are at the heart of natural resource management. Although men and women participate relatively equally in agricultural work, the harvesting and marketing of agricultural products is generally carried out by women. Since the project focuses on sustainable land management in the Ouadis, women constitute an important target group in its implementation.

Through the promotion of sustainable land management practices and improvement of the productivity of natural resources, the opportunities to secure and strengthen the economic, social and environmental advantages offered to women must be seized.

General gender analysis in the project area

In the project area, discrimination against women is visible in access to education, agricultural activities, animal resources, credit, primary health services and employment. The problem of gender inequality has been exacerbated in both private and public spheres. Gender-based violence (GBV) cases are rare in public in the project area, because they are not declared or sometimes women victims are forced into silence. On the other hand, the marriage of girls before the age of 15 is frequent, they are removed from the school system and undergo genital mutilation. Forced and early marriages are thus widespread practices despite national legislation prohibiting them. Furthermore, the precarious living conditions in the villages and the crisis of Boko Haram and returnees from Libya have led to the growing impoverishment of women following the destruction of the socio-economic fabric and the erosion of self-promotion or self-sustenance.

In the project intervention area, women are more numerous in the villages because of the strong male migration outside the province. Women fully assume household responsibilities as Head of Household in the absence of her husband. They are timid about getting involved in the management of household financial resources and rarely participate in training opportunities to build the capacities of their group outside of traditional gender norms. Social norms influence the attitude of men and confirm them in their role as the sole head of the family, which limits women's capacities to participate in decision-making. In community groups, although women seem to be involved in meetings on the needs of their village, their voices are rarely heard and they often have to enlist the support of their husbands to assert their needs and discuss them within the group. . In addition, although women are the main targets of the project, social norms limit the control they have over the outputs of many planned activities, such as access to cash/income, tools and seeds. Women may also lack the confidence and willingness to volunteer on committees and make meaningful contributions at meetings, while men are likely to dominate discussions and decision-making.

Illiteracy can also be seen as a determining factor for gender inequalities. These issues are relevant to the success of all activities related to improving access to cash, training, capacity building and functioning of representative committees in terms of increasing participation, representation and women's ability to get the most out of each activity. It has often been shown in development studies that women manage household income more effectively than men, which is a valid reason for targeting women for income-generating activities. However, this approach carries risks if women have no power over the money to which they have access. Worse still, if they try to play a bigger role in the use of this money, women often expose themselves to conflict or violence within the household. Other (cash) money risks, especially for female-headed households, include theft by robbers.

The lack of consideration of these gender-related risks can have a serious impact on the achievement of the results planned by the project. It is important to address gender in a transversal way throughout the management of the project, throughout the duration of the action, in order to ensure a lasting and quality impact. In terms of gender, the objective of the project is to ensure the active participation of women in all stages of the project while ensuring that their time is not too monopolized by these new activities so as to minimize the risks incurred. by women beneficiaries, to facilitate decision-making and to ensure a good understanding by men of the importance of women's participation.

The situation of socioeconomic inequalities in the project area

Production role: The main activity of women in the villages visited remains agriculture, which keeps them busy throughout the year. 98% of the women surveyed practice agriculture in addition to the animals they own and also process the products. The rainy season productions concern millet and maize, The dry season productions: are tomatoes, okra, and other vegetables produced in the Ouadis.

Access to land and its control by women farmers: The analysis shows that women produce various types of foods composed of cereals and vegetables often on smaller land areas. Agriculture is family-type, with a head of household who owns the land and the labor provided by family members: the head of the household, the wife or wives, young children (girls and boys). In the project area, land is managed by the Sultan of Kanem who delegates his powers to village chiefs. Discussions with women highlight two types of access to land; inheritance and loan.

Inheritance: It remains the most accessible mode of access for women. Often, when a father dies, his plots are redistributed to his heirs, daughters and sons. However, the girls inherit half of the surfaces bequeathed to the boys. Out of a total of 23 women who spoke on this issue, four (4) women said they had inherited the

plots on which they produce from their late father. The share which goes to the daughters in surface areas depends on the number of heirs. If the deceased left many children, the daughters can only receive a few square meters. If the inherited plot is too small, some women bequeath it to one of the brothers.

Loans: Some women farmers work on plots lent by close relatives, or sometimes by the village chief. The husband can also lend a plot to his wife who wishes to produce. This mode of access does not guarantee its control by women. In case of conflict with the husband, he can withdraw it. The village chief can lend unused plots to vulnerable women.

Access to agricultural equipment and inputs by women: Despite the advancement of technology, the agricultural tools most used by women remain the hoe, machete. There is poor access for women to agricultural tools because their plots are small and sometimes dispersed. This situation is caused in part by the invisibility of women's roles in agriculture.

The level of involvement of women in the various household productions: Agriculture in the project area is family-type, i.e. the labor is provided by the head of the household, the wives, children and other people living in the household. For married women or women from polygamous husbands, their working time is shared between the fields of their husbands. The help given to the husband by the women and their children concerns all agricultural operations (from sowing to harvesting).

Animal production: Women own animals, but in very small numbers. A few women present at the interview were kind enough to declare the animals they own. This figure remains to be clarified during fieldwork: The number of chickens is very negligible because they are decimated by Newcastle disease each year. Yet poultry and small ruminants play a very important socio-economic role within households. Livestock is an important source of income. Raising small ruminants and poultry, if well managed, can provide cash income for women and also be used to feed children with goat's or sheep's milk. Donkeys can relieve women in the transport of sometimes very heavy loads (fagot, straw, agricultural products, water for cooking) often carried on their heads and over long distances.

Access to training: Women farmers use their knowledge transmitted by their parents to continue to produce. However, despite the evolution of the context linked to climate change, very few women have benefited from training to help them strengthen their agricultural production strategies.

Control of income by women farmers: The social position of the man as head of household gives him the obligation to support his family: food, family health, education of children, maintenance of wives and other social expenses. . This overload of family expenses reduces her financial contribution to the well-being of the household and offers leeway to the wives who can decide on the use of the products from their fields. Faced with these multiple burdens, some heads of household prefer to leave the village in search of other employment opportunities in the neighboring towns of the province, N'Djamena or the south of the country. For polygamous households, the wife is obliged to provide for her children during the husband's absences (nights in the co-wives' homes).

Participation in decision-making: At the level of the monogamous household, the woman occupies an important place given her social responsibilities: maintenance of the house, of the children. She is consulted in family circumstances but the last word goes to the husband. At the local level, the interventions of public projects and institutions have contributed to changing mentalities. However, there are obstacles to women's participation in decision-making bodies. Men do not hesitate to prevent certain curious wives from taking part in meetings to discuss the development of the village. Women do not have access to information in the same way as men allowing them to seize the opportunities offered to them. Without information there is no development.

The level of structuring of women: The grassroots initiatives for the creation of women's organizations in the project area are diverse. In all the villages visited, women's groups exist, including unions of women's groups, but their number remains to be determined. The members of the group contribute in kind and cash in their fund.

Conditions for improving the situation of women in the project area ? the project's considerations

The project will align itself with positive steps that the government has been taking to close the gender gaps, particularly as detailed in the "Violence against women and girls and resilience links, impacts and perspectives from the Chadian context" reports which constitutes, one of the minimum standards in identifying gender inequalities in resilience programs is the analysis systematic aspects likely to be influenced by social norms and power dynamics . It is also necessary to take into account the differences between sex, age, ethnic origin or disability, to better anticipate social resistance and prevent negative reactions.

The goal will be to support women to participate significantly in decision-making in all groups set up by the project as well as during activities. Therefore, among others, efforts will be targeted at:

? Providing women and girls with knowledge, skills and tools - Women having access to training and capacity building opportunities tailored to their needs

? Strong understanding of the risks and vulnerabilities that women may face during the implementation of the project and implementation of a strategy to prevent and reduce its risks ? minimizing socioeconomic and cultural risks for all women who want to participate in the project.

? Integrating and implementing the gender transformative approach - having a wider impact within communities, the project will engage community leaders such as village chiefs, traditional structures? (traditional leaders for women and youth) and religious leaders. The report "Violence against women and girls and resilience links, impacts and perspectives from the Chadian context" explains that "the awareness of the authorities, in particular traditional leaders, for the dissemination of laws and to involve them in behavior change , given their nature in communities" is seen as a gateway to advancing equality in communities.

Gender dimensions of resource management and access to socioeconomic opportunities in Kanem region

Despite the many challenges associated with investing in sustainable management of natural resources, several factors favorably influence the adoption of appropriate and suitable measures among the different target groups. These factors also vary by individual and technology.

? *Favorable factors among female farm managers:* In some municipalities in the province, the possibility for women farm managers to inherit land use rights from their husbands (most often outside the zone for trade) or to have exploitation rights on family land (case of women living with a disabled person) is an important favorable factor for the adoption of SLM technologies. In any case, as long as it concerns family patrimony land, their rights of use are rarely called into question. In most cases, women heads of households, widows and women living alone (girls from the village who have returned for various reasons) are granted permanent rights of use on family land. The land dimension is therefore not an obstacle to investment in SLM for this category of women. In addition, the relatively small sizes of the lands they exploit (often less than 2 ha) combined with the state of degradation of these constitute factors likely to encourage the adoption of SLM technologies. The farms run by female heads of household are those where the spreading of organic manure obtained from the excreta of their sheep herd is regularly practiced. Faced with a lack of labour, these women devote themselves more to raising small ruminants and poultry to not only diversify their sources of income, but also to take advantage of animal waste for land improvement they exploit. They perceive the interest of SLM technologies. However, their lack of financial income constitutes a brake on investment in SLM measures, particularly with regard to the transport of manure. However, solidarity is strong among women producers and religious leaders pay particular attention to this.

a. *Favorable factors among women and young non-managers:* Young people can have crop plots within the family farm to cover their needs. Informal groupings make it possible to support the commitments of their members to invest in SLM. The same is true for women who invest a lot in market gardening on their husbands' fields. Their diversified source of income allows them to acquire small ruminants and dispose of animal waste for their crop plot. Then there are the groups which are means of building partnerships and access to agricultural inputs. In some cases, the groups also serve as a means of accessing small loans for their members from microfinance institutions.

Groups are also a means of more secure access to land for collective production. Among young people, informal self-help groups have great potential for the adoption of SLM technologies. These groups, which are formed on the basis of affinity, can be used to mobilize young people in collective development actions or on individual fields. In addition, these informal groupings are target groups for training in SLM technologies. Effective advisory support could enable these groups to access agricultural credit which would facilitate young people's investments in their individual fields.

b. *Favorable factors among agro-pastoralists:* Agro-pastoralists offer important examples of good SLM practices given the large number of their cattle herds (this varies between twenty and a hundred head in the area). The fact that they have their stables attached to their homes allows them to control the manure from the excreta of their livestock. With the manure thus protected from theft, agro-pastoralists are reassured to be able to spread it on their cropland. On these crop fields, millet or maize stalks are spread over almost the entire area of the farm. These good SLM practices illustrate the adherence of this category of the population to measures contributing to the improvement of the productivity of their farmland. However, the majority of these agro-pastoralists are forced to relocate part of their herds due to water limitations for watering and the disappearance of grazing areas. The development of a water point dedicated to the watering of livestock would allow breeders to take better advantage of the manure resulting from the excrement of their animals.

c. *Other factors favoring the adoption of SLM technologies:* Awareness of the state of land degradation and personal initiatives in SLM is the first favorable factor for the adoption of SLM measures. Awareness is manifested through endogenous local initiatives or introduced by agricultural extension services and projects/programs (manure spreading, crop rotation, etc.). Despite the shortcomings that may characterize these initiatives, they nevertheless remain benchmarks in SLM for local actors.

d. *Gender and agriculture:* It is important to know what services access to electricity can support and what benefits access to these services can generate. New water management technologies, such as solar-powered water pumps, can mitigate the risks associated with limited access to electricity in rural areas and the high cost of pumping groundwater, reduce emissions of greenhouse gases and translating the benefits of energy access into socio-economic outcomes, which cannot be achieved otherwise.

Unfortunately, due to factors related to limited access to credit or decision-making, women are worse off when it comes to adopting agricultural innovations. It is suggested to improve women's access to vital agricultural inputs that require intensive energy use, such as irrigation technology, which can significantly increase their productivity and farm income. In a broader sense, improving access to technology can enhance the impact of the availability of high-quality electricity supply on equality and poverty reduction, particularly if it is accompanied by the provision of access to other infrastructures or services.

Furthermore, the majority of businesses in the informal sector in Chad are owned and managed by women. Women are twice as likely as men to work in the informal sector, but face constraints in growing their business to sufficient scale.

e. *Gender issues in the context of energy poverty and rural development*: Diversification of energy sources is necessary to meet growing energy demand and to provide the following energy services: mechanical power for agriculture, water pumping and irrigation, cooking and lighting, communications and other utilities. Limited access to efficient and affordable energy sources, or lack thereof, limits opportunities for economic development in rural communities. Access to modern energy is however problematic in rural areas in Chad.

Men and women in rural areas experience the lack of access to energy differently. Women tend to diversify their choice of energy sources less than men. Female-headed households face systemic inequalities in access to resources, credit but also mobility, which also limits women's access to energy. Poor rural women generally have less time to invest in income generation due to their traditional household roles, but at the same time almost as many women as men identify themselves as the main breadwinners in the household and form the backbone of the rural economy.

Women often spend long hours collecting water, which is another chore traditionally done by women. These hours could be spent on other productive or income-generating activities or invested in education. However, access to sustainable, reliable and affordable energy services, as an alternative at the community level, has significant potential to reduce poverty in rural communities. The impact of access to energy services on equality and poverty reduction could be enhanced by better access to grants, credit, microfinance or other innovative financial solutions.

f. *Gender and energy projects*: Women in rural areas face particular barriers to accessing renewable energy technologies due to their relatively high level of poverty, lower access to credit due to limited access to land and water. other resources that can serve as a guarantee of a lower literacy rate or reduced access to information and mobility. When energy interventions involve women in project design and consider their broader participation, the potential for benefits is much higher for all.

The European Energy Initiative (EUEI) Partnership Dialogue Mechanism in cooperation with ENERGIA, the International Network on Gender and Sustainable Energy, has developed the Gender Briefing Notes *Supporting the active inclusion of women in energy and development projects*. The brochure highlights relevant gender dimensions in four thematic pillars: Energy Access, Renewable Energy, Biomass Energy and Energy Efficiency. The section on gender issues in renewable energy technologies and programs demonstrates that the productive use of energy in agriculture is a means to

quickly empower women and youth. The project will ride on lessons from these institutions to strengthen gender mainstreaming and women participation in the project.

g. *Gender and the nexus of agriculture and energy*: In its article 'Energy and agricultural technologies for the economic advancement of women?' (2012), the International Center for Research on Women (ICRW) argued that involving women in the development and distribution of a technology agriculture (based on renewable energy), which allows them to access and use this technology, generates a positive chain reaction with widespread results. This process opens up two main pathways to economic progress for women: 1) improving women's productivity in existing economic activities, and 2) creating new economic opportunities for women and youth. For example, technology that irrigates arable land, such as solar-powered irrigation systems, can improve crop yields and reduce the time women have to spend collecting water. To this end, female-headed households will be able to increase their net income through the use of solar-powered irrigation pumps.

Lessons learned from several experimental projects have shown that solar irrigation can have a positive impact on gender equality. In Chad, women make up more than 50% of the agricultural labor force, but they have less access to credit and formal banking services, which can be improved by a credit history from paying for solar water pumps by distribution. In the project area, the introduction of solar pumps for the irrigation of plots in the Ouadis constitutes a solution as recommended according to the result of the analysis carried out above.

The project will consider and build on the government's efforts to achieve gender equality in Chad and will actively promote women's empowerment in the project implementation, SLM and energy access. During the development process of the project, women have been met and been supported to be part of the conversation and prioritisation of project activities, including women support groups. The theory of change and the results framework have all taken into consideration gender dimensions informed by the gender thematic study. The results framework has included gender-responsive indicators to monitor women engagement in the project as beneficiaries but also as participants in the implementation of the project activities. The study has identified differentiated roles, capacity gaps and opportunities that affect land management across gender categories.



Figure 17: *Picture showing women involvement and participation in consultations for this project's*

The project will improve women's access to Ouadis for market gardening, etc. by negotiating with the traditional chiefs to release plots on new areas to be developed by women, so they can invest in and benefit from the yield of their own land. The project will support women participation on various Renewable Energy capacity building trainings that are planned as part of this project.

Grievance redress mechanisms

The project has an obligation of accountability to the communities it works with. Thus, in order to promote accountability, the project will place grassroots communities and stakeholders at the center of its action and improve the quality of the services it provides.

In order to meet this commitment, the project will put in place a mechanism that provides stakeholders with access to safe and suitable mechanisms for handling complaints. It will be:

? Consult village communities as a priority and other stakeholders involved in the implementation of the project on the design, implementation and monitoring of complaints management processes.

? Welcoming and registering complaints, but also providing information on how to access the mechanism and its scope.

? Manage complaints in a timely, fair and appropriate manner by prioritizing the safety of the complainant and those affected in all phases of complaint management.

The Complaints Mechanism: The main objective of a Grievance Redress Mechanism (GRM) is to help resolve complaints and grievances in a timely, effective and efficient manner that satisfies all parties involved. More specifically, it provides a transparent and credible process for fair, efficient and sustainable results. It also builds trust and cooperation as an integral component of broader community consultation that facilitates corrective action. Specifically, the GRM:

The Complaints Mechanism will be a formalized system that will give beneficiaries, communities, partners, staff, suppliers and other stakeholders access to safe means to express complaints in a secure and efficient manner, to ensure that the project is accountable for pledges and commitments in support.

Wherever possible, the Complaints Mechanism should build on existing structures and systems for handling complaints and resolving local disputes.

The system must be: participatory, secure, confidential, transparent and accessible and will be supported as far as possible by the following structures and means:

? The Management Committee: This mechanism has a central structure which is the Management Committee which will be put in place by the Coordinator of the PMU of the project. It will be composed of a minimum of three people and two substitutes including at least one who knows how to read and speak Arabic or French. The committee must also be mixed. Its focal points in the commune of Nokou and in the Sub-prefecture of Kekedina who will be responsible for processing, within the limits of their competences; and

? Complaints received and/or recorded through a range of methods used to collect complaints.

? *Complaint boxes:* Complaint boxes are strategically placed and in places decided by the community, erected next to an information board in each village, at a jointly accessible place which was decided by the community.

? *Phone numbers:* Its numbers are established to receive complaints by telephone, it can be the green lines (free) or paying.

? *Complaints collection sheets:* Staff will be provided with standard forms with them when they go to the field so that if anyone wants to make a complaint verbally, they can do so.

? *The Village Accountability Committee:* The community will choose a group of 5 representatives to form a Village Accountability Committee (VAC) where community members, if they wish, can lodge a complaint. The committee members will take note of it and communicate it to the organization. The committee must be mixed.

? *Help Desks:* During certain one-off activities such as distributions, assistance desks will have to be set up. This channel is very specific and temporary, but can be used by beneficiaries to lodge their complaints.

Complaints handling / management: Complaints collected are managed by the Complaints Management Committee which is already established. Complaints processed will be recorded in a database. Complaints can fall into one of three categories: valid and not sensitive, valid and sensitive / sensitive and invalid. The explanation of these categories is given in a separate document. Complaints should not be minimized. All complaints should be taken seriously but sensitive complaints should be handled with particular caution and confidentiality and immediate action. Sensitive complaints should be forwarded to the implementation coordination committee at the provincial level for guidance. After analysis and investigation (if necessary), the Complaints Management Committee will respond to each complainant who has submitted a complaint.

A good Complaint Management/Handling Mechanism will serve several purposes. First, it helps with transparency by creating a channel through which people can register their concerns. Second, it provides a mechanism for individuals to report acts of corruption and abuse of power by the organization or staff. Finally, it is a unique and invaluable source of information that should be used for better project management.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources; Yes

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women Yes

Does the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

According to the Chad Ministry of Agriculture[1], by most estimates, 80% of Chad's population relies on agriculture, livestock, or fishing. The market is primarily domestic, and Chad imports a significant number of foodstuffs from Cameroon. There is little value-added production of agricultural products. Chad's primary agricultural exports include gum arabic, sesame, and cotton. The Government of Chad prioritized industrialization of agriculture and boosting exports in its 2017 - 2021 national development plan to reduce dependence on oil exports and increase tax revenue. Chad exported USD 33.8 million of sesame seeds and USD 21.5 million of gum Arabic in 2019, according to the International Trade Centre. Other potential export crops include peanuts, shea butter, hibiscus, cashews, dates, moringa, and spirulina.

The Government of Chad and Chadian entrepreneurs seek to improve agricultural production in Chad through modernization, mechanization, better seeds, improved irrigation, and food processing and packaging. There is demand for agricultural equipment and inputs from both the government and private sector. Lack of access to capital is a constraint in this area. Chad is the second largest global producer of premium grade gum arabic. Chadian producers currently sell to intermediaries and wholesalers to export to the United States, China, and Europe. Producers are interested in exporting directly to the United States. Chadian partners seek relationships with U.S. importers to facilitate direct exports. Chad is one of the world's largest suppliers of sesame seed. White and black sesame seeds are grown in southern and central Chad. Other foods, e.g. mangos, cashews, peanuts, and dates, are widely grown in Chad but are not packaged, processed, or exported. This presents an opportunity for investment. There is a growing market for natural products from Chad. At least one U.S. company is exporting Chadian shea butter to the United States and China. There is small-scale production of moringa, spirulina, karaya gum, hibiscus, and other natural products. Chadian producers and intermediaries seek new markets for these goods, and there are opportunities for export and investment in value-added processing and packaging.

The socioeconomic study conducted in framework of the PPG, reveals that there is no established private sector in the Kanem region. The project will therefore work in promoting private individual to engage in value chains of Arabic Gum, spirulina production and other agricultural products. Transformation of animal products will be also engaged. The involvement of private sector partners in the project will ensure the financial viability and therefore rate of return of the projects. To date, the lack of involvement of private sector in operated mini-grids in the country has been the high up-front cost for non-capex investments such as licensing and design that are made higher with the remoteness of the sites, and the lack of adequate concessional terms from local financing. Local Bank lends at rates much higher than the expected returns. Achieving scale in a fragmented manner could be very challenging, as markets are relatively small and landlocked, with a limited availability of capital in a post-COVID context.

Working within these constraints, the proposed project will engage with private sector through the following stakeholders:

- o Agence pour le Développement de l'Électrification Rurale et de la Maîtrise de l'Énergie: It is not a private sector institution, but it helps to mobilize the private sector. It is an agency whose mission is to promote, and implement National Emergency Access Plan to Electricity, and mobilizing public-private initiatives in support of the plan.
- o Technology providers and potential investors. The private sector will lead in the design renewable energy systems to be established in the Kanem region as part of this project.
- o The Societe Nationale d'Electricite(SNE): The company has an ambitious objective of promoting mini-Grid Solar Energy in Remote areas of the country. Specific targets have been identified in the

National Energies Policies. The project will engage with the company for the promotion of the Solar Energy at rural level but also for the purchase of energy access that will be generated from the the min-Grid.

The project will help to explore public-private partnerships with local cooperatives? local investors/informal sector actors. Traditionally, public-private partnerships are considered from the dimension of attracting foreign investments alone. However, there is an opportunity to leverage them to mop-up local investments using the same dynamic of partnerships that is being explored for the power-purchase agreements. The government invests in delivering the capital infrastructure, which they also own, and then they transfer to beneficiary communities through their cooperatives, and these local communities are then responsible for operating and maintaining this infrastructure.

In terms of private sector engagement, the project will remain determined to work closely with the private sector in various ways, acknowledging that there is still a lot of room in Chad to improve the private sector in the country. The engagement strategy will therefore, be dynamic and consider the following aspects:

A private sector engagement plan in the agriculture and renewable sectors in Chad involves strategic actions to attract and involve private businesses and investors in these industries. Here are key components of such a plan:

- o *Continued engagement*: this will be critical to remain attuned with investment opportunities, market potential, and areas for private sector engagement as new products are brought on the market ? this will ensure informed and targeted areas of mutual interest for both the project and the private sector entities.

- o *Policy and regulatory framework*: Develop a favorable policy and regulatory environment that encourages private sector participation such as the power purchasing regime. This will include establishing clear rules, providing incentives, and addressing barriers to investment and business development in solar water pumping systems.

- o *Investment promotion*: Actively promote investment opportunities in agriculture and renewable sectors through targeted marketing campaigns, investment forums, and business matchmaking events. Engage with domestic and international investors to showcase the potential and benefits of investing in Chad in land rehabilitation and smart interventions in food production and water resources management.

- o *Public-Private Partnerships (PPPs)*: Foster partnerships between the public and private sectors to leverage resources, expertise, and technology. The project believes that PPPs can enhance agricultural value chains, support scaling up of renewable energy projects, and support sustainable business models in food production and water usage in the country.

- o *Capacity building and technical assistance*: Provide training, technical assistance, and business development support to local businesses and entrepreneurs but also communities and government agencies to strengthen their capacity to engage in the agriculture and renewable sectors, enhance competitiveness, and fosters innovation.

o *Access to finance*: The private sector engagement plan will also focus on developing dialogue platform to facilitate access to financing options for private sector actors through targeted loan programs, investment funds, and partnerships with financial institutions to support green investment in water management system. This might be an opportunity that can enable certain businesses to access the necessary capital for expansion and growth.

Through this consideration of private-sector engagement, the project will contribute to unlocking the potential of the agriculture and renewable sectors, stimulate economic growth, create employment opportunities, and promote sustainable development. This plan encourages innovation, investment, and collaboration between the public and private sectors, leading to a thriving and sustainable agricultural and renewable energy landscape in the country.

[1] International Trade Administration: <https://www.trade.gov/country-commercial-guides/chad-agricultural-sectors>

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Chad shares a number of challenges with the rest of countries within the Sahel region. Doing development projects in Chad, broadly speaking, has a number of risks which include the following:

- ? **Political Instability**: Chad has a history of political instability, characterized by frequent coup attempts and armed conflicts. This instability creates an unpredictable environment for development projects, as changes in leadership or outbreaks of violence can disrupt project implementation and increase security risks.
- ? **Weak Infrastructure**: Chad and particularly Kanem region has inadequate infrastructure, including limited road networks, unreliable power supply, and deficient water and sanitation systems. These deficiencies pose significant challenges for development projects, making transportation of goods and materials difficult, increasing operational costs, and hindering overall project effectiveness.
- ? **Economic Vulnerability**: Chad's economy heavily relies on oil exports, making it susceptible to price volatility and economic shocks. Fluctuations in oil prices can disrupt project funding and economic stability, leading to project delays or cancellations.
- ? **Climate Change and Environmental Risks**: Chad is vulnerable to climate change impacts, including desertification, droughts, and floods. These environmental risks can damage infrastructure, affect agricultural productivity, and displace communities, all of which can undermine development projects and exacerbate poverty and food insecurity.
- ? **Limited Human Capital**: Chad faces challenges related to limited human capital, including low literacy rates, inadequate access to quality education, and a shortage of skilled labor. This scarcity of human resources can impede project implementation, limit local capacity building efforts, and hinder the long-term sustainability of development initiatives.

Addressing these risks requires comprehensive strategies that promote political and governance processes at various levels; investing in critical infrastructure, invest in diversifying the economy, including rural economies that almost entirely depend on the exploitation of natural resources; building resilience to climate change, and strategic human capital development that prioritises key socioeconomic sectors. Some specific risks have been identified and together with mitigations measures are presented in the table below:

Component	Risks	Proposed Mitigation Measure	Risk level
Technical risks	The SLM practices adapted to the ecological situation of the project sites may not be well mastered by key stakeholders and The Solar water pumping based mini-grid technologies are not technically viable for electricity generation in rural areas	Detailed techno-economic feasibility studies to be carried out on identified sites in relation to the SLM and mini-grids established at proven sites. UNEP will use its portfolio experiences to mobilise expertise to build national capacities on SLM and Solar pumping system and renewable energy mini-Grid power distribution	High
Economic and financial risks	The SLM technologies and Solar water pumping mini-grids are not financially viable in rural areas.	The project will support initial investment to support cooperative to establish the system. Focus on private and cooperative led nurseries; productive uses powered by the energy produced, so that the seedlings produced and energy generated are used to create value/service for the communities women and men by the organized cooperative and/or private sector, which can spread the benefits to the communities.	Moderate

Market risks	<p>Increased investments on renewable energy based mini-grids do not provide high enough returns. Lack of funding for replicating the pilot projects.</p> <p>The surplus of solar energy generate is not purchase by possible the Societe Nationale d'Electricite (SNE)</p>	<p>Favoring the emergence of cooperatives and Involvement of private sector partners will ensure the financial viability and therefore rate of return of the projects. Also focus on providing energy for productive uses.</p> <p>Mobilize stakeholders? participation, especially IFIs and private sector, at an early stage and in the project implementation process.</p> <p>The project will develop the capacity of the cooperatives to manage energy surplus by finding local options to direct saling of power to local residents</p>	<p>Low</p> <p>Moderate</p>
Policy, regulatory and institutional framework	Policy and regulatory as well as institutional framework not in place	An energy policy and a renewable energy master plan both exist in Chad, and the institutional mechanism such as the Ministry of Energy, l'Agence pour le D?veloppement des Energies Renouvelables (ADER), l'Agence pour l'Energie Domestique et l'Environnement, l'Autorit? de r?gulation du secteur de l'nergie ?lectrique (ARSE) etc have been created.	Low
Safety disposl of/or recycling of solar panel	Safely disposal and/or recycling of solar panels is important for the project sustainability	The project will coordinate with the national child project in Chad of the Africa Mini-grid Project, which incorporates a provision for the safely disposal of solar panels. The two projects will work together to common up with a common approach for disposal/or recycling of Solar Panels. The two projects IA are already talking to each other on possible synergy and complementarity.	Low

Sustainability	Mechanical and biological ecological insfratstructures and Solar water pumping mini-grids plants do not follow sustainability principles	Detailed techno-economic studies and provision for productive uses in the beneficiary communities men and women, will ensure sustainability of the project. Adequate local structures including cooperative will be created/supported and their capacity built on sustainability approach to project activities. This sustainability approach will include also the disposal and or recycling of solar panels.	Low
Government fulfilment of its commitment on cofinancing	Insufficient budget stability from Government cofinancing entities	While this is a possible Risk, it is good to Note that the targeted cofinancing entities have autonomous management mode which escape from the Government budget instability. These entities have predictable resources even though the somehow military government situation may impose another style of management . However, the commitment of the Government to this GEF project will likely favor a smooth budget realease to cofinancing entities	Moderate

Internal political issues and fragility of communities	Chad is experiencing political instability since the Boko Haram sporadic invasion in Lake Chad Area. This has been exacerbated by the passing away of President Idriss Deby. The situation has also created fragility of the communities as result of armed conflicts	<p>The Chad GoV effort to overcome insecurity and significantly help to reduce the security risk in the project area. All the Kanem and in some extent the Lake regions have been freed from Boko Haram bandits and the presence of security personnel is a guarantee for sustain security in the region. The project has chosen the approach of making the Local Authorities (Governor, District Chief, Mayors) and Traditional Rulers (the Sultans and their delegated people in villages) as key project stakeholders. Recent mission by UNEP and Ministry of Environment has attested the commitment of these local authorities to support the project activities on the ground.</p> <p>The project will assess regularly the political and security situation including for the project team and comprehensive mitigation measures provided based on the assessment of the situation and guidance from local authorities and Country UN Security Adviser.</p>	Moderate
--	---	--	----------

Climate Change related risks

Chad is a country particularly vulnerable to climate change. The impacts are significant on the large hydrographic

systems, which are the Lake Chad and Niger basins, as well as on natural, agro-sylvo-pastoral, fishery and human systems. As temperatures rise and droughts increase in frequency and intensity, wetlands and river systems are increasingly at risk of evolving into other ecosystems, with plants being supplanted by other species and animals losing their habitat. The climate change challenges that have far-reaching impacts on its environment, economy, and society. Here are some major challenges:

- o Desertification: Chad is highly vulnerable to desertification, with a significant portion of its land already experiencing desert encroachment. Rising temperatures, decreased rainfall, and unsustainable land use practices contribute to the expansion of desert areas, leading to soil degradation, loss of vegetation, and reduced agricultural productivity.
- o Droughts and Water Scarcity: Chad regularly experiences droughts, which are exacerbated by climate change. These prolonged periods of water scarcity have severe consequences for agriculture, livestock, and access to clean drinking water. Reduced water availability hampers food production, heightens the risk of famine, and increases competition for resources, leading to social tensions and conflicts.
- o Flooding: Climate change also brings increased rainfall intensity and unpredictable weather patterns, leading to periodic flooding in Chad. Flooding damages infrastructure, destroys crops, displaces

communities, and spreads waterborne diseases. It disrupts livelihoods, undermines food security, and strains the limited resources of the country.

- o **Impact on Biodiversity:** Chad's unique biodiversity, including its diverse ecosystems and wildlife, is under threat from climate change. Changing habitats, loss of vegetation, and altered rainfall patterns directly affect the country's flora and fauna. The decline in biodiversity not only disrupts ecosystems but also impacts local communities that rely on natural resources for their livelihoods.

- o **Migration and Conflict:** The adverse impacts of climate change, such as droughts, desertification, and food insecurity, contribute to population displacement and migration. This displacement puts pressure on urban areas and neighboring countries, potentially leading to social tensions and conflicts over resources and livelihood opportunities.

Risk related to Local Conflicts and security issues including security of project team and partners in project site:

The Chad GoV had made effort to overcome insecurity. This had significantly help to reduce the security risk in the project area. All the Kanem and in some extent the Lake regions have been freed from Boka Haram bandits and the presence of security personnel is a guarantee for sustain security in the region. However, to ensure a long lasting mechanism for local conflicts management, the project will learn and apply with contextual adjustment, the Dimitra Clubs approach. The Dimitra clubs set up by FAO in Niger and Chad (Kanem Region) have enabled the affected populations to be better informed and to be able to communicate with the project. According to the sub-group discussions, they have strengthened social cohesion within the communities. Within these clubs, the organization by age group and affinity shows the ability of people to associate, create spaces for communication and reflect together on consensual solutions to face adversity. The theme of protection and conflict sensitivity has been widely discussed within Dimitra clubs, allowing everyone to express their experience of violence in this crisis. In ten months of operation of these Dimitra clubs in the four sites in Niger (Ch?timari, Boudouri, Guidan Kadji and Sayam) the communities themselves declared to be proud/satisfied with the various results generated by the actions they initiated and undertaken.

Given the success of the Dimitra clubs, it seems strategic to identify and set up mechanisms that allow the dissemination of these clubs at a lower cost and that are based on national technical and financial capacities. While the impact of clubs is positive at the local level, many conflicts still need to be resolved between communities. The establishment of clubs in a greater number of villages would make it possible to set up networks that could have an impact on other types of problems. Of particular importance for consideration in this approach, is the security of the project team and its partners. The role of the traditional leaders and opinion leaders will play an important role in strengthening the role of these Dimitra clubs and ensuring security of project team and partners.

Addressing these challenges requires both local and international efforts. These risks associated with climate change in Chad need to be addressed by focusing on sustainable land management practices, water conservation measures, and climate-resilient agriculture. Strengthening early warning systems, improving infrastructure, and promoting adaptive livelihood strategies can help communities cope with climate change impacts. Additionally, financial assistance, and knowledge sharing are crucial in assisting Chad in building resilience and mitigating the effects of climate change.

Based on the emission scenario RCP4.5, the graphs below show:

- o (A1): Temperature average over the reference period 2000-2020;
- o (A2): Projected change in temperature for 2031-2050 compared to the reference period 2000-2020;
- o A3: Regional climate model projections for temperature displayed as 20 year running mean. The line represents the ensemble mean while the shaded area represents the model spread;
- o B1: The precipitation sum over the reference period 2000-2020;
- o B2: Projected change in precipitation for 2031-2050 compared to the reference period 2000-2020; and
- o B3: Regional climate model projections for precipitation displayed as 20 year running mean. The line represents the ensemble mean while the shaded area represents the model spread.

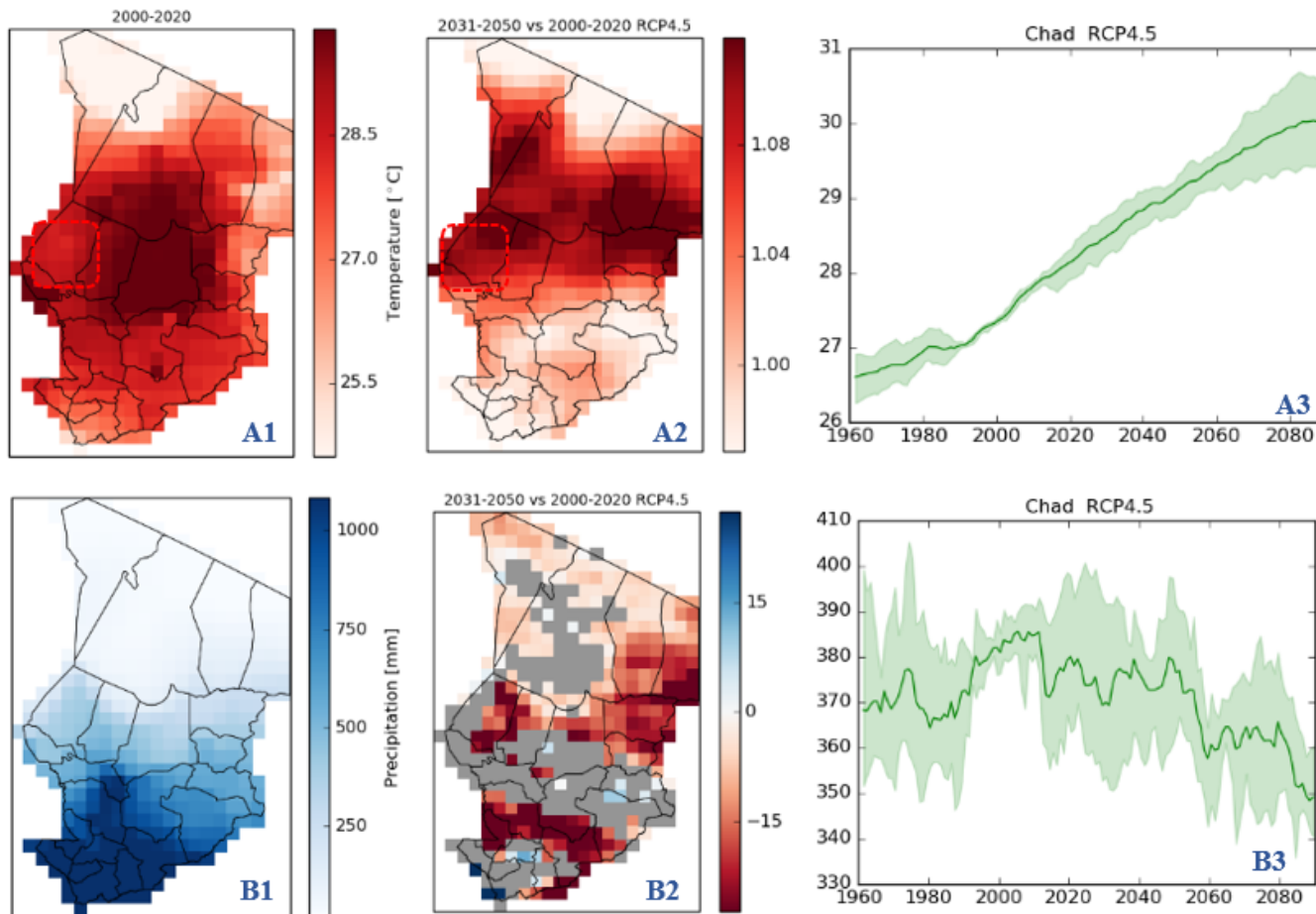


Figure 18: Historical and projected rainfall and temperature patterns

Overall, it can be deduced that temperature increase in the range of 1 to almost 1.1 is likely to be experienced between 2031 and 2050 in the upper regions of the country, particularly towards the north-east and north-west. On the precipitation front, some areas in the southern region and almost the entire zone in the north-east of the country are likely to experience a decrease in rainfall by at least 15mm.

Important impacts of climate change

o *Impacts on water resources:* Climate changes are having an impact on surface water resources, particularly through the drastic reduction in the water level of Lake Chad between 1966 and 1975, by 95%. Still facing major threats, its variability under climate change remains very uncertain. The country's other lakes were also severely affected by the droughts of the 1970s and 1980s, with Lake Fitri drying up completely in 1973 and 1984 as a result of a significant reduction in inflows. The country's two major rivers, the Chari and the Logone, also experienced marked variability in their hydrological regimes (the lowest modulus of the Chari, at N'Djamena, was 235 m³/s, recorded in 1984 and a clear downward trend). Current projections of water availability in Chad are fraught with a high degree of uncertainty under either GHG emission scenario. Considering population growth per capita, water availability? in Chad is projected to decline by 75 percent by 2080 relative to the year 2000 under both scenarios.

o *Impacts on agriculture and livestock:* Agriculture contributes 51.9% of GDP, 20% of which comes from food production and 3% from cash crops. The impacts of climate change on agriculture include decreases in yields and production (-10 to -25%) of food crops (millet, sorghum, maize), a regression of vegetation cover, and an expansion of cultivated land at the expense of forest land that may lead to irreversible deforestation in the long term. It is also noted that the distribution area of crop pests (plagues, diseases, etc.) is extended, which can lead to a decrease in agricultural production. Impacts are observed on the modalities of livestock transhumance with possible reductions in forage biomass with prolonged stays in the south and an evolution towards agro-pastoral systems.

o *Impacts on fishing and aquaculture Sector:* The fisheries and aquaculture sector represent 3% of GDP. Fish farming is still underdeveloped with only 156 tons of production in 2016; this represents a very small percentage of the total national fish production. However, fisheries and aquaculture are impacted by climate change through the loss of about 210,000 ha of spawning areas in the floodplains and swamps of the Chadian part of Lake Chad. Most of the known fish species in Chad are now threatened with extinction. There is also a loss of oxygen saturation that eliminates many fish species, especially in swamp water, and poor reproduction of many migratory species, including an important commercial species, the Salanga (*Alestes baremoze*), which recovers during years of good river flooding.

o *Impacts on ecosystem services:* Recurrent droughts and extensive desertification have contributed to the loss of biodiversity in Chad. Other impacts of climate change observed are related to the limitation of vegetation to lowlands, outwash plains and groundwater outcropping areas in the north, increased dieback of woody plants and soil cracking in the Sahelian zone. The Sudanian zone is experiencing a relative reduction in large trees. The disappearance of certain animal and plant species (especially aquatic species), the degradation of ecosystems and ecosystem services, especially wetlands and river systems, which are at risk of being transformed into other ecosystems, are also observed impacts. An increase in the risk of forest fires and bush fires has also been noted.

In a context of increasing desertification, insecurity and the loss of grazing land to expanding settlements, the southward migration of Chad's herders is causing tensions over land and water with local farmers. Chad is facing a resurgence of deadly communal conflicts between nomadic Arab herders and local farmers. Land use rights and access to water are the leading causes of these inter-communal clashes, especially during the arid and dry season, where water sources and pastures become very scarce. Farmers who do not allow cattle to graze in these areas are attacked by herders who destroy their fields and huts. Drought and desertification

degrade pastures, drying up many natural water sources and forcing large numbers of herders to migrate southward in search of grassland and water for their herds. These conflicts quickly escalate and aggravate relations among communities and clans. To prevent the crisis from escalating, national authorities should strengthen security for herders and farmers, implement conflict resolution mechanisms, promote social cohesion and guarantee herders and breeders access to land as well as ensure food self-sufficiency. There is also concern regarding the non-respect of transhumance corridors, by both farmers and herders, and the non-application of texts governing transhumance corridors by local authorities.

o *Impacts on Human health and nutrition sector:* Climate change poses significant threats to the health and nutrition sector due to the increased frequency of heat waves, floods, droughts and storms. Increased morbidity and mortality resulting from vector-borne and non-vector-borne tropical diseases (malaria, cholera, bacillary dysentery, measles, etc.) and water-related diseases (diarrhea and cholera). There are already more than 2.5 million cases of malaria, including 8,693 deaths in 2018. A significant increase in the number of cases of meningitis that largely corresponds to the Sahel region and is the site of the majority of meningitis epidemics. The effects of climatic shocks associated with conflict and migration exacerbate malnutrition (which is already chronic in 14 regions of Chad with a prevalence ranging from 40 to 64%). Projections of the share of the population affected by at least one heat wave per year show a sharp increase for the RCP6.0 scenario, from 2.5% in 2000 to 14% in 2080. In addition, for the same scenario, and the same baseline, heat-related mortality is likely to increase threefold, to 12 deaths per year per 100,000 inhabitants.

o *Impacts on infrastructures:* Human settlements and economic production sites, particularly in densely populated urban areas (such as N'Djamena, Moundou, or Sarh) are impacted by climate change. Makeshift dwellings are often built in unstable geographical locations, such as riverbanks, where flooding can result in the destruction of homes, water contamination, injury or death. The heavy floods of 1996, 1999, 2004, 2005, 2006, 2007 and 2008, 2010, 2016 affected the precarious neighborhoods of urban centers, leaving thousands of people homeless and homes destroyed in N'Djamena.

o *Impacts on the oasis ecosystem:* Climate change is expected to have a significant influence on the ecology and distribution of tropical ecosystems, though the magnitude, rate and direction of these changes are uncertain. With rising temperatures and increased frequency and intensity of droughts, wetlands and riverine systems are increasingly at risk of being converted to other ecosystems with plants being succeeded and animals losing habitats. Increased temperatures and droughts can also influence succession in forest systems while concurrently increasing the risk of invasive species, all of which affect ecosystems. With regards to tree cover, model projections vary depending on the scenario. Climate Model projection announce a variation for more or less of 2% in the tree cover in the south of the country by 2080. Although these results paint a rather positive picture for climate change impacts on tree cover, it is important to keep in mind that the model projections exclude any impacts on biodiversity loss from human activities such as land use, which have been responsible for significant losses of global biodiversity in the past, and are expected to remain its main driver in the future.[1] For example, population influxes in affected areas, need for pasture and agricultural land and logging have resulted in high rates of deforestation:[2] Chad has lost 1.54 million ha of forest cover in the period from 2001 to 2016, which is equivalent to a 25 % decrease.[3]

[1]IPBES, "Report of the Plenary of the Intergovernmental Science- Policy Platform on Biodiversity and Ecosystem Services on the Work of Its Seventh Session," n.p., 2019.

[2]FAO and UNHCR, "Rapid Woodfuel Assessment 2017 Baseline for the Area Around the City of Gor", Chad," Rome, Italy and Geneva, Switzerland, 2018.

[3] Global Forest Watch: [Chad](#).

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

As has been noted, the design of this project has benefitted from consultations with different stakeholders, including development partners. Thus, the proposed project will coordinate with the AfDB and the WB-funded programs described in the baseline. In terms of coordination, the project will continue holding discussions and meetings where ideas, lessons and knowledge exchange will be supported and promoted. In this regard, project exchange sessions and field visits will be used to create space for more focused coordination with other relevant GEF-financed projects and other initiatives. Thus, the project will coordinate with:

- **The World Bank/GEF project "Improved Natural Resource Management and Livelihoods for the Ouadi Rime and Ouadi Achim Communities":** The \$54.5 million project from the International Development Association (IDA) and the Global Environment Facility (GEF) project objective is to improve natural resource management and the livelihoods of the populations in climate-vulnerable areas in the Ouadi Rime and Ouadi Achim (OROA) Reserve in the central-north region of the Chadian Sahelo-Saharan zone. The project aims at improving the livelihoods of the communities while mitigating the impact of climate change. The project will also address the following constraints and issues: the lack of good practices on the sustainable use of natural resources, limited livelihood options for the most vulnerable communities, the vulnerability of communities to climate shocks, inadequate management of protected areas, and poor-quality access to water and sanitation. The UNEP/GEF project will coordinate with this project to learn from the natural resources good practices use, the livelihood options and access to water.
- **The UNDP/GEF Africa Mini Grid project**, notably by facilitating communication, generation and disseminating lessons learned, building on strengths and avoiding duplication. The two project will also work closely to develop common approach for the disposal/recycling of the solar panels.
- **The AfDB/GEF project Strengthening rural and urban resilience to climate change and variability by the provision of water supply and sanitation in Chad.** The project aims at Developing climate change resilience in the Chadian water sector by providing sustainable infrastructure and management tools to rural populations, and mainstreaming climate change risk and data at the national level;

- **The AfDB/GEF Chad child project LCB-NREE Integrated management of natural resources in the Chadian part of the Lake Chad basin.** The GEF project will address the underlying drivers of resource degradation, the functional integrity of ecosystems, and span the full array of natural assets needed in a Sahelian context
- The World Bank \$295 million grant from the International Development Association (IDA)* to help Chad expand its access to energy. The Chad Energy Access Scale Up Project (PAAET) approved in May 2022.
- the Djermaya Solar project
- Sahel Solaire Company: The company called Sahel Solaire is operating since 2019 and has started production of Solar Panels in the country and the region. The company will be engaged to establish working collaboration, including providing technical support but also quality assurance to the solar panels to be procured for this project.

Given the political context in Chad that is marred with security and safety concerns, coordination with other projects will offer a safe space for continuing to implement project activities; learning from the experiences of others to support adaptive management. Therefore, in the general project institutional arrangement, a virtual project coordination structure is embedded to support cross-learning and adaptive management.

The **Ministry of Environment, Fisheries and Sustainable Development (MEFSD), through the Agency for Domestic Energy and Environment, is the Executing Agency of the project.** The project will therefore, be anchored in MEFSD, and will be implemented by UNEP, as GEF Implementing Agency. MEFSD will be critical not just as a state institution with the mandate to support government development agenda, but also because MEFSD has the convening power to bring various stakeholders together around the objective of the project to support its achievement ? including advocacy for additional funds and or other resources from other players. Furthermore, MEFSD will ensure that the project remains consistent with and is implemented within the confines of government policies, regulations and guidelines. Similarly, as the Executing Agency of the project, MEFSD shall take responsibility to ensure that the project is implemented in accordance with the (a) agreement to be signed with UNEP ECOSYSTEMS DIVISION, (b) agreed objectives, activities and budget and deliver the outputs and demonstrate its best efforts in achieving the project outcomes. It shall also coordinate activities with the other key Government and other relevant partners and address and rectify any issues raised by UNEP with respect to project execution in a timely manner. As Executing Agency (EA), the Ministry is committed to make best use of project resources and implement the project in the most effective manner.

To oversee the day-to-day management of project activities, including providing operational support to project implementation, the project will have a Project Management Unit which will be completed embedded

in the Agency to ensure ownership and sustainability. The Agency will appoint a small number of staff and opportunity will be created for CSOs and CBOs for on-the-ground activities. This will be strongly considered as a sustainability mechanism for building local capacities but also to ensure ownership by non-state institutions ? a democratic mechanism of project implementation that creates space for active and unfettered participation and ownership of development projects beyond the spheres of influence of state institutions.

Additionally, given the possible security concerns in the project area, non-state actors will be critical in the implementation given their proximity to local communities and their understanding of local contexts. The project believes that this will improve service delivery, and lessen long drives between national structures and subnational level places where the project will be implemented.

The project has technical as well as administrative competence requirements. Therefore, the PMU will include relevant staff with capacity on Ouadis management as natural resources management specialist, gender-public inclusion specialist and an M&E officer to support monitoring and evaluation. The project will need the services of a Solar power management specialist. This one will not be full-time staff of the PMU, but the project will have an agreement with pump suppliers for services when needed. This will help the project to remain engaged with the private sector while also transferring technical pump operating skills to community members, particularly the youth.

In addition to a Management Unit, the project will also have a Project Steering Committee (PSC) to oversee the GEF project through provision of strategic technical oversight. Strategic monitoring of project activities will be the responsibility of the Project Steering Committee (PSC), which acts as the Project Orientation Board. The PSC will meet annually, or extraordinarily as may be warranted, in order to:

- o Provide overall guidance and ensure coordination between all parties;
- o Provide monitoring for project implementation;
- o Review and adopt the annual work plans and budgets prepared by the Project Coordinator and Chief Technical Advisor, in conformity with the project objective and subject to the rules of GEF and UNEP;
- o Review the six-monthly progress reports to be prepared by PMU and oversee the implementation of corrective actions, when necessary;
- o Enhance synergy between the GEF project and other initiatives being implemented in the project area; and
- o Provide advice on policy and strategic issues to be taken into account during project implementation.

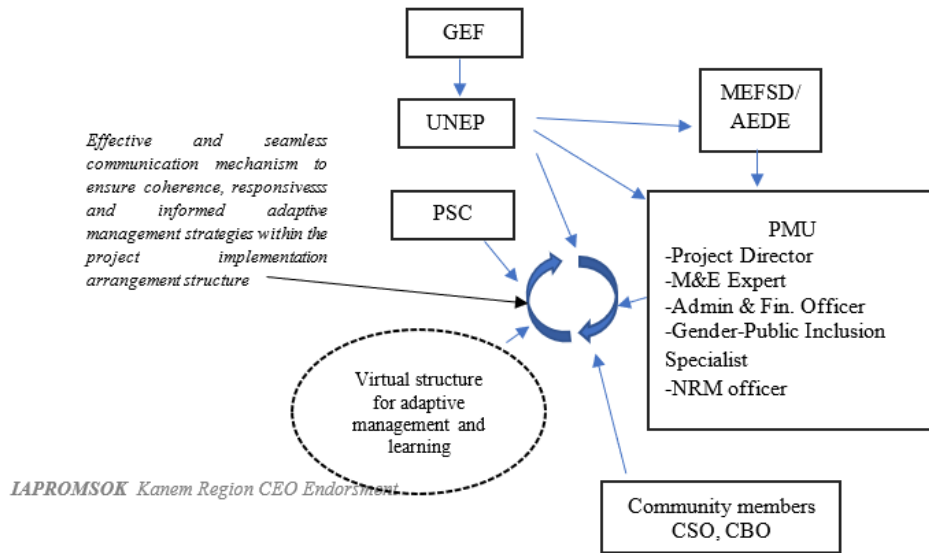
The members of the PSC will include:

- o Chair: the designated Senior Staff from the Ministry in charge of Environment
- o Co-Chair: UNEP ECOSYSTEMS DIVISION Task manager or mandated UNEP Official
- o Members: GEF Operational focal point and representatives of various ministries, in particular those in charge of the environment, forests, protected areas, agriculture, livestock, fisheries, mines, finance, spatial planning, land, Business women Association, tourism, Kanem state and non-state authorities, youth groups, representatives of indigenous communities and the differently-abled, scientific researchers. The specific roles within the PSC are based on the mandates assigned to each by the ministry.

The broad level of membership in the PSC highlights the democratic space of the project in its implementation that offers potential for sustainability, knowledge transfer, capacity development and project ownership. The Secretariat to the PSC will be provided by the Project Management Unit, and may be the Project Coordinator. As may be required on specific issues, an Advisory group can be formed to offer any other guidance or expertise as required by the specific agenda of the PSC.

UNEP ? through its GEF Task Manager (TM) and Funds Management Officer (FMO) - will monitor and supervise the implementation of the project, review progress in the realization of the project outputs, and ensure the proper use adequately of the GEF funds. The UNEP TM will be directly responsible among others for: (i) providing consistent and regular project oversight to ensure the achievement of project objectives; (ii) liaising between the project and the GEF Secretariat; (iii) ensuring that both GEF and UN Environment policy requirements and standards are applied and met (i.e. reporting obligations, technical, fiduciary, M&E); visibility through logos, stakeholders and gender participations (iv) approving budget revisions, certifying fund availability and transferring funds; (v) organizing mid- and end-term evaluations and reviewing project audits; (vi) providing technical, legal and administrative guidance if requested; and (vii) certifying project operational completion.

The structure summarises the proposed implementation arrangement of the project.



7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The issue of environment protection is enshrined in articles 47 and 52 of the Constitution of Chad, and Act N°014/PR/1998 defines the general principles for protecting the environment. In 1992, Chad signed the United Nations Framework Convention on Climate Change (UNFCCC), which was ratified on 30 April 1993. Since then, the country has produced the Initial and Second National Communications relating to climate change, in accordance with the relevant UNFCCC provisions. This demonstrates Chad's desire to make an effective contribution to the global effort to combat global warming, to which the country is highly vulnerable given the fragility of its ecosystems and its economy, which is highly dependent on sectors that are sensitive to climate change. The Project is supportive of the objectives of the UNFCCC, and with the commitments that Chad made for national GHG reductions. Chad has submitted its second Second National Communication (SNC) to the UNFCCC, and have made significant pledges to reduce GHG emissions in their Nationally Determined Contributions (NDC). Chad has identified the energy sector, including off-grid electrification, as one of their key priorities for achieving their emissions reduction targets set in their NDC. The project also support Land degradation Neutrality as outlined by Chad in its LDN targets, specifically: By 2040, restoring 1 738.8 km² of forest, and 29 000 km² of degraded zones.

The Government's main development priorities are embedded in "Vision 2030: The Chad we want", a strategic framework to be implemented through consecutive National development plans (NDP): beginning with the 2017-2021 NDP, and to be followed with two future NDP over the periods 2022-2026 and 2027-2030. The GEF Project is aligned with this Vision and is directly contributing to one of the four strategic axes of the Vision, which focuses on improving the Quality of Life of the Chad People, and include two (2) sub-axes: (i) a healthy environment with preserved natural resources; and (ii) an environment conducive to the flourishing and well-being of the Chad people. This project is also in alignment with the 2017-2021 NDP. Its aims to ensure the sustainable management of natural resources and implement policies to adapt to climate change. The main objective of the NDP that are in alignment with this project is that of achieving food security through investments in the rural agro-pastoral sectors. The main sectors relevant to this project are those of agriculture, livestock, water and the environment.

At the sectoral level, the project will contribute towards the implementation of national laws and decrees of Chad as follows:

- Decree n° 904 / pr / pm / merh / 2009 regulating pollution and nuisances to the environment. This Decree defines the rules relating to pollution and environmental nuisances, in accordance with Title V of Law No. 014 / PR / 98 of August 17, 1998. It aims to protect the environment against any form of degradation, alteration and its sustainable management, as well as the improvement of the framework and the living conditions of the population;
- Law n° 016 / PR / 99 for the Water Code: The Law covers inter alia special conditions for the collection, treatment, storage, supply of drinking water and sanitation; conditions surrounding the use of water; the approval mechanism for hydraulic works; and offenses and penalties for non-compliance. All water resources are a collective asset forming part of the public domain of the State and their exploitation is subject to declaration or authorization by the Ministry of Water.
- Law n° 014 / PR / 98 defining the general principles of environmental protection. This law establishes the fundamental principles for the sustainable management of the environment and its protection against all forms of degradation, in order to safeguard and develop natural resources and improve the living conditions of the population. This project is designed to respond to those challenges and help deliver on the Law's objectives for Chad's environmental well-being.
- The 2015 Environmental Education National strategy and its four Strategic Axis: Axis 1: Capacity building of institutional structures and stakeholders involved in Environmental Education (EE); Axis 2: Establishment of a coordination and collaboration framework for stakeholders involved in EE; Axis 3: Establishment of communication mechanisms in EE at all levels; and Axis 4: Promotion of scientific research in the field of the environment.
- The Chad's National Strategy to Combat Climate Change? NSCCCC, (2017). This NSCCCC aims for the sustainable and coherent integration of the challenges in Climate Change Adaptation and mitigation into national development policies as well as improving effective coordination of initiatives aimed at the fight against climate change. This project will support and promote good sustainable land management practices including agroforestry and other agricultural value chains, which will help boost soil quality and land productivity, while conserving and enhancing carbon stocks.

- The Chad's commitments under the UNFCCC, as detailed in the national communications to the UNFCCC (2001 and 2012), the National Adaptation Program of Action ? NAPA, (2009), its nationally determined contributions ? NDC (2015), and its National Adaptation Plan (NAP). Chad has identified the energy sector, including off-grid electrification, as one of their key priorities for achieving their emissions reduction targets set in their NDC. This alignment is therefore done through the focus on combating land degradation through promotion of SLM which will make use of Solar energy for pumping water for irrigation and use of the access in mini-grid system to support energy access for local communities. Concerning NAP: There at present no NAP for Chad and its development will be supported as part the UNDP/GEF project Chad National Adaptation Plan Project. This project will aim to also contribute to the NAP development process through increasing access to the socioeconomic and climate information concerning Ouadis ecosystems. It will provide knowledge of the land degradation dynamic in Ouadis ecosystems, and appropriate good restoration practices in Ouadis ecosystems, which may inform planning and policy making in climate-sensitive sectors as well as working to integrate medium and long-term climate considerations into planning and budgeting processes.

- The National Strategy on Water, Sanitation and Hygiene in the School Environment (2018-2030), which is to promote the adoption of good hygiene practices by students and their families. While the project will not specifically target sanitation improvements in schools, it will be closely relevant to the national strategy to improve sanitation to vulnerable youth, women and elderly as well as men. The project will aim to improve access to and efficiency in the use of water for multiple purposes. Improved access to water for multiple uses will be accessible to all without favoritism including school pupils

- The Chad's commitments under the United Nations Convention to Combat Desertification (UNCCD). Through the Land Degradation Neutrality (LDN) Target Setting Programme, Chad has set its LDN targets and the Government is committed to achieving LDN by 2040. This GEF project will directly contribute towards achieving the LDN targets, both at national level and sub national areas where project interventions are planned through promotion of good SLM practices applicable to Ouadis restoration/protection, Investment on high capacity solar water pumps to provide water for production systems which integrate good SLM practices and access to solar energy for multiple benefits, land Use Plans development and implementation in selected pilot Ouadis, and capacity strengthening of local communities cooperative legally created for management of infrastructure and community resources.

- The National Biodiversity Strategy and Action Plan (NBSAP) for Chad. The overall objective targeted through the Action Plan is to slow down in the short term the trend of loss of biological diversity and the degradation of its biotopes through sustainable participatory management strengthening current achievements. The specific objectives of the Action Plan include to: strengthen the conservation of ecosystems and endangered species and / or of marked importance; promote the sustainable use of biological resources of known or potential value; ensure a fair and equitable sharing of the benefits arising from the exploitation of biological resources (especially genetic). The project is aligned with the Strategy and Action Plan through the promotion of SLM techniques and approaches that will help reduce soil degradation and improve soil fertility, and preserve the integrity of Ouadis and its entire ecosystem.

o

- The project will contribute to Chad UNDAF 2017 ? 2023 on its Axe : 4 and outcome related to ?by 2023, the farmers, the pastoralist, fishermen, and small producers , particularly the youths and women of targeted regions use sustainable production models which allow them to respond to their need, to provide markets and adopt a lifestyle resilient to climate change and other environments challenges?. This project contribution will be reported to UN country Team through the Regional Office Focal Point on regular basis. Furthermore, the Project Task Manager will include in his supervision plan meetings with UNCT and the Coordination Team.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

IAPROMSOK recognises that knowledge management (KM) is critical for adaptive management but also sustainability. Therefore, the project will embed systematic collection, organization, analysis, and dissemination of information and experiences to support informed decision-making and learning during its implementation. In its approach to KM, IAPROMSOK will have the following considerations:

- o Knowledge sharing: The project will facilitate the exchange of knowledge and experiences among project stakeholders, including researchers, practitioners, communities, and policymakers. This will be done through workshops, trainings, conferences, and online platforms.
- o Documentation: The project will be capturing project activities, best practices, lessons learned, and research findings through documentation, reports, case studies, and project flyers. This documentation will ensure the retention and accessibility of project knowledge.
- o Knowledge integration: The project will have space for integrating scientific knowledge from solar pump installations, local knowledge, and community perspectives to develop context-specific and evidence-based strategies for land rehabilitation and climate change adaptation in the Kanem region.
- o Monitoring and Evaluation: The project will be conducting monitoring and evaluation exercise to assess the project's progress, measure outcomes, and identify areas for improvement. This will help in identifying successful practices and determining the effectiveness of interventions.
- o Capacity building: The project will promoting capacity building activities (this will be particularly important and directly relevant to the use and fixing of solar pumps) to enhance the skills and knowledge of project stakeholders in land rehabilitation, climate change adaptation, and sustainable resource management.
- o Communication: When the projects kicks off, a communication plan will be developed which will be implemented during the project period. The communication strategy and activities will consider the specificity of the Ouadis ecosystem and the particularity of Kanem region.

Overall, the KM approach will include developing synergies and networking with similar projects in the country and the region, and also by sharing important lessons generated by the project itself with the participating institutions and associated projects. UNEP as implementing agency will play a key role by promoting interaction between the project and similar initiatives in the region. The KM of this project will build on, learn from, the UNDP Africa Mini Grid Project as well as on other projetcs outlines in the baseline. The KM of this project will also provide targeted technical assistance to potential entrepreneurs in Renewables energy to increase stakeholder knowledge on design and operations of mini grid projects.

Finally, it will establish mechanisms for assimilating, documenting and sharing knowledge gained through project experiences. KM instruments such as knowledge products, Community of Practice, KM Platform, exchanges and field visits, online learning events, learning and training workshops will promote and strengthen sharing of lessons learned and best practices to support stakeholders in their efforts to operate mini grid projects. In order to enable the development of future replication and scaling-up plans, this project will promote a systematic approach in order to: (i) identify knowledge deemed to be relevant and valuable; (ii) capture and retain that knowledge; (iii) share that knowledge with key audiences; and (iv) design guidelines for future replication and upscaling. Furthermore, in development and designing of knowledge products, it will be included gender responsive approach in which the following principles will be considered:

- o Use male and female knowledge product, communication, and public education material developers for the diversity of perspectives and approaches, as well as male and female reviewers of these products.
- o Use gender-responsive language and gender-balanced images (women not presented as victims but as agents of change).
- o Check context and content (use gender analysis; use convincing gender arguments based on reliable sources and qualitative and quantitative data including sex-disaggregated data).
- o Refer to (inter-)national policy framework, policies, strategies, and plans, as applicable and appropriate.

It should be mentioned that through its KM, the project will optimize the impact of interventions, foster learning, and facilitate the replication and scaling up of successful practices. It enables evidence-based decision-making, supports adaptive management, and contributes to the long-term sustainability of the project's outcomes.

9. Monitoring and Evaluation

Describe the budgeted M and E plan

In line with the GEF Evaluation requirements and UNEP's Evaluation Policy, any project with a duration of 4 years or more will be subject to an independent Mid-Term Evaluation or management-led Mid-Term Review at mid-point.

All GEF funded projects are subject to a performance assessment when they reach operational completion. This performance assessment will be either an independent Terminal Evaluation or a management-led Terminal Review.

In case a Review is required, the UNEP Evaluation Office will provide tools, templates, and guidelines to support the Review consultant. For all Terminal Reviews, the UNEP Evaluation Office will perform a quality assessment of the Terminal Review report and validate the Review's performance ratings. This quality assessment will be attached as an Annex to the Terminal Review report, validated performance ratings will be captured in the main report.

However, if an independent Terminal Evaluation (TE) of the project is required, the Evaluation Office will be responsible for the entire evaluation process and will liaise with the Task Manager and the project implementing partners at key points during the evaluation. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results

and lessons learned among UNEP staff and implementing partners. The direct costs of the evaluation (or the management-led review) will be charged against the project evaluation budget.

The TE will typically be initiated after the project's operational completion. If a follow-on phase of the project is envisaged, the timing of the evaluation will be discussed with the Evaluation Office in relation to the submission of the follow-on proposal.

The draft TE report will be sent by the Evaluation Office to project stakeholders for comment. Formal comments on the report will be shared by the Evaluation Office in an open and transparent manner. The project performance will be assessed against standard evaluation criteria using a six-point rating scheme. The final determination of project ratings will be made by the Evaluation Office when the report is finalized. The evaluation report will be publicly disclosed and will be followed by a recommendation compliance process.

The evaluation recommendations will be entered into a Recommendations Implementation Plan template by the Evaluation Office. Formal submission of the completed Recommendations Implementation Plan by the Project Manager is required within one month of its delivery to the project team. The Evaluation Office will monitor compliance with this plan every six months for a total period of 12 months from the finalisation of the Recommendations Implementation Plan. The compliance performance against the recommendations is then reported to senior management on a six-monthly basis and to member States in the Biennial Evaluation Synthesis Report.

In its conducting of monitoring and evaluation, IAPROMSOK will follow standard processes and procedures for monitoring, reporting and evaluation. The conditions and reporting templates are an integral part of the related legal instruments that must be signed. The project monitoring and evaluation plan is in line with GEF monitoring and evaluation policy. The project outcome framework includes SMART indicators for each expected outcome as well as end-of-project objectives. These indicators in Results Framework constitute the main basis for the assessment of the progress accomplished in project implementation and determination of whether the project results are achieved or not. The monitoring-evaluation costs are also presented in the costed monitoring - evaluation plan and are fully integrated into the overall project budget. The monitoring - evaluation plan will be reviewed and revised as necessary during the project's launching workshop to ensure that the stakeholders understand their roles and responsibilities in the processes of monitoring and evaluation.

The proposed indicators and their means of verification will be reviewed and validated at the launching workshop. The project management team will manage the day-to-day monitoring of the project, but other project partners will be assigned to collect specific information allowing indicators monitoring, including engaging consultants where deemed necessary. The Project Coordinator will inform UNEP as the Implementing Agency of any delays or difficulties encountered during implementation so that appropriate support or corrective measures can be taken in a timely manner. The Project Steering Committee will periodically submit reports on progress achieved and make recommendations to Implementing Agencies on the need to revise any aspects of the outcomes in the framework or the monitoring - evaluation plan. Project supervisions to ensure the project's compliance with UNEP and GEF policies and procedures are assigned to the Task Manager of the Implementing Agency. The Task Manager will also review the quality of preliminary project results, provide feedback to project partners and establish peer review procedures to ensure adequate quality of the outputs and scientific and technical publications.

Project supervision will adopt an adaptive management approach. The Task Manager will develop a project supervision plan at the beginning of the project, which will be communicated to the project partners during

the launching workshop. The UNEP Task Manager will ensure the monitoring of outcomes as well as the financial management of the project and the implementation project activities. Progress made in achieving the overall environmental benefits of the project will be assessed with the Steering Committee at agreed intervals. Risks and assumptions of the project will be regularly monitored by the project partners and UNEP, as the Implementing Agency. Risk assessment and rating will be fully integrated in the project implementation review (PIR). The quality of project monitoring and evaluation will also be reviewed and rated in the framework of PIR. Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources. A mid-term review will be carried out at the end of the second year of the project, as indicated in the project stages. The review will include all the parameters recommended by GEF Evaluation Office for the final evaluations and verify the information collected through GEF monitoring tools, as appropriate.

The review will be conducted using a participatory approach. This will entail consulting the potential project beneficiaries or the parties affected by the project. These parties are identified during the review and mapping of stakeholders.

The project steering committee will be involved in the mid-term review and will prepare the management response to the recommendations of the evaluation as well as an implementation plan. Also, the Task Managers of Implementing Agencies will have the responsibility to monitor the implementation of agreed recommendations.

An independent final evaluation will take place at the end of the project implementation. UNEP Evaluation and Monitoring Unit will conduct the final evaluation process. A report on the quality of the evaluation report will be made by Evaluation Office of UNEP and submitted with the report to GEF Evaluation Office no later than six months after the end of the evaluation. GEF monitoring tools will be updated at mid-term and at the end of the project. These will be transmitted to GEF Secretariat along with the project's PIR report. As mentioned above, the mid-term review and the final evaluation will check the information provided by the monitoring tool. The evaluation report will be publicly disclosed and will be followed by a recommendation compliance process. The evaluation recommendations will be entered into a Recommendations Implementation Plan template by the Evaluation Office. Formal submission of the completed Recommendations Implementation Plan by the Project Manager is required within one month of its delivery to the project team. The Evaluation Office will monitor compliance with this plan every six months for a total period of 12 months from the finalisation of the Recommendations Implementation Plan. The compliance performance against the recommendations is then reported to senior management on a six-monthly basis and to member States in the Biennial Evaluation Synthesis Report.

Table of the budgeted M&E plan

Type of Monitoring & Evaluation activity	Responsible	Budget US\$ (Excluding project staff's time)	? Frequency
--	-------------	--	-------------

Project launching workshop	? Project Coordinator ? UNEP/ GEF ? AEDE	10,000	Within three months after project initiation
Preparation of the launching Report (initial report)	? M&E and Project Team ? UNEP ? AEDE	0	Immediately after launching workshop
Project M&E including Thorough gender-related results monitoring and reporting (M&E Officer and Gender Expert to take the lead)	? Gender Experts ? Steering Committee ? Project Coordinator ? Project teams ? PIR	60,000	Every year before annual progress report
Quarterly dashboard and periodic implementation monitoring reports	? Project Team ?	0	According to the periodicity of production
Annual progress reports and dissemination	? M&E and Project Coordinator ? UNEP / GEF	0	? Annually
Steering committee	? AEDE relevant Ministries ? UNEP/GEF ? Project Team ? CNEDD	30,000	Every year, after reception of the annual progress report
Mid-term evaluation of the project	? Project coordinator and M&E ? UNEP/GEF ? External evaluator	20,000	Midway of the project implementation

Final external evaluation of the project	? Project coordinator and M&E ? UNEP/GEF ? External evaluator	30,000	At the end of the Phase
Project closing report	? Project team and M&E ? AEDE/UNEP/GEF	0	Available at least one month before the end of the Phase
Field visits	? UNEP/GEF ? AEDE ? Governorate	0	Every year
? Total Indicative Costs		150,000	

It should be emphasized that consistent with the GEF Monitoring Policy[1] as well as the Evaluation Policy[2] requirements, during the process of the project monitoring, UNEP as the Implementing Agency, will duly engage with GEF Operational Focal Point in Chad.

Project Inception Phase

A Project Inception Workshop (IW) will be held within the first two (2) months of project start-up with the participation of the full project team, relevant counterparts, co-financing partners, and the UNEP Focal Point, as appropriate. A fundamental objective of the IW will be to help the project team to understand and take ownership of the project's goal and objectives, as well as finalize preparation of the project's first annual work plan on the basis of the project results framework and the GEF Tracking Tool. This will include reviewing the results framework (indicators, means of verification, and assumptions), imparting additional detail as needed, and on the basis of this exercise, finalizing the Annual Work Plan (AWP) with precise and measurable performance indicators, and in a manner consistent with the expected outcomes for the project. Specific targets for the first-year implementation progress indicators together with their means of verification will be developed at the inception workshop. These will be used to assess whether the implementation is proceeding at the intended pace and in the right direction and will form part of the Annual Work Plan.

Additionally, the purpose and objective of the IW will be to a) introduce project staff to project stakeholders that will support the project during its implementation; b) detail the roles, support services, and complementary responsibilities of UNEP staff in relation to the project team; c) provide a detailed overview of UNEP-GEF reporting and M&E requirements, with particular emphasis on the Annual Project Implementation Reviews (PIRs) and related documentation, the Annual Project Report (APR), mid-term review, final evaluation and financial reporting. Equally, the Inception Workshop will provide an opportunity to inform the project team on UNEP project-related budgetary planning, budget reviews including arrangements for the annual audit, and mandatory budget re-phrasings. The IW will also provide an opportunity for all parties to understand their roles, functions, and

responsibilities within the project's decision-making structures, including reporting and communication lines and conflict resolution mechanisms.

The Terms of Reference (ToRs) for project staff and decision-making structures will be discussed again, as needed, in order to clarify each party's responsibilities during the project's implementation phase. A report on the Inception Workshop is a key reference document and must be prepared and shared with participants.

Monitoring Responsibilities and Events

A detailed schedule of project review meetings will be developed by the project management in consultation with project implementation partners and stakeholder representatives and incorporated in the Project Inception Report. Such a schedule will include: a) tentative timeframes for Project Steering Committee meetings (and other relevant advisory and/or coordination mechanisms); and b) project-related M&E activities.

Day-to-day monitoring of implementation progress will be the responsibility of the Project Lead Technical Expert based on the project's Annual Work Plan and its indicators. The Project Director will inform the UNEP, on behalf of the Executing Agency of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely and remedial fashion. The Project Director will fine-tune the progress and performance/impact indicators of the project in consultation with the full project team at the IW with support from UNEP Task Manager.

At the inception workshop, specific targets for the first-year implementation progress indicators together with their means of verification will be developed. Targets and indicators for subsequent years will be defined annually as part of the internal evaluation and planning processes undertaken by the project team. Measurement of impact indicators related to global benefits will be done during the annual evaluation.

Periodic monitoring of implementation progress will be undertaken by the UNEP Task Manager through six-monthly exchanges with the project implementation team, or more frequently as deemed necessary. This will allow parties to take stock of and to troubleshoot any problems pertaining to the project in a timely fashion to ensure the timely implementation of project activities. The UNEP Task Manager, as appropriate, will conduct yearly visits to the project's field sites, or more often based on an agreed upon schedule to be detailed in the project's Inception Report/AWP to assess first-hand project progress. Any other member of the Steering Committee can also take part in these trips, as decided by the Steering Committee and as determined by project resources. A Field Visit Report will be prepared by the UNEP Task Manager and circulated no less than one month after the visit to the project team, all Steering Committee members, and UNEP-GEF.

Annual monitoring will occur through the Project Steering Committee (PSC) meetings. This is the highest policy-level meeting of the parties directly involved in the implementation of a project. The project will be subject to the Project Steering Committee meeting at least once every year.

The first such meeting will be held within the first twelve (12) months of the start of full implementation. The Project Lead Technical Expert will prepare an Annual Project Report (APR) and submit it to UNEP GEF Task Manager at least two weeks prior to the PSC for review and comments. The APR will be used as one of the basic documents for discussions Project Steering Committee meeting. The Project Lead Technical Expert will present the APR to the PSC, highlighting policy issues and recommendations for the decision of the PSC. The Project Lead Technical Expert will also inform the participants of any agreement reached by stakeholders during the APR preparation on how to resolve operational issues. Separate reviews of each project component may also be conducted if necessary. UNEP has the authority to suspend disbursement if project performance benchmarks are

not met. Benchmarks will be conveyed by UNEP to project stakeholders at the IW, based on delivery rates and qualitative assessments of achievements of outputs.

The Terminal PSC Review is held in the last month of project operations. The Project Lead Technical Expert with support of M&E Officer and guidance from UNEP is responsible for preparing the Terminal Report and submitting it to UNEP GEF. It shall be prepared in the draft at least two months in advance of the PSC meeting in order to allow review and will serve as the basis for discussions in the PSC meeting. The terminal PSC review considers the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It decides whether any actions are still necessary, particularly in relation to the sustainability of project results, and acts as a vehicle through which lessons learned can be captured to feed into other projects being implemented.

Project Monitoring Reporting

The Project Lead Technical Expert, with support from M&E officer and guidance from UNEP-GEF team, will be responsible for the preparation and submission of the following reports that form part of the monitoring process and that are mandatory.

- **A Project Inception Report (IR)** will be prepared immediately following the IW. It will include a detailed First Year/AWP divided in quarterly timeframes detailing the activities and progress indicators that will guide implementation during the first year of the project. This work plan will include the dates of specific field visits, support missions from the UNEP Task Manager or consultants, as well as timeframes for meetings of the project's decision-making structures. The IR will also include the detailed project budget for the first full year of implementation, prepared on the basis of the AWP, and including any M&E requirements to effectively measure project performance during the targeted 12-month timeframe. The IR will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions, and feedback mechanisms of project-related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation. When finalized, the IR will be circulated to project counterparts who will be given a period of one calendar month in which to respond with comments or queries. Prior to the IR's circulation, the UNEP/GEF will review the document.

- **The Annual Project Report (APR).** An APR will be prepared on an annual basis prior to the PSC Review, to reflect the progress achieved in meeting the project's AWP and assess performance of the project in contributing to intended outcomes through outputs and partnership work. The format of the APR is flexible but should include the following sections: a) project risks, issues, and adaptive management; b) project progress against pre-defined indicators and targets, c) outcome performance; and d) lessons learned/best practices.

- **The Project Implementation Review (PIR)** is an annual monitoring process mandated by the GEF. It has become an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from on-going projects. Once the project has been under implementation for one year, a PIR must be prepared by the project management and submitted by UNEP to the GEF. The PIR should then be discussed in the PSC meeting so that the result would be a PIR that has been agreed upon by the project counterparts and the UNEP. The individual PIRs are collected, reviewed, and analysed by the UNEP Operational Focal Point prior to sending them to the GEF by UNEP-GEF Coordination Office.

- **Half year (July-December) Progress Reports** outlining main updates in project progress will be provided every six months to the UNEP/GEF Task Manager. The January - June progress report stands as the PIR described above.

- **Specific Thematic Reports** focusing on specific issues or areas of activity will be prepared by the project team when requested by UNEP-GEF or the project implementing partners. The request for a Thematic Report will be provided to the project team in written form by UNEP and will clearly state

the issue or activities that need to be reported on. These reports can be used as a form of lessons learned exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered. UNEP is requested to minimize its requests for Thematic Reports, and when such are necessary will allow reasonable timeframes for their preparation by the project team.

• **A Project Terminal Report** will be prepared by the project team during the last three (3) months of the project. This comprehensive report will summarize all activities, achievements, and outputs of the project; lessons learned; objectives met or not achieved; structures and systems implemented, etc.; and will be the definitive statement of the project's activities during its lifetime. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's activities.

• **Publications/Technical reports.** The project intends to publish some documents covering specific themes. In the Inception Report, the project team will prepare a draft list of publications that are expected during the course of the project and tentative due dates. Where necessary, this publications list will be revised and updated, and included in subsequent APRs. Publications may also be prepared by external consultants and should be comprehensive and specialized analyses of clearly defined theme of research within the framework of the project. These publications will represent, as appropriate, the project's substantive contribution to specific issues, and will be used in efforts to disseminate relevant information at local, national, and international levels.

[1] GEF (2019). GEF Monitoring [Policy](#)

[2] GEF (2019). GEF Evaluation [Policy](#)

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The socioeconomic and environmental benefits have already been detailed in the section (section 5) regarding the global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF). In this section, they are recapitulated and reinforced. Generally, land rehabilitation and the use of solar water pumps offer significant environmental benefits to smallholder farmers and pastoral communities in Chad. Advantages include the following:

- o *Soil Conservation and Restoration:* Land rehabilitation practices, such as agroforestry that IAPROMSOK will support help prevent soil erosion, improve soil fertility, and restore degraded lands. This leads to increased agricultural productivity and resilience to climate change impacts.
- o *Water resource management:* Solar water pumps provide reliable and sustainable access to water for irrigation, reducing dependence on rainfall and minimizing water stress. Efficient water management through irrigation systems improves crop yields, enhances water use efficiency, and conserves water resources.
- o *Climate change mitigation:* Land rehabilitation practices and solar water pumps help mitigate climate change impacts. Restored lands sequester carbon dioxide from the atmosphere, acting as carbon sinks.

Solar-powered irrigation reduces reliance on fossil fuel-based pumps, lowering greenhouse gas emissions and promoting cleaner energy use.

- o *Sustainable land use*: By implementing land rehabilitation and utilizing solar water pumps, smallholder farmers and pastoral communities, the project will support farmers and herders to use and adopt sustainable land management practices. This will contribute to the long-term productivity of their lands, reduces land degradation, and promotes sustainable livelihoods.

As result of the above, the project wil contribute to *Biodiversity conservation*: Land rehabilitation efforts, coupled with sustainable water management, contribute to the preservation of biodiversity. Restored ecosystems in the target project region will be an important factor in improving habitats for flora and fauna, including beneficial insects and pollinators, thereby enhancing biodiversity conservation.⁸

Overall, land rehabilitation and the use of solar water pumps contribute to environmental sustainability, climate change adaptation, and ecosystem conservation in Chad. These practices support the resilience of agricultural systems, promote resource efficiency, and improve the overall well-being of smallholder farmers and pastoral communities while conserving the natural environment.

Within the specific context of this project, the following specific socioeconomic and environmental benefits will be generated:

- o It has been argued that one of the impacts of climate change in Chad is reduced access to natural resources such as fertile land, water and pasture, and this is undermining livelihoods of vulnerable people and communities in the Lake Chad region, which triggered recurrent conflicts.[1] As mentioned above, land rehabilitation and the use of solar water pumps offer significant environmental benefits, including reduction of the current trend of desertification, deforestation and forest degradation, and animal-human conflicts. The improve resource base will have positive spillover effects on human conflicts, given that resource-scarcity triggers conflicts;

- o 3,000 ha of Ouadis ecosystem protected using good SLM Practices that benefit both men and women. The project acknowledges that Numerous environmental, economic and social benefits are generated when degraded lands are restored. These benefits may range from conservation of ecosystems, creation of jobs, improvement in agricultural productivity;[2]

- o 20,544 t CO₂ emission avoided

- o 3,000 persons including 1500 men and 1500 women will benefit directly from the SLM activities and energy production.

- o Solar Energy Water Pumping - non connected mini grids systems to support women and men income generation activities

It should be noted that the project's interventions to restore ecosystems through sustainable land management practices are not only important for food security and improving local livelihoods in Chad, but will also help the country to progress towards the Sustainable Development Goals, in particular target 15.3: ?By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world? (UN General Assembly, **2015**).

[1] Ehiane et al. (2022). Climate Change, Human Insecurity and Conflict Dynamics in the Lake Chad Region. *Journal of Asian and African Studies*

[2] Wainaina et al. (2020). Cost-Benefit Analysis of Landscape Restoration: A Stocktake. *Journal of Land*

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification *

PIF	CEO Endorsement/Approva I	MTR	TE
Medium/Moderate	Medium/Moderate		

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted
SRIF_Chad Ouadis and MiniGrid_RS1223	CEO Endorsement ESS	
SRIF CHAD FSP Document	Project PIF ESS	

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

Project title: Innovative approach to protect ouadis through the promotion of non connected mini-grid solar energy in 3 municipalities (Mao, Kekedena and Nokou) of Kanem region-Chad (IAPROMSOK)						
	Indicator	Baseline	Mid term target	Project target	Verification sources	Risks and assumptions
Project objective: To protect the integrity and productivity of Ouadis ecosystems and ameliorate access to renewable energy through the use of the benefits of Solar Pumping systems in 3 Municipalities of Kanem region of Chad.						
Component 1: Restoration of degraded Oadis ecosystem through appropriate SLM gender-responsive practices						
Outcome 1.1. The ecosystem integrity of the Ouadis ecosystem is enhanced through the rehabilitation of 3000 ha degraded land	Number of hectares rehabilitated in three (3) Ouadis	None	1,500	3,000 ha	Project progress and evaluation reports, technical support missions, requests for no-objections	<ul style="list-style-type: none"> -Political stability and will and stakeholder engagement continue to support the implementation of IAPROMSOK - Government as a key stakeholder maintain their interest and engagement in the project, particularly in mobilizing different stakeholder and interest groups (including the private sector). -Established / strengthened capacities, are maintained to ensure knowledge exchange and sustainability.
	Number of Climate resilient Agricultural practices adopted	None	2	5		
	Number of female-headed households adopting Climate resilient Agricultural practices	None	150 households	300 households		
	Number of land use plans developed and implemented in ouadis	None	Consultant engaged and land use plan consultation processes concluded	3 plans		
	Number of ha under improved management and practices	None	1,250	2,500 ha		
Output 1.1.1: 3 Ouadis restored using 5 good gender-responsive SLM practices (mechanical control of sand dune, biological sand dunes fixation; drip irrigation technics, mulching; herbaceous seeding):						
1.1.2 Climate resilient Agricultural practices adopted						
1.1.3 Gender-responsive land use plans in at least 3 pilot ouadis developed and implemented using good SLM practices and solar energy						
Component 2: Investment to support local communities (men and women) access to solar energy for irrigation and economic benefits						

Project title: Innovative approach to protect ouadis through the promotion of non connected mini-grid solar energy in 3 municipalities (Mao, Kekedena and Nokou) of Kanem region-Chad (IAPROMSOK)						
	Indicator	Baseline	Mid term target	Project target	Verification sources	Risks and assumptions
Outcome 2.1 Investment in high capacity solar water pumps to provide water for both women and men production systems which integrate best SLM practices and access to solar energy for multiple benefits	Number of water pumps pieces of infrastructure	None			Project progress and Evaluation reports, technical support missions, actual report of developed water infrastructure, list of participants technical support missions	- COVID-19 will continue at bay so as not to disrupt the implementation of project activities -Availability of quality labour and materials for water infrastructure development. -Continued community engagement and buy-in in the project implementation process.
	Number of women and men-led households accessing solar energy for irrigation and economic benefits	None	i) 375 male-headed households ii) 375 female headed households	i) 750 male-headed households ii) 750 female-headed households		
	Number of direct beneficiaries disaggregated by gender	None in the context of IAPROMSOK	i) 750 male direct beneficiaries ii) 750 female direct beneficiaries	i) 1,500 male direct beneficiaries ii) 1,500 female direct beneficiaries		
2.2 Gender-responsive power purchase agreements enhance the participation and empowerment of women while aligning objectives between Cooperatives and the Societe Nationale d'Electricite (SNE)	Number of gender-responsive power purchase agreements negotiated and agreed upon	None	Processes initiated, including advanced stages of negotiations	3		
Output 2.1.1: Solar water pumps infrastructures to benefit both women and men (boreholes, Solar panels, Batteries, network of irrigation tapes) established in at least 3 pilot ouadis in 3 Municipalities of Kanem						
Output 2.1.2: Gender-responsive power purchase agreements are negotiated and agreed upon between the cooperatives and the Societe Nationale d'Electricite (SNE)						
Component 3: Establishment of long-term gender-responsive Knowledge management and monitoring system of Ouadis ecosystemsmen and women						

Project title: Innovative approach to protect ouadis through the promotion of non connected mini-grid solar energy in 3 municipalities (Mao, Kekedena and Nokou) of Kanem region-Chad (IAPROMSOK)						
	Indicator	Baseline	Mid term target	Project target	Verification sources	Risks and assumptions
Outcome 3.1 Men and women from Chad and Kanem region including those involved in ouadis, natural resources management and energy sector are actively engaged and exposed to the potential best SLM practices for Ouadis restoration and introduction of solar energy	Policy brief for SLM and Solar pumps	None	Consultant engaged and relevant literature review and consultations concluded	Policy brief concluded and launched	Project progress and evaluation reports, list of participants technical support missions	- COVID-19 at bay so as not to disrupt the implementation of project activities
	Guidelines for SLM and Solar pumps	None	Consultant engaged and relevant consultations concluded	Guidelines concluded, validated and used		- Awareness-raising campaigns and political will inspire action on policy brief recommendations, and trigger interest in the guidelines, knowledge products and data collection for the monitoring system.
	Number of knowledge products	None	3	6		-Capacity available to support technical assistance required
	Monitoring indicators	None	Consultant engaged and relevant consultations concluded	Monitoring indicators fully developed and piloted in the monitoring system		
	Monitoring system established	None	Consultant engaged and relevant consultations concluded	Monitoring indicators fully developed and piloted		
Output 3.1.1: Policy brief and guidelines to promote the use and scaling up of good SLM practices for Ouadis restoration and Solar water pumps developed and disseminated						
Output 3.1.2: Communication and knowledge products generated by the project and uploaded in a dedicated Portal on the project host website to facilitate access and disseminated at local, national and regional levels through different channels.						
Output 3.1.3: Gender-responsive indicators for monitoring impact of SLM practices and use of Solar pumps to restore Ouadis ecosystems and generate energy for mini-Grid developed and necessary data for monitoring regularly collected through a long term monitoring system						
3.1.4. Project is adequately monitored through a well gesnder responsive established monitoring and evaluation system						

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

STAP Comments

Part I: Project Information	Response		Responses at CEO
<p>STAP Overall Assessment and Rating</p>	<p>Minor issues to be considered during project design. This is a solid project proposal, which proposes an interesting and highly-innovative set of activities including implementing cutting-edge technology and applications to develop novel solutions. Through the use of solar mini-grids and sustainable land management (SLM) in sensitive ouadi ecosystems, this project aims to reduce carbon emissions while also providing ecological restoration benefits. The proponents have made a convincing case for the GEBs offered through low carbon electricity delivery in some of the remotest and least serviced parts of Africa.</p> <p>Our review identified a few areas that would benefit from minor and in some cases moderate revisions, mostly around language, phrasing and in a couple of cases (e.g. outline of components, list of stakeholders) also content. We have included a few recommendations with our comments for consideration by the design team and would be happy to engage in further discussions as needed.</p> <p>Overall, this project is well constructed. The proponents may consider the following key reading in making sure that lessons from past research in this arena can be better harnessed: Hassane, A.I., Didane, D.H., Tahir, A.M., Mouangue, R.M., Tamba, J.G., Hauglustaine, J.-M., 2022. Comparative Analysis of Hybrid Renewable Energy Systems for Off-Grid Applications in Chad. International</p>		<p>The STAP comments have well been noted and appreciated because they have helped to strengthen the overall quality of the project document, but also to sharpen the focus of the project. The comments and suggestions have been duly taken into account, and we believe that the current version sufficiently reflects the concerns that were raised.</p>
	<p>Journal of Renewable Energy Development 11, 49?62. (https://doi.org/10.14710/ijred.2022.39012)</p>		
<p>Part I: Project Information B. Indicative Project Description Summary</p>	<p>What STAP looks for</p>	<p>Response</p>	

Part I: Project Information	Response		Responses at CEO
Project Objective	Is the objective clearly defined, and consistently related to the problem diagnosis?	<p>Yes, the description of the objective is acceptable, although it could be rephrased to be clearer and easier to read. However, when compared with the description of the problem diagnosis, which is much clearer and better articulated it was more evident how the two are related. For clarity, it would be helpful for the proponent to find a consistent way to refer to solar energy throughout the document. In some cases, it refers to mini-grids but in others to solar pumps (for abstracting water) even where more extensive benefits of solar power are mentioned such as reduced use of biomass.</p>	<p>In concurrence with the recommendation, efforts have been made to clarify and maintain ?renewable mini grid system.?</p>

Part I: Project Information	Response		Responses at CEO
Project components	A brief description of the planned activities. Do these support the project's objectives?	<p>As a whole, the activities listed as part of the project components support the project objectives. However, we found the wording for component 1 to be slightly out of synch with the other components and the project objectives.</p> <p>STAP recommends that the phrasing for component 1 be revised to ensure that it is:</p> <ul style="list-style-type: none"> i) more focused on achieving a specific objective (i.e. the protection and/or restoration of aquatic ecosystems); ii) more consistent with the project objectives and the other components as well. 	<p>Following the STAP recommendation to recast component 1 to focus on ecosystem restoration, but also in response to other comments and the findings from thematic studies during project development process, the Theory of Change has been redone at CEO endorsement to reflect the new developments in the project. A narrative has been provided which we believe gives in sufficient details the context, the barriers and the pathway to achieve transformational change that reflects the project's objective</p>

Part I: Project Information	Response		Responses at CEO
Outcomes	<p>A description of the expected short-term and medium-term effects of an intervention.</p> <p>Do the planned outcomes encompass important adaptation benefits?</p>	<p>In line with what we observed in relation to the project components, we thought that the description for outcome 1.1. Could be improved to be more aligned with the project objectives. We also found that there was too much emphasis placed on gender issues across all outcomes, in some cases even at the expenses of setting clearer objectives, targets or outputs. Whilst we completely agree that gender issues are very important and crucial to the success of any program, it is also important that balance and proportionality are maintained throughout any proposal. STAP recommends that the outcomes be revised to ensure they are more balanced throughout and that enough emphasis is given to the full range of issues to be covered by</p>	<p>STAP comment well noted and appreciated. As noted above, component 1 has been rephrased as well as its outcome. Regarding the 'omnipresence' of gender, by including gender the way we have, the project underscores the criticality of gender in its context, and we believe that this level of inclusion does not overshadow other equally relevant aspects of the project.</p>

Part I: Project Information	Response		Responses at CEO
		this project, including of course gender issues.	
	Are the global environmental benefits/adaptation benefits likely to be generated?	The environmental benefits described in the proposal are likely to be realized if the project activities will be implemented as indicated therein.	Noted with thanks

Part I: Project Information	Response		Responses at CEO
Outputs	<p>A description of the products and services which are expected to result from the project.</p> <p>Is the sum of the outputs likely to contribute to the outcomes?</p>	<p>In most cases the description of the outputs was well matched with the outcomes. It is not clear just how critical the study of qadi dynamics (mentioned under output 1.1) is to the remainder of the project. There does seem to be other research on the ecohydrology of qadi ecosystems, so it is presumed that this study is to adapt SLM practices developed elsewhere to this particular area. As already observed in relation to the outcomes, we found that some of the outputs lacked in focus and could be improved to ensure they reflect the full breadth of activities that the project is planning to implement. The emphasis on gender issues should also be proportional to avoid giving a perception of tokenism. It is also difficult to</p>	<p>As noted above, component 1 has been revised and new aspects highlighted focused on ecosystem restoration. Consequently, outputs have equally been modified, including the information provided for barrier.</p>

Part I: Project Information	Response		Responses at CEO
		<p>differentiate the outputs of component 1 and component 3. For example, output 1.1 focuses on knowledge products and includes research projects on the dynamics of qadi ecosystems. At the same time outputs 3.1.2 and 3.1.3 refer to development of knowledge products and monitoring systems. It may be that the intention under Component 1 is to identify appropriate SLM practices and fine tune them through localized research, whereas Component 3 may intend to disseminate knowledge and include M&E for the implementation of the project.</p> <p>STAP recommends that these aspects of the project description be reviewed as the project develops to make this</p>	

Part I: Project Information	Response		Responses at CEO
		distinction clearer.	
Part II: Project justification	A simple narrative explaining the project?s logic, i.e. a theory of change.	-	-
1. Project description. Briefly describe: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description)	Is the problem statement well-defined?	Yes, the problem statement is clearly written and also very well defined. A range of issues were identified in the proposal and were clearly organized by category; they were also coherently linked as part of the overarching narrative.	Noted with thanks.

Part I: Project Information	Response		Responses at CEO
	<p>Are the barriers and threats well described, and substantiated by data and references?</p>	<p>The project proposal comprises a total of three barriers. Two of these (i.e. barrier 2 and 3) are well described and consistent with the rest of the proposal. On the other hand, the description for barrier 1 is less clear. It seems to cover some of the same issues as barrier 3 (use of appropriate SLM technologies) and reads more like a potential risk and does not match the narrative flow. STAP recommends that this be revised to ensure the language is consistent with the narrative used for the rest of the section.</p>	<p>Please, note response provided above regarding our response to STAP's comment to revise component 1 and associated barrier 1.</p>
	<p>For multiple focal area projects: does the problem statement and analysis identify the drivers of environmental degradation which need to be addressed through multiple focal areas; and is the objective welldefined, and can it only be supported by integrating two, or more focal areas objectives or programs?</p>	<p>Yes, the drivers of environmental degradation are clearly identified, and they match multiple focal areas.</p>	<p>Noted with thanks.</p>

Part I: Project Information	Response		Responses at CEO
2) the baseline scenario or any associated baseline projects	Is the baseline identified clearly?	Yes, the proposal identifies a total of fourteen ongoing initiatives, which were implemented and supported by a range of actors including the government of Chad, and multilateral donors such as WB and AfDB and the UN.	Noted with thanks
	Does it provide a feasible basis for quantifying the project's benefits?	Yes, the activities identified and described in the baseline provide a solid basis for quantifying the additional benefits that will accrued from implementing this project.	Noted with thanks

Part I: Project Information	Response		Responses at CEO
	<p>Is the baseline sufficiently robust to support the incremental (additional cost) reasoning for the project?</p>	<p>Yes, the baseline provides enough information about the existing needs and gaps to justify the additional investment to be made through this project. The current lack of investments in the region means that the status quo as summarized above will continue leading to: a) continued degradation, b) fragmentation and loss of ouadis ecosystems; the exacerbation social conflict and land disputes; c) reduced agricultural productivity. The additional GEF support will help rehabilitate and restore the landscape, increase socio-economic wellbeing, and limit the rate of carbon emissions from land use change.</p>	<p>Noted with thanks</p>

Part I: Project Information	Response		Responses at CEO
	<p>For multiple focal area projects: are the multiple baseline analyses presented (supported by data and references), and the multiple benefits specified, including the proposed indicators; are the lessons learned from similar or related past GEF and non-GEF interventions described; and how did these lessons inform the design of this project?</p>	<p>Yes, as already outlined the baseline includes initiatives that cover multiple focal areas (i.e. biodiversity, climate change and land degradation).</p>	<p>Noted with thanks</p>

Part I: Project Information	Response		Responses at CEO
3) the proposed alternative scenario with a brief description of expected outcomes and components of the project	What is the theory of change?	<p>The theory of change also lays forth barriers to implementation and how they could be overcome and overall, the project has considerable potential for replicability in other parts of Saharan Africa and other arid areas of the world. The TOC in essence argues that: if initial funding for solar mini-grids is provided, this will facilitate a move away from dependence on diesel generators and biomass; if communities are exposed to appropriate Sustainable Land Management technologies they will change their practices, reduce levels of degradation and restore degraded areas; and if appropriate knowledge systems are in place. Communities</p>	Noted with thanks. Given the change of component 1, the ToC has been modified to reflect this change.

Part I: Project Information	Response		Responses at CEO
	<p>What is the sequence of events (required or expected) that will lead to the desired outcomes?</p>	<p>In general, the sequence of events will lead to desired outcomes. In some places there seems to be a conflation of specific activities with intended outcomes, e.g. that the installation of solar pumps will benefit restoration. If the water will be used for restoration, this link should be made more clearly.</p>	<p>Comment noted with thanks. This link has been clarified by the text provided under the ToC.</p>
	<p>What is the set of linked activities, outputs, and outcomes to address the project's objectives?</p>	<p>-</p>	

Part I: Project Information	Response		Responses at CEO
	<p>Are the mechanisms of change plausible, and is there a well-informed identification of the underlying assumptions?</p>	<p>Yes, the ToC was quite comprehensive and well-constructed, it provided a good theoretical foundation for the project and included all elements that would be expected including a set of assumptions, barriers, challenges and drivers of change. Overall the ToC was one of the best we reviewed in this round of projects and a good example for other projects to follow.</p>	<p>Comment noted with thanks. Please, also see comment above indicating the modification of the ToC because of the modification of component 1.</p>
	<p>Is there a recognition of what adaptations may be required during project implementation to respond to changing conditions in pursuit of the targeted outcomes?</p>	<p>We found no direct references to this specific aspect, but it can be inferred reading the theory of change narrative. We are therefore satisfied that this requirement was adequately covered.</p>	<p>Noted with thanks</p>

Part I: Project Information	Response		Responses at CEO
5) incremental/additional cost reasoning and expected contributions from the baseline, the GEF trust fund, LDCF, SCCF, and cofinancing	GEF trust fund: will the proposed incremental activities lead to the delivery of global environmental benefits?	Yes, our assessment is that the successful implementation of project activities will lead to the realization of the environmental benefits listed in the proposal.	Noted with thanks
	LDCF/SCCF: will the proposed incremental activities lead to adaptation which reduces vulnerability, builds adaptive capacity, and increases resilience to climate change?	-	-
6) global environmental benefits (GEF trust fund) and/or adaptation benefits (LDCF/SCCF)	Are the benefits truly global environmental benefits/adaptation benefits, and are they measurable?	The environmental benefits listed in the proposal are for the most part measurable and include some that meet the criteria for GEBs. Out of these, the avoidance of a significant amount of CO ₂ emission is the most prominent. An additional benefit of ouadi restoration is that hydrological features that are so important for wildlife and human populations could also be better conserved.	Noted with thanks?information in the document has been provided that alludes to water level improvement because of restoration efforts.

Part I: Project Information	Response		Responses at CEO
	Is the scale of projected benefits both plausible and compelling in relation to the proposed investment?	Yes, the overall scale of projected benefits justifies the proposed investment which is not very large	Noted with thanks
	Are the global environmental benefits/adaptation benefits explicitly defined?	Yes, the proposed environmental benefits are explicitly defined and quantified where relevant.	Noted with thanks
	Are indicators, or methodologies, provided to demonstrate how the global environmental benefits/adaptation benefits will be measured and monitored during project implementation?	Yes, a set of indicators were provided to measure the results from the implementation of project activities.	Noted with thanks
	What activities will be implemented to increase the project's resilience to climate change?	-	-

Part I: Project Information	Response		Responses at CEO
7) innovative, sustainability and potential for scaling-up	Is the project innovative, for example, in its design, method of financing, technology, business model, policy, monitoring and evaluation, or learning?	<p>Yes, the very nature of the activities proposed, which is centered around combining the combating land degradation by making use of Solar energy for pumping water for irrigation and use of the access in mini-grid system to support energy access is still quite innovative and has only been implemented by a few international development agencies across the Global South.</p> <p>Therefore, this project is still relatively at the cutting edge of current practice.</p>	Noted with thanks

Part I: Project Information	Response		Responses at CEO
	<p>Is there a clearly-articulated vision of how the innovation will be scaled-up, for example, over time, across geographies, among institutional actors?</p>	<p>Yes, the proposal presents a clear vision of how to scale up activities, which is centered around the creation of a critical mass of market activities that will support broader replication of the systems for basic rural electrification in the country. Whether this aspiration can actually be realized, especially in view of the challenges currently affecting the energy sector in region, is another issue and entirely to be seen.</p>	<p>Noted with thanks</p>

Part I: Project Information	Response		Responses at CEO
	<p>Will incremental adaptation be required, or more fundamental transformational change to achieve long term sustainability?</p>	<p>Although the project builds on other initiatives and will therefore require some incremental adaptation of existing practices, it does also require more fundamental change. The adoption of good SLM practices will require local people to transform their current practices and it will require learning new technologies, e.g. the maintenance of solar power plants instead of diesel generators.</p>	<p>Comment noted with thanks. This has been acknowledged in the document, and capacity development to, for example, maintain solar pumps has been mentioned to be key, and will be supported by the project.</p>
<p>1b. Project Map and Coordinates. Please provide geo-referenced information and map where the project interventions will take place.</p>		-	

Part I: Project Information	Response		Responses at CEO
<p>2. Stakeholders. Select the stakeholders that have participated in consultations during the project identification phase: Indigenous people and local communities; Civil society organizations; Private sector entities. If none of the above, please explain why. In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement.</p>	<p>Have all the key relevant stakeholders been identified to cover the complexity of the problem, and project implementation barriers?</p>	<p>The proposed list of stakeholders includes partners from government agencies and civil society but seems to be missing actors from the private sector and academia, which could add significant value to the project. STAP recommends that the list of prospective stakeholders is revised to ensure that all relevant sectors are adequately represented and that the project is supported by a broad range of actors covering all aspects of society in Chad.</p>	<p>Extensive consultations have been had at national and subnational levels, and field/community visits conducted. These have been mentioned in the CEO endorsement document, complemented with a list of participants and photographs.</p>
	<p>What are the stakeholders' roles, and how will their combined roles contribute to robust project design, to achieving global environmental outcomes, and to lessons learned and knowledge?</p>	<p>-</p>	<p>-</p>

Part I: Project Information	Response		Responses at CEO
<p>3. Gender Equality and Women's Empowerment. Please briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis). Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes/no/tbd. If possible, indicate in which results area(s) the project is expected to contribute to gender equality: access to and control over resources; participation and decisionmaking; and/or economic benefits or services. Will the project's results framework or logical framework include gendersensitive indicators? yes/no/tbd</p>	<p>Have gender differentiated risks and opportunities been identified, and were preliminary response measures described that would address these differences?</p>	<p>Yes, the proposal includes a section on gender issues and this aspect has been referred to throughout the proposal and features prominently in all of the project components and most of the outcomes and outputs. The gender section of the proposal focused almost exclusively on land tenure issues and glazed over some of the more pervasive societal realities and risks that affect women in Chadian society (e.g. Chad has the world's third highest maternal mortality rate, as well as 25% literacy rate among women and girls), which in a way limited the scope of the description. However, the proposal also states that the project will conduct a gender analysis in the next stage of development, which among other things will identify and</p>	<p>As recommended, the ToRs have been included. Recognizing that there are various factors at play that keep women at the periphery of socioeconomic development and decision-making processes, the ToRs include experience in gender and public engagement among preferred experiences for the role.</p>

Part I: Project Information	Response		Responses at CEO
		<p>address differentiated roles, capacity gaps and opportunities that affect land management across gender categories.</p> <p>STAP recommends that the ToRs for the gender analysis be reviewed to ensure that they cover all aspects of gender related issues in Chadian society, how these may affect project activities and how the project activities may be used to improve the condition of women and girls across all areas identified as needing improvement.</p>	

Part I: Project Information	Response		Responses at CEO
	<p>Do gender considerations hinder full participation of an important stakeholder group (or groups)? If so, how will these obstacles be addressed?</p>	<p>Traditional values that are still predominant in Chadian society, which is articulated around approximately 25 traditional ethnic groups and is predominantly (Muslim 52.1%, Protestant 23.9% and Roman Catholic 20%). Societal norms will certainly pose challenges in this area, but the project is taking a robust approach to tackle any barriers and is directly aiming to improve women's access to Ouadis by negotiating with the traditional chiefs to release plots on new areas to be developed by women, so they can invest in and benefit from the yield of their own land. The project will also support women's participation in various Renewable Energy capacity building trainings.</p>	<p>Noted with thanks</p>

Part I: Project Information	Response		Responses at CEO
<p>5. Risks. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design</p>	<p>Are the identified risks valid and comprehensive? Are the risks specifically for things outside the project's control? Are there social and environmental risks which could affect the project? For climate risk, and climate resilience measures: ? -How will the project's objectives or outputs be affected by climate risks over the period 2020 to 2050, and have the impact of these risks been addressed adequately? ? -Has the sensitivity to climate change, and its impacts, been assessed? ? -Have resilience practices and measures to address projected climate risks and impacts been considered? How will these be dealt with? ? -What technical and institutional capacity, and information, will be needed to address climate risks and resilience enhancement measures?</p>	<p>The proposal includes a risk section, which is reasonably comprehensive but could be expanded to include additional risk categories such as: <i>operational risk, security and conflict, epidemic or pandemic outbreaks not limited to COVID 19</i> (the WHO is currently investigating an unusual outbreak of monkeypox, which is endemic of the region of Africa where Chad is located) and political support. Some of the descriptions for the proposed mitigation measures (i.e. technical risk, internal political risk and fragility) could also be improved and expanded to be more thorough and comprehensive. The proposal includes a very thorough and comprehensive section on climate change</p>	<p>Noted with thanks. Information has been included regarding the risks associated with operations, security and conflict. A check on monkeypox, including with government agencies did not yield any information that could be included as a risk.</p> <p>Additional information has been provided pointing to the potential impacts of climate change on water resources.</p>

Part I: Project Information	Response		Responses at CEO
		risks, which would be strengthened by including some analysis of possible impacts on groundwater recharge. Some studies suggest that groundwater recharge is diminished by poor rainfall and this may be important for the sustainability of solar water pumps.	
<p>6. Coordination. Outline the coordination with other relevant GEF-financed and other related initiatives</p>	<p>Are the project proponents tapping into relevant knowledge and learning generated by other projects, including GEF projects?</p>	<p>Yes, the project will draw upon five other projects implemented by the GEF, WB and AfDB. These include GEF child projects covering very similar areas of operations.</p>	<p>Noted with thanks.</p>
	<p>Is there adequate recognition of previous projects and the learning derived from them?</p>	<p>Yes, this aspect is adequately covered in the relevant section of the proposal.</p>	<p>Noted with thanks.</p>
	<p>Have specific lessons learned from previous projects been cited?</p>	<p>Yes, judging from the description provided in eth proposal it would appear that they have.</p>	<p>Noted with thanks.</p>

Part I: Project Information	Response		Responses at CEO
	How have these lessons informed the project's formulation?	We could see no direct references to this in the proposal, but from reading the information provided it would be reasonable to assume that there has been at least some level of influencing from learning made in previous projects.	Noted with thanks.
	Is there an adequate mechanism to feed the lessons learned from earlier projects into this project, and to share lessons learned from it into future projects?	Yes, some of the projects that were referred to in the baseline comments above will be used to disseminate good practice and feed lessons learned. Among these the UNDP/GEF Africa Mini Grid project was identified as a likely candidate.	Noted with thanks.

Part I: Project Information	Response		Responses at CEO
<p>8. Knowledge management. Outline the Knowledge Management Approach? for the project, and how it will contribute to the project's overall impact, including plans to learn from relevant projects, initiatives and evaluations.</p>	<p>What overall approach will be taken, and what knowledge management indicators and metrics will be used?</p>	<p>According to what was stated in the proposal, the knowledge management approach for this project will involve the development of synergies and networking with similar projects in the region, as well as sharing any lessons generated by this project with associated ones. UNEP who is the IA for this project will play a key role as a broker with similar initiatives in the region. The abovementioned UNDP-GEF Africa Mini-Grid Project will be one of them. The type of restoration and improved land management being proposed seems to offer an opportunity to integrate indigenous and local knowledge with good practice in SLM from elsewhere and it would be important to capture both elements in the knowledge management system.</p>	<p>Noted with thanks.</p>

Part I: Project Information	Response		Responses at CEO
	What plans are proposed for sharing, disseminating and scaling-up results, lessons and experience?	This will be arguably achieved through the deployment of KM instruments, as well as exchanges and field visits, online learning events, and learning and training workshops, which will be used to support the replication of mini-grid projects across the region.	Noted with thanks.

GEF Council comments

No	Comment	Response
Canada comments		
	The choice of solar energy to power the water pumping systems in Ouadis represents the most appropriate technological solution in the context of the GEF proposal. In addition, it reduces GHG emissions from fossil fuels in these communities and is an environmentally and economically attractive option for these communities.	Comment noted with thanks

No	Comment	Response
	<p>However, in the PIF document on p.36, it's mentioned that "out of the main 4 types (monocrystalline, polycrystalline, PERC, and thin-film) and the 2 standard sizes (60-cell and 72-cell) of the Solar Panels available on the markets the best type will be selected based on the expert's guidance and stakeholders needs". It would also be important to ensure transparency and traceability in the supply chains of solar panels due to the link with the use of forced labor in the solar panel industry in the Xinjiang region. The GEF Council should ensure that the implementing entity has sufficient mitigation actions in place to avoid the use of forced labour in its solar supply chain</p>	<p>Comment noted with thanks, and the project will remain consistent with labour laws as well as internationally established standards. Additionally, the project will remain consistent with Chad's National Referral Mechanism that outlines standard operating procedures for suspected cases of trafficking in persons, including those involving children. Furthermore, the project plans to favor Local Services providers when ever they are competitive in area of quality, cost and ethic observation. The Solar Sahel in Chad is anticipated to be on of the project Salar Pannel provider. This local purchase will allow the control of ethic and sustainable business model which will be a condition for partnership.</p>

No	Comment	Response
	<p>Also, it would be important for the initiative to mention the problem of waste management from renewable energy equipment (solar panel, batteries, etc.). Without imposing all responsibility for waste management on the implementing partner, an analysis of how this will play out in the near future would be an important point to raise</p>	<p>In response, a section on waste disposal in Chad has been introduced in the document. The waste to be generated by the project activities will carefully be assessed and legally agreed disposal options will be observed. The issue of project waste management is now an integral part of the project Environment Impact Assessment and mitigation measures of potential risks.</p>
	<p>Low productivity in the agricultural sector is one of the drivers for further land degradation, and the protection of productivity of the ecosystems is one of the key goals of the project. If possible, consider monitoring changes in agricultural productivity (either through SLM or solar-powered water pump system) and add an appropriate indicator e.g. a SDG indicator 2.3.1 Volume of production per labour unit by classes of farming / pastoral / forestry enterprise size (source: https://www.fao.org/sustainable-development-goals/indicators/231/en/)</p>	<p>The comment is well appreciated, and we see the value this recommendation would bring to the project. The project has now included in the costed M&E plan design and monitoring of indicators related to possible impact of project activities on agricultural and livestock production together with biophysical indicators including the biodiversity composition in the concerned ouadis .</p>

No	Comment	Response
	<p>What is the added value of the publication of one peer-reviewed article to the protection of Ouadis ecosystems (Component 1)? There are better forms of knowledge production and sharing (e.g. workshops, training, demonstration sites, etc.) than the publication in a scientific journal if its objective is to inform land use mapping and local people's decisions on their activities. The publication can be welcomed to anyone who wants to study and contribute to the development of scientific knowledge but the fund should focus more on innovating education and training for local people.</p>	<p>The component 1 has been recast to focus on ecosystem restoration as per STAP recommendation. The description and output have equally been redefined.</p>
Germany comments		
	<p>In general, the PIF does not sufficiently describe the link between solar energy water pumping and how it can address the issue of land degradation. It is implied that solar powered water pumping is intended to provide water for irrigation so that land can be sustainably managed to restore land and prevent deserts from spreading. However, many details of the proposed approach remain unclear. The co-benefits between solar water-pumping, food security and LDN should be described explicitly and in more detail.</p>	<p>Comment noted with thanks. Information has been provided under the Theory of Change that clarifies the link in question.</p>
	<p>Furthermore, the potential to align LDN targets and NDC targets to increase synergies in monitoring and reporting should be explored. A successful project approach shall include integrated planning for coordinated implementation of the UNCCD and the UNFCCC to ensure outputs that contribute to the achievement of multiple objectives regarding LDN, adaption to and mitigation of climate change.</p>	<p>As mentioned, additional information has been provided that points to how the project is positioned to support the country contribute to NDC and LDN goals.</p>
	<p>In addition, it shall be mentioned that by implementing LDN measures, carbon can be sequestered in soil and vegetation. An analysis of how SLM in the area contributes to lower greenhouse gas emissions could be included.</p>	<p>As recommended, this is mentioned in the document in the information provided under the Theory of Change. The project mitigation benefits has been viewed in the angle of emission avoided by using solar energy and carbon benefit as result of SLM activities based on the No of Ha to be restored.</p>
	<p>SLM ("Sustainable Land Management") is mentioned many times, but not specified. Please elaborate in more detail which SLM techniques shall be deployed</p>	<p>These are included in the document, and include agroforestry, soil conservation</p>

No	Comment	Response
	<p>The proposal also needs to take into account the PDP Kanem (Plan de Dvpt Regional) as well as the PDC (Plan de Dvpt Communal) of the targeted pilot communities.</p>	<p>Thank comment is very welcome and it is worth to mention that the existence of the referred planning tools have been indicated by local stakeholder. The stakeholders recommended that these regional and District Development Plan use serve as the entry points for the land use planning to focus updating to mainstream SLM and environment conservation instead of embarking in a new process. Output 1.1.3 has been amended to consider this direction.</p>

No	Comment	Response
	<p>UNDP must inform the Comit? Provincial d?Action (CPA) about the project measures planned and undertaken in Kanem Province to allow for the coordination of different humanitarian and development actors.</p>	<p>We assume, the reviewer is referring the GEF Agency and this case it is UNEP, not UNDP.</p> <p>During the PPG phase discussed were held with the members of that Committee particularly with the Chair who is the Governor of the Kanem Province (image in the stakeholders section), the Regional delegate of Environment and other key members. All are supportive of using the existing coordination mechanism and if necessary , the project will strengthen such mechanism.</p> <p>The document includes a number of project and initiatives that it will synergize with and seek complementarities, and the mechanism for engaging with other stakeholders and players in Kanem</p>

No	Comment	Response
	<p>The conflict prevention and economic aspects are mentioned, but in a very general way. For the economic aspect, it would be necessary to develop reflections on:</p> <ul style="list-style-type: none"> o the agricultural value chain (Forecast: protection of 600 ha of production). How to sell these products and ensure harmonious economic development? o the (financial) motivation for the 3000 people who will contribute to the restoration of the land in the short but also medium term. o o the strengthening/existence of local skills for the maintenance of these solar systems? 	<p>The comments are noted. We can confirm that:</p> <p>? the project has specific focus and to ensure meaningful impact and maximize on the resource envelop.</p> <p>? Engaging with direct beneficiaries during the project development showed that communities are motivated to participate in the project and are looking forward to its commencement</p> <p>? the project focuses on sectors that are key first of all, to their daily survival (e.g agricultural production through water availability) before even having motivation for financial reasons beyond daily survival.</p> <p>? The aspect of capacity development has been included in the document so that communities are able to take care of systems.</p>
	<p>Water resources management aspects shall be included throughout project planning and implementation, incl. capacity building measures ("use what you need").</p>	<p>This aspect has been considered ? see output 1.1.2</p>

No	Comment	Response
	<p>In Project Output 1.1 ?A package of good SLM practises applicable to Ouadis restoration/protection? it should be considered to consult the WOCAT Database. Further, it should be ensured, that project findings are also uploaded on WOCAT to ensure knowledge transfer to similar projects.</p>	<p>Comment is noted. Discussion will be engaged with WOCAT secretariat to ensure this cooperation and sharing knowledge products. Other regional platform like CILSS in which Chad is a member countries will be also engaged. Furthermore, the project itself will have a dedicated portal to facilitate dissemination and access to information and best practices.</p>
	<p>To advance a just and socially equitable energy transition Germany recommends that the aspect of employment promotion should be considered even more strongly in the project design, e.g. through the construction of wells and the installation and maintenance of solar panels.</p>	<p>This aspect has been considered, and the project will have agreements with service providers to build capacities of solar panel users and solar pumps.</p>
	<p>In addition, we do have some questions with regard to the proposed project:</p>	

No	Comment	Response
	<p>Feasibility:</p> <p>? The project will focus on only 3 Ouadis (1 per commune) and provides for the restoration of 1500 ha (on average 500 ha per Ouadi).</p> <p>o Is such a surface really available around a single wadi?</p> <p>o Are the proposed 3000 people (women and men) to be engaged in the restoration of these lands sufficient (on average 1 person per 0.5 ha)? How do you plan to provide enough water for such a large surface?</p> <p>o How will environmental restoration work on remote surfaces (e.g. dunes) be envisaged? And how can it be ensured that land restoration continues in the medium term?</p>	<p>Additional questions noted In response:</p> <p>? Land availability. Yes it is, and please note that land to be restored has gone up to 3,000 ha following additional thematic studies and stakeholder engagement that have been conducted during the project preparation.</p> <p>? The 3,000 people are direct beneficiaries, and should be understood in terms of households. 3,000 people in Chad is about 519 households (given the household size of 5.78 persons per household).</p> <p>? Environmental restoration: Environmental restoration on sand dune is possible and the countries like Chad and Niger have established experience on this type of restoration. The critical aspect is the availability of materials for mechanical control to stabilised the sand movement. In this case, there is a huge potential of materials as Thypha, an</p>

No	Comment	Response
		<p>invasive species is colonizing the ouadis water bodies. The project will use the local communities as labors to harvest the thypha and use it on sand dune for restauration. This approach will generate multiple cobenefits which will include: the restauration activities; the control of invasive species, the economic incomes to local communities and the protection of Ouadis ecosystem including increase fish production..</p>

No	Comment	Response
	<p>2. Stakeholders: ? The Association for the Development of the Region of Baga-sola ADERBA is listed as a participant of the project, although it is not the same province. Is this a mistake? Please elaborate. ? How will the project ensure that sufficient experts on SLM ("Sustainable Land Management") are available, especially technicians active at the provincial level?</p>	<p>Comment well noted. Project implementation will be enriched by experiences from different stakeholders and players. Creating space for different stakeholders with different experiences will be an opportunity for cross-pollination of ideas that work. Therefore, Baga-sola's participation in the project is not out of the normal to promote scaling up and out of best practices and experiences. The Regional Delegate and the Provincial Inspector General of Environment have been fully embaded in the project and they will monitor the implementation on the ground. These staff from the Ministry in charge of environment are very knowledgeable about land restauration activities and they will service as Technical people guiding the work on the ground. However, capacity development will continue to bring to speed a group of experts to work on the project.</p>
Switzerland Comments		

No	Comment	Response
	It is not clear to use how the Global CO2 emission savings as per PIF are derived. The number seems to be highly overestimated and unrealistic when related to direct emission reduction as stated. Even if indirect emission reduction is included, there will be very high uncertainty from estimating the impact of changed land management practices. Could the secretariat provide more details?	Under table of core indicators, the approaches used to arrive at the Greenhouse Gas Emissions Mitigated have been provided ? that is, from the use of solar energy and land restoration.
	A more detailed break-up of the project funding would be needed for assessing if fund allocation is efficient. Could such a break-up be provided?	Table A of the document and the Budget (Annex F) provide a breakdown of resources at component level. The budget details budget allocation to envisaged activities.

	GEF Secretariat comments	
Nr.	Comments	Response
	Rio markers: The project is cofinanced by CCM. The CCM Rio marker should be CCM2.	The Rio Marker has now been changed to CCM2. Similarly, the Rio Marker for LD has been changed to 2 and that of BD to 0
	Please, correct Sector. The project has been tagged as sector ?Energy Efficiency ? EE? at the beginning of the project. Please update the sector to ?Renewable Energy - RE?; to check in Portal	The sector is now updated and changed to Renewable Energy in the portal
	Executing partners: is the national Agency for the Energy and the Environment the only executing partner? We understand for the CCM part, but not for the SLM part. Please, clarify. - Will the GGW Agency be associate as Executing partner? In this case, update the list of executing partners.	The list of the executing partners has now been updated and Great Green Wall and NGO Baga-Sola (for SLM) are added. All under the coordination of the Ministry of Environment. The GGW agency has been part of all the PPG process and agreement is reached to use their infrasture in the province to build the project activities. The Agency of the GGW has also provided a cofinancing letter.

	GEF Secretariat comments	
Nr.	Comments	Response
	- If cofinancing in grant/cash is confirmed, the GEF should not bear all the burden of pmc and a contribution from cofinancing, to be determined, should indeed be visible in the budget. to be checked at CEO endorsement.	This is very well noted and consider in the final project resources allocation per component.
	- Output 1.1.3: this is the formulation of an outcome, reflecting an expected situation. Please, reformulate it as an output, if possible quantifiable, reflecting the expected result, giving the sense of the value for money. In the text, please develop the different modes of land restoration and SLM that will be promoted.	Consistent with STAP comment regarding recasting component 1 to focus more ecosystem restoration, please note that output 1.1.3 at PIF has been rephrased as "Gender-responsive Land use plans in at least 3 pilot ouadis developed and implemented using good SLM practices and solar water pumping system," merging outputs 1.1.1 and 1.1.2 given their closeness/overlapping focus. The budget allocations have also been adjusted accordingly.
	Component 2. - Please note that Outputs 2.1.2 and 2.1.3 are not investment but technical assistance activities. To differentiate between technical assistance and investment activities, please create in Table B two rows for Component 2, one row for the outputs with technical assistance activities and another row with the outputs for the investment activities.	The component 2 outputs have now been re-structured as per the guidance
	Output 2.1.3. "Gender sensitive Power purchase agreements are negotiated and agree upon between the cooperatives and possible buyers including the National Water Compagny (SNE)". Please replace National Water Company by Societe Nationale d'Electricity (SNE).	The change suggested is now effected throughout the document
	- Hybrid or renewable energy mini-grids?. The proposal mentioned "low carbon mini-grid". However, please confirm whether the mini grids will be "renewable energy mini-grids" or "hybrid mini-grids" (using a combination of renewable energy and diesel).	It is confirmed that the "low carbon mini-grid" will be renewable energy mini-grid
	Disposal of solar panels. The proposal shall include an explanation and risk mitigation measures for the safely disposal and/or recycling of solar panels. In this regard, we suggest to coordinate with the national child project in Chad of the Africa Mini-grid Project, which incorporates a provision for the safely disposal of solar panels. This way, potential overlaps between projects are avoided and efficient use of climate funding is encouraged. This point shall be linked to the sustainability section of the PIF, since by ensuring a correct disposal of solar panels we are contributing to the overall sustainability of the project.	A risk is now added in the Risk table and it relates to the Safety Disposal of solar panels. The Sustainability section is also been amended to include the approach for the disposal or recycling of the solar panels as part of the project sustainability

	GEF Secretariat comments	
Nr.	Comments	Response
	- In Investment Mobilized description section, provide a brief summary of each grant, including the funded activities/projects and the disbursement timeline.	Brief summary of each grant, including the funded activities and investment modalities are provided in the section 1.2 and some in section 1.6 of the PIF document. Some details are provided under table C- Indicative cofinancing. Updated information will be provided particularly on the disbursement timeline will be provided.
	- In the past, some projects faced challenges to mobilize cofinancing for GEF projects in Chad, especially in cash or grants. The proposed ratio of 1:7.2 is potentially promising. Some clarification is needed about the meaning of 'investment mobilized?' for each line of cofinancing. Please, clarify.	Some details are provided under table C- Indicative cofinancing. Updated information will be provided particularly on the disbursement timeline at CEO endorsement following the follow up discussion with these partners.
	- Cash cofinancing from four governmental agencies is pretty unusual (national agency for Domestic Energy and Environment, National Society for Electricity, Special Fund for the Environment, and the national Agency of the Great Green Wall). One identified risk is 'Insufficient budget stability?'. Please, clarify.	A risk related to the instability of budgetary allocation is now included. However, it is also good to note the said Government entities have autonomous management style.
	It seems probable that some of these resources will not be available as grants but as public investments. Be careful to be able to provide a justification for each cofinancing line, as there will be budget implications in the CEO endorsement. Please, confirm.	This is very well noted with thanks. During PPG phase these entities have been engaged as follow up to understand the updated investment plans of these entities and adequate synergies and complementarity with the project address to avoid duplication and inadequate resources planning.
	- Could you explain the level of interaction with EU projects at this stage? It may have been challenging in a recent past to obtain a letter of cofinancing. Please, clarify.	The discussion was conducted between the National Domestic Energy and Environment Agency and the project and there is clear indication that the project is viewed as a government investment and that it will be ensure that all government entities will support the under development GEF projects. Cofinancing letters have been mobilized.
	IFAD and GCF are mentioned as cofinancing partners in the same line. Moreover, the contribution is in-kind. To be clarified.	The mistake has been corrected. The cofinancing is now tagged cash and a cofinancing letter will be mobilized in that direction during PPG.

	GEF Secretariat comments	
Nr.	Comments	Response
	Could you provide any information about the level of discussions you may have had with these cofinancing partners?	The National Agency of the Domestic Energy and Environment has taken the leading as executing partner and together with the GEF OFP started discussions with these partners. Follow up discussion were done during PPG and cofinancing letters are mobilised mobilized.
	Table E: For a project grant up to \$3 million (\$2,954,534), a PPG up to \$100,000 is allowed. The few words of explanation are not convincing to allow an exception. Please, correct and insert a \$100,000 PPG.	Noted with thanks. A PPG amount excluding the fees to Agency was included.
	<p>Core Indicator - GHG emission reductions.</p> <ul style="list-style-type: none"> - Under section ?Core Indicators? please include a description of the calculations conducted for the estimations of the GHG emission reductions, including a reference to the sources used. - It is advisable to provide an excel sheet to easily track the calculations with an narrative explaining the assumptions (at least at CEO Endorsement stage). - All the other targets should be confirmed at CEO endorsement, with explanations on the estimation modes. 	<p>The calculation of the GHG emission reduction was based on the standards of solar panel emission reduction based on figures provided by many research work including the US-based National Renewable Energy Laboratory (NREL) which estimated that solar power produces lifetime emissions of 40g CO2 equivalent per kilowatt-hour. As indicated in PIF document, this will be recalculated at PPG using the GEF developed methodology to determine the three types of GHG reductions (Direct contribution, Direct post-project contribution and Indirect contribution)</p> <p>At CEO endorsement, the calculated total emissions from solar panel emission reduction was 1,264,322 t CO2. At CEO endorsement, an estimated total of 20,544 t CO2 from ecosystem restoration of 3,000 ha has been estimated. Therefore, the total estimated GHG emission reductions are 1,284,866 t CO2eq. The carbon estimation levels from land rehabilitation has been based on the Nationally Determined Contributions Expert Tool (NEXT) as detailed under the table of core indicators.</p>
	- It is advisable to provide an excel sheet to easily track the calculations with an narrative explaining the assumptions (at least at CEO Endorsement stage).	A screenshot of the NEXT output has been provided in the document
	- All the other targets should be confirmed at CEO endorsement, with explanations on the estimation modes.	As noted above, the targets have been confirmed and explanations provided.

	GEF Secretariat comments	
Nr.	Comments	Response
	The proposal mentions a project for the establishment of a manufacturing photovoltaic system, which would benefit from the country's reserves of glass sand (the main material for the manufacture of solar panels). If possible, please elaborate further on the status and expected timeline for this manufacturing facility, since this could greatly impact the potential scaling up opportunities of the project.	The company called Sahel Solaire is operating since 2019 and has started production of Solar Panels in the country and the region.
	Energy consumption in Chad is dominated by thermal generation and overall use of fossil fuels. However, from the proposal it is unclear how many and what type of renewable energy projects are already in operation or expected to be built in the near future; Please, clarify, if possible.	Noted and addressed in section 1.1 particularly in Energy Context
	In March 2022 the World Bank approved the project "National electricity Emergency Plan Implementation 2021-2021", which includes renewable energy mini-grids among others. Please add this project to the list of associated baseline programs and ensure proper coordination between the two projects;	Noted with thanks. The project is now added in the base line and the coordination section include the coordination with the project
	We cannot see/find the main assumptions needed to follow the proposed pathways. To be completed.	Following the STAP recommendation to recast component 1 to focus on ecosystem restoration, but also in response to other comments and the findings from thematic studies during project development process, the Theory of Change has been redone at CEO endorsement to reflect the new developments in the project. A narrative has been provided which we believe gives in sufficient details the context, the barriers and the barriers, but also the pathway to achieve transformational change that reflects the project's objective.

	GEF Secretariat comments	
Nr.	Comments	Response
	- The Theory of Change seems a bit simplistic. We understand that only one barrier was identified for the development of mini-grids in Chad: ?Lack of support for the initial investment to access solar panels for irrigation water pumps to address land degradation in Ouadis?. Please, confirm.	We concur with the review that there more than one barrier related to promotion of best SLM practices and the use of Solar Energy to facilitate irrigation. However, due to the limited resources available to this project we decided to focus on one major one. During the PPG more assessment were conducted and stakeholders are engaged in prioritization of which ones to address but also clearly reflect all in the Report of the Assessment and the peer-review article envisaged in component 1. This will allow the country to have comprehensive overview of what needs to be overcome in order to include it in national environment action plan and resources mobilization strategy. The barrier section has been amended to consider this move.
	- The barriers section (and therefore the ToC) could be further strengthened by being more specific on the underlying barriers, as there are very probably more than one to consider. If it can help, please find below a list of general risks and barriers to develop renewable energy mini-grids. Please, update.	As noted above, at CEO, the Theory of Change diagram has been modified to reflect and capture the complexity of what the project is intending to address, detailing the pathways to project impact.
	Overall, Component 2 shall be further elaborated providing a more in-depth description of each of the outputs, including a list of deliverables.	At CEO, component 2, as also for components 1 and 3, additional information has been provided to highlight what the project seeks to achieve, and each output has provided to clarify what is envisaged under each.
	- Mini-grid business model & PPA (Power Purchase Agreement). Component 2 does not provide enough information on the business model used for the implementation of the three water pump infrastructures (including solar panels and batteries). We understand some of the features of the business model would be defined during the selection of the communities (please clarify whether community selection will take place at PPG or implementation stage) since the model varies by ownership, size and customer. But overall the proposal would benefit from a more in depth explanation on either the business model selected or its selection process.	The proposed approach was based on the exchange and discussions with the National Agency of Domestic Energy and Environment; past experience of some partners in the project areas (e.g. World Food Program); some stakeholders from energy sectors and review of available literature on the topic. As explain above an in-depth analysis of options was carried out and thorough stakeholders? consultation particularly with local communities were conducted during PPG on workable models. This is reflected in the amended component 2 description.

	GEF Secretariat comments	
Nr.	Comments	Response
	<p>Some of the information missing is the following:</p> <ul style="list-style-type: none"> - As per the proposal, it seems the proposed business model is a utility mini-grid, meaning that the government would be the owner of the mini-grids and the cooperatives will be responsible for their maintenance and operation. Please explain why this is the most suitable business model for the proposed project. Also, going forward and to ensure its sustainability, the business model shall be flexible and allow for a gradual increase of private sector participation in future mini-grid projects. - Does the utility expect any revenue collection through the PPA (Power Purchase Agreement) ? If so, is there analysis of the ability and willingness of end user to pay or will this be part of the project? What about affordability of tariffs and metering technology? - What is the role of the private sector? Just supplier of the solar panels? - Are the cooperatives already established? If not, what criteria would be used for the creation of the cooperatives? For instance, the proposal mentioned the use of any surplus of energy for other potential uses of energy. Potential uses of energy is key for the expansion of mini-grids. As such, identification of potential uses of energy in the selected communities is key. - Also, if possible at this stage please provide more information on the type and expected size of solar panels. 	<p>Noting these comments, additional information has been provided under component 2 based on the thematic studies that have been conducted during the project development phase.</p> <p>These review comments are very much welcome as it have allow to review the component 2 description and the outcomes have been strengthen during the PPG based on data collected and commutations with stakeholders.</p>
	Core Indicator 6: please, provide the methodology behind the proposed target?	Please, refer above
	- In the part on ?Innovation, sustainability and potential for scaling up?, please, include a comment on how and why the proposed business model contributes to the project potential for scaling up.	The scaling up subsection is amended to include why and how the proposed business model is viable
	- Coordinate with the Chad national child project under the Africa Mini-grid program, because 1) it includes an analysis of the best suitable business models for Chad, 2) it includes a disposal mechanism of solar panels .	There have been already two rounds of discussion with UNDP and Chad AMP and commitment are made from both sides (UNDP and UNEP) to work together and to ensure synergies and complementarity

	GEF Secretariat comments	
Nr.	Comments	Response
	<p>- Please, provide information about the number of meetings and consultations that took place, their date, the number of participants, and the main outcomes.</p>	<p>Number of consultations through phone calls face to face meetings in Ndjamena, were conducted between the IA that is UNEP and Chad Operational Focal Point, the National Agency for Domestic Energy and Environment; two local NGOs and UNDP. Indeed, extensive consultations have been had at national and subnational levels, and field/community visits conducted. These have been mentioned in the CEO endorsement document, complemented with a list of participants and photographs. Reports of some consultations are include as Annex to the CEO endorsement document</p>
	<p>- The document is silent on farmer organizations and different forms of support (extension services, agronomy research center, NGO...). Please, clarify.</p>	<p>As noted above, a participatory approach has been used during PPG to engage various stakeholders to discuss various aspects of the project, including grievance redress mechanism, and gender dimensions of the project, among others.</p>
	<p>There is a generic text about the private sector, but we do not know the potential role of the private sector in the SLM component. Please, clarify.</p>	<p>Preliminary analysis at PIF revealed that private sector in SLM in Chad is very weak. This has been confirmed by the baseline assessment conducted in the Great Green Wall area in preparation of future intervention. However, there is weak knowledge of the private sector within the ministry. For example the Gum Arabic operators, the Spirulina operators exist by or often not consider as private sector, the PPG phase will conduct a comprehensive analysis of private sector in SLM and a good engagement plan develop?</p>
	<p>- What is the role of the private sector in the CCM aspects? Just supplier of the solar panels? Please, clarify.</p>	<p>As indicated in the document, the private sector will not produce or supply solar panels, but it is anticipated that the excess energy generated will be sold to the National Electricity Company.</p>
	<p>There is no mention of political risks. Don't you think that internal political issues or fragility of communities on the ground should be included in the risk analysis?</p>	<p>Political and Fragility included in Risk Table</p>

	GEF Secretariat comments	
Nr.	Comments	Response
	- Have you made a financing and administrative assessment of the potential national agency? Is it planned at PPG? How was selected the designed National Agency?	The national executing agency is an arm of the Ministry and it is receiving and managing funds from various donors, however, during PPG the assessment was done the capacity and the capacity building need of executing partners have been identified and will be addressed. The needed capacity building activities have been included in the project budget.
	COVID-19 risks are included. However, a paragraph on potential opportunities related the COVID-19 situation is missing. Please, complete.	The potential opportunities provided by COVID 19 Situation have been assessed and project related activities in support of building country resilience embedded in the project adaptive management strategy ? monitoring closely the evolution of the pandemic in the country in observance of guidelines.
	See the item II, 3) and the suggestion about the risks related to the development of minigrids in Chad. Please, update.	See above
	- As mentioned above (table B). we suggest coordinating with the national child project in Chad of the Africa Mini-grid Project for several reasons. For instance, this project incorporates a provision for the safety disposal of solar panels. This way, potential overlaps between projects could be avoided and efficient use of climate funding will be encouraged	Addressed in items above.
	- Best practices and lessons from the SLM, MFA, IW, and LDCF portfolio would help, as well as potential connections/arrangements with project that are still active	Well noted with thanks. A comprehensive analysis of lessons learn from the above mentioned portfolio will be conducted and findings relevant to this project will be considered.
	We note that the project overall ESS risk is classified as moderate, and UNEP attached Safeguard Risk Identification Form (SRIF). In the ESS section of the Portal, it is, however, not clear what is the next step for the Agency to address ESS risks including security risk at the project site in Chad. The safeguard recommendations by the safeguard team in the SRIF states that ?Carry out further assessment? and ?carry out impact assessments in the risk areas and develop management framework/ plan?. - Please include summary of ESS risks identified in the screening process and further action that Agency will take during PPG or initial stage of the project implementation in the ESS section of the Portal.	Well noted this is addressed in the portal. The following comment from ESS team will be included in the portal: This is likely a moderate risk project. Some potential risks are identified. They should be further assessed during the project development phase through consultation with local and indigenous people, site visits, and experts monitoring of the project. Having a person to respond to the community concerns and grievance matters via prompt and close communication will also be critical. Furthermore, the risk related to security, community fragility have been assessed and the risk has been updated.

**ANNEX C: Status of Utilization of Project Preparation Grant (PPG).
(Provide detailed funding amount of the PPG activities financing status
in the table below:**

PPG Grant Approved at PIF: \$100,000			
<i>Project Preparation Activities Implemented</i>	<i>GETF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
International consultant (Drafter)	25,000	25,000	0
Consultancies for various thematic studies	30,000	30,000	0
National stakeholder consultations	20,000	20,000	0
Validation and inception workshops	25,000	25,000	0
Total	100,000	100,000	0

Key products from the PPG include:

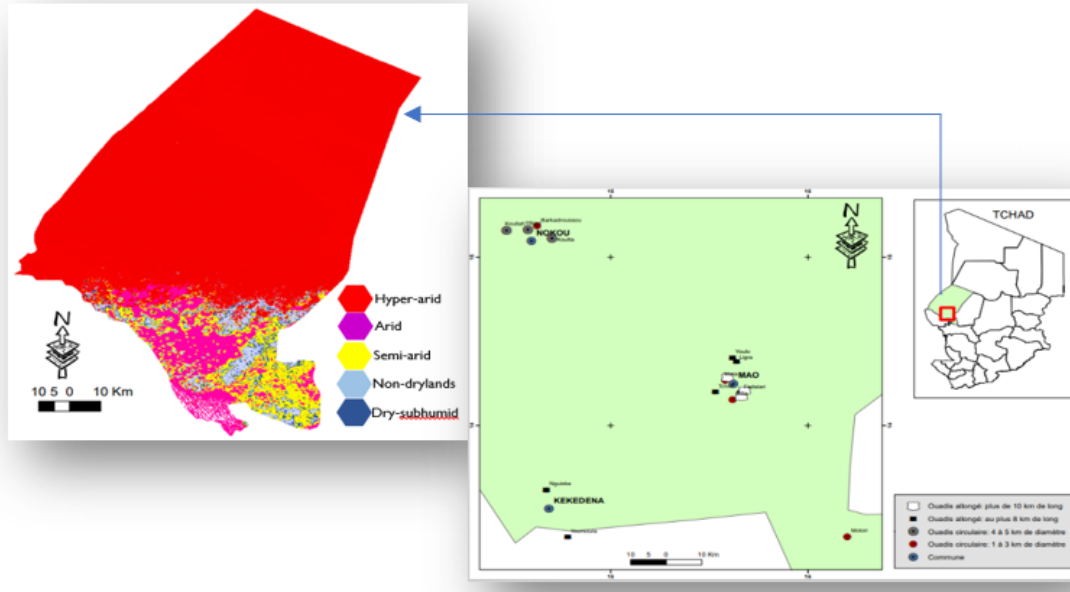
- a) CEO Endorsement document including relevant annexes
- b) Project document in UNEP format
- c) Meetings with stakeholders and partners: Minutes are attached as Annex I

Thematic Studies Reports: Attached as annex H. These thematic studies include:

- ? Stakeholders analysis for the implementation of the project
- ? Different type of Oasis characterization
- ? Land Degradation in the project Area
- ? Knowledge Management, communication and M&E
- ? Land Use in the project area
- ? Socioeconomic analysis in the project area
- ? Mini-Grid Solar Energy potential in the project area
- ? Analysis of the development of renewable energy ? Mini-Grid
- ? Data collection on Natural Resources in the Project area

ANNEX D: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.



GEO LOCATION INFORMATION

The Location Name, Latitude and Longitude are required fields insofar as an Agency chooses to enter a project location under the set format. The Geo Name ID is required in instances where the location is not exact, such as in the case of a city, as opposed to the exact site of a physical infrastructure. These IDs are available on the [GeoNames? geographical database](#) containing millions of placenames and allowing to freely record new ones. The Location & Activity Description fields are optional. Project longitude and latitude must follow the Decimal Degrees WGS84 format and Agencies are encouraged to use at least four decimal points for greater accuracy. Users may add as many locations as appropriate. Web mapping applications such as [OpenStreetMap](#) or [GeoNames](#) use this format. Consider using a conversion tool as needed, such as: <https://coordinates-converter.com> Please see the Geocoding User Guide by clicking [here](#).

Location Name	Latitude	Longitude	Geo Name ID	Location & Activity Description
Kanem Region	13.84238	14.847077		
Mao Region	14.12116	15.3103		
Noukou Region	14.583	14.777		

ANNEX E: Project Budget Table

Please attach a project budget table.

Project title: Innovative approach to Protect Ouadis through the Promotion of non connected mini-Grid solar energy in 3 municipalities (Mao, Kekedena and Nokou) of Kanem region-Chad (IPOPronog)								
Appendix A: Indicative Project Budget Template								
Expenditure Category	Detailed description	Component (USDeq.)			Sub- Total	M & E	P M C	Total (USDeq.)
		Component 1 Outcome 1.1	Component 2 Outcome 2.1	Component 3 Outcome 3.1				
Works								
	3 Ouadis restored using 5 good gender-responsive SLM practices (mechanical control of sand dune, biological sand dunes fixation; drip irrigation technics, mulching; herbaceous seeding);	410,370			410,370		410,370	
	Promotion of climate smart agricultural good practices	230,000			230,000		230,000	
	Updated Provincial and Communal Development Plans to include Ouadis Protection and environmental conservation	273,725			273,725		273,725	
Goods					0		0	
	Solar water pumps infrastructures to benefit both women and men (boreholes, Solar panels, Batteries, network of irrigation tapes) established in 3 pilot Ouadis in 3 Municipalities of Kanem; Societe Nationale d'Electricite		1,140,069		1,140,069		1,140,069	
Grants/ Sub- grants					0		0	
International Consultants					0		0	
	Policy brief and guidelines to promote the use and scaling up of good SLM practices for Ouadis restoration and Solar water pumps developed and disseminated			45,000	45,000		45,000	
	Gender-responsive indicators for monitoring impact of SLM practices and use of Solar pumps to restore Ouadis ecosystems and generate energy for mini-Grid developed and necessary data for monitoring regularly collected through a long term monitoring system			70,000	70,000		70,000	
					0		0	
Local Consultants					0		0	
	Communication and knowledge products generated by the project and uploaded in a dedicated Portal on the project host website to facilitate access and disseminated at local, national and regional levels through different channels.			55,000	55,000		55,000	
	Gender-responsive power purchase agreements are negotiated and agreed upon between the cooperatives and the Societe Nationale d'Electricite (SNE).		80,000		80,000		80,000	
	Supporting the implementation of Climate resilient Agricultural practices	179,840			179,840		179,840	
	Land use plans of 3 pilot Ouadis developed and implemented using good SLM practices and solar water pumping system	179,840			179,840		179,840	
	Publications				0		0	
	Mid Term review				0	0	0	

	Terminal Evaluation				0	30,000		30,000
Salary and benefits / Staff costs					0			0
	Project Director				0		48,000	48,000
	Admin & Fin. Officer				0		25,000	25,000
	Project M&E Officer and Gender Related Results Monitoring and Reporting				0	60,000		60,000
	Gender-Public Inclusion Specialist				0		40,690	40,690
Trainings, Workshops, Meetings					0			0
	Inception Workshop				0	10,000		10,000
	Ass of Project progress and mean of verification				0			0
	Technical reports					20,000		
	Steering Committee Meeting				0	30,000		30,000
Travel					0			0
Office Supplies					0			0
	Office supplies, computers, other equipment..				0		7,690	7,690
Operating Costs					0			0
	Audit				0		19,310	19,310
Grand Total		1,273,775	1,220,069	170,000	2,663,844	150,000	140,690	2,934,534

ANNEX F: (For NGI only) Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

ANNEX G: (For NGI only) Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agency is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

ANNEX H: (For NGI only) Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies' capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).