AFB/PPRC.15/15
17 September 2014

Adaptation Fund Board
Project and Programme Review Committee
Fifteenth Meeting
Bonn, Germany, 7-8 October 2014

Agenda Item 6 k)

PROPOSAL FOR MOROCCO

Background

1. The Operational Policies and Guidelines (OPG) for Parties to Access Resources from the Adaptation Fund (the Fund), adopted by the Adaptation Fund Board (the Board), state in paragraph 45 that regular adaptation project and programme proposals, i.e. those that request funding exceeding US$ 1 million, would undergo either a one-step, or a two-step approval process. In case of the one-step process, the proponent would directly submit a fully-developed project proposal. In the two-step process, the proponent would first submit a brief project concept, which would be reviewed by the Project and Programme Review Committee (PPRC) and would have to receive the endorsement of the Board. In the second step, the fully-developed project/programme document would be reviewed by the PPRC, and would ultimately require the Board's approval.

2. The Templates approved by the Board (OPG, Annex 4) do not include a separate template for project and programme concepts but provide that these are to be submitted using the project and programme proposal template. The section on Adaptation Fund Project Review Criteria states:

> *For regular projects using the two-step approval process, only the first four criteria will be applied when reviewing the 1st step for regular project concept. In addition, the information provided in the 1st step approval process with respect to the review criteria for the regular project concept could be less detailed than the information in the request for approval template submitted at the 2nd step approval process. Furthermore, a final project document is required for regular projects for the 2nd step approval, in addition to the approval template.*

3. The first four criteria mentioned above are:
   1. Country Eligibility,
   2. Project Eligibility,
   3. Resource Availability, and
   4. Eligibility of NIE/MIE.

4. The fifth criterion, applied when reviewing a fully-developed project document, is:
   5. Implementation Arrangements.

5. It is worth noting that since the twenty-second Board meeting, the Environmental and Social (E&S) Policy of the Fund was approved and consequently compliance with the Policy has been included in the review criteria both for concept documents and fully-developed project documents. The proposals template was revised as well, to include sections requesting demonstration of compliance of the project/programme with the E&S Policy.

6. In its seventeenth meeting, the Board decided (Decision B.17/7) to approve "Instructions for preparing a request for project or programme funding from the Adaptation Fund", contained in the Annex to document AFB/PPRC.8/4, which further outlines applicable review criteria for both concepts and fully-developed proposals. The latest version of this document was launched in conjunction with the revision of the Operational Policies and Guidelines in November 2013.

7. Based on the Board Decision B.9/2, the first call for project and programme proposals was issued and an invitation letter to eligible Parties to submit project and programme proposals to the Fund was sent out on April 8, 2010.

8. According to the Board Decision B.12/10, a project or programme proposal needs to be received by the secretariat no less than nine weeks before a Board meeting, in order to be considered by the Board in that meeting.

9. The following fully-developed project document titled “Climate changes adaptation project in oasis zones- PACC-ZO” was submitted by the *Agence pour le Développement Agricole* (ADA), which is the National Implementing Entity of the Adaptation Fund for Morocco. This is the third submission of the project concept document. It was first submitted as a concept during the twenty-second Board meeting and was not endorsed by the Board. It was subsequently submitted as a concept during the twenty-third meeting and the Board decided to:

(a) Endorse the project concept, as supplemented by the clarification response provided by Agence pour le Développement Agricole (ADA) to the request made by the technical review;

(b) Request the secretariat to transmit to ADA the observations in the review sheet annexed to the notification of the Board’s decision, as well as the following issues:

(i) When developing the fully-developed proposal, the proponent should ensure that final language editing is duly performed and that the outcomes, outputs and activities under the project results framework are clearly and specifically outlined, with relevant targeted indicators;

(ii) The fully-developed proposal should include a participatory assessment of potential social and environmental risks and impacts of the project’s activities, providing for each principle of the Environmental and Social Policy a justification either of no further assessment requirement for compliance with Policy, or a justification of further assessment that may be needed, including Environmental Impact Assessments;

(iii) The fully-developed proposal should elaborate further on how the sustainability of the project outcomes will be ensured, at the economic, social, environmental and institutional levels, including through local government systems;

(iv) A comprehensive consultation process should be demonstrated at the fully-developed proposal stage, to include the inputs from all stakeholders, particularly the most vulnerable communities and marginalized groups;

(v) The fully-developed proposal should demonstrate that the project will be implemented in synergy and collaboration with all relevant initiatives and programmes in similar sectors and/or its areas of intervention. The types of collaboration and synergies sought should be clearly outlined and reflected in the execution arrangements of the project;

(c) Approve the Project Formulation Grant of US$ 30,000;

(d) Request ADA to transmit the observations under item (b) to the Government of Morocco; and

(e) Encourage the Government of Morocco to submit through ADA a fully-developed project proposal that would address the observations under item (b) above.

(Decision B. 23/9)

10. The present submission was received by the secretariat in time to be considered in the twenty-fourth Board meeting. The secretariat carried out a technical review of the project proposal, assigned it the diary number MAR/NIE/Agri/2013/1, and completed a review sheet.

11. In accordance with a request to the secretariat made by the Board in its 10th meeting, the secretariat shared this review sheet with ADA, and offered it the opportunity of providing responses before the review sheet was sent to the PPRC.

12. The secretariat is submitting to the PPRC the summary and, pursuant to decision B.17/15, the final technical review of the project, both prepared by the secretariat, along with the final submission of the proposal in the following section.

Project Summary

Morocco – Climate changes adaptation project in oasis zones- PACC-ZO

Implementing Entity: *ADA*
Project/Programme Execution Cost: USD 872,950
Total Project/Programme Cost: USD 8,315,990
Implementing Fee: USD 781,060
Financing Requested: USD 9,970,000

Project/Programme Background and Context: Moroccan oases experience degradation due in particular to climate change, compounded by population and urban pressure. This deterioration, in recent years, has taken alarming proportions and is leading to an increasingly threatening desertification. A dozen of southern Morocco Oases has already lost more than 40% of their crop area: 208 Ha of agricultural land were silted in Errachidia area. The gradual disappearance of favorable farming conditions of oases, led to the decline in the income of the population, which is a big issue for the majority of the southernmost oasis societies.

The objective of the proposed project is to help reduce the vulnerability of people and oasis agro ecosystems in Morocco to climate change by increasing the adaptive capacity of local actors, increasing the resilience of the target ecosystem and by disseminating knowledge management. Actions will include improved management of soil and water resources, as well as the use of resistant varieties of palm trees and training sessions for the stakeholders.

This objective will be achieved through the following five components:

- Component 1: Improving adaptive capacities of the water sector.

- Component 2: Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted areas.

- Component 3: Improving the ecosystems' resilience in response to climate change and variability.

- Component 4: Improving stakeholder awareness though the management and exchange of knowledge.

- Component 5: Strengthening the capacities of participants in the design and implementation of adaptation measures.

Component 1: Improving adaptive capacities of the water sector (USD 4,279,400)

Water scarcity is a major problem in oasis areas, conditioned upstream by both persistent and recurrent drought by upgraded irrigation systems. The degradation of Moroccan palm groves has greatly accelerated during the last 10 years, for both anthropogenic and climatic reasons, losing nearly three-quarters of their palms. Therefore, the project will aim at rationalizing water resources by: i) Improving the efficiency of existing irrigation resources, including the most appropriate to oases systems and the ancestral systems including khettaras and spreading of floodwaters, and ii) Improving the rate of water storage both on surface and underground, through development and full rehabilitation of irrigation schemes. In addition, resources will be

optimized through a better use and management of resources through capitalization of existing systems, and building new systems, and also developing water infrastructure to improve the rate of resources gathering and limit downstream losses.

Component 2: Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted areas (USD 1,729,400)

The project will also aim to improve the living standards of local populations by taking various support measures around the most promising sectors in the oasis agriculture, for young people and women; and therefore diversify the income generating activities for the populations. This will help to (i) relieve the pressure on water resources, (ii) improve the living conditions of populations by increasing their incomes, and (iii) increasing the resilience through diversification of activities which are less reliant on water. Activities under this component will help improve and ensure the agricultural income of the oasis population through the adaptation of techniques to the new restrictions and through adding value to the agricultural products. Other activities will include promoting pilot activities with young people and women which would help to create sources of incomes related to economic sectors that do not put pressure on natural resources (water and soil), and promoting sustainable tourism.

Component 3: Improving the ecosystems' resilience in response to climate change and variability (USD 1,010,600)

The oasis environment is affected by the combination of natural factors, including climate change, desertification, increase in temperature, scarcity of water and anthropogenic factors, including loss of traditional knowledge for the management of this ecosystem and polluting activities. The project will support the Water and Forests Commission in its biological efforts to fight against desertification and the construction of palm leave fences. It will also support the communities and small businesses in reducing soil and water pollution and cleaning their environment. To preserve and promote local heritage with traditional mud buildings which are particularly adapted to the climatic context (heat, wind), the project will support the restoration of historic constructions and the redevelopment of mud in modern constructions with building of model houses.

Component 4: Improving stakeholder awareness though the management and exchange of knowledge (USD 366,590)

The project will undertake efforts for the consolidation and capitalization of knowledge and capitalization of results of other interventions on adaptation to climate change. Therefore, data on climate change at the oasis area will be updated. In addition, Internships and visits will be organized for actors. These actions will focus on risk management, hydro meteorological management, findings & facilitating tools, groupware, monitoring, analysis of climate information, use of methodological tools and development of modules of adaptation.

Component 5: Strengthening the capacities of participants in the design and implementation of adaptation measures (USD 480,000)

The project will support technical staff from government and local NGOs to access analyze and use information related to climate in combination with the oases ecosystems. It will also support communities in determining participatory adaptation measures allowing them to generate environmental and socio -economic benefits. Therefore workshops, training courses and

information sessions for local stakeholders (institutional, associations of agricultural water users, professional first and second degree organizations, etc.) will be organized. Capacity building will involve both informative aspects and awareness on environmental and economic situations related to oasis and desertification issues, technical aspects of installation and project management, governance and territorial approach. For individuals, capacity building will aim at changing attitudes and behaviors, improving knowledge, skills and performance. In the case of institutions (public, private, civil society), it will cover all areas to improve their performance and help them define organizational frameworks, coordination of cooperation and convergence.

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Regular-sized Project

Country/Region: **Morocco**
Project/Programme Title: **Climate changes adaptation project in oasis zones – PACC-ZO**
AF Project ID: **MAR/NIE/Agri/2013/1**
NIE/MIE Project ID:
Requested Financing from Adaptation Fund (US Dollars): **9,970,000**
Regular Project Concept Approval Date: **March 2014**
Anticipated Submission of final RP document (if applicable): **n/a**
Reviewer and contact person: **Daouda Ndiaye**
Co-reviewer(s): **Mikko Ollikainen**
NIE/MIE Contact Person: **Hamid Felloun**

Review Criteria	Questions	Comments on 21 Aug. 2014	Comments on 15 Sept. 2014
Country Eligibility	1. Is the country party to the Kyoto Protocol?	Yes.	
	2. Is the country a developing country particularly vulnerable to the adverse effects of climate change?	Yes. Morocco is an arid country, which likely impacts of expected climate change include frequency and intensity of droughts, unusually devastating floods, changes in the spatial and temporal distribution of rainfall, an overall net decrease in the amount of rainfall collected, and high summer temperatures. More particularly, the water and agricultural sectors in the target oasis areas, are highly vulnerable to the climate risks described above.	
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	Yes. Letter dated 1 August 2014.	

	2. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?	Yes. The project seeks to improve the adaptive capacities of the water sector through building and restoration of several underground and surface infrastructures; and increase the resilience of populations through the diversification and strengthening of their economic activities and the resilience of the ecosystem in which they live. However, under components 1 and 3, it seems the project has yet to find a mechanism for financing and contracting the maintenance works for the infrastructures and formalize the commitment of the beneficiaries in the restoration work and the maintenance of the traditional distribution networks. This seems to constitute a serious risk for the achievement of the results under these components. Please clarify how such risk will be overcome before approval of the proposal. **CR1** Under output 2.2.1, the activities suggested here are important in reducing the ecosystem vulnerability but could not be seen as improving revenues of people. There is no tangible tourism activity proposed. It is not clear what the activity 2.2.1.1 entails. **CR2.** Also, under 2.2.2.2, please provide examples of "careers adapted to climate change". **CR3** Component 3 is quite vague in the description of the activities and does not really demonstrate how it will help in achieving the project's objectives. For example, under outcome 3.1 the budget of 800,000 USD is quite high and not justified. Under outcome 3.2, the adaptation reasoning needs to be further demonstrated and the budget of 400,000 USD justified. **CR4** Finally, please explain the legal status Melk and Habous. **CR5**	**CR1:** Addressed. **CR2**: Addressed. **CR3**: Addressed. **CR4:** Addressed. **CR5:** Addressed.

	3. Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations, while avoiding or mitigating negative impacts, in compliance with the Environmental and Social Policy of the Fund?	Yes. The project will directly or indirectly benefit around 40,000 people, members of the families of farmers and residents in the vulnerable traditional oasis. Women and youths represent 50% of the beneficiaries.	
	4. Is the project / programme cost effective?	Yes. However, the provision of costs/infrastructure and total number of infrastructures under the budget notes will allow for a better assessment of the project's cost effectiveness. See CR14 below	
	5. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?	Yes.	
	6. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?	Yes. However please clarify if an EIA will be done prior to the building of the retention dams or any other relevant infrastructure. **CR6**	**CR6:** Addressed.

	7. Is there duplication of project / programme with other funding sources?	No. However, additional information is requested. Please describe the activities of the Oasis development programs (PNUD POS-POT) including the complementarity/synergy with this project which is expected to supply them with tools aimed at ensuring the resilience of their activities in the face of climate change. **CR7** Also, please clarify if this project will seek synergies with the approved GEF/IFAD's project "Increasing productivity and adaptive capacities in mountain areas of Morocco (IPAC-MAM)" which targets the Mountain Areas of Morocco, more specifically the provinces of Sefrou and Azilali[1]. **CR8**	**CR7:** Addressed. **CR8:** Addressed.
	8. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?	Yes. Component 5 is dedicated to knowledge management activities. However, the proposed activities are mainly based at the local level. It is not clear how lessons learned from this project will be shared at the national level, to inform future programmes and support scaling up of expected results. **CR9**	**CR9:** Addressed.
	9. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations?	Yes. However, please provide more information on gender considerations during the consultations. **CR10**	**CR10**: Addressed.
	10. Is the requested financing justified on the basis of full cost of adaptation reasoning?	Yes. However, please expand on justifying the adaptation reasoning. **CR11**	**CR11:** Addressed.

[1] See the project's PIF in the GEF website:
http://www.thegef.org/gef/sites/thegef.org/files/gef_prj_docs/GEFProjectDocuments/Climate%20Change/Morocco%20-%20%285685%29%20-%20Increasing%20Productivity%20and%20Adaptive%20Capacities%20in/ID5685__MOROCCO_PIF_Resubmission__24JAN14.pdf

	11. Is the project / program aligned with AF's results framework?	Yes.	
	12. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	Yes. However, see CR1 above on the lack of early agreement with communities on the maintenance of infrastructures under Component 1.	
	13. Does the project / programme provide an overview of environmental and social impacts / risks identified?	Yes. The project is correctly categorised as B, and the summary table on p. 85-86 identifies correctly a number of environmental and social risks. The identification of the risks is however incomplete, and could probably be expanded to include human rights, core labour rights (in particular regarding child labour), heritage, and natural habitats (wadis, streams). Pollution prevention is also a risk, certainly during construction, and has to some extent been incorporated in the mitigation and management measures that are described on p. 86-89. On p. 94, the proposal states that an ESMP will be prepared during project implementation but incorrectly refers to ESP article 9 to justify this, as article 9 clearly states that the ESMP for category B projects typically should be included in the proposal. There seems no justification to accept the assurances further described in article 9 for delayed ESMP preparation, since the relevant activities under component 1 do not constitute a minor part of the project. **CR12**: Please include an ESMP, together with implementation arrangements and M&E provisions, which will contain the elements described in the table provided in p. 95, expanded to the potential additional risks mentioned above, i.e. relevant to child labor, heritage and natural habitat. The ESMP is required for category B	**CR12:** Not addressed. However, additional information on risks related to child labour, heritage and natural habitat were not provided, as requested.

		projects for which the proposed activities requiring environmental and social assessment do not represent a minor part of the project.	
Resource Availability	1. Is the requested project / programme funding within the cap of the country?	Yes.	
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	Not, it has been set at 9.29% of the total budget. **CAR1**	**CAR1:** Addressed.
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?	Not, it has been set at 10.38% of the total budget. **CAR2**	**CAR2:** Addressed.
Eligibility of IE	4. Is the project/programme submitted through an eligible Implementing Entity that has been accredited by the Board?	Yes, ADA is the National Implementing Entity for Morocco.	
Implementation Arrangements	1. Is there adequate arrangement for project / programme management?	Yes.	
	2. Are there measures for financial and project/programme risk management?	Not adequate. Please provide a risks table, with an explanation of the risk identified, its category (financial, institutional, environmental…), the level of risks and the mitigation measures. Those risks will be monitored annually and information on how they have been mitigated throughout the project implementation will be provided annually through the Project Performance Reports. **CR13**	**CR13**: Addressed.

	3. Are there measures in place for the management of for environmental and social risks, in line with the Environmental and Social Policy of the Fund?	Yes. However, although the proponent has come a good way towards meeting the requirements of the ESP and has correctly identified most of the risks and has provided elements for an ESMP, the risk assessment should be expanded to the issues mentioned under CR11 above, and a formal ESMP prepared, together with implementation arrangements and M&E provisions.	
	4. Is a budget on the Implementing Entity Management Fee use included?	No. **CAR3**	**CAR3**: Addressed.
	5. Is an explanation and a breakdown of the execution costs included?	No. **CAR4**	**CAR4**: Addressed.
	6. Is a detailed budget including budget notes included?	Not adequate. Budget notes detailing the budget items are not provided. **CR14:** Please provide budget notes, including the costs per infrastructure and providing justification for the costs of technical and feasibility studies.	**CR14**: Addressed.
	7. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-disaggregated data, targets and indicators?	Not adequate. A budgeted M&E plan is not provided. **CAR5** Also, the results framework does not provide any sex-disaggregated indicator target, where feasible. **CAR6**	**CAR5**: Addressed. **CAR6**: Addressed.
	8. Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function?	No.	Addressed.

	9. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	Yes. However, please use the AF alignment table template and provide adequate indicators to support demonstration of the alignment. **CAR7** **CR15**: Also, please provide information on the relevant Adaptation Fund core indicators, as requested by the Board. Please see AF document "Methodology for Reporting Adaptation Fund Core Impact Indicators" : https://adaptation-fund.org/sites/default/files/AF%20Core%20Indicator%20Methodologies.pdf	**CAR7**: Addressed. **CR15**: Addressed.
	10. Is a disbursement schedule with time-bound milestones included?	No. A chronogramme of outputs table is provided instead. **CAR8**	**CAR8**: Addressed.

Technical Summary	The project seeks to improve the adaptability of populations in Oasis areas in the face of climate change, by increasing the adaptive capacity of local actors and by disseminating knowledge management. The project will implement concrete adaptation measures in Moroccan oasis areas, including the rehabilitation of irrigation canals and related structures, the rehabilitation of "khettaras" (traditional irrigation galleries), the enhancement of the value chain of oasis agricultural products and promotion of non-agricultural economic activities with young people and women that would help to create sources of incomes related to sectors that do not put pressure on natural resources, activities to improve the ecosystem resilience, as well as capacity building and knowledge management activities. The intervention zones of the project cover the Intermediary Gheris Basin and the Maïder Basin. The number of beneficiaries is expected to be about 40,000 people. The initial technical review found that while most of the activities of the project were adequate to address the identified climate change adaptation challenges, the proposals presented many gaps that needed to be fulfilled. This included the lack of consultation and commitment of the beneficiaries for the maintenance of the infrastructures to be built under components 1 and 3, the need for more information regarding the activities under Component 3, the need to widen the knowledge management component to the national level, a lack of budget notes and sex-disaggregated data in the results framework. The revised proposal has adequately addressed all of the clarification requests (CRs) and corrective action requests (CARs) made, except the one related to compliance with the E&S Policy, through the submission of an Environmental and Social Management Plan.

	The following observation is made: (i) The proposal should include an ESMP, together with implementation arrangements and M&E provisions, which will contain elements on compliance with the Environmental and Social Policy, including risks associated with interfering in the existing hydrology of the area for the principles of natural habitats, biodiversity, heritage, land and soil. The ESMP is required for category B projects for which some of the proposed activities require environmental and social assessment.
Date:	16 September 2014.

Royaume du Maroc

ROYAUME DU MAROC
Ministère de l'Agriculture et de la Pêche Maritime

وكالة التنمية الفلاحية
AGENCE POUR LE DEVELOPPEMENT AGRICOLE

الوكالة الوطنية لتنمية مناطق الواحات و شجر الأركان
ANDZOA
Agence Nationale pour le Développement des Zones Oasiennes et de l'Arganier

ADAPTATION TO CLIMATE CHANGE

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Project of Adaptation to Climate Change – Oases Areas

September 10th, 2014

ADAPTATION FUND

Project of Adaptation to Climate Change-
Oases Areas

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

Acronyms

ADA	Agency for Agricultural Development
ANDZOA	National Agency for Development of Oases and Argan Tree Zones
AUEA	Association of Agricultural Water Users
CEI	Call for Expression of Interest
CERKAS	Center for the Restoration and Rehabilitation of Atlas and Sub-Atlas Zones
CLE	Local Water Council
CTB	Belgian Technical Cooperation
CT	Work Center
DNM	Department of National Meteorology
DPA	Provincial Direction of Agriculture
DWS	Drinkable Water Supply
EIG	Economic Interest Group
ESA	Environmental Strategic Assessment
ESMP	Environmental and Social Management Plan

GIEC	Intergovernmental panel on Climate change
HBA	Hydraulic Basin Agency
INDH	National Initiative of Human Development
INRA	National Institute for Agronomic Research
IRD	Integrated Rural Development
JICA	Japanese International Cooperation Agency
MAPM	Ministry of Agriculture and Maritime Fisheries
MP	Master Plan
OFPPT	Office of Vocational Training and Employment Promotion
ONCA	National Agricultural Council Office
ONEE	National Office of Water and Electricity
ONEP	National Office of Drinkable Water
ORMVA	Regional Office of Agricultural Development
PADO	Plans for Adapting and Developing the Oases
PCD	Municipal Development Plans
PCM	Project Cycle Management
PMU	Project Management Unit
PMV	Moroccan Green Plan
POT	Program Oasis Tafilalet
RCC	Regional Coordinating Committee
SEEE	Secretariat of the State of Water and the Environment
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category: Regular
Country/ies : Morocco
Title of Project/Programme : Project of Adaptation to Climate Change– Oases Zones-
PACC-ZO
Type of Implementing Entity : NIE
Implementing Entity : Agricultural Development Agency
Executing Entity/ies : National Agency of Development of Oases and Argan Tree Zones
Amount of Financing Requested: 9 970 000 (in U.S Dollars Equivalent)

Project/Programme Background and Context:

In Morocco, observations over the past three decades (1976-2006) have shown warning signs of likely impacts of expected climate change: frequency and intensity of droughts, unusually devastating floods, decrease in the length of snow coverage on peaks in the Rif and Atlas mountains, changes in the spatial and temporal distribution of rainfall, and an overall net decrease in the amount of rainfall collected, and high summer temperatures. Some of these events have already taken social, economic, and environmental tolls on Morocco.

Morocco is suffering from more frequent and severe periods of drought that are exacerbated by an ever-increasing demand for water. The past century has been marked by over forty years of drought accompanied by extreme changes in temperature. In just a twenty year period (1980-2000), there were two droughts lasting four years, and one lasting three years, which took a serious toll on agricultural productivity (over 50% decrease in yields).

Over the last three decades (1976-2006), Morocco has also experienced random fluctuations in precipitation (haphazard succession of dry and wet years) on top of an overall net decrease in collected rainfall. This decrease varied between -3% and -30% depending on the region. Furthermore, over the past two decades, Morocco has witnessed a higher frequency of extreme weather. Torrential rainfall with floods caused extensive damage in the province of Errachidia in August 2006 (region of Merzouga), in the east of the country in May 2007 and more recently once again in the province of Errachidia in October 2008 (Gourrama and Boudnib regions) and in the north of the country (Tangier, Tetouan, Nador, etc.).

Analysis of Moroccan climate data during the past quarter of a century reveals a high variability of the country's climate, with warming trends and a decrease in rainfall. Over the course of the last forty years, the overall air temperature in Morocco (with all seasons taken into consideration) has increased an average of +0.6 to +1.4°C depending on the region. This increase has been evident since the 80's and 90's (during which global warming was accentuated by the frequency of droughts).

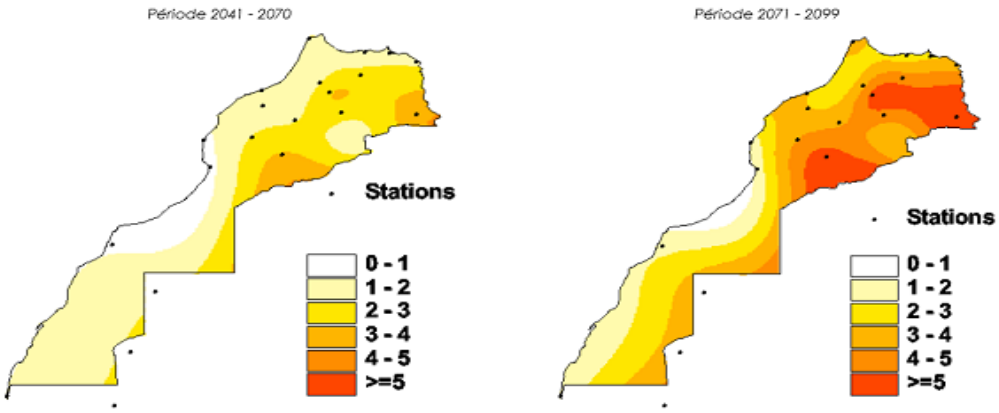
According to the IPCC methodology, and included in the Initial National Communication for Morocco to the UNFCCC[1] (2001) for the development of climate scenarios in Morocco, the following results were given for the 2020 horizon:

- A clear trend in the increase of the average annual temperature between 0.6°C and 1.1°C.
- A 4% reduction in the average annual rainfall by 2020, compared to the year 2000
- An increase in frequency and intensity of frontal and convective storms in the north and to the west of the Atlas mountain range
- An increase in the frequency and intensity of droughts in the south and eastern parts of the country
- Unpredictable seasonal rainfalls (winter rains are concentrated over a short period)
- A decrease in the duration of snow cover and retreat of the snowpack (an increase in altitude of 0°C isotherm and accelerated snow melt).

Climate predictions during the 21st century project a worsening situation, as shown in the following temperature and precipitation maps compared to the period between 1961 and 1990.

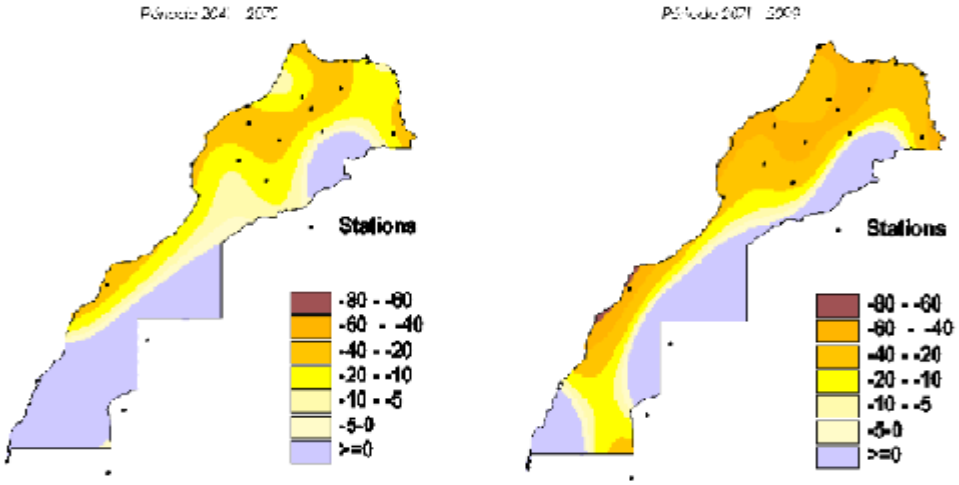
[1] UNFCCC : *United Nations Framework Convention on Climate Change*

Figure 1: Average annual temperature changes projected (°C) in 2080/2090 compared to those in 1980/1990



Source: http://www.minenv.gov.ma/PDFs/CLIMAT/changements_climatiques.pdf

Figure 2: Projected Changes in Average Annual Precipitation (°C) in 2080/2090 compared to 1980/1990



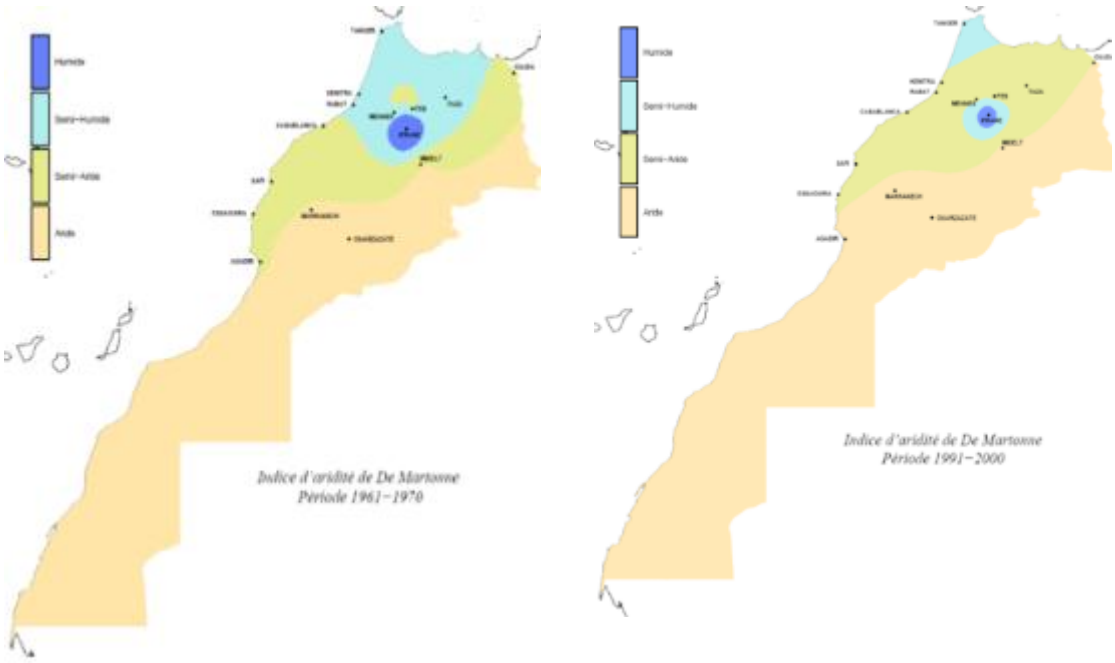
Source: http://www.minenv.gov.ma/PDFs/CLIMAT/changements_climatiques.pdf

These projections are confirmed by the results of the Second National Communication (currently being finalized) that give as global climate change projections for the annual average temperatures increases of +0.6°C, +1.8°C, and +3.2°C for the 2015, 2045, and 2075 horizons respectively. Heat waves will become more frequent and severe across the entire country. Average annual rainfall is projected to decrease by -6%, -13%, and -19% for the 2015, 2045, and 2075 horizons respectively.

The recent prospective study on the impact of climate change on crop yields in Morocco by the end of the 21st century, conducted by the Ministry of Agriculture

and Maritime Fisheries (MAPM) and the World Bank (BM), in collaboration with the National Institute of Agronomic Research (INRA), the United Nations Food and Agriculture Organization (FAO) and the National Department of Meteorology (NDM) confirm the future climate projections on Morocco and indicate that the decrease in rainfall and increase in temperature will gradually increase the country's aridity (see Figure 3). The increased aridity will have negative impacts on crop yields, particularly after 2030, and it will be non-irrigated crops that will bear the brunt from climate change. This study also shows that technological progress (improving crop yields in arid and semi-arid conditions), irrigation (water management on agricultural plots, catchment, and the region) and land use based on their agricultural use are important keys for adapting to climate change.

Figure 3 : The increase in arid and semi-arid climates in the north of the country in 1991-2000 compared to 1961-1979



Water management is one of the biggest problems affecting the future of Morocco, regardless of climate change. Irrigation is a strategic sector in Morocco and an important channel for development. The basic principle rests on the necessity for optimal management of water resources, given the decrease in availability and wasted water through outdated water recuperation and irrigation techniques. In this respect, the situation today in the oases in southern Morocco is dramatic, in that it foreshadows a significant acceleration in the effects of desertification with the deterioration, then the loss, and finally the abandonment of productive ecosystems that play important social, ecological, and economic roles for the region.

In these oasis environments, where the climate and hydrological situation is becoming increasingly sensitive due to unpredictable water availability across the region and throughout the year, water management is of vital importance. Especially in times of drought, which exposes the weaknesses of the current system and their effects across the entire country. Therefore, the oases are both the first to feel the impacts of climate change and the last line of defense in the country against desertification.

The Moroccan Oases

The oasis is a sustainable semi-arid to arid environment with precipitation that greatly varies from one year to the next and a strong continental climate character. The annual average precipitation is only 132 mm and there are barely twenty days of rain per year. Nevertheless, there are microclimates in certain valleys that manage to mitigate aridity due to the presence of vegetation and the protection of these valleys by high reliefs. The region is characterized by very random periods of rather violent flooding caused by localized rain and thunderstorms, which can cause considerable damage. They are more frequent as one moves from east to west across the county. The construction of reservoir dams (Mansour Addahbi on the Wadi Drâa and Hassan Addakhil on Wadi Ziz) has reduced the risk of these floods. While the erection of these dams has helped provide water on a regular basis to the Drâa and Tafilelt palm groves, it has severely limited the replenishment of groundwater reserves, particularly free groundwater, all along the course of the wadis and low-lying areas.

If the temperature conditions remain steady from one year to another, precipitation remains very irregular and the inescapable nature of flooding and droughts leave a lasting impact. Farmers live in a world where they at the same time expect benevolent rain and fear the random occurrences of flooding and droughts.

The power of winds increases the atmosphere's ability to evaporate and enables sands to be transported, which threaten high-value sites (Ksour, roads, agricultural land, irrigation infrastructure, etc.). This situation gives the zone the following general characteristics: arid climate and poor soils; harsh Saharan influences: wind erosion, sand storms, drought, and desertification; lack of groundwater resources, significant evaporation and water loss; and a remarkable diversity of fauna and flora, characterized by a dominance of native species.

Five (5) major wadis from west to east drain the region: the Drâa, the Rheriss, Maïder, the Ziz, and the Guir. Covering an area of 115,563 km^2 and an average flow of 25 m^3/s, this region only represents approximately 4% of the surface water sources in Morocco and only 5.7% of the global water supply. 93% of the resources have been mobilized, which means that the hydraulic system implemented is operating at full capacity and that the existing balance between population growth and resource use must be maintained. Uncontrolled population growth or programming irrigation projects consuming large quantities of water could disrupt this delicate balance. On the 1,102 million m^3 mobilized in the oasis zone, 98% is used for agriculture (75% of needs are covered) and the rest is reserved for drinking water. It is clear that before the scarcity of resources and the difficulty of mobilizing others, water saving techniques, particularly in agriculture, must be implemented as soon as possible and water saving must become a strategic objective for protecting the oasis zones.

The oasis zone in southern Morocco has 1.733 million inhabitants (5.3% of the national population according to an estimate in 2002) on an area of 115,563 km^2 (15% of the national land area), with a density of 15 inhabitants per km^2. This is a significant figure, considering that the utilized agricultural area (SAU) only covers 2% of this space and that the remaining 98% is almost completely desert. The density per hectare of SAU greatly surpasses the seven hundred inhabitants per km^2, but the

most remarkable fact is that this population has doubled over the past twenty years, despite its worsening economic situation. The region does not live off of its own economic base but rather benefits from money transferred from family members living abroad, which represents approximately 60% of the region's monetary income. The oasis populations are currently immersed in a vicious cycle of ecological degradation and impoverishment. As a result of the degrading ecosystem, the oases no longer provide sufficient means of subsistence and the oasis populations are forced to resort to seasonal migration and have an increased dependence on the income earned from migrating, which results in the abandonment of practices adapted for the oasis zone, and leading to a loss of environmental services – resulting in a continuous cycle of poverty. Indeed, while the influx of money from immigration ensures the maintenance of parcels, the creation of economic projects, the maintenance and construction of houses and the consolidation of family budgets, it is also the source of regional transformations.

The biological, cultural, and architectural diversity found in the oases offers exceptionally rich and varied landscapes, which play a wide range of environmental roles and provide a multitude of social, environmental, and economic goods and services. The oases have the assets needed for developing various human activities, such as agriculture, grazing pastures, tourism, handicrafts, and industry. However, this potential is trapped in a restrictive context and a fragile environment. Severe weather, low resilience, and water scarcity have led humans to use traditional systems for producing food and goods, which helped them develop traditional skills for mobilizing water (khettaras, etc.), for agriculture (adopting an intensive 3-level vegetation system integrated with raising livestock and creating artisanal products), and for managing natural resources.

The rapid population growth over the past few years and the radical change in lifestyle, in addition to the precarious economic situation, have placed a great pressure on natural resources. This pressure has resulted in intensified agriculture and excessive groundwater pumping. Wasting this rare resource is even more serious because it is often used to irrigate agricultural land with very low economic productivity and uses traditional methods of irrigation (gravity), which is known for using water inefficiently. This reality results in soil degradation, drying palm groves, the drying up of khettaras, and the overexploitation of water resources, therefore leading to a loss of agricultural productivity and agro-biodiversity. In addition to water shortages, viruses such as "Bayoud" pose serious threats for the future of the entire oasis ecosystem, wall(s) of vegetation, and the natural microclimates that protect against the advancing desert.

Today, environmental heritage, the major wealth of the productive activities in the Moroccan oases, which has already been weakened by recurrent periods of drought, and is subject to an arid climate and irrational modes of exploitation (overfishing, overgrazing, excessive water pumping, etc.), is now further degraded. This degradation process affecting the integrity of the ecosystems could eventually lead to the decline in goods and services, which the local population relies on for sources of income, and subsequently lead to the deterioration of the standards of living and the sociocultural destabilization of the local communities.

The oases are currently facing the additional challenge of climate change, which may bring with it even greater constraints (water scarcity, extreme weather events). A

study conducted by the Ministry of the Environment, Water, and Mines on the future scenarios on the oasis areas in the 2021-2050 horizon in terms of climate change yielded the following results:

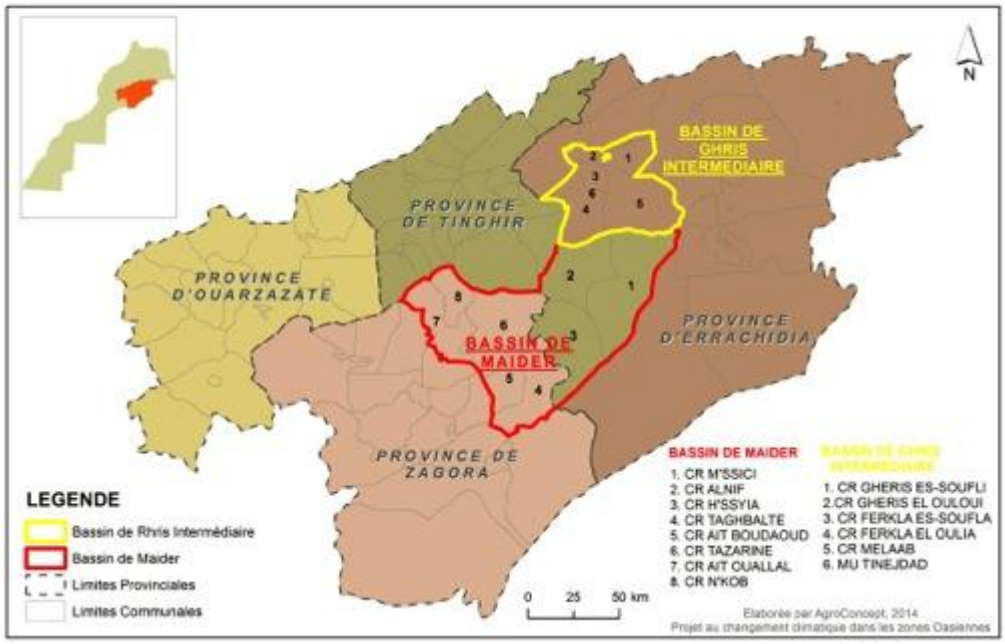
- A decrease in total winter rainfalls for the entire zone and associated with a decline in the number of wet days and heavy precipitation events.
- The magnitude of cumulative winter precipitation will be between 10% and 40% depending on the region and the number of wet days and heavy precipitation events will go from 5% to 30%.
- The magnitude of extreme winter weather will decrease as well over a large part of the zone.
- The spring season will experience a cumulative increase from 5% to 20%
- The zone will heat up during all seasons. Elevated temperatures, more pronounced during the summer, will vary between 1°C and 2.2°C.

Project Zones

Looking across the expanse of the Moroccan oasis zone, two zones that are particularly vulnerable to climate change, as will be demonstrated, and have different issues that are representative of those of the zone in general, particularly with respect to water, have been selected for the implementation of the project. The rest of the oasis area will be indirectly impacted by the diffusion of these adaptation models.

- **Intermediary Gheris Basin**: area located in the intermediary part of a catchment where water resources can still be mobilized for saving the palm groves with a potential for agricultural production.
- **Maïder Basin**: area located downstream of a catchment where the availability of water resources must be protected to ensure the preservation of the drinking water supply.

Map 1: Location of the Project Zones



Indeed, water plays an essential role in maintaining these oases, given that it:

- Provides direct survival to the population in the form of drinking water
- Ensures that the oasis agro-ecosystem is maintained by providing food security, income through agriculture and animal husbandry, and well being induced by the microclimate.

The specifics of the two project zones will therefore be presented by taking into account the following elements for each:

- The water situation given that it is the keystone to the survival of the oasis, and also the aspect the most vulnerable to climate change
- Demographic trends in order to understand the dynamics at work (the oasis being the result of human development)
- Economic activities to assess the oasis population's resilience to climate change.

The Intermediary Gheris Zone

Resources

The Gheris catchment extends from the foothills of the High-Atlas, where the Atlas tributaries originate in the Sahara to the south. The average annual rainfall on the High-Atlas Mountains ranges from 150 to 200 mm (PDAIRE, 1996)[2].

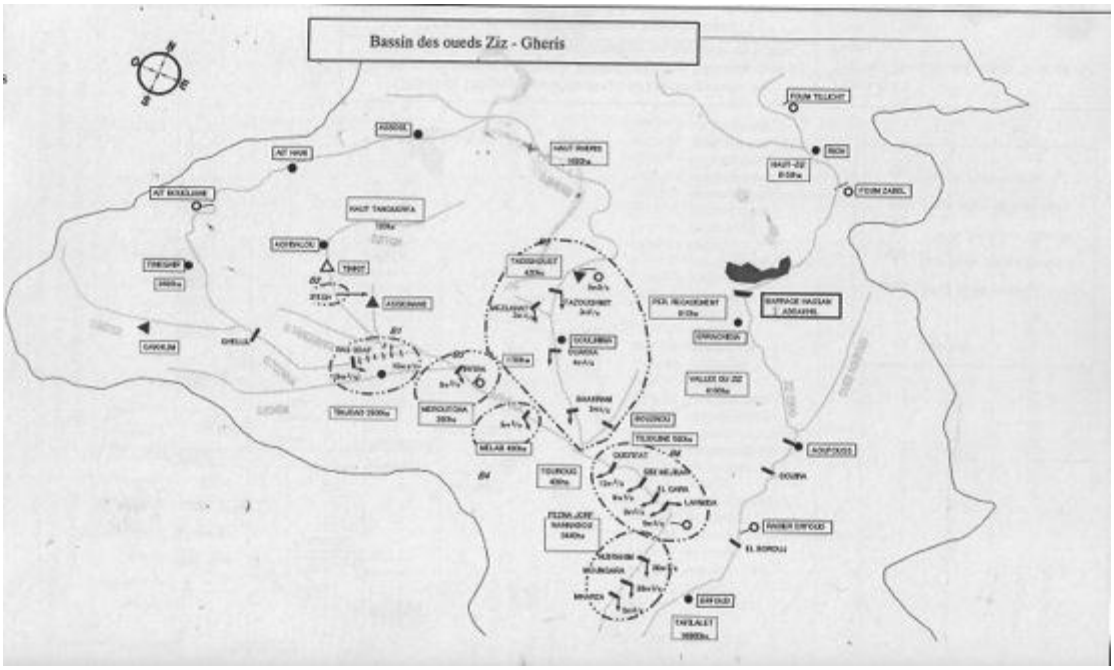
Four main wadis have sources in the High-Atlas from west to east:

- Wadi Todgha, which irrigates the Todgha Tinghir palm groves at the foot of the High Atlas and the Tinjdad palm grove, located at its convergence with Wadi Tanguarfa.
- Wadi Tanguarfa, which irrigates the Tinjdad Oasis and then after the confluence with the Wadi Todgha, and the Wadi Sate (source located on the Jbel Saghro in the Anti-Atlas), the Melaab and Touroug palm groves.
- Wadi Gheris, which has the largest catchment, irrigates the palm groves of the upstream part of the basin (Tadirhoust at the foot of the High Atlas), then the intermediary part of the basin – Goulmima, Ksar El Kebir, and Touroug.
- Wadi Tarba, which irrigates the Tarba palm grove and joins the Gheris to irrigate the downstream portion of the catchment (Jorf and Fezna).

The intermediary Gheris zone joins with the upstream portion of the Wadi Todgha, which then takes the name Wadi Ferkla, and Wadi Tanguarfa until its confluence with the Gheris (Map 1). It covers the municipalities of Tinjdad, Gheris El Ouloui, and Gheris El Soufli, Ferkla Oulia, and Ferkla El Soufla, and Melaab. This zone includes the palm groves that extend along the Tinjdad-Touroug axis. In this intermediary section of the basin, the palm groves are irrigated primarily from floodwater and from pumped groundwater (Table 1). They do not benefit from seasonal water sources provided from the upstream wadis, particularly the Todgha. In the event of drought, groundwater plays an essential role in saving the oasis (Pdaire, 1996; Kabiri, no date available).

[2] Sogreah, Scet Maroc, (1996). Etude du plan directeur d'aménagement des eaux des bassins sud-atlasiques. Mission 1, Etude des ressources en eau. MTP/DGH/DRPE, Juin 1996.

Map 2: Gheris Basin



Source: JICA, 2005b

Table 1: Palm Groves in the Intermediary Gheris Zone (in blue)

Wadi	Palm Groves	Area (ha)	Water
Todgha	Todgha-Tinghir	2440	Perennial surface water (sources) upstream (diversions and seguias) surface water (surplus) and ground water (khettaras, pumping) upstream
Ferkla	Tinjdad	2100	Diversions of floodwaters from wadi Ferkla. Dried up Khettaras. Ground water pumping.
Ferkla (upstream confluence of the Tanguarfa and Todgha-Ferkla wadis)	Ait Ben Omar, Ksiba N'Igouramene, Oumeira	300	Diversion of floodwaters of the wadi Tanguarfa. Ground water – Khettaras and pumping
Ferkla downstream (between the confluence of the Todgha-Tanguarfa their confluence with Wadi Gheris), 35km	Isilfde, Tamellalt, Melaab, Touroug	770	Diversion of flood waters from the Ferkla and Tanguarfa wadis – ground water – pumping and khettaras

Source: PDAIRE Study - Sogreah (1996)

The average annual rainfall in this zone does not exceed 100 mm and precipitation for generating permeation is limited to a few days per year. Effective rainfall generating runoff is limited to a water surface of about ten millimeters per year (PDAIRE, 1996). Water supply in this zone therefore relies heavily on the wadis flooding upstream from the basin, creating a direct application or replenishment of the groundwater reserves.

Numerous diversion structures harness the floodwaters. In the Intermediary Gheris Zone, approximately 25 different types of weirs (Figure) divert floodwaters to supply irrigated perimeters (Table 2).

Figure 4: Wadi Sate Weir

Table 2: Inventory of Major Works by Irrigated Perimeter

Perimeter	Municipality	Area Used	Name (output)	Type of Work
Palm Groves of North Tinjdad	Tinjdad	84	Tabahbout Goulmima Barrage Ouakka	Fusible weir Fusible weir Constructed weir
Tinjdad	Tinjdad-Ferkla	1822	Salma Tamazirt Gardmit	Fusible weir Constructed weir Constructed weir
Tinjdad	Tinjdad-Ferkla		Barrage Mohamed V Barrage Tairza Talat Satt	Constructed weir Constructed weir Constructed weir Constructed weir
Tinjdad	Tinjdad-Ferkla (wadi Ferkla right bank)		Lahsini Barrage Asrir Barrage Ait Hammou Barrage Assem	Fusible weir Constructed weir Constructed weir Constructed weir

Palm groves in south Tinjdad	Tinjdad	44	Lahsini Asrir Ait Hammou Assem	Fusible weir Constructed weir Constructed weir Constructed weir
Tilouine	Melaab	371	Ba Adram Bouzmou	Fusible weir Constructed weir
Touroug	Melaab	1173	Taghountest Talat	Constructed weir Gabion weir

Source Sogreah, Scet Maroc (2000)[3], JICA (2005b)[4], Kabiri (no date available)[5]

In some oases, a network of underground tunnels are used to mobilize groundwater located upstream of the oasis. Farmers in the 12th century introduced these underground tunnels, called khettaras, to move water by using gravity from groundwater sources to the surface. The khettara is managed by a traditional system for allocating water rights based on volume of works done by each claimant. The output of one khettara does not exceed 30 l/s and the area used by each is rarely more than 30 ha. There are 27 still functioning khettaras in the Ferkla zone (6 in the upstream section in Ferkla Oulia and 21 in the downstream section in Ferkla Essoufla) that mobilize the groundwater.

Table 3: Khettaras in the Gheris Intermediary Zone

Municipality	**Number of khettaras**	**Number of functioning khettaras (*)**
Melaab	40	12
Ferkla Essoufla	28	21
Ferkla Oulia	30	6
Gheris Soufla	12	6
Tinjdad	1	0

(*) Having a current output that is greater than zero.
Source: JICA, 2005a[6]

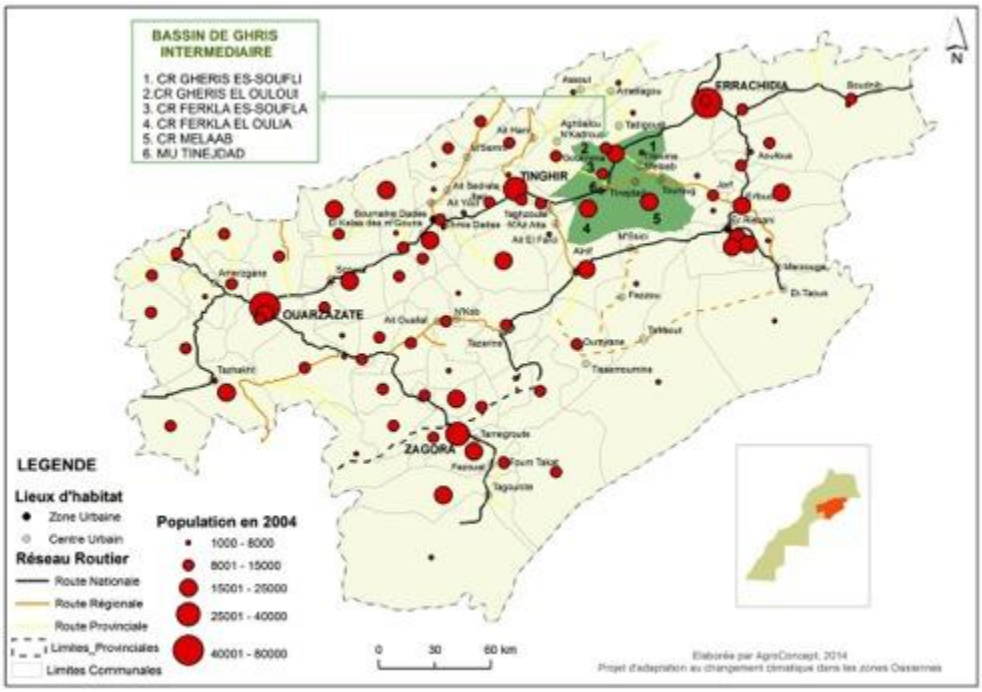
Pumping by motor-pump was more recently developed as a way to mobilize groundwater. Collective pumping stations were installed by the State during periods of drought in order to protect the oases. Pumping was then highly developed on the individual level through the introduction of motor-pumps in the 1970's and 80's.

[3] Sogreah, Scet Maroc (2000). Etude du plan Directeur de l'aménagement des Eaux des Bassins Sud-Atlasiques. Etude complémentaire des ouvrages de dérivation des eaux de crues. *Mission I* :Reconnaissance et inventaire.
[4] JICA (2005b). Etude de développement du projet de développement des communautés rurales à travers la réhabilitation des khettaras dans les régions semi-arides de l'est sud-atlasique au Royaume du Maroc. MADRPM/ORMVAT/JICA. Annexes.
[5] Kabiri, L. (non daté). Impact des changements climatiques et anthropiques sur les ressources en eau dans l'Oasis de Ferkla (Tinjdad, Goulmima, Errachidia, Maroc). UNESCO MAB.
[6] JICA (2005a). Etude de développement du projet de développement des communautés rurales à travers la réhabilitation des khettaras dans les régions semi-arides de l'est sud-atlasique au Royaume du Maroc. MADRPM/ORMVAT/JICA. Inventaire des khettaras.

Demographic

The distribution of the Intermediary Gheris Basin shows that most of the population is concentrated along the three main wadis that cross the basin (Wadi Ferkla, Tanguerfa, and Gheris), and their tributaries.

Map 3: Population Distribution in the Gheris Basin



The population living in the project zone represents 13% of the Greater Basin of Ziz-Gheris and has a growth rate of 0,9%, which is slightly inferior to the rate of the entire Greater Basin.

The Intermediary Gheris zone is being urbanized with population growth occurring in the cities. Indeed, Tinjdad registered even higher growth rate of 2.7% during the period of 1994-2004, as shown in the table below.

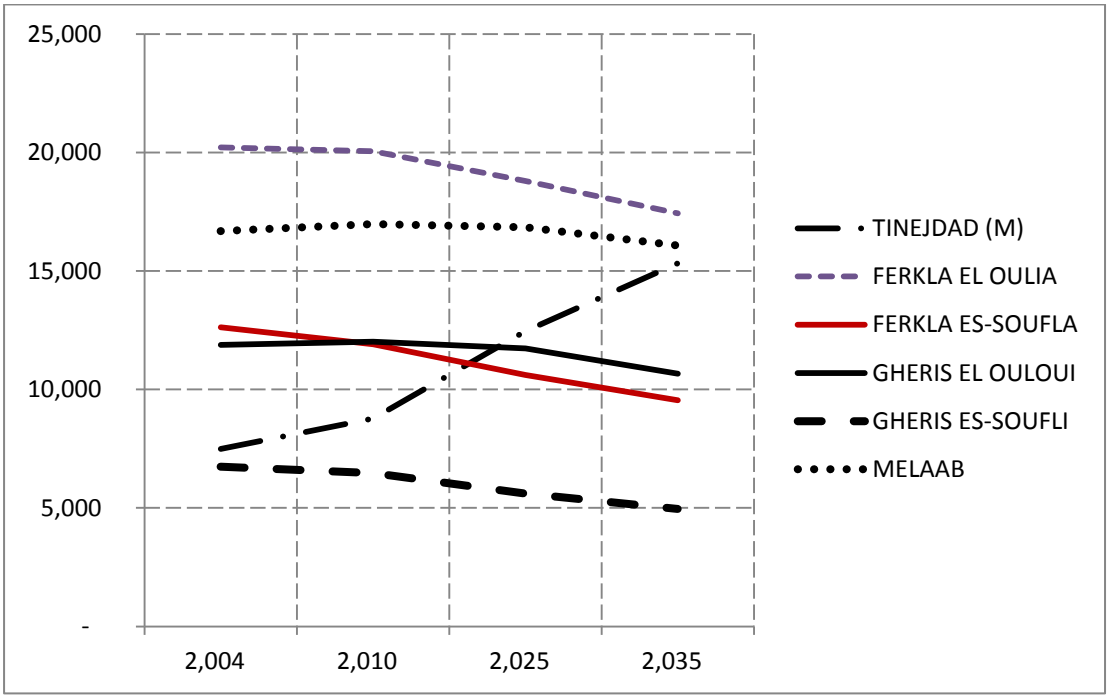
Table 4: Changes in the Population in the Intermediary Gheris Basin Between 1994 and 2004

Intermediary Gheris Basin	Population 1994	Population 2004	AAGR %
TINEJDAD (M)	5 755	7 494	2,70
FERKLA EL OULIA	18 889	20 214	0,68
FERKLA ES-SOUFLA	12 653	12 624	-0,02
GHERIS EL OULOUI	10 958	11 879	0,81
GHERIS ES-SOUFLI	6 521	6 742	0,33
MELAAB	14 604	16 681	1,34
Total rural	63 625	68 140	0,69
Total urban	5 755	7 494	0,7
Total Basin	**69 380**	**75 634**	**0,9**

(*) Annual Average Growth Rate
Source: RGPH 1994 and 2004

In terms of demographic forecasting, the results of population projections established during the PDAIRE update for the 2035 horizon show that the population in the project zone will go from 75,634 to 73,986 inhabitants between 2004 and 2035. The summary of these results by municipality reveals the differences in development between the municipalities in the basin.

Graph 1: Demographic Forecasting for the Municipalities of the Intermediary Gheris Basin for the 2035 Horizon



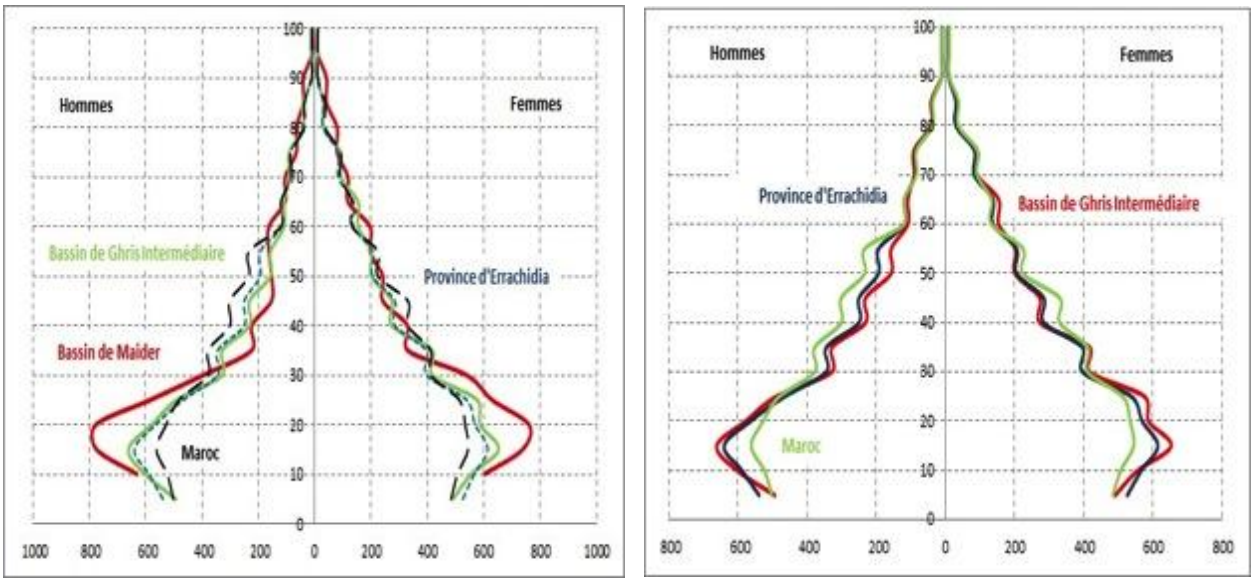
Source: Source: Guir-Gheris-Ziz Hydraulic Basin Agency, Update study by PDAIRE, 2011.

Only the municipality of Tinjdad show positive trend during the period of 2004 to 2035. The urban population will increase from 7,495 inhabitants in 2004 to 15,318 in 2035. At the same time, however, five (5) rural municipalities in the project zone record a downward trend according to the demographic projections. This difference can be explained by the population in the rural municipalities migrating towards urban centers in search of work. This phenomenon is accentuated during some years by the harsh climate making agricultural activity uncertain.

In 2004, the net rate of migration was -1%[7]. The graph below shows how these movements directly affect the structure of the population in terms of age and sex.

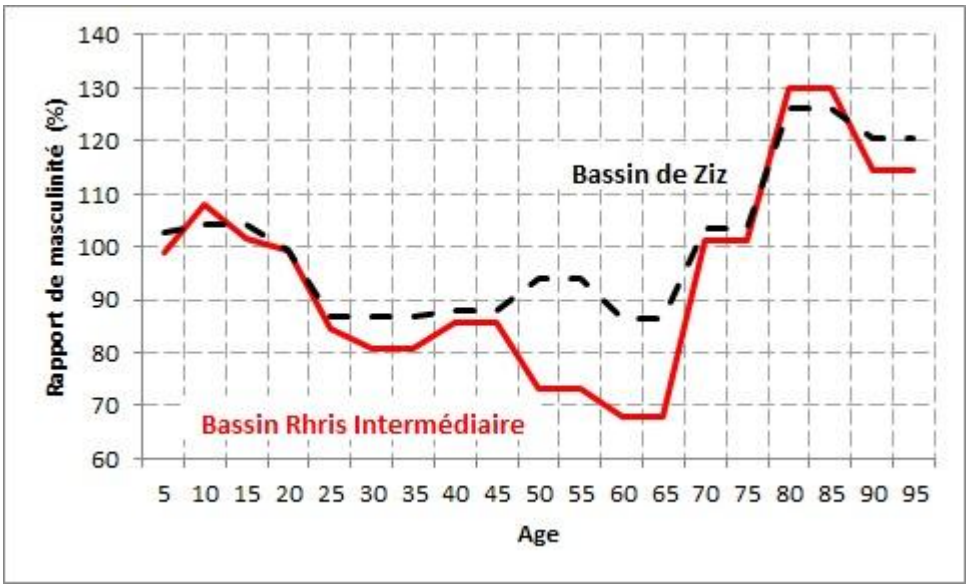
[7] Errachidia Hydraulic Basin Agency, "Update Study of PDAIRE", 2011.

Figure 5: Comparison of the Age Structures between the Intermediary Gheris and Maïder Basins, the Errachidia Province, and Morocco.



Source: Created using data from the High Commissioner for Planning, 2004

Figure 6: Male Ratio by Age in the Intermediary Gheris Zone



Source: Created using data from the High Commissioner for Planning, 2004

Indeed, emigration in the Intermediary Gheris Basin is nearly 100% masculine; particularly men of working age, between 25 and 70 years old. There is a trend for men over this age range to return. Therefore, the permanent population living in these oases is nearly all women, young children, and the elderly. These women remain the most affected by illiteracy, as nearly half the female population in these oases basins cannot read or write. As the main inhabitants of these oases, they are therefore the essential representatives of the project.

The effects of migration are also felt through construction work encroaching in on the interior of the valley and scattered across agricultural land, thereby affecting the palm grove landscape. In addition, this construction is now being done in concrete rather than mud, which is a sign of upward social mobility due to the transfer of money from emigration, but is not as well adapted to the climate conditions of the zone. There is also an increase in the construction of second homes, since migrants working and living in the city still keep a fond attachment to their "oasis" place of origin where their family house remains a place to reunite during religious holidays or vacations.
It should also be noted that there is another type of migrant who returns to the project zone after their children become financially independent or once they have launched an economic activity that provides them with a stable income. This type of migrant is, in addition to the active residents of the community (tour operators, community activists, etc.) a significant human capital and a partner that has the potential to be mobilized for implementing this project.

Economic Activities

This section will present the economic activities currently being used by the population given their available resources.

Agriculture and animal husbandry are the main economic activities in the zone, and therefore, they are the source of the most income for the resident population and they are also the main providers of employment for the labor force.
Monetary transfers from emigration supplement the sources of income of the population and play an important role in investing in core activities/offsetting potential declines in farm yields (or to maintain them). Indeed, a significant portion of the labor force is resorting to emigration either abroad or to other parts of Morocco.

Agriculture

Data on the agricultural areas are mixed and therefore make it difficult to have a clear vision of agricultural dynamics: extensions outside the palm groves, regression and abandonment of the palm groves, crop rotation practiced, etc.

The most recent data by municipality estimates that the irrigated area of the zone is approximately 6,000 ha (Table 5).

Table 5: Irrigated Areas by Municipality

Municipality	Irrigated SAU (*) (ha)
Ferkla Es-Soufla	855
Ferkla El Oulia	1337
Gheris El Ouloui	1000
Gheris Es-Soufli	1200
Tinjdad	217
Melaab	1535
Total	*6144*

(*) Workable Agricultural Land
Source: PDAIRE 2011

The introduction of pumping completely changed how land was used (Figure 7). For example, the Ghellil Plain located in the upstream section of the Wadi Ferkla (Map 2) only rarely received surface water and therefore it was only farmed during wet years. This plain was used by nomadic tribes mostly for grazing until the middle of the 20th century. Pumping was introduced during the colonial era but it was mainly developed in the late 1970's and truly took off during the 1980's and 1990's when families started settling in the plains. In 2000, there were 300 farms irrigated by pumping and approximately 2,000 irrigated hectares (de Haas, 2000[8]).

Figure 7: Extension of palm groves and watermelons using solar pumping in Tinjdad

The financial flow from emigration has played a significant role in the development of these investments (de Haas, 2006). In the Bour el Khorbat perimeter the number of wells is estimated at around 5000 (Kabiri, date not available).

The impact of the agricultural development through pumping continues to be difficult to evaluate and to isolate the impact of drought or climate change. Notably the impact on downstream water resources is rarely taken into account.

The majority of the farmers use subsistence farming since this activity is predominantly micro and small-scale holdings with an average zone of 1 hectare per

[8] de Haas, H., & El Ghanjou, H. (2000). *Développement agricole récente dans une zone aride sud-marocaine: la plaine de Ghallil (bas-Todgha)* (No. 11). IMAROM working paper series.

farm. Farmers whose total land is equally to or less than 5 hectares represent 98% of the total

For irrigated land, the majority (around 95%) of farms have the legal status Melk[9]. The rest of the farms are Habous[10]. The most common way to work the land is directly, which is the case for almost 85% of farms

Despite a more and more restrictive water resources situation, in particular during drought periods, farmers conduct their speculations and business/ activities in a very cautious fashion, and put in consistent effort to access water resources to irrigate their parcels

In the Gheris valleys, agricultural production is based on a three-tier system of cultivation with fruit trees, in particular palm dates and olvies, as well as low growing crops (cereals, fodder, legumes and produce)

In the lower Gheris, agriculutral production is based on a two-tier system of cultivation, the date palm and low growing crops (cereals, fodder and cash crops)

As for fruit trees, the date palm represents 35%-40% of the number of trees while olives represent around 30%: the rest is shared between almonds and other fruit trees.

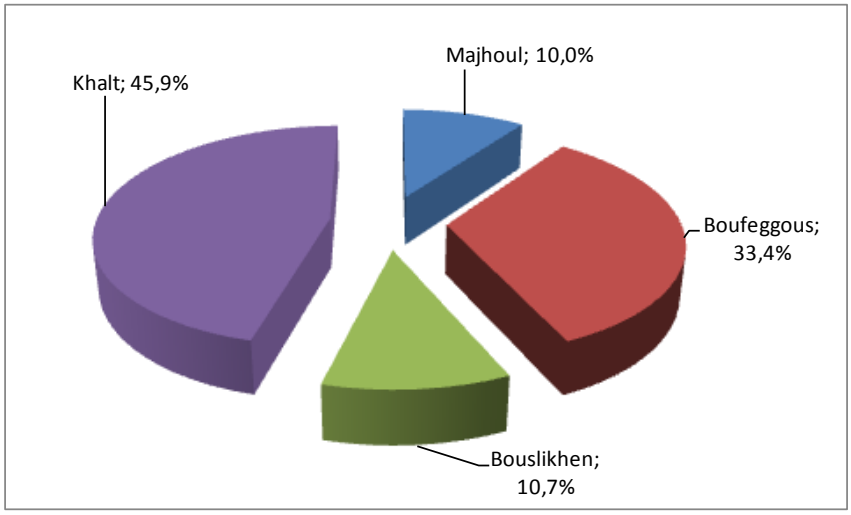
The main varieties of date palms found within the zone covered by EIG[11] are : Khalt, Boufeggous, Bouslikhen et Majhoul. For the EIG of Tijdad representing the Gheris zone, the “Khalt” variety reprsents 46% of the trees, where as “Boufeggous” represents 33%, “Bouslikhen” 11% and Majhoul “10%”.

[9] Melk: This plan shows the real estate property governed by Islamic law and Malikite rite. Often seen to be in opposition to State or tribal-owned property, private property governed by Roman law (usus, abusus, fructus), it is most often presented as inseparable from the appearance and development of capitalism.

[10] “The habous is a legal act by which a person, in order to please God, is stripped of one or more of his properties, normally buildings, and puts them out of business, by assigning them to a pious, charitable, or social purpose in an absolute manner that is exclusive of any restriction (habous public), by reserving the utilization of such property to one or several specific persons (habous family); in the extinction of beneficiaries, the habous family becomes a habous public” (Luccioni J., 1945).

[11] The data presented above comes from a study of a palm grove characterisation which formed the basis for creating the Economic Interest Group (EIG).

Figure 8: Distribution of the date palm trees by variety within the Tinjdad EIG



The average yield of a palm grove is around 15 to 20kg/ tree

For olive trees, 90% of the trees are the ‘‘Picholine Marocaine’’ variety and they have a dual purpose, table olives and oil. The average yield varies from 16 to 25 cwt/ha.
As for annual crops, soil use demonstrates the importance of cereals, which use 44% of SAU[12] (wheat, barley and maize) with yields varying between 17 and 25 cwt/ha for wheat, 13 and 20 cwt/ha for barley and 15 cwt/ha for maize.
The main fodder crop is the alfalfa using 13% of SAU with yields varying between 48 and 110 T/ha. The importance of alfalfa production and that of barley demonstrates the interest of animal husbandry in the zone.
The area covered by legumes (3% of SAU) and the produce crops (2.5%) remains limited and the subsequent production is, for the most part, for home consumption.
Cash crops are also cultivated but on very small areas, in particular henna and cumin are produced since they provide relatively significant incomes.
Le rendement moyen du palmier est de l’ordre de 15 à 20 kg/pieds.

Animal husbandry

The rearing of animals is one of the basis of the agricultral production system in the oasis, it makes use of the fodder crops and the by products of vegetable cultivation. Two types of animal usbandry are present in the zone: (i) extensive livestock rearing made up of mixed herds of ovines, caprines and camelides through a nomadic, semi-nomadic (based essentially on grazing) or sednentary system and (ii) intensive liestock rearing in irrigated zones with herds composed of bovines and ovines (D’man breed) conducted in fixed stalls and with small sized herds.

[12] Source: PDAIRE 2011

Other Activities

Handicraft economic activities are developed around the by products of animal husbandry, such as wool, fur and skins.

The intermediary Gheris zone is geographically situated in a tourist zone. As a result, it benefits from the regional development of tourism activities, which add to the populations' incomes who work as artisans, sellers and in activities linked to tourism

In addition, the Errachidia region is one of the main mining regions of the country with local populations receiving money from the industry.

The Maïder basin zone

The Maïder basin includes the municipalities and provinces of Errachidia, Tinghir and Zagora. The municipalities are then grouped together in three units each with their own capital.

Table 6: Organization of the Municipalities of the Maïder basin

Units	Municipality	Province
Alnif Unit	Alnif center, Rural Alnif, Hssia, Mcissi	Tinghir
Si Ali Unit	Sidi Ali	Errachidia
Tazarine Unit	Aït Ouallal, Tazarine, Nkob, Taghbalt	Zagora

Resources

The Maïder basin, which covers an area of 12,374 km2[13], is made up of the southern slope of Jbel Saghro, which is drained by the Taghbalt, Hssia, Fezzou, and Mcissi wadis. It is adjacent to the Dades basin to the north and the Middle Draa basin to the West.

From a hydrological point of view, the basin can be separated into two relatively homogenous sub-units[14]. The sub-basin of High Maïder and the sub-basin of Low Maïder

The non-diverted floodwaters naturally spread along the Maïder basin. This zone, grazing pasture in dry years, is made up of fertile soil and covers an area of 10,000 hectares. It is used by the Aït Atta tribe. Only exceptional high floodwaters are able to cross Foum El Maïder to reach the Gheris wadi[5].

The Maïder basin is on the whole, geographically part of the Gheris catchments. It forms the largest sub-basin of the Gheris, with the Maïder wadi the natural drainage point that joins the Gheris at Hassi Remlia. The surface is half relief, half plains made up of eroded materials and deposits.

The arid and semi-arid climate becomes Saharan in the south. The average annual rainfall is around 90mm/year. Precipitation varies from 200mm on Jbel Saghro, to 100mm on the first plains of N'Kob and Alnif, to 50mm on the plain downstream of Maïder[15]. On the peaks over 2000 meters, the precipitation is in the form of snow. In the plains, the maximum temperature is over 40° C in July and below zero in winter.
The extreme variability in the hydrological patterns is demonstrated through the contribution of two or three floods in autumn and spring estimated at 16Mm3. The

[13] CEDARS, 2013. ETUDE AEP Maïder, rapport de synthèse.
[14] Master plan: MASTER PLAN STUDY OF LAYOUT OF WATER IN THE SOUTH ATLAS BAISINS, 1998. MISSION 3: STUDY OF THE DEVELOPMENT PLANS Volume 3 Units Ziz-Gheris and Maïder 1998
[15] Representative Ministry responsible for water, RMRW, undated www.water.gov.ma . Presentation of the Hydraulic Basin of Maïder,

surface water contributed to the basin until its release reaches 68 Mm3/year[16], of which 25 Mm^3 is used[17], with variations that can cancel the contributions once every three[18] years. In the high basins at the latitude of Alnif and N'kob the average rainfall produces a more significant flow, with an average of 2 floods a year, which could justify the construction of flood deceleration dams.

Table 7: Main works for surface water usage

Type	Sub-basin	Site	Wadi	Date	Possible volume regulated	Capacity	Aims	Cost
					Mm3/an Mm3/year	Mm3		MDH
Existing	Maïder	Achbarou	Fezzou	1986		1	I, FW, FG	15
Planned	Maïder	Bouchama	Bouchama (Fezzou)		1.05		I, FG	
Planned	Maïder	Handour	Handour (Taghbalt)		0.95	7.7	FL	96
Planned	Maïder	Imin Touzra	Reg (Fezzou)		1.45	4.5	FL	32
Planned	Maïder	Khing	Khing (Hssia)		2.1	2.1	FL	45
Studied	Maïder	Assif Ouamrane				0.4	I, LW	20

I: Irrigation LW: Livestock watering, FG: Feeding groundwater, FL: Flood limitation
Source: ORMVAO, 2011. Spread of floods in the action zone of ORMVAO

The frequency that these structures replenish and last is becoming "less and less"

Within the Maïder unit, the known ground water resources are found in the upper aquifers of Mcissi, Fezzou, Hssia and Taghbalt and in the primary aquifers. According to the Master Plan, khettaras and boreholes that have a chronic lack of water exploit the potential of the Mcissi aquifer. The source of the Fezzou aquifer, which feeds the palm groves of Alnif and Fezzou, is drying up. The Hssia aquifer, which is located between the two sites mentioned above, also suffers from over exploitation. The Taghbalt aquifer, which feeds the N'Kob, Tazarine and Taghbalt palm groves, also shows signs of a lower water level.

Across the whole basin and since the beginning of the 90s, when the MP was written, the authors indicated that "all the ground water resources are used and even over-exploited and, considering the established changes, it will be necessary to

[16] CEDARS, 2013. AEP STUDY Maïder, Report summary
[17] ORMVAO, 2011. Spread of floods in the action area of ORMVAO
[18] Master Plan: MASTER PLAN STUDY OF LAYOUT OF WATER IN THE SOUTH ATLAS BAISINS, 1998. MISSION 3: STUDY OF THE DEVELOPEMNT PLANS Volume 3 Units Ziz-Rheris and Maïder 1998

take measures to improve the refilling of aquifers in a way to fight against the progressive, but already perceptible, drying up of the subterranean waters." [19]

The points of ground water extraction are, for the most part, wells and drilling (40%), followed by boreholes (10%) and khettaras (6%). Of all aquifers, 41% of the testing sites had mediocre water quality, 14% had poor quality water, 38% average quality and 7% good quality.

Table 8: Assessment of the subterranean resources supplying the Maïder basin

Type	Aquifer	Input	Output	Net
		Mm3/year	Mm3/year	Mm3/year
Upper aquifers	Mcissi	3.1	3.35	-0.25
	Fezzou	6.96	7.73	-0.77
	Hssia	4.94	5.36	-0.42
	Taghbalt	8.01	8.2	-0.19
Primary aquifer	Maïder			2.5

The 32 still functional khettaras are responsible for the continued mobilization of the ground water

Tableau 9: The khettaras of the Maïder zone

Municipality	**Number of khettaras**	**Number of functional khettaras (*)**
Alnif	57	19
Mcissi	14	6
Hssia	33	7

(*): Currently having a flow above 0
Source: JICA, 2005a

[19] Master Plan: MASTER PLAN STUDY OF LAYOUT OF WATER IN THE SOUTH ATLAS BAISINS, 1998. MISSION 3: STUDY OF THE DEVELOPEMENT PLANS Volume 3 Units Ziz-Rheris and Maider 1998

Agricultural Use

Traditionally, agriculture was conducted over around 5000 hectares downstream of the diversion weirs in the small perimeters irrigated by the seguias or by the khettaras, which use the underflow aquifers[20].

The massive return to individual pumping following the effects of drought in the 70s[21], transformed the fundamental characteristics of irrigation in the zone and the options for resource management. In the valleys and outside of the traditional palm groves, numerous small extension perimeters have been created around wells and boreholes.

In total, some 47 Mm3 are extracted from the surface water. The use of ground water in the irrigation sector is estimated at 42 Mm3/ year. Diagnostics established since the MP have shown that the Taghbalt site has been frequently damaged and the Mcissi site has practically silted up. Since then, there have been restoration works[22].

Table 10: Inventory of works for the use of irrigation resources in the Maïder basin

Type	Site	Wadi	Date	Capacity	Capacity	Date
				In ha	Mm3/s	
Diversion	Taghbalt	Tazarine		800 ha		1950
Diversion		Mcissi			1 m3/s	
Ground water	Tazarine			678 ha		
Ground water	N'Koub			682 ha		

Source ORMVAO, 2011. Spread of floods in the ORMVAO operation zone

Extraction of ground water benefits from the replenishment of the N'kob and Tazarine subterranean dams.

Drinkable water supply (DWS)

The ground water destined for DWS is used and exploited by ONEP (the national office of drinkable water) for the centers and capitals of the municipalities and by the douars associations, with dessert rates over 80%. The services supplied to the populations as regards DWS have experienced failures due to (i) the quality of water (Alnif, Hssia, Mcissi, in particular) owing to the nature of soils rich in mineral substances such as iron and sulphur and to (ii) the degraded quality of the channels which serve the distant douars, (iii) the absence or selective treatment of water and

[20] This is sitting groundwater linked to water courses. It develops in the sediment and the sub flow of wadis and remain on an impermeable substratum

[21] Master Plan: MASTER PLAN STUDY OF LAYOUT OF WATER IN THE SOUTH ATLAS BAISINS, 1998. MISSION 3: STUDY OF THE DEVELOPMENT PLANS Volume 3 Units Ziz-Rheris and Maider 1998

[22] ORMVAO, 2011. Epandage des crues dans la zone d'action de l'ORMVAO
ORMVAO, 2011. Spread of floods in the ORMVAO operation zone

(iv) the overall hydro-geological situation. The current needs have been estimated at 2.5 Mm3/year with a slight tendency to increase[23].

Maïder/Province	2020	2030
	Mm3	Mm3
Zagora	1,36	1,41
Tinghir	1,33	1,39
Errachidia	0,07	0,06

Assessment

The assessment of resources/ uses of the water (resources) experienced major supply and demand changes following the droughts of the 70s. The MP mentions "catastrophic repercussions" on all of the palm groves in Maïder.

In terms of resources, the reduction in surface and groundwater input/ contribution has placed the palm groves fed by traditional methods (seguias, khettaras) in a situation of chronic shortfall which cannot be compensated by the input of the several exceptional years, which have been registered since (2008).

Under these conditions, agricultural exploitation of water is redirected towards cultivation outside the traditional palm groves made possible with the private motor-pumps (henna, cumin, then vegetable crops), with consequences on:

- The resource (reduction in the stock of groundwater)
- The cost of exploitation (over-excavation, energy)
- Behavior (reduction in collaborative endeavors and development of mining habits implying frequent movement in search of water)
- And on the use of space (sedentary lifestyle, migration towards the zones in the North of the basin)

The tendency to deplete the stock, which normally would allow populations to cope with droughts, has resulted in a very tenuous balance for the effects of climate change.

Over the past few years, climate change and its unpredictability have led to modification in meteorological and rainfall conditions. The Oasis zones are expected to undergo a rise in temperature of 1.1°C by 2030 and 2.1°C by 2050. In the oases, these climate changes will be particularly felt through the following phenomena:

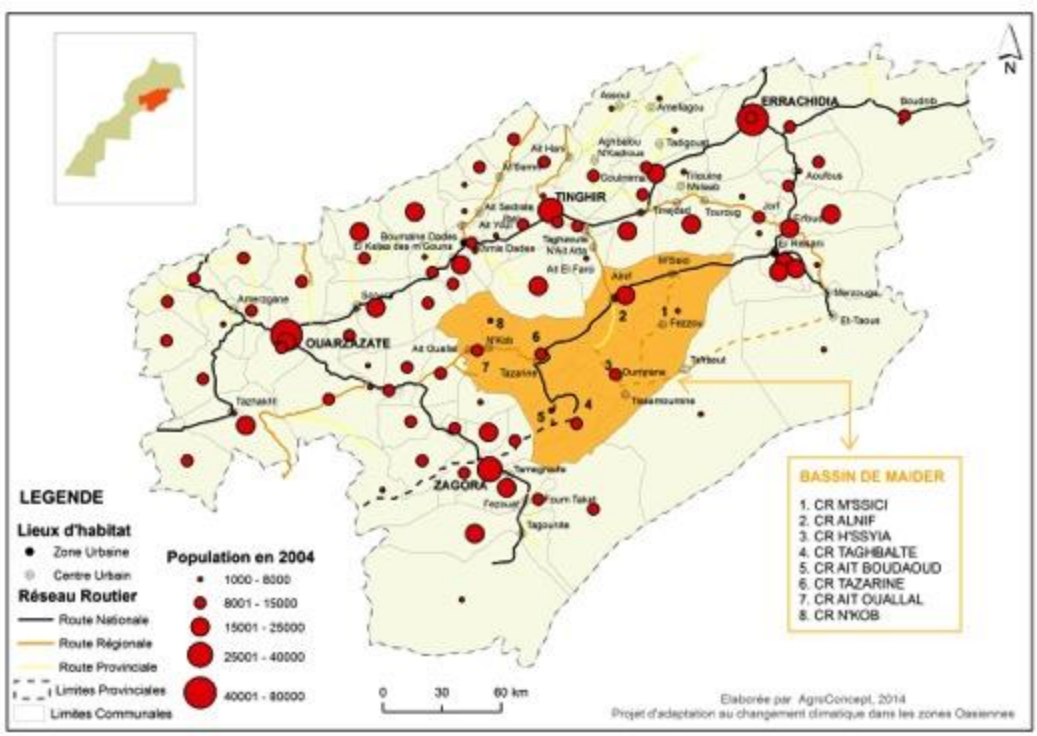
[23] CEDARS, 2013. DWS Maider study , Summary report

- Increase in the intensity of sunshine in the summertime and irregularity in the coming of the autumn rains.
- Changes in the vegetation cycle, crop varieties and their productivity
- Degradation in the quality of the dates because of periods of intense heat, early heavy rain storms, and floods.

Demographics

The population distribution in the project zone is spread along the main watercourses crossing the basin formed by the Taghbalte, Hssia, Fezzou and Mcissi wadis as well as their main tributaries. Over half the population is concentrated in the sub-basins found upstream. Thus, Alnif, Tazarine and Hssia represent respectively 25%, 17% and 14% of the total population in the project zone.

Map 4: Distribution of the population in Maïder basin



The population of the Maïder basin represents 13% of that of the Greater Guir-Gheris-Ziz basin and had a growth rate of 0.8% during the period 1994-2004, far inferior to the average in the wider basin. This weak demographic growth is partly explained by the rural character of the basin, migration is in the direction of the urban centers outside of the basin. In fact, the urban development of the basin is limited to the Alnif population center. The municipalities of N'kob and Ait Oullal registered a higher growth rate with 2.4% and 1.9% respectively for the same period, as illustrated in the table below.

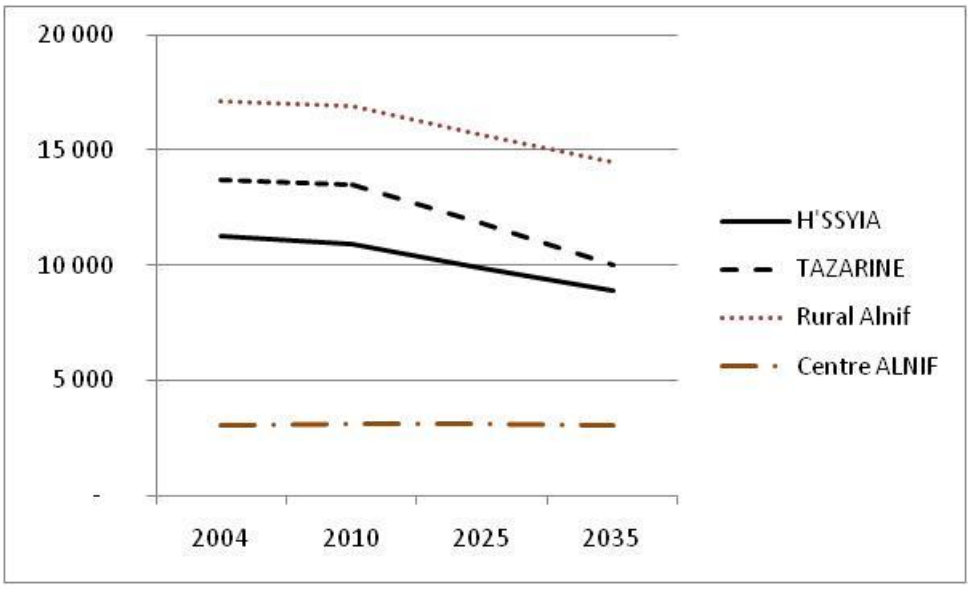
Table 11: changes in the population in the Maïder basin between 1994 and 2004

Maïder Basin	Population 1994	Population 2004	AAGR %
ALNIF	19.023	20.175	0,6
Rural population:	-	17.103	-
ALNIF urban center	-	3.072	-
HSSIA	10.151	11.237	1.0
M'SSICI	6.836	7.043	0.3
AIT OUALLAL	8.010	9.649	1.9
N'KOB	5.344	6.782	2.4
AIT BOUDAOUD	5.568	5.293	-0.5
TAGHBALTE	8.140	8.867	0.9
TAZARINE	13.134	13.721	0.4
Total rural	76.206	82.767	0.4
Total urban	-	3.072	-
Total Basin	76.206	82.787	0.8

Source: RGPH 1994 and 2004.

As regards demographics, the projection results for 2035 show that the population of the project will go from 82,787 inhabitants in 2004 to 68,629 inhabitants by 2035. The figures below establish the evolutionary differences between the municipalities of the basin.

Graph 2: Demographic projections of the main municipalities in the project zone for 2035.



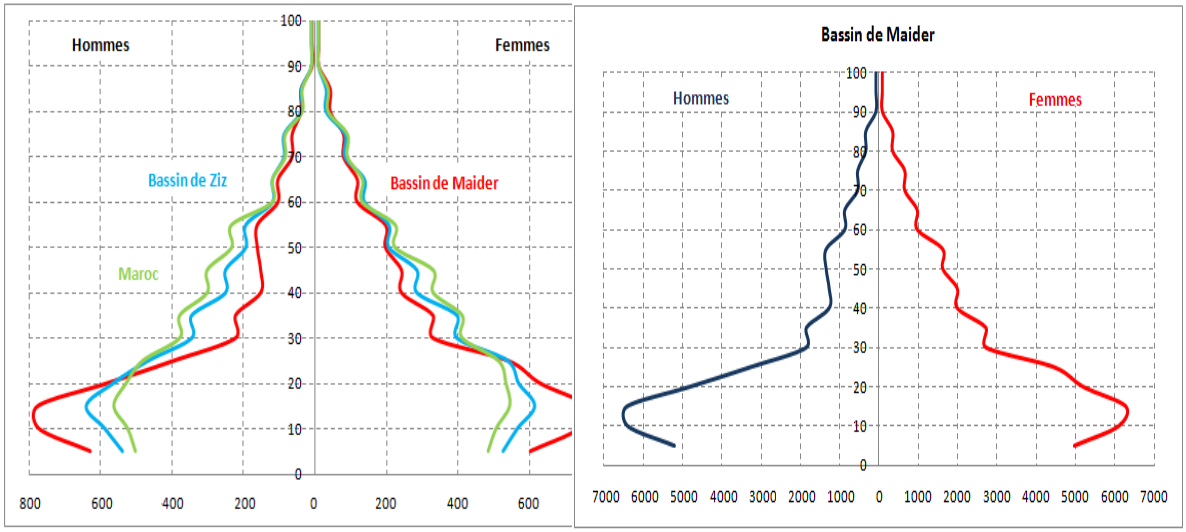
Source: Guir- Gheris-Ziz hydraulic basin agency, update study of PDAIRE, 2011.

It is noteworthy that only the center of Alnif will register a sustained upward evolution during the 2004-2035 period. The urban population will go from 3,072 in habitants to 3,082 by 2035. Whereas the rest of the rural municipalities in the project zone will together register a reduction during the same period. This indicates

a movement of the population in rural municipalities towards the urban centers of the zone.

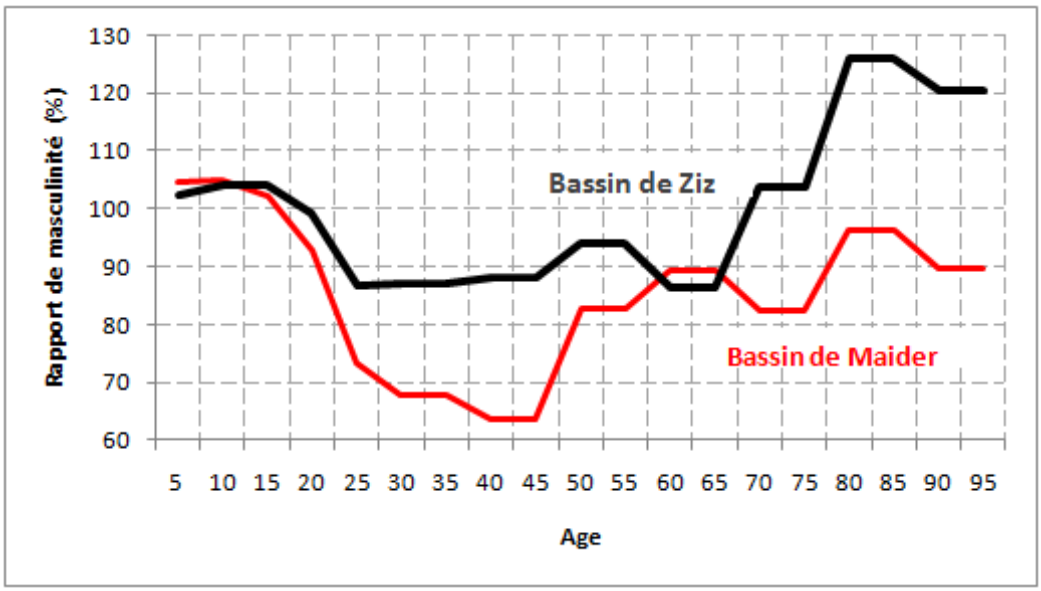
The graph below presents a comparison of the population structure by age and sex in the Maïder basis, in the Ziz basin, and at a national level.

Figure 9: Structure of the population by age and sex in the Maïder Basin



Source: Taken from the data of the High Commission for planning, 2004

Figure 10: Male ratio by age group in the Maïder zone



Source: Taken from the data of the High Commission for Planning, 2004

The age structure in the zone is characterized by an overrepresentation of women except for the age groups 0-15 and the over 80s. This situation is explained by migration, which predominantly affects active men. The male ratio confirms this situation and indicates that women are more numerous than men in the age groups (20-45 years) and to a lesser degree for the group (45-70). The weak ratio of men to

women for the over 70 age group, bears witness to the absence of a return phenomenon to the villages of origin of migrants as we have already established in the other project zone (Intermediary Gheris).

Economic Activities

As in the majority of oases, the combination of agriculture and animal husbandry constitutes the main economic activity of the zone, generating the main incomes of resident populations and employing the active population

Emigration to other zones of Morocco or abroad is a common practice; it has been increased by a succession of long dry periods. This emigration allows, through the monetary transfers, to complete the income sources of the resident populations.

Agriculture

The most recent data by municipality estimates the irrigated surface of the zone to be around 10,000 ha (Table 12).

Table 12: Irrigated zones by municipality

Municipality	**Irrigated SAU (ha)**
Tazarine	*1 361*
Nkob	*670*
Ait Ouallal	*1 359*
Ait Boudaoud	*1 272*
Taghbalte	*1 750*
Alnif	*1 515*
Mcissi	*1 200*
Hssia	*886*
Total	***10 013***

Source: Pdaire, 2011

The Maïder Unit is part of a zone characterized by the predominance of micro properties with 98% of farmers having an area smaller than or equal to 5 ha and an average area of 1ha per farm. It is therefore subsistence farming for the majority of users.

In the irrigated part of Maïder, Melk is the predominant legal status, which involves 95% of farms, the rest of the farms have the status of Habous. The most common way to work the land is directly, which is the case for almost 85% of farms.

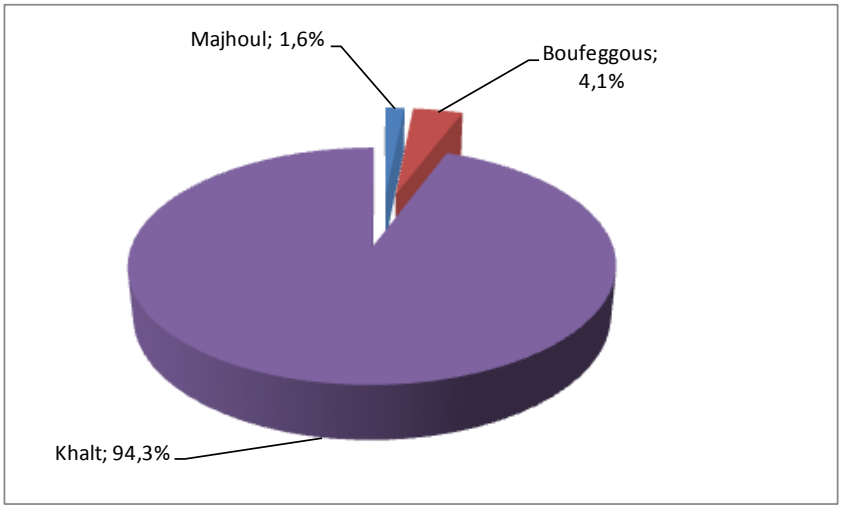
In the high Maïder, agricultural production is based on a three-tier cultivation system with frui trees, in particular palm dates and olives, as well as low growing crops (cereales, fodder, legumes and vegetable crops).

In lower Maider, the agricultural production is based on a two-tier system of cultivation, date palms and low growing crops (cereals, fodder and cash crops).

According to the most recent statistics which include both Maider and Gheris, the date palm represents nearly 40% of the number of fruit trees and olive trees represent around 30%.

The main varieties of date palms found in the zone are Khalt, Boufeggous et Majhoul. Thus for the Alnif EIG representing the Maider zone, “khalt” is the most common variety with over 94% of trees, against 4% for the “Boufeggous” variety and less than 2% for the “Majhoul”.

Figure 11: Distribution of palm date trees by variety at the level of the Alnif EIG



The average yield is around 15 to 20 kg/ tree.

90% of the olive trees are the ‘‘Picholine Marocaine’’ variety which is used for both table olives and olive oil. The average yields vary from 16 to 25 cwt/ha.

The usage of the soil for annual crops demonstrates the importance of cereals with 44% of SAU[24] (wheat, barley and maize) the yields vary from between 17 and 25 cwt/ha for wheat, 13 and 20 cwt/ha for barley and 15 cwt/ha for maize.

Tableau 13: Soil usage in the Maïder basin, 2011

Crops	Area in Ha	Number of trees
Cereals	4,195	
Fodder	1,393	
Legumes	657	
Vegetable crops	365	
Others	267	
Palm trees		41,000
Almond trees		3,010
Various plantations		46,500

Source: Update study of PDAIRE, 2011

The fodder crops take up around 13% of the SAU, the Alfalfa being the main fodder crop with a yield varying from 48 to 110 T/ha. The significance given to fodder cultivation and that of barley strongly demonstrates the interaction between vegetale production and animal production in the zone.

Designated primarily for home consumpotion, legumes (with 3% of SAU) and vegetable crops (2.5%) take up a limited surface zone.

Cash crops are also cultivated but on very limited area, in particular henna and cumin which generated relatively significant incomes.

Animal husbandry

Livestock rearing and its interaction with vegetable production constitutes one of th basis of the agricultural production system in the oasis in particular it makes use of the fodder crops and the by-products of vegetable crops. Two types of livestock rearing are present in the zone: (i) extensive livestock rearing made up of mixed herds of ovines, caprines and camelides through a nomadic, semi-nomadic (mainly based on grazing) or sednentary system and (ii) intensive liestock rearing in irrigated zones and composed of bovines and ovines conducted in fixed stalls and with small sized herds.

[24] Source: PDAIRE 2011.

Tableau 14: Distribution of livestock by species in the Maïder basin

Species	Head Count (*)
Bovines	1,490
Ovine	14,770
Caprines	10,670
Camelides	122
Equines	88

(*): Present in the ORMVAT zone

Source: Update study of PDAIRE, 2011

Other activities

Other than agriculture and animal rearing, tourism constitutes a job and income generating activity for resident populations. The Maider basin hosts an oasis that is the main crossroads between the three tourism areas of the South including Tafilalet, Drâa et Toudgha.

In fact, the study for drafitng the Communal plans for developement (PCD)showed that tourism, in all of the municipalties of the Maider basin, constitute a development lever whoses possibilities haven't been completely exploited (natural countryside, cultural heritage: ksours, khettara,…)

The fact that Tourism is mainly transit tourism means that the majority of the resources generated do not go to the municipalities: this is particularly the case with foreign tour operators (Marrakesh, Casablanca,…) and to a lesser degree by the neighbouring municipalities who provide food and accomodation (Erfoud, Merzouga…).

However, several tour operators offer various tourism products in particular in Alnif, N'Kob and Ait Boudaoud : « treasure hunt » tours of the geological and mineral miningn sites ; "heritage" tours which reveal the secreats of berber culture and its neolithic origins; 4X4 treks to discover the amazing landscapes all represent dynamic local initiatives for a type of responsible tourism in the project zone.

As regards other activities, it is significant to note the exisitance of local trade and artisanal activity which produces little in the way of products and income. In fact, numerous businesses are present, but the weekly souk remains the true heart of commercial activity in the zone. Local crafts (pottery, carpets) are little valued and soly for home use.

Vulnerability

In Morocco, the vulnerability analysis, conducted during project for adaptability to climate change for more resilient oasis, had as its aim the identification of the most vulnerable sectors and zones to climate change.

The approach is based on all a set of indicators for analyzing the impact of weakness on the territory (See the table below).

Table 15: Matrix for the analysis of vulnerability indicators

	Impacts					
Points of weakness	Water	Ecosystem/ Biodiversity	Soil/ Land	Agriculture	Tourism	Health
Flooding						
Drought						
Extreme temperatures						
Irregularities in precipitation						
Strong winds						
Drinkable water						
Management of water resources						
Salinity						
Land division						
Demographic pressure						
Migration						
Agriculture						

Source: Diagnostic-Assessment of climatic vulnerabilities and adaptability to the current situation, October 2011.

At the Gheris basin level, as in that at Ziz, the territory is susceptible to various climate risks, in particular floods, droughts, extreme temperatures, strong winds and poor distribution of rain.

The results of the vulnerability analysis demonstrate that the main activities of the local economy are vulnerable. In fact, the water sector, soil/ land, agriculture and tourism have a high degree of vulnerability. The fields such as the ecosystem and biodiversity as well as those of population are also exposed to the impacts of climate risks but to a lesser degree of vulnerability (see the figures below).

	Degree of vulnerability
Water	High
Ecosystems/ Biodiversity	Medium
Soil/Land	High
Agriculture	High
Tourism	High
Population	Medium
Health	Low

Figure 11: Vital zones of vulnerability by sector and environment

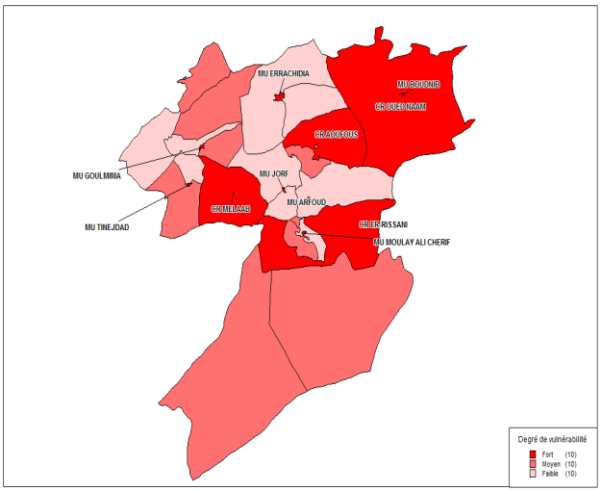


Figure 12: Vulnerability Map of the Province of Errachidia

In regards to the Maïder basin, the integration of different sensitivity factors allows the identification of the most sensitive sectors in particular water, soil/land and agriculture.

	Degree of vulnerability
Water	**High**
Ecosystems/ Biodiversity	**Medium**
Soil/Land	**High**
Agriculture	**High**
Tourism	**Medium**
Population	**Medium**
Health	**Low**

Figure 13: Vital zones of vulnerability by sectors and environment

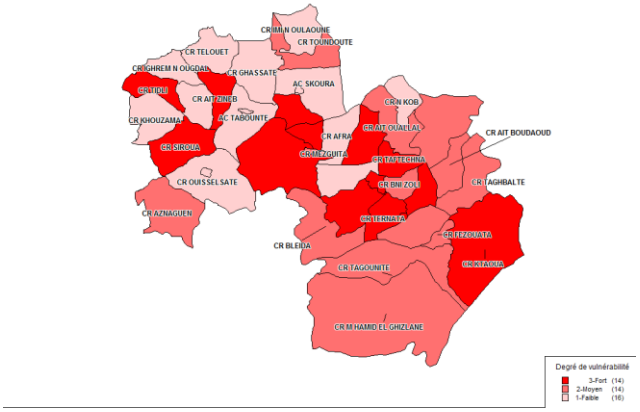


Figure 14: Vulnerability map of the Province of Ouarzazate

According to a World Bank study[25], the vulnerability of a territory is due to:

- Its degree of exposure to heat waves (depending on location and physical characteristics)
- Its socio-economic characteristics such as the presences of fragile populations (over 75 years, for example), which will affect its sensitivity to heat risk (risk of exposure)
- Its adaptability (established systems of prevention, access to emergency equipment…)

As has been demonstrated previously, the Moroccan oases, and more specifically the Maider and Gheris basins, which have been chosen, are vulnerable zones due to their exposure to climate change and their socio-economic characteristics.

This is why this project aims to improve the adaptability of these zones and their populations by working on above all else the water sector, but also on the resilience of populations through the diversification and strengthening of their economic activities and the resilience of the ecosystem in which they live.

[25] World Bank, Program of Analytical Support for the Climate Change Strategy of Morocco "Development of a concept of the vulnerability index to climate change and environment at the regional level : Morocco" December 2013

Project / Programme Objectives:

The overall objective of project is **to improve the adaptability of populations in Oasis areas in the face of climate change.**

Through following the subsequent specific objectives

- Improve the adaptive capacities of the water sector
- Diversify income sources and improve living conditions populations vulnerable to climate change in the targeted areas
- Improve the ecosystem's resilience in response to climate change and variability
- Improve the awareness of all stakeholders though the management and sharing of knowledge
- Strengthen the capacities of participants in the design and implementation of adaptation measures

Project / Programme Components and Financing:

The program components, expected outcomes and concrete outputs are summarized in the following table and are detailed and explained in part II. The budget by component is detailed according to each product (Table 16).

Table 16: Program Components and budget

Components	Expected Outcomes	Expected Concrete Outputs	Amount (US$)
1. Improving adaptive capacities of the water sector	1.1 Improved joint regulation of ground and surface water through new sustainable hydraulic and protective structure management	1.1.1 Replenishment structures for groundwater are built	1,150,000
		1.1.2 Structures for perimeters protection are built	700,000
		1.1.3 Feasibility studies on the exploitation of deep-water resources intended for the dried up palm groves of the Maïder basin are carried out.	800,000
	1.2 Vulnerable infrastructure allowing the improvement of water distribution efficiency are restored	1.2.1 Khettaras are restored	900,000
		1.2.2 Seguias are restored	300,000
	Technical assistance		429,400
Total component 1			**4,279,400**
2. Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted areas	2.1 Improved livelihoods of families due to the development of more resilient small scale agriculture	2.1.1 Conservation technics are circulated and adopted	250,000
		2.1.2 Oasis agriculture products are developed and promoted	500,000
	2.2Developed non-agricultural economic activities help increase the resilience of the Oasis population	2.2.1 Sustainable and responsible tourism, which faces up to climate change is developed	174,000
		2.2.2 Other economic activities, particularly for youths and women, are supported and developed	805,400
Total component 2			**1,729,400**
3. Improving the ecosystems' resilience in response to climate change and variability	3.1 Threats reducing the value of Oasis ecosystems are taken into account by municipalities	3.1.1 The fight against desertification is organized	300,000
		3.1.2 Techniques for environmental cleanup are developed	300,000
	3.2. Preserved and Promoted Heritage	3.2.1 Historic constructions are restored for new uses	360,000
		3.2.2. Traditional techniques and materials are reused for new constructions	50,600
Total component 3			**1 010 600**

4. Improving stakeholder awareness though the management and exchange of knowledge	4.1 Organized public debate on water and climate change	4.1.1 An assessment of resources in the intermediary Gheris basin and Maider is carried out	60,000
		4.1.2 A local council for water dialogue is operational	80,000
	4.2. Supported and developed local initiatives for communication	4.2.1 An awareness and communication strategy is developed	126,590
		4.2.2 A financing mechanism is implemented	100,000
Total Component 4			**366,590**
5. Strengthening the capacities of participants in the design and implementation of adaptation measures	5.1 Consolidated and developed adaptive capacities for climate change	5.1.1 the managers of public service are informed on the issues of climate change and introduced to adaptability measures for the main sectors	90,000
		5.2.1 Oasis beneficiaries are trained on innovative adaptability measures	150,000
	5.2 Strengthened coordinated management capacities for climate change projects	5.2.1 The participants (operators and beneficiaries) are trained in the designing and financing of projects	120,000
		5.2.2 The participants (operators and beneficiaries) are trained on the implementation and joint management of projects.	120,000
Total Component 5			**480,000**
Sub-Total			**8,315,990**
Execution Costs			**872,950**
Implementation Costs			**781,060**
OVERALL TOTAL			**9 970 000**

Projected Calendar:

Milestones	Expected Dates
Start of Project/Programme Implementation	October 2014
Mid-term Review (if planned)	October 2016
Project/Programme Closing	April 2019
Terminal Evaluation	December 2019

PART II: PROJECT/PROGRAMME JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

The overall objective of the project is to improve the adaptability of the Oasis populations to the impacts of climate change

The project aims to do this by improving, first of all the, adaptive capacities of the water sector in each of the project's two areas through an improvement of both surface and ground water management, and the efficiency of water distribution. Subsequently activities will be put in place, which aim to improve the living conditions of vulnerable populations through the diversification of income and to improve the resilience of ecosystems though their protection. Finally the project aims to contribute to better awareness of the impacts of climate change and to facilitate the retention of adaptability measures to these risks through the management of knowledge and the strengthening abilities. These activities will focus on 3 oases per zone (see section III A).

Component 1: Improving adaptive capacities of the water sector

In the small and medium hydraulic perimeters (SMH) of the Intermediary **Gheris** zone, the diversion of floodwaters is carried out according watershed between upstream and downstream though diversion infrastructure whose technology can vary from a simple fusible diversion weir regularly maintained by the users to a diversion dam with regulation infrastructures requiring management and specific maintenance, the investment in which can be taken care of by the State.

The khettaras network, allowing the caption of groundwater from the foothills destined for the supply of the oases downstream - system adapted for an arid environment – is threatened by the lowering aquifer levels, the lack of maintenance or even the risk of deterioration linked to climate change in particular desertification and deterioration of the wadis by flooding. The census of the khettaras showed a reduction in the number of functioning khettaras, which went from 570 to 308 between 1967-2000 (ORMVAT, 2007). According to the inventory carried out starting in 2003, 191 Khettaras out of 490 are functional (JICA, 2005a).

In the **Maïder Basin**, agriculture has traditionally been practice downstream of the diversion weirs within the small perimeters irrigated by the seguias or from the kettaras which extract underflow[26] groundwater.

[26] This is sitting groundwater linked to water courses. It develops in the sediment and the sub flow of wadis and remains on an impermeable substratum

The huge increase in individual pumping following the effects of drought during the 70s[27], has transformed the fundamental characteristics of irrigation in the zone and the resource management options. In the valleys and outside of the traditional palm groves, numerous small extension perimeters have been created around wells and boreholes.

In total, some 47 Mm3 are extracted from the surface water. The use of subterranean water in the irrigation sector is estimated at 42 Mm3/year. Diagnostics established since the MP have showed that the Taghbalt site has often been damaged and the Mcissi site has practically silted up. Since then, there have been restoration works, but since they are essential for feeding the palm groves, they should be continued.

For the entire basin, and since the beginning of the 90s, date of writing MP, the authors indicated, "all groundwater resources are being used and overexploited".
It is necessary, for the maintenance of these palm groves, to improve the refill of the aquifers in a way that fights against the progressive depletion of ground water, and to investigate the potential of existing deep-water resources

Climate change models anticipate on one hand an increase in temperature in the Oasis areas, which will lead to an increase in evapotranspiration and a general elevated scarcity of water resources. What is more episodes of short strong precipitation producing flash floods which could allow the recharge of groundwater or be used for the spreading of flood waters risk becoming more rare. Faced with these impacts of climate change, infrastructure allows the development of both surface and ground water management strengthening the adaptability of the system. On one hand it allows an increase in the system's flexibility and the optimization of resource management and on the other hand, promoting the mobilization of resources in priority zones. Adapted and functional diversion infrastructures are also indispensable for the efficient use of floodwaters for filling oasis. In this context, the replenishment of groundwater and its subterranean storage as well as the conservation of surface water through permeation seem to be the appropriate solutions to limit evapotranspiration and to use groundwater resources. The use of floodwaters through the spreading of floodwaters for filling aquifers that supply wells and khettaras also appears to be crucial.

The Gheris basin is characterized by a potential use of water resources, which could allow preserving the palm groves and their potential production. The total surface flow of wadi Gheris (105Mm3) is operating at 75% and the possible usage is estimated at 26Mm^3 (Figure). These resources could irrigate through submersion and the replenishment of the groundwater in areas where the level is considerably low (JICA, 2005b). The quality of groundwater, in general, is good with a concentration of dissolved salt less than 2g/l despite certain zones – Melaab in particular – having higher concentrations (JICA, 2005b).

[27] Master Plan : ETUDE DU PLAN DIRECTEUR DE L'AMENAGEMENT
DES EAUX DES BASSINS SUD-ATLASIQUES, 1998. MISSION 3 : ETUDE DES SCHEMAS D'AMENAGEMENT Volume 3 : Unites Ziz-Rheris et Maïder 1998

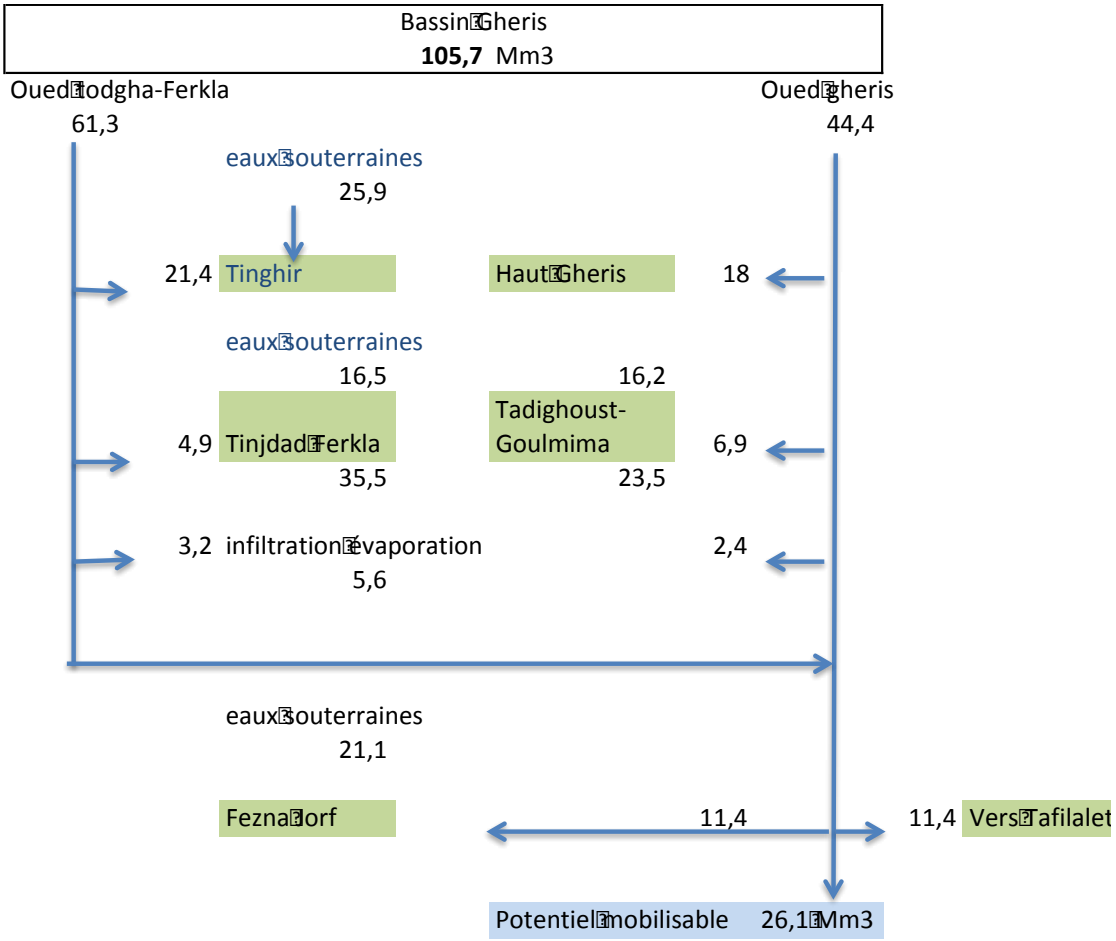


Figure 15: Assessment of water resources (Million m3) in the Gheris basin (Source: JICA)

In this basin where the water is not regulated by a dam, the use of floodwaters is thus essential, either through the spreading of floodwaters or through the refilling of aquifers. In fact, these aquifers play an important role in filling khettaras and the extraction points – from collective or private wells.

The major expected outcomes involve improving the regulation of groundwater and surface water and the efficiency of water distribution systems.

Outcome 1.1: Improved joint regulation of ground and surface water through new sustainable hydraulic and protective structure management

Mobilizing and restoring the groundwater aquifers will level off the progressive depletion of groundwater sources due to low inflows and climate change. Estimates show that appropriate surface treatments completing the spreading areas through penetration can increase the overall recharge, and subsequently increase the flow of hydraulic structures downstream. The planned actions aim to replenish the groundwater stock in the palm groves that have not reached the point of "no return".

This outcome consists in building new infrastructure allowing better regulation of access to surface and ground water and in protecting the infrastructures and irrigated areas from erosion. The construction of this infrastructure will be subject to a preliminary commitment from the beneficiaries in order to ensure the sustainability of the work carried out.

The continuity and sustainability of the service to supply water to the palm groves requires a new maintenance policy promoting the preservation of infrastructures and the sustainability of the under-lying service. Yet, in the current state, the maintenance problems of the infrastructure are often at the origin of the discontinuity of the water supply service, primarily due to the collective nature of the network. On one hand, the network being collective, the users are not encouraged to maintain this infrastructure; on the other hand the HBA doesn't have the means to complete all of the necessary maintenance for the good working of the infrastructure.
Thus, the lack of an adequate maintenance policy (preventative, regular) increases the risks of degradation in the infrastructures and the direct repercussions on the good working of the service, which would lead in the long term to significant and expensive renovation and restoration works.

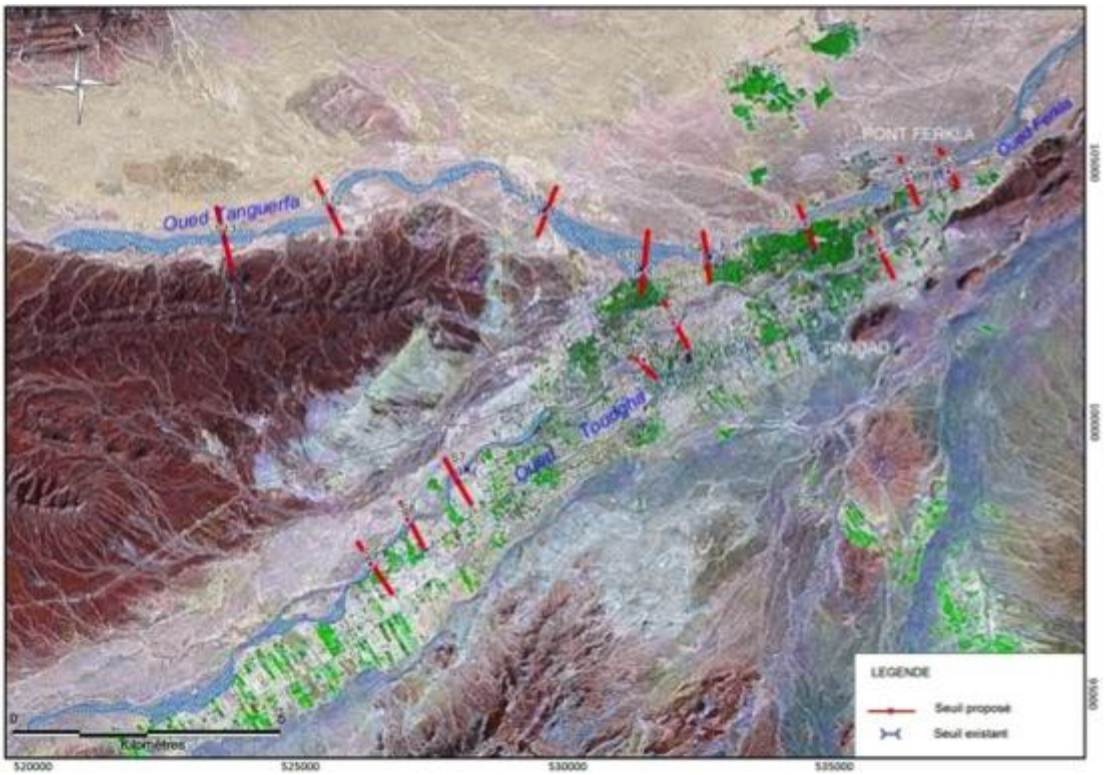
This is why the PACCZO project will build on and strengthen an infrastructure management and maintenance system developed through agreements for similar projects (Annex 1).
The maintenance includes planned and non-planned activities, which allow keeping of the equipment in good order. It includes infrastructure inspections, the prevention and repair of failures and potentially the restoration of one part of the infrastructure.

Output 1.1.1: Replenishment structures for groundwater are built

Different types of infrastructures allowing the slowing down of the river flow contribute to the replenishment of ground water all by limiting of evapotranspiration thanks to stocking water underground: weirs, hillside and underground dams. The most frequently used techniques on the subject are presented in the annex 2.

In the area of Middle Gheris, the Agency for Hydraulic basins carried out an inventory and analysis of potential sites for groundwater recharge weirs (Figure) on the basis of morphologic and physiographic criteria (ABHGZR 2010). The weirs identified cause a slowing in the spread of water flow and increase the area watered along wadi beds. 6 possible sites have been identified for groundwater recharge and the detailed pre-projects have been carried out.

Figure 16: Location of recharge weirs in the Tinjdad zone (Source: ABGZR 2010)[28]



Despite being part of the projects of the Agency for Hydraulic basins and of the State Secretary for Water and the Environment (SEEE), few groundwater recharge weirs have been constructed and these types of experiments remain innovative in Morocco. Thus the SEEE has only completed 4 groundwater replenishment structures in Morocco (in the province of Haouz) according to the annual report of the General Accounting Office (Cours des comptes 2011). The lessons learned from the completed projects in the framework of this project could also be useful for the stakeholders from the water sector, in particular the SEEE for their groundwater recharge program.
A capitalization study on this subject is expected in order to learn the lessons from the completed for this project and the other possible existing projects such as those of the underground recharge dam currently in construction at Skoura in the province of Ouarzazate.

The subterranean water resources of the palm groves in the North of the Maïder basin, not having reached the threshold of irreversible degradation must be preserved. To achieve this result, adapted constructions must be carried out in order to ensure the recharge. The potential recharge of the retention dams was estimated at 6 Million m^3 when these studies were conducted. The retention dams would have the capacity to release 1 to 2 m3/ second of water over a period ranging from a few days to 2 months, according to the size of the flood. The regulated volumes would increase by 50% in the seguias and 30% in the alluvial aquifer, the rest having evaporated. There are 5 sites identified for these dams according to the MP studies. The construction of subterranean structures is justified when the flow can be

[28] ABHGZR (2010). Etude de la recharge artificielle de la nappe de Tinjdad et des Khettaras (Jorf-Meharza). Mission II : Avant-projet détaillé du système de recharge artificielle.

recuperated and contribute to the maintenance of the free groundwater during the dry season. In the Maïder basin, the situation of shortage doesn't allow the contemplation of this type of intervention.

Activity 1.1.1.1: Carry out complementary studies[29] of groundwater recharge structures on the potential sites identified on the basis of water resources, the acceptability to the populations and the socio-economic interest.
The objective is to finish these pre-project studies by the HBA.

Activity 1.1.1.2: Build infrastructure with the greatest potential on the basis of acceptability to all users. Two structures per area will be built.
Two structures will be built in the Intermediary Gheris Basin in accordance with the pre-project study by the HBA. They will be selected out of a total six priority sites identified in these studies. Two flood-retaining structures will be built in the Maïder Basin according to the model presented in the Master Plan studies and updated by the HBA.

Activity 1.1.1.3: Purchase of the follow-up equipment (piezometers).
This activity is necessary for strengthening the HBA groundwater-monitoring network in the project zone and for upgrading in relation to the monitoring-evaluation requirements.

Activity *1.1.1.4:* Ensure the follow-up evaluation in coordination with the HBA.
This activity aims to strengthen the analysis of the data from the establishing piezometric monitoring system.

*Activity 1.1.1.5: E*stablish a maintenance agreement for the groundwater recharges structures.
Maintaining groundwater recharge structures requires a rapid mobilization of technical and human resources, which the agencies cannot provide without the participation of users or their representatives. The maintenance agreements will define the terms of this tripartite cooperation (project/agencies/users).

Output 1.1.2: Structures for perimeters protection are built

The severity of floods, which intensifies the impact of climate change, causes the loss of agricultural land in certain areas adjacent to rivers, which require protective intervention. Different techniques are implemented – gabions, protective walls etc.

Activity 1.1.2.1: Carry out complete technical studies of protective infrastructure in the priority sites identified on the basis of risks, of population mobilization and of socio-economic interest.
The objective of these studies is to work with partners to finish existing works in an attempt to ensure technical and economic consistency among the upstream interventions for recharging the groundwater in the Intermediary Gheris and Maïder basins.

Activity 1.1.2.2: Build priority infrastructure.
Applying the techniques selected for protecting perimeters in the supplementary studies, structures will be built with the support of technical teams and competent external services.

[29] These studies include the completion of the EIA (Environmental Impact Assessment) required by Moroccan law 12-03, but whose funding is included in the preparation of the ESMP.

Activity 1.1.2.3: Establish the maintenance agreement for perimeter protection structures.
Maintaining protective structures is an essential task that will become very expensive without the cooperation of services with the technical, human resources, and direct or indirect beneficiaries or their representatives. Maintenance agreements will determine the terms of this cooperation (Annex 1).

Output 1.1.3: Feasibility studies for the exploitation of deep-water resources intended for dried up palm groves in the Maïder basin are carried out.

Drinking water in the Maïder Basin is distributed from groundwater sources, whose water flow and quality are low. Studies conducted by the HBA, the Minister of Water (*Ministère Délégué Chargé de l'Eau* – MCDE), the POT project, and the municipalities highlight the need to explore groundwater resources by studying the feasibility of long-term solutions (transfer between sectors, transfer between basins, demineralization).

Activity 1.1.3.1: Carry out an exploration/reconnaissance study through drilling for deep-water resources. Two boreholes will be done.
The project will contribute to the completion of two exploratory boreholes selected out of five (5) pre-identified by the HBA in the zone. The 1996 Master Plan studies indicate that the first deep boreholes were explored in the mid 1930's and bore satisfactory results.

Activity 1.1.3.2: Carry out feasibility studies to identify priority sites and their financing.
The project will be based on the results of prospections and proposals for AEP project funding in the Maïder zone.

Outcome 1.2: Vulnerable infrastructure allowing the improvement of water distribution efficiency are restored

In the areas touched by the impacts of climate change, the occurrence of violent events (sever weather events) and the increase risk of silting up require better protection of the vulnerable structures in order to guarantee their good functioning. The restoration of hydraulic infrastructure and structures requires the organization of management and collaborative maintenance guaranteeing of the durability of the equipment. In fact, the restoration of this infrastructure together with the organization of management and maintenance measures could allow the improvement of water distribution. The choice of restoration projects will by subject to the implication and prior commitment of the users.

The khettaras and traditional irrigation channels no longer allow, in the areas where water resources are rare, protection for the distribution flow because of the poor efficiency of distribution caused by seepage in the underground networks. These networks are on the other hand risk being silted up and deteriorated by floods. The restoration of these infrastructures, particularly in concrete increases the efficiency and protects against silting up. It is required to guarantee the supply of the oasis whose water supply is threatened by the impacts of climate change. The most commonly used restoration techniques are presented in Annex 2.

Figure 17 : Partially restored Khettara in Bouya

The project will restore the perimeters and the irrigation water servicing networks through the following actions:

- Restore the khettaras
- Restore the irrigation canal networks (seguias).

Output 1.2.1: Khettaras are restored

The restoration of the vulnerable hydraulic structures and infrastructure, which supply the traditional palm groves include constructing permeation basins with the restoration of khettaras and the diversion weirs as well as the commitment of the beneficiaries to contribute in the restoring this infrastructure. The main objective is to improve the flow of the selected khettaras and to increase the supply of water to the palm groves.

Activity 1.2.1.1: Formalize the commitment of the beneficiaries in the restoration of the khettaras, permeation basins and the diversion weirs: participation in the restoration and the maintenance of the structures in the long-term.

Activity 1.2.1.2: Lead the works on the restoration of the khettaras (Reshaping, cleaning, building, and covering the khettara galleries and additional boreholes) and the complementary diversion weirs as well as the necessary repairs on permeation basins.
18 khettaras, in both of the zones together, will be restored with their weirs and basins. This choice was made based on a certain number of criteria, including:

- A flow exceeding or equal to 10 l/s (available from the resource),
- Leaks and low efficiency of the network
- Risk of desertification
- Risk of flood damage of neighboring wadis.

Output 1.2.2: Seguias are restored.

The restoration of the distribution network, in order to guarantee their good functioning and to also supply the traditional palm groves in good conditions includes the restoration of the seguias and the commitment of the beneficiaries to contribute to the restoration of these distribution networks.

Activity 1.2.1.1: Formalize the commitment of the beneficiaries in the restoration work: participation in the restoration and the maintenance of in the seguias in the long term.

Activity 1.2.1.2: Carry out the restoration works on the irrigation water distribution networks: irrigation channels identified as priorities. The works done will improve the efficiency of the water supply by seguias for two to three perimeters (around 120ha each).

Component 2: Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted areas

Today, the oasis economy is based directly and indirectly on agriculture. In effect this activity ensures: (i) the necessary production for home consumption and the sale of the surplus – particularly dates - making agriculture the main income generating activity in the vast majority of the oasis, and (ii) the maintenance of attractive landscapes for tourism.

However the increasing scarcity of water resources compromises the possibility of improving the incomes of vulnerable populations through the development of agriculture in the face of climate change. On the contrary, this increasing scarcity risks negatively impacting the agricultural production and thus reducing the incomes and living conditions of these populations if adaptation measures are not taken.

It is thus necessary, on one hand to adapt oasis agriculture in accordance with this pressure and on the other to diversify the income generating activities for the populations in order to (i) relieve the pressure on water resources, (ii) improve the living conditions of populations by increasing their incomes, and (iii) increasing the resilience through diversification of activities which are less reliant on water.

Outcome 2.1: Improved livelihoods of families due to the development of more resilient small-scale agriculture

The agriculture currently practiced by the « small holders » in the oasis no longer ensures sufficient income for the oasis populations. This is explained, on the one hand, due to the quantitative and qualitative degradation of the resources (water and soil), to the techniques used, to the excessive use of ground water and to climate change. In fact, the irrigation techniques and the treatments that impoverish the soil and pollute water limit the sustainability of agriculture. Similarly, the development of individual pumping has lea to an excessive use of ground water, which has then led to a lowering in the level of groundwater

putting in direct danger the sustainability of this agriculture. Finally, climate change reinforces this increasing scarcity of water resources; making the periods of precipitation unpredictable and putting back crop cycles. The agricultural techniques must therefore be adapted to these new restrictions in order to ensure the sustainability of this key activity to maintain the oases and the livelihoods of their populations.

On the other hand, the oasis agricultural products are sold in conditions, which don't contribute the territory. From this point of view, it is possible to increase the added value created and keep it "in situ" and thus the increase income of the oasis farmers without intensifying the production through the extraction of the water resources.

The aim is thus to improve and ensure the agricultural income of the oasis population through the adaptation of techniques to the new restrictions and through adding value to the agricultural products.

The actions done as regards the adaptation of oasis agriculture could be integrated into the programs granted through pillar II of the Moroccan Green Plan. In oasis areas, this will reinforce their positive impact and sustainability.

Output 2.1.1: Conservation technics are circulated and adopted

Agro-ecological and conservation techniques offer possibilities to improve agricultural production within the context of the increasing of water scarcity, though conserving water and improving the soil structure. These are already present in the zone and outside. These techniques involve covering and limiting the working of the soil, biological control, crop rotation and composting. The experiments already carried out in this vein in the oasis zones need to be capitalized on and followed up in order to allow a larger number of farmers to adapt their activities.

In addition the resilience of the oasis agro-system is based on the maintenance or redevelopment of specific crops (date palm cultivation, fruit trees, fodder crops and vegetable crops) coupled with a system of animal husbandry integrated with the oasis agriculture (including manure production, biogas, etc.).

These techniques will therefore be developed as part of the project in order to improve the resilience of agriculture.

Activity 2.1.1.1: Carry out a study on the experiences already undertaken in the zone or in similar zones abroad.
Numerous experiences already exist on the subject, including in the zone involved, of which several have been carried out in recent years by the POT (Program Oasis Tafilalet). The analysis of successes factors and obstacles met for the adoption and circulation of these techniques will allow greater efficiency in this work. A partnership with the associations involved in these previous experiences and the national agronomic universities will be implemented in order to optimize this assessment.

Activity 2.1.1.2: Train new farmers on the conservation techniques and promote their circulation

Following on from the previously completed assessment, training of the most motivated farmers on these conservation techniques will be carried out and will be led by experienced associations. This training will use actual experimentation on the parcels of land of the voluntary farmers in order to improve and to adapt the techniques to local specifications. During this experimentation, the ideas are taught to producers who will then circulate it to interested neighboring farmers who couldn't attend the training. The project targets agricultural leaders to do the training in order to ensure their circulation by imitation. The project will operate by adopting the model of Farm Schools in partnership with the National Office of Agricultural Council (ONCA). The project anticipates training 400 farmers by zone for a total of 800 farmers.

Output 2.1.2: Oasis agriculture products are developed and promoted

In oasis zones, it is necessary to increase the added value of products in order to directly increase the income of the farmers. For that, it is important to promote these products. Some EIGs, and cooperatives have already established in this vain activities to transform certain products, particularly dates. In order to support this momentum and to amplify the results of this first effort, the project will accompany these initiatives through the development of certification for four oasis agricultural products and their promotion; primarily: cumin, henna, dates, and olives (oil), which will provide a product from each of the three levels of oasis cultivation.

On the other hand, other existing local agricultural products adapted to the climate context are today little exploited. The project will support research in this vein in order to identify the other endemic species with promising potential.

Activity 2.1.2.1: Support the producers in the certification process for their products.

Certification will add value to the agricultural products, through the geographic location of the product. The identification of the production of the oasis offers, a stamp looked for by tourists, creating an increase in demand for the product. On the other hand, the organic techniques spread will allow the addition of this label, symbol of quality, sort by more and more consumers, unlocking greater added value.

The project will thus accompany the EIGs and cooperatives in the process of certification.

Activity 2.1.2.2: Promotion of oasis agricultural products.

In order to ensure the promotion of the products, participation in cooperative fairs will be organized. In addition, the producers will be accompanied in the promotion of their products though learning promotion technique and the successful definition of the history around the product presented.

Activity 2.1.2.3: Encourage research on endemic species and their uses.

Acacia, cactus, Aromatic and medicinal plant etc. are all little used plant species which are adapted to the oasis environment and to the restrictions of climate change. However, their possibilities are promising. The Acacia, for example, is particularly well adapted and possesses

numbers advantages for the ecosystem. What is more, its resin can be harvested for medical use.
The project will thus, in this vein, finance four (4) research projects in partnership with the national agronomic universities.

Outcome 2.2: Developed non-agricultural economic activities help increase the resilience of the Oasis population.

The development and promotion of a more resilient agriculture is essential, however this activity is not sufficient to ensure a decent living standard for all the oasis populations in the face of climate change. The diversification of income sources is necessary to increase the resilience of the vulnerable populations who have little in the way of agricultural resources. On the other hand this diversification must also alleviate the pressure on water resources required for agricultural activity.

Support for and adaptation of the tourism sector is essential in light of the importance of this activity in oasis. Equally important is support for all the other existing local activities and the development of new activities adapted to the changes in the oasis.

The programed actions as regards the diversification of livelihoods will be, after consultation, made consistent with the sector programs of the departments concerned, in particular Tourism, Culture and Energy.

Output 2.2.1: Sustainable and responsible tourism, which faces up to climate change is developed.

Tourism is a significant activity in the oasis economy; it increases the resilience of vulnerable populations to climate change through the production of income that is complementary to agriculture. However it must be directed towards practices that are responsible in order (i) to increase the positive economic consequences for the population – which are today strongly concentrated with the foreign operators – (ii) to limit the negative externalities for the oasis populations, and (iii) to not compromise the beautify of the sites so that the activity can maintain itself and develop itself in a sustainable way. IN fact, the oasis creates the tourism and not the other way round. This activity must not have negative impacts on this fragile environment. This redirection must pass through the establishing and use of good practices as well as the update and labeling of the welcome infrastructure.

On the other hand, targeted training of guides on the impacts of climate change is vital since they are the priority contacts of tourists. It is up to them to raise awareness and guide the tourists on good behavior to adopt. This is not done just through restrictive regulations; on the contrary, this raising of awareness is the opportunity to help them discover the functioning of the oasis, the balance between man and nature, the anthropogenic threats and those linked to climate change which oases face. The maintenance of this oasis balance is not therefore merely a restriction for tourism but can be seen as an avenue their promotion. It is thus necessary to identify and promote new responsible tourism products.

Activity 2.2.1.1: Support the Tourism stakeholders to make the sector more accountable
Today, tourism is a dynamic sector in the zone. The stakeholders (delegation, regional, provincial counsel) are heavily involved in its development and are currently investing in a shift in the activity in order to make it more sustainable. The PACC-ZO project will support this dynamic shift towards tourism adapted to contemporary evolutions by financing the following actions:

- Stakeholder accountability (guides, hotels, etc.) with respect to the activity's impacts
- Development of good practice guides
- Upgrade tourism structures (water and energy conservation)

The implementation and management methods for these activities will be delegated to decentralized institutions of the Ministry of Tourism (regional delegation, provincial counsel) through an agreement.

In reducing the ecosystem's vulnerability, this activity helps to maintain if not increase tourist appeal – above all connected to this ecosystem – of the zone and therefore the incomes of the population relying on this activity. In addition, tourism is shifted to target the high-end market, thereby improving the activity's earnings.

Activity 2.2.1.2: Carry out a study on niche tourism products to develop.
In order to complete the responsible tourism portfolio in the zone, the project will launch a study on niche Tourism products to highlight (such as spiritual/ sport tourism), the public to target and the promotion to carry out. This will allow the development of the activity and increase the attractiveness of the zone for tourists.

Output 2.2.2: Other economic activities, particularly for young adults and women, are supported and developed.

Women in the oasis usually live there permanently. They are the most concerned by the development of new activities that allow them to compensate for the impossibility of cultivating during certain years. Similarly, young adults who do not have the opportunity to leave do not find work in the oasis. Nevertheless small business projects exist that must be supported and encouraged. However, numerous jobs adapted to the changes in the zone are missing and should be developed in order to accompany an endogenous adaptation of the oasis to climate change all the while increasing the resilience of the most vulnerable groups though raising their incomes.

Activity 2.2.2.1: Support small-scale local economic projects
In order to galvanize and support local initiative for small-scale activities, a fund allowing the support of around twenty micro projects will be reserved and made available on the basis of calls for project implemented by the PMU. The PMU will establish the procedures manual at the same time.

Activity 2.2.2.2: *Develop new careers adapted to the context and needs of the oasis..*
To promote the added value activities, to support the creation of jobs and to generate income, the project will carry out professional training in fields of growth for climate change adaptation such as:

- The environment – conservation, water management, organic products (environmental representative, green space maintenance technician, biotechnology technician, water cleaning and sanitation technician)
- The sun is the major asset of the zone presents a significant possibility to alleviate the costs of vulnerable populations (research engineer, project manager, installer, production operator, technical-commercial photovoltaic)
- Bioclimatic construction saves energy and improves living conditions and the comfort of populations in the face of rising temperatures (architects and bioclimatic builders).

For this the project anticipates a partnership agreement with OFPPT (Office of Vocational Training and Employment Promotion) in order to make accessible to youths in both project zones two innovative trainings amongst the previous three. The OFPPT shall issue a certificate at the end of the training. The US$ 405,400 of the project will permit to pay 15 teachers foreach training during 5 years.

Component 3: Improving the ecosystems' resilience in response to climate change and variability

Oases are the result of a delicate balance between man and his environment in the middle of the desert. Man has created and managed this ecosystem in order to live. If man left, the oasis would disappear entirely. However, the difficulties in maintaining the oasis environment are increased by the combination of natural factors: climate change, desertification, increase in temperature, scarcity of water and anthropogenic factors: loss of traditional knowledge for the management of this ecosystem and polluting activities.

Oasis ecosystems ensure functions, which have been widely documented since the work of the Millennium Ecosystem Assessment, and recognized by the FAO (SIMPA) and UNESCO (Biosphere reserve). In economic terms, oases contribute to the production of goods and services both agricultural and non-agricultural. In ecological terms, the oasis contributes to ensuring certain highly important functions without market value (protection against the wind, the sun, the heat through vegetation, biodiversity and territory occupation). In cultural terms the oases host a unique artistic and spiritual heritage.

The degradation of this ecosystem causes significant loss – temporary or permanent – of the population. It weakens the oasis because it becomes even more difficult to maintain for those who remain. Thus a vicious cycle is begun forcing the disappearance of the oasis.

Yet, climate change constitutes an aggravating factor to the threats, particularly desertification and water scarcity. It is thus vital for the project to protect this ecosystem from the internal and external increase in threats to the oasis. This protection includes (i) the municipalities taking charge of the threats and (ii) promoting the heritage of the oasis.

Outcome 3.1: Threats reducing the value of Oasis ecosystems are taken into account by municipalities

Desertification and pollution are the main threats to oasis ecosystems currently found in the project zones. Desertification is exacerbated by the increased frequency of droughts linked to climate change, and water pollution, which increases the loss of this scarce resource becoming increasingly rare, primarily due to climate change. In addition, these two phenomenons make the living conditions of the population more difficult by reducing the appeal of generating revenue through tourism in the zone. Each requires specific intervention particularly though the mobilization of those elected to manage the structures and of the population to adopt new habits.

Output 3.1.1: The fight against desertification is organized

Roads are threatened by desertification; however they ensure access to the oasis and thus improve the living conditions and the resilience of oasis populations. The interventions of the Water and Forests Commission for fight against desertification have on the whole been efficient, however only when the follow-up on the vegetation (watering) has been consistent. However the scale of this fight against desertification is huge and the current means only just allow the maintenance of the works already carried out. It is therefore necessary to financially support the protection of new sites in order to not compromise the development of the oasis zone by limiting the interactions of the oasis with the outside world.

Oases are also threatened directing by desertification. In fact the succession of droughts has particularly limited the cultivation of parcels of land. Bare, the advance of sand is easy. The housing and parcels of land are private, their protection increases their value, and thus the populations threatened benefit from this fight and should therefore be included in it in order to lower management costs mobilized by the Water and Forests Commission, and therefore increase the protected area. This involvement will be achieved through an established agreement based on an existing model (Annex 1).

Activity 3.1.1.1: Carry out a study to identify the priority sites
A study will be carried out to identify the priority public structures to be protected based on: exposure to the risk of desertification, traffic on the road etc. whilst a consultation with the population will target private spaces.

Activity 3.1.1.2: Financial support for the Water and Forests Commission man-made efforts (construction of palm leave fences) and biological efforts (planting tamarix aphylla and atriplex canescens) will be provided.

A partnership agreement will be set up with *the Water and Forests Commission*. Protecting a hectare of land from a combination of biological and mechanical factors costs US$ 7,500/ha. The project aims to protect 40 ha for a total of US$ 300,000.

Activity 3.1.1.3: Populations will be mobilized in the fight against desertification of housing and parcels of land.
Populations must participate in the construction of fences and ensure that the plants are watered for the first three months. For this an association of beneficiaries for the management of the structures will be implemented and their commitment formalized in the agreement.

Output 3.1.2: Techniques for environmental cleanup are developed

Pollution is significant in oases; it directly damages the well-being of the population and reduces its attractiveness for tourists. It is thus vital to organize, with the involvement of the inhabitants, the management of water and training on recycling and green technologies.

On the other hand, the importance of water quality, particular groundwater, on which a portion of oasis populations depend for their drinkable water source justifies putting more importance on the risks of pollution and the degradation of the quality of water. These are accentuated by climate change. Flood water, in particular during the first hours of a flood, are in certain cases of inadequate quality for drinking water as well as for irrigation according to a study carried out in 2009[30].
Finally the impact of economic activities, particularly Tourism, on the quality of water in the oasis needs to be better understood by the stakeholders and decision makers.

Pollution limitation techniques and the treatment of water must be implemented. However the difficulty in applying the approaches for used water treatment carried out in urban centers requires the development of solutions adapted to the oases and to make the stakeholders and decision makers aware of the best way to consider water quality.

Several initiatives and pilot projects in phyto-purification have been done in the oasis zones whose results and impacts have not been investigated or circulated. The development of technical solutions adapted to the oases requires the capitalization and assessment of these first experiences. Activities to circulate the success stories and pilot projects through training will be put in place.

Activity 3.1.2.1 Study the impact of the oasis economic activities
The environmental impact of economic activities, particularly the management of used water from the Tourism industry will be studied. The results of this study will be used as the basis of establishing measures to take and will support projects to raise awareness amongst the population on habits to adopt. US$ 20,000 will be awarded to this study.

[30] Project, « Education in the field of sustainable development and the protection of natural habitats in the Mhamid Oasis (Southern Morocco)" carried out in 2009 as part of a Polish Aid program from the Ministry of Foreign Affairs through the Association of Polish Geomorphologues in cooperation with the ZAILA Association.

Activity 3.1.2.2: Train and equip the stakeholders concerned on environmental cleanup techniques
Trainings will be done on phyto-purification, as well as equipping individual members, and recycling techniques that have been successful. The project targets 400 beneficiaries, reserving for this purpose US$ 500/beneficiary, for a total of US$ 200,000.

Activity 3.1.2.3: Support community services, which aim to protect natural resources
In this vein, a fund of US$ 80,000 will be reserved and made available through the municipalities (waste management). The PMU will write the procedures manual and will manage the requests to the fund.

Outcome 3.2 Preserved and Promoted Heritage

Mud buildings are part of the heritage of the oasis to be protected. Through preserving the oasis landscape these building add to the attractiveness of the zone for tourists. What is more, these traditional buildings are particularly adapted to the climatic context (heat, wind), since they maintain an agreeable temperature throughout the year. Unfortunately, the expansion of concrete buildings is significant; as for local populations they are a symbol of social status and require less maintenance. However, to make them habitable, these constructions require much equipment (air-conditioning, heating), which consume a significant amount of energy and money.
Upgrading the mud buildings compared to those in concrete will:

- Indirectly improve the incomes of the local population dependent on tourism by increasing tourist appeal. These constructions are part of the oasis heritage and the oasis landscape sought by tourists
- Improve the living conditions of the population in terms of comfort: these buildings stay cool during periods of extreme heat, which tends to increase with climate change
- Reduce the energy costs of households involved, particularly through the necessity of using air conditioning in concrete structures.

If the efforts exerted, particularly by CERKAS (Center for the Restoration and Rehabilitation of Atlas and Sub-Atlas Zones), for the reuse of traditional materials and techniques, have not provided the expected results up to now, and therefore are not capable of reaching the above objectives, which can be explained according to them by two main factors. First of all from a legal perspective, mud buildings outside of conservation projects or tourism projects that were not recognized by the law over many years.

After significant advocacy, a law text recognized them once again. The second factor is part of this model of modernity, which inspires construction in concrete. Two main axes of intervention have been identified and will be supported by PACC-ZO for the redevelopment of mud in modern constructions:

- Old buildings must offer modern uses, a space with a contemporary outlook and not just for a museum
- Modern construction for a new model of comfort must be built.

Output 3.2.1: Historic constructions are restored for new uses

The mud brick constructions last whilst they are maintained, whilst they are lived in. Restoring them merely with the aim of preservation doesn't always make sense. CERKAS encourages the preservation of these constructions through giving them a new use. For example, the ancient Kasbahs can be restored and managed to make them into libraries, schools etc. These following activities will be done in partnership with CERKAS.

Activity 3.2.1.1: Carry out a study in order to identify the mud brick buildings to restore
A study on the most appropriate constructions to be restored based on their state and their position in community and their possible future use will be done, as well as identifying owners willing to take part.

Activity 3.2.1.2: Restore and fix up the buildings with a heritage interest
The restoration and fixing up of the building for new functions will always be in partnership with CERKAS.

Output 3.2.2: Traditional techniques and materials are reused for new constructions.

In order to inspire a new model of comfort and modernity though mud brick constructions that are better adapted to climate change, houses of public utility must also be rebuilt.

Activity 3.2.2.1: Study, bearing in mind town planning, the most pertinent public building to be done in mud brick, like Youth Centre.
This will be done in partnership with CERKAS.

Activity 3.2.2.2: Construct said building
Many oases still possess people with the knowledge for mud brick restorations. They are often requested to work on heritage projects or to build eco-tourism sites. CERKAS will mobilize the necessary personnel. Two houses will be built, one in each zone.

Component 4: Improving stakeholder awareness though the management and exchange of knowledge

ADA and ANDZOA are national institutions of reference for any program that will be established for climate change adaptation in the oasis zones. They collect all results and knowledge produced by the project and make them available. Their mission is to ensure that this information is accessible and shared among all stakeholders involved currently and in the future who will need access to this data.

Climate change impacts and will impact the vulnerable populations of the oases, above all by testing the availability of water resources. Being aware and visualizing the change of this resource and the impacts human activities have on its sustainability is essential so that the population directly concerned takes all the necessary adaptation measures previously explained in components 1, 2 and 3.

The challenge of the sustainable management of water requires confronting the long-term balance between the water resources and the demands of different sectors. Urban demand, particularly for drinking water, develops with the demographic growth of towns. The economic sectors experience contrasted changes. While agriculture shrinks in certain oases, vegetable crop cultivation speculation, in particular those of watermelon have experienced rapid development outside of the oasis thanks to pumping and the availability of land. To improve the long term balance between the supply and demand for water involves developing a shared vision, which takes into account the changes underway.

This component has two specific outputs. It is a sharing of information and the animation of public debate on water in the face of climate change. It is, also, the development of actions to raise awareness and communicate with local populations.

Outcome 4.1: Organized public debate on water and climate change

In order to create a long-term balance between the supply and demand of water, the project will develop a comprehensive vision, which takes into account the changes underway. To this effect, it will carry out initiatives for the circulation of information and the organization of debates.

Output 4.1.1: An assessment of resources in the intermediary Gheris basin and Maïder is carried out

Activity 4.1.1.1: Implementation of a Documentation library
The partners of the project represented in the Pilot committee and the Regional Coordination Committee will give the PMU the mandate to launch a consultation to create a digital documentation library compiling the studies and research on the oases and climate change. This documentation library will also include the results and lessons learned from the PACC-ZO project. This will ensure the accessibility of the data to various local and national stakeholders in order to promote ownership of all this knowledge and to increase the efficiency of future projects.

Activity 4.1.1.2: Strengthening of the monitoring system for water resources in the project zones.
The quantitative and qualitative monitoring of the water resources in the hydraulic basin highlighted through the missions of the HBA. The project will support the methods of the HBA in the project zones through an agreement, which will also include the writing of specific monitoring reports.

Output 4.1.2: A local council for water dialogue is operational

Activity 4.1.2.1: Writing of a draft Charter on water and climate change in the Oases
The project will begin the process of creating a CLE (Local Water Council) by writing of a draft Charter on water and climate change in the oases.
This Charter will be subject to the partners through bilateral meetings, which will result in a workshop to approve and to constitute a local water council.

The presidency will be given to a personality who is well known in the zone for their commitment to sustainable development and an expert will fill the Secretariat position.

Activity 4.1.2.2: Organization of conferences on the themes of water and climate change
Each year, the CLE will give the PMU a provisory program of conferences which will, after budget arbitration, lead to a definitive program.

Outcome 4.2: Supported and developed local initiatives for communication

The active contribution of local organizations for communicating and raising awareness amongst the public who are not directly affected by the effects of climate change (children, emigrants, tourists) is a priority of this project. This will be done through the implementation of mass communication campaigns and targeted awareness initiatives.

Output 4.2.1: An awareness and communication strategy is developed

Activity 4.2.1.1: Writing of a communication strategy
The project will carry out a consultation to conduct a study to define a communication strategy on the themes of climate change and planned adaptation initiatives at a local level.

Activity 4.2.1.2: "Mass" communication campaign
The project will take charge, according to the recommendations of the study (messages, support, media), of a communication campaign in partnership with the stakeholders.

Activity 4.2.1.3: Organizing a project closeout seminar

At the end of the PACC-ZO project, a national seminar will be organized in Rabat to present the results of production and lessons learned in terms of the measures of adaptation to climate change.

Output 4.2.2: A financing mechanism is implemented

Activity 4.2.2.1: Establishing of a list of Partner-organizations for awareness actions
Following the communication campaign and through the PMU, the project will create a list of organizations able to conduct awareness initiatives in the project zones on the basis of a file, particularly for school populations and oasis visitors (emigrants, tourists, etc.).

Activity 4.2.2.2: Management of call for projects on awareness.
After approval by the CRC and the Pilot committee, the PMU will be responsible for preparing and managing the mechanism of call for projects on awareness addressed to partners.

Component 5: Strengthening the capacities of participants in the design and implementation of adaptation measures

Through this component, the project participants (managers and beneficiaries) will be able to strengthen their design and project implementation skills for adaptation measures to climate change.

The meeting with the managers and representatives of beneficiaries organized in the two selected basins, have allowed the identification of the missing principles to satisfy:

- On one hand, the strengthening of participants knowledge on climate change and adaptation
- On the other hand the development of skills on the participative approach, the management of financial partnerships and the management of conflicts

Outcome 5.1: Consolidated and developed adaptive capacities for climate change

There is a need for capacity building for the local oasis populations, whose livelihoods are directly affected by the effects of climate change, as well as public officials who are responsible for managing and anticipating these effects on the population across all areas of local life.

Output 5.1.1: The managers of public service are informed on the issues of climate change and introduced to adaptability measures for the main sectors

In the oasis zones, information and training provided to public service officials on how to adapt to climate change is very uneven, with a concentration of skills acquired around the sites of previous projects. The project intends to address these information and education gaps in the selected sites (Intermediary Gheris and Maïder), which have not yet benefitted from major interventions on adaptation.

Activity 5.1.1.1: Conduct climate change training modules
The project will organize a call for expressions of interest for organizations with the skills for training public officials. The organizations selected will be consulted on the basis of the terms of reference prepared by the PMU for executing the training services site by site. The terms of reference will include an estimate of the number of participants and a preliminary list of training needs. The modules covered will include most of the sectors impacted by climate change.

Activity 5.1.1.2: Participation in scientific meetings and forums
According to an annual planning prepared by the Project Management Unit, the project will cover the costs for the technical staff to participate in scientific meetings on climate change as well as the costs for local actors to participate in education forums organized around issues pertaining to oasis zones.

Output 5.1.2: Oasis beneficiaries are trained on innovative adaptability measures

The populations of the sites selected by the project have adaptation skills passed down from previous generations on managing scarcity and natural risks. The consultation workshops have confirmed that there is an awareness of elevated risks due to climate change in the sites. The project will expand the technical reference for adaptation in the selected sites (Intermediary Gheris and Maïder) through training and exchange activities.

Activity 5.1.2.1: Conduct adaptation training modules
The project will organize a call for expressions of interest for organizations with the skills to train actors in the oasis. The organizations selected will be consulted on the basis of a terms of reference prepared by the PMU for carrying out the training services site by site. The terms of reference will include an estimated number of participants and a preliminary list of training needs. The modules for this training will focus on adaptation measures that represent innovations compared to measures known by the populations. For example, for agriculture, the terms of reference may be duly based on modules from the « Climate Smart Agriculture » initiative from the FAO.

Activity 5.1.2.2: Organizing trips and internships
According to the annual program prepared by the Project Management Unit, the project will pay the costs for the oasis actors to take part in trips and internships for implementing innovative adaptation measures in certain areas of interest.

Outcome 5.2: Strengthened coordinated management capacities for climate change projects

Experience shows that the success of climate change adaptation measures greatly depends on the quality of the consultation process between public officials and beneficiaries. To achieve this, the project will support management training and financing, as well as co-implement the projects.

Output 5.2.1: The participants (operators and beneficiaries) are trained in the designing and financing of projects

The process for implementing adaptation measures will be greatly facilitated by the project management tools provided by the involved stakeholders and by financing mechanisms from various partners.

Activity 5.2.1.1: Conduct modules on the project cycle
The project will organize a call for expressions of interest for organizations with project cycle management skills (PCM). The organizations selected will be consulted on the basis of the terms of reference prepared by the PMU for executing the training services site by site. The terms of reference will include an estimated number of participants and a preliminary list of training needs. The modules covered will consist of diagnostics and planning. The participants will be introduced in particular to monitoring and evaluating the implementation of the logical framework of the project.

Activity 5.2.1.2: Conduct training modules on project financing

Output 5.2.2: The participants (operators and beneficiaries) are trained on the implementation and joint management of projects.

Adaptation measures involve changes in how sustainable development of the oases is designed.

Activity 5.2.2.1: Conduct training modules on the participatory approach
The experience of development projects shows that the participatory approach helps anticipate risks of reject or opposition and increase the sustainability of actions. The project will organize a series of training workshops on the participatory approach for public officials.

Activity 5.2.2.2: Conduct training modules in conflict management and mediation
The project will organize a series of training workshops on conflict management and mediation for the beneficiaries in order to contribute to an increased sustainability of actions that pose risks of being rejected or facing unjustified opposition.

B. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund (the Environmental and Social Policy)

The project zones include oases, which are representative of the climate change adaptation issues which all the oasis zones of Southern Morocco experience. In particular they are representative of those with an elevated level of poverty (14.1% for the whole oasis zone compared to the national average of 9.5%)

In each of the intervention zones (intermediary Gheris and Maïder), the project will directly or indirectly benefit around 40,000 people, members of the families of farmers and residents in the vulnerable traditional oasis. Women and youths represent 50% of the beneficiaries as is indicated below in the demographic diagnostic. In each of the two zones, there is a large range of institutions and organizations. As regards agricultural water management, the khettaras networks are used by claimants who are granted this through an interview with a team led by a "cheikh" of the khettara. The seguias networks restored by ORMVA are managed by AUEA, which are the associations who respond to the provisions of the 1984 texts on AUEA. For drinkable water, the management is either the direct responsibility of municipal councils or delegated to ONEE in populations of certain sizes. In the douars supplied outside of the ONEE jurisdiction, the management is the responsibility by common law associations. There are also professional associations in each of the two areas, under the form of cooperatives and cooperative associations created recently as EIG[31] (EIG of Tinjdad and EIG of Alnif). The operators in the tourism sector also have professional structures in the form of guide and bed and breakfast (gîte) associations. The intervention areas are characterized by the presence of very active textile associations (see the reports in **Annex 7** and 8).

The project will have economic, social and environmental impacts and benefits. The adaptability measures and technologies selected will be transferred to the beneficiaries. Their ability to face up to the impacts of climate change, particularly to drought and desertification, will be strengthened.

[31] See NOVEC, 2011, Characterisation study of the palm groves.

Table 17: Social, economic and environmental benefits of the project

Components	Social benefits	Economic Benefits	Environmental Benefits
Component 1: Improving adaptive capacities of the water sector	Securing of the drinkable water supply.	Save the productive capital of the oasis Reduce the cost of water extraction Reduce investment expenditure (over digging, prospections)	Improve the hydraulic balance in the oasis, particularly during dry years.
Component 2: Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted areas	Widen access to sector programs for vulnerable, marginalized and poor populations.	Improve the gross income through the enhancing of various assets specific to the oasis environment. Reduce expenditure through bringing together the economic sectors and stakeholders. Develop new careers	Sustainable integration of adaptability issues in the programs of the agricultural, tourism, energy and residential sectors etc.
Component 3: Improving the ecosystems' resilience in response to climate change and variability	Improvement of living conditions in the traditional oasis through innovations	Development of the economic activities associated with the ecological, cultural and economic services of the oasis.	Maintain the ecological and cultural functions guaranteed by the oasis
Component 4: Improving stakeholder awareness through the management and exchange of knowledge	Strengthening the active participation of vulnerable populations in decisions linked to climate change	Development of economic activities associated with adaptation needs	Identification of research and development needs.
Component 5: Strengthening the capacities of participants in the design and implementation of adaptation measures	Strengthen cohesion and integration between stakeholders	Develop economic activities associated to adaptation needs. Improve the efficiency of projects	Raise awareness of the environmental services of the oasis and the adaptation retention methods

Even if the project will not have a major negative impact on the environment and society, it will aim to integrate the management of socio-environmental aspects though a process which includes the writing of specific studies, the environmental follow-up and monitoring and finally skills strengthening.

It is important to highlight that the project actions are part of programs identified by the national strategy for agricultural development, "Moroccan Green Plan". An Environment Strategy Evaluation (EES) of this Plan was done in 2012 and gave a general insight into the environmental and social implications of these interventions, showing the potential impacts and proposing environmental and social management measures. These aimed to reduce the environmental and social repercussions and increase the environmental and social benefits. In addition, the same area saw the implementation of a large-scale project financed by the American Government though the Millennium Challenge Account. This project was also subject to an Environmental Evaluation Strategy (EES) in 2009.

In addition to the two aforementioned documents, the concrete actions expected by the project will be subject to a technical, environmental and social feasibility study which will lead to Environmental and Social Management Plans (ESMP) for every large perimeter or small holding.
Similarly throughout implementation, the general and specific conditions for environmental and social management will be included in the Entrepreneur Consultation Files (DCE) so that the works completed conform to all the environmental and social specifications and execution requirements these clauses will efficiently manage the following aspects:

- Surface water
- Site facilities
- Traffic
- Nuisances
- Hydrocarbons
- Waste
- Health and Safety
- Restoration

In conjunction with the above, the process will be strengthened through the application of an environmental and social monitoring procedure for the works and the **environmental skills strengthening of all the stakeholders involved:**

- Training – Raising environmental awareness amongst companies
- Skill Strengthening of the Group
- Skill strengthening of the DPA and ORMVA
- Raising awareness in the AUEA on the environment and the protection of natural resources.

Finally, after having finished the works the land used by the installation sites should be restored. This restoration should be done properly.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

The measures to adapt to climate change are intended to help the populations in the targeted zones, who are the most socially, economically and environmentally vulnerable and to overcome the consequences of these changes. They consist in adopting practices to prepare the populations for the effects of climate change while accepting the fact that it is at this point impossible to avoid them all together.

The degradation of Moroccan palm groves has been hugely accelerated over the past 10 years, losing almost 2 thirds of their palm trees and a third of production[32].

The factors involved in the degradation particularly concern:

1. The scarcity of water determined upstream by the persistence of reoccurring droughts and amplified by certain failures in the hydro-agricultural and DWS systems.
2. The encroachment or desertification of roads and agricultural land and the efficiency of the water circulation networks (silting up)
3. The lack of human and financial means available to the local operators and stakeholders worried about sustainable development in their area.

The aforementioned restrictions have contributed to a reduction in the most vulnerable populations' means of existence and to acceleration in the excessive extraction of natural resources, which will logically significantly increase the cost of inaction in the short and medium term.

This situation requires the consideration of data on climate change for development actions and projects to achieve in the future. The issue of adaptability is more and more present in a wider context in Morocco, in the creation of strategies and of sector programs for rural areas and in particular for the oasis areas. For example, in the framework of pillar II of "Plan Maroc Vert" (Moroccan Green Plan), through the update of the PDAIRE hydraulic assessments which conform to the national strategy for the development of oases and argan trees.

The proposed project, aims to move forward though the implementation of measures to reduce the climatic and anthropic vulnerability of the Oasis agro-ecosystems in Morocco. It also aims to strengthen the adaptive capacities of the institutions and local stakeholders in the oasis zones, which suffer from the above issues.

[32]The harvest forecast for the year 2013 (108 thousand tons) signifies an increase of 6% in the production of dates. This figure includes those coming from recent extensions "outside of traditional palm groves".

This project is built on five main components, namely:

Component 1: Improving adaptive capacities of the water sector

Component 2: Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted zones

Component 3: Improving the ecosystems' resilience in response to climate change and variability

Component 4: Improving stakeholder awareness though the management and exchange of knowledge

Component 5: Strengthening the capacities of participants in the design and implementation of adaptation measures

Component 1: Improving adaptive capacities of the water sector

The table below summarizes the conclusions of the economic efficiency analysis of the options supported by the project for the adaptation of the water sector namely methods to recharge the water aquifers and the water economy. The alternatives to these options under consideration in the studies consulted concern the construction of storage dam's in situ, inter-basin transfer or the search for deeper groundwater resources.

Component	Intervention logic of the project	Possible alternatives	Relative effectiveness
Water	Recharge the aquifers upstream and save water within the network	Storage dams to hold back water Transfer of water between basins Deep excavations	In comparison with storage dams, the projects option (recharge and save) improve the balance of water (evaporation) and security in times of drought As regards water transfer and deep-water exploration, the option is regarded as more economic only in the short and medium term.

The literature consulted on similar projects in Morocco, particularly the recharge project of the Haouz-Mejjate aquifer financed by the African Development Bank for the HBA (Hydraulic Basin Agency) of Tensift confirms our evaluation, as well as the preliminary studies done by the POS in the zone on DWS in Maïder.

Similarly, there is international support for increasing the role of groundwater resources in the context of climate change (see the box below).

Extract: Global Water Partnership, 2012, ''Groundwater Resources and Irrigated Agriculture making a beneficial relation more sustainable.''

The impact of climate-change on groundwater replenishment (and on long-term resource sustainability) remains uncertain, and requires more detailed monitoring and analysis before reliable predictions can be made. But **it is clear that groundwater storage reserves will be a critical element in climate-change adaptation to confront more frequent and extended droughts.**

But maintaining groundwater stocks against all depletion is rarely appropriate, especially in arid regions where (given the long periodicity of major recharge episodes) **groundwater is critical for mitigating the impacts of surface-water drought and for providing time to allow transition to lower water use economies to evolve**.

The economic efficiency of these groundwater recharge projects will be complemented and reinforced by the programmed downstream interventions along the networks of seguias, khettaras and the drinkable water systems associated with these resources.

Component 2: Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted zones.

For the component related to the livelihoods of vulnerable populations, the logic of the project is to develop a variety of resilient economic activities (small-scale oasis agriculture, tourism, new activities). In order to ensure the sustainability of the actions, the project will intervene in partnership with the sector operators in order to ensure the transfer of knowledge and technologies.

Component	Intervention logic of the project	Possible alternatives	Relative effectiveness
Conditions of vulnerable populations	Diversification of economic activities	Agricultural grants/ Subsidies Direct income aid Emigration	The agricultural subsidies do not directly improve the livelihoods of numerous small-scale producers Direct income aid and emigration are expensive and unreliable alternatives

The project notably targets the actions, which have a positive impact on the most vulnerable populations through promoting products, knowledge and characteristic heritage of the oases.

As a first alternative to the intervention logic of the project, it is possible to consider subsidies for agricultural investment in the oases. This option would aim to correct the current imbalances, which are to the detriment of oasis agriculture, which does not benefit from the subsidies distributed in the framework of the Agricultural Development Fund (ADF), for various reasons. The farmers have criticized the conditions for eligibility, which are difficult for the producers to satisfy. They also criticized the list of subsidized operations, which do not include specific investment in the oasis environment (fight against desertification, against salinization, etc.). This option is less efficient than diversification because it doesn't target the poorest populations (with little or no land).

As a second alternative, it is possible to envisage the improvement of livelihoods through the emigration of members of vulnerable families, such as is already practiced. This option is both

uncertain since it depends on outside demand and selective as it only involves populations able to emigrate. In this sense, it cannot constitute an effective alternative.
As a third alternative, it could be possible to think of a system of direct income aid for vulnerable populations. This is an expensive option and is difficult to put in place as seen by Moroccan experiments in targeted aid.

Component 3: Improving the ecosystems' resilience in response to climate change and variability

Component 3 of the project refers to the need to preserve the flow of economic, ecological and cultural goods and services supplied by the traditional oasis. They are not for the most part able to be sold but are rather about public well being. As such, the project has adopted an integrated, participative, territorial approach aiming to recognize and preserve common heritage, against the threats which put it in danger such as pollution, desertification, urbanization, and the degradation of collective equipment and of sites of interest, etc.

Component	Intervention logic of the project	Possible alternatives	Relative effectiveness
Resilience	Sustainable territorial development	Payment of Environmental Services (PES) Definition of protected areas.	The PES alternative anticipates continual financing which is not possible, whereas the participative approach is replicable at a low cost. The total protection alternative is the most expensive and least replicable.

Several interventions through workshops have highlighted the positive economic consequences of actions to protect the oasis ecosystems, in particular its attractiveness for visitors and the retention of talent and human capital. To achieve this result, the project will rely on the potential of local institutions, identified through a consultation process, able to develop sustainably the oasis though a mechanism of call for projects open to local collectives and associations.
As a first alternative to the "upward" intervention logic of the project, the "Payment of Environmental Services" (PES) option or that of defining "protected oasis areas" could be considered. The PES system consists of defining through contract documents the ways of exploiting the resources that are compatible with the preservation of oasis services and though compensating populations who lack income by "payments". The analysis of the international experience shows that the sustainability of this option depends in large part on the financing possibilities for PES though revenue generated from the preservation of heritage, a hypothesis difficult to envisage in the case of the oasis.
Another alternative to the option preferred by the project could be though the transformation of the status of the traditional oasis into protected zones according to a boundary measure and under the control of local administration. This option cannot be easily replicated while the option upheld by the project is sensitive to circulation through savoir-faire developed by local institutions.
The fourth component of the project is the consolidation of the knowledge acquired, the update of data and transmission of knowledge relating to climate change in the project zones. The fifth component, also seeks to strengthen the abilities of local institutions to access, analyze and use the information linked to climate change to manage the risks associated with

it. These objectives are rarely considered in the activities forecast in current programs of skill strengthening. The integration of the activities to reinforce the skills and knowledge with concrete adaptability activities will ensure better results using the mobilized resources.

D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, sector strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

The Moroccan government has long been firmly involved in the fight against desertification and adaptation to climate change. This project is perfectly in line with these strategies; the development of some is outlined below:

In 1996, the National Action Program (PAN) brought together on one national guidance and planning platform several institutional stakeholders, various bodies and the main backers of Moroccan funds.

In 1999, as part of its 2020 strategy for rural development, some large-scale programs in the oases were supported by the World Bank This strategy once again extolled the paradigm of the fight against poverty and desertification though the Integrated Rural Development (DRI) approach;

In 2005, the Government made its priority the restoration and conservation of the Moroccan Oases, similar to its priority for the mountain environment, and this was primarily though the INDH program but also supported by the World Bank.

In 2008, a national strategy for agricultural development was established (Moroccan Green Plan) which maintained amongst its main concerns sections referring to water and its industries.

In 2010 and 2013 following the creation of the National Agency for the Development of the Oasis and Argan tree zones and an intervention strategy was formulated. The strategic diagnostic of the oasis territory identified 3 main challenges, to which the development plan will have to respond:

- The challenge of human development
- The challenge of economic resource development
- The challenge of sustainable development

As regards environmental planning, the zone constitutes the final barrier against advancing desertification. Yet, it remains under sever natural restrictions (climate, erosion etc.) which are aggravated because of the pressure exerted on it by man (over grazing, over exploitation of vegetation, optimum water management etc.). This situation represents a serious

environmental problem and must be blocked all the more so since the territory possesses a rich heritage.

Starting from these three challenges, 5 main ideas created the basis of a development strategy for the Oasis and Argan tree zones:

- Development which guarantees a good quality of life to citizens
- Development which continually improves the income of local populations
- Development which supports the sustainable promotion of natural and cultural heritage
- A development program which revitalizes the territory
- Integrated development, which capitalizes on all of the sector and territorial strategies underway.

On the basis of these 5 main ideas, the territorial strategy was articulated around 3 development axes:

1. Strengthening the attractiveness of the territory: improving the living conditions for all citizens, through the strengthening of basic services (water, electricity and roads), the development of healthcare and education possibilities, as well as construction of cultural and sport infrastructure;
2. Strengthening the competitively of the territory, through the promotion of its natural and cultural resources in a way that directly benefits the local population. 4 priority sectors are here addressed: agriculture, argan, tourism and mines;
3. Conservation of the territory, through programs for the optimization of water use and management, programs for soil conservation well as programs for the conservation of biodiversity.

These axes were stated in 10 strategic project files and in 45 development programs.

Moreover, the project in question is perfectly in line with the implementation of the national charter for the conservation of the environment and the sustainable development guidelines, particularly those applicable to oasis and argan tree biosphere reserves.

E. Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy

The project adopted an integrated and multi-sector approach that focused on the active participation and involvement of beneficiaries at all levels of decision-making. This approach was chosen in order to reinforce the major thrusts of Morocco for decentralization and developing the region and will serve as a model for launching similar projects in other fragile regions or areas, such as mountainous and coastal zones.

This project took into consideration the national standards for hydro-agricultural development and thus, the work undertaken during these past five (5) years in Morocco have generated a cost per hectare varying between US$2,420 and US$4,253. Our project estimates a cost per hectare to be US$2,420. In addition, the various projects carried out in oasis zones have retained an EIRR of approximately 12%.
The technical standards of the structures are presented in the Annex 1.

Below are the laws in force in Morocco that relate to the Project activities:

- Law no. 19-98 amending and supplementing law no. 10-95 on water: involves the completion of the EIA including a public survey before drilling
- Law no. 11-03 for the protection and development of the environment
- Law no. 12-03 for impact assessments on the environment: involves the completion of a mandatory EIA prior to working on the groundwater refill
- Law no. 13-03 on the fight against air pollution
- Law no. 28-00 on waste management and disposal
- Law no. 22-80 on preserving historic monuments, sites, inscriptions, art, and relics
- Law no. 7-81 on expropriation for public utility and temporary occupation
- Law no. 65-99 on the Labor Code

The following implementing decrees also relate to the Project activities:

- Decree no. 2-07-253 on the classification of waste and establishing a list of hazardous waste
- Decree no. 2-07-96 fixing the procedure for granting authorizations and approval in the field of public water
- Decree no. 2-04-553 for spills, discharges, releases, and direct or indirect deposits of surface or groundwater
- Decree no. 2-04-563 on the functions and operations of the National Committee and the regional committees of impact assessments on the environment.

F. Describe if there is duplication of project / programme with other funding sources, if any.

The project is complementary to actions undertaken and completed by the Moroccan government, financed through cooperation both multilaterally and bilaterally, particularly with the World Bank, the International Agricultural Development Fund, the Millennium Challenge, Belgian Development Agency, Japanese International Cooperation Agency, etc. What is more, this project aims to capitalize on the success of other projects and programs that will supply a package of favorable conditions to establishing new better-adapted practices.

More specifically, implementation of this project will be strictly carried out with Oasis development programs (PNUD POS-POT) including supplying them with tools aimed at ensuring the resilience of their activities in the face of climate change. These two programs, underway in the two locations of the oasis zone, are implementation tools of the National Oasis Management Strategy, and aim for sustainable development and the reduction of poverty.

The approach adopted by the POS and POT programs is an integrated approach to development, combining activities to strengthen local and institutional capacities with the implementation of economic networks (particularly in agriculture).

These programs aimed to:

- Conduct an environmental analysis to develop knowledge on the components of the oasis ecosystem and its degradation risks, as well as the oasis system's level of vulnerability to climate change. The PACC-ZO Project relied on the results of these programs to define its strategy during a consultation phase.
- Reduce the degradation of the oasis, develop its natural wealth and resources to reduce poverty among the poor, fight against social exclusion, and improve the living conditions of the populations. The pilot projects have been carried out in this sense and the PACC-ZO Project is based on their outcomes in order to carry out the necessary adaptations and share successful experiences.

The PACC-ZO Project is thus in the pursuit and the complementarity of efforts carried out by POT and POS programs. This synergy will increase the resilience of these two (2) programs.

To illustrate, a list of projects undertaken by the Department of Agriculture (Regional Office to Promote Agriculture in Tafilalet), which coincide with the objectives of the project in question. They include the:

- Rural development project in Tafilalet – PDRT – (1995-2002), financed by FIDA and which cleared 43 khettaras, resurfaced 29km, extended 3km and covered over 18km.
- Rural Development project in rural communities through the restoration of the khettaras in the regions of the South East Atlas (2002-2005) financed by JICA, and which established the Master Plan for the development of rural communities based on the khettaras.

- Restoration program of the khettaras in the form of a non-refundable grant for small local projects financed by the Japanese embassy in Rabat, which has since 2002 restored, over 24 khettaras covering a total length of 11km of tunnels for an overall sum of around MAD 13million.
- Rural Development Program to integrate and promote Bours land DRI-MVB, (2007-2010) which affected 9 khettaras restoring 0.8km of tunnels, resurfacing 1.5km and building a distribution network over 1km for a total sum of MAD 3 million.
- Millennium Challenge Account Program (2009-2013), an important program that dealt with the development of fruit tree productivity, amongst others the date palm. This project also involved the oasis zone through the completion of hydro-agricultural development works focusing on irrigated areas, the restoration of the khettaras and the small and medium sized irrigation network.

The PACCZO project is complementary to these projects, as we have seen in the justification of the components. In summary:

- The certification and promotion of agricultural projects transformed in the framework of pillar II of the Moroccan Green Plan.
- The construction of modern buildings in mud, which is in line with the CERKAS strategy to redevelop the use of traditional materials that are adapted to climate change.

In addition, the project will participate in strengthening a dynamic integrated territorial development by bringing together all the stakeholders in a communal project, which unites the strategies of each.

The GEF/IFAD's project "Increasing productivity and adaptive capacities in mountain areas of Morocco (IPAC-MAM)" is also a climate change adaptation project that will be carried out starting in 2014. The synergy between this project and PACC-ZO is geographic, since it focuses on mountainous zones, which do not concern the PACC-ZO project.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

The processes for managing knowledge are essential to learning and risk mitigation. To ensure that individual knowledge is developed and shared, the project includes several actions for managing and sharing knowledge as detailed in Component 4.

In summary, existing information will be shared with the vulnerable populations by:

- Producing and capitalizing on this knowledge (results from the water resources in the Intermediary Gheris Basin and Maïder Basin, improving the system for monitoring water resources in the project zones)
- Making this information accessible by establishing a documentation library
- Sharing and appropriating this knowledge through the establishment of a Local Water Council and the support of local initiatives for communication and exchange by creating a fund for calls for project proposals to this end
- A national close out seminar to present the results of the study and lessons learned will be organized

In addition, it must be noted that the project finances research projects in partnership with national universities, which assist in spreading, on the national level, the knowledge produced by the project.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations.

The concept for this project comes from the participatory diagnosis initiated by the National Agency for the Development of the Oasis and Argan Tree Zones in conjunction with the decentralized services of the Ministry of Agriculture and Maritime Fisheries, local communities, as well as various local organizations working in the project zones, such as development associations, cooperatives, and second order professional organizations.
The participative approach is essential for the success of the projects' activities.

The consultation process took place in two stages: the first exploratory phase for developing the Concept Note, and then a second deeper phase for defining the project in detail and receiving its validation by various stakeholders.

Exploratory Phase

Workshops and meetings with focus groups were held (Annex 6) in various locations throughout the oasis zone, during which the strengths, weaknesses, opportunities, and threats were identified for the different areas in order to propose actions for mitigating risks and enhancing potential. This collaborative approach:

- Identifies the main areas of development selected
- Makes an analytical review of the diagnostics completed
- Identifies the dynamic territorial actors on which to base the implementation of the project, and those that are likely to be inhibitors
- Develops the axes of the project: construct a collective vision for the area's evolution by identifying the elements uniting the communities and developing budgeted projects accordingly
- Establishes a participatory and potentially contractual approach for the project involving the main actors involved in the territory to ensure consistency within the development of the projects with national sectorial projects and encourage their commitment to the project.

The different consulted stakeholders are:

- Beneficiaries, their organizations, and their representatives: AUEA, second order professional organizations such as cooperatives and EIGs, local elected officials, local development NGOs, etc.
- Local technical administrations: ORMVA, DPA, and regional representatives of ANDZOA and ONCA
- Central structures of the MAPM, of water, and of the environment to ensure consistency with national strategies and policies.

In addition, as part of a project integrated in sustainable development and the production and quality of the date industry preserving natural palm tree resources, as recorded under the program contract, a certain number of characterization studies and participatory diagnostics were completed. These studies were conducted using a participatory approach to identify the expectations and needs of the local population and the regional cooperatives to overcome problems relating to water scarcity as well as develop more favorable socio-economic conditions for the oasis population.

Detailed Design Phase of the Project

This phase was carried out in two steps:

First, actors of all key areas for adapting to climate change in the oasis zones identified during the first phase were revisited. This consultation aimed to: (i) deepen each component defined above in order to identify innovative actions to carry out with the stakeholders, based on the problems of the different zones. (ii) Identify the risks to be considered to ensure the success of these actions. (iii) Define, by organizing information collected, the most relevant areas for this project.

The actors of the following areas have been consulted in the zones of Errachidia, Ouarzazate, and Zagora:

- Water: Hydraulic Basin Agency (HBA), National Office of Drinking Water (NODW)
- Agriculture: Regional Office of Agricultural Development (ROAD), National Institute of Agronomic Research (INRA), farmers, beekeepers

- Tourism: Regional Delegation, Provincial Council (CPT), hotels
- Heritage: CERKAS
- Environment and Protection: Water and Forests High Commission
- Integrated development of the oases: Friends of the Environment Association, RADDO, professors, the local voluntary sector, Zeila Association, POT, EIG, youth associations, and women.

Once the zones were selected (Intermediary Gheris Basin and Maïder Basin) and the actions were identified, the third consultation phase was organized to present the proposal to various project stakeholders, and particularly to the vulnerable populations that are the main beneficiaries, and were represented by the associations (See **Annex 7** and 8).

Beneficiary involvement is reflected in their conscious and effective participation throughout the phases of the project: identification, planning, implementation, and monitoring and evaluation. Their participation involved mobilizing, educating, negotiating, and convincing all the different parts of the population in order to gain the support of all in the project.

To further strengthen their involvement in the rest of the process, the project offers promotion, communication and awareness activities for all project stakeholders around the experiences and practices for adapting to climate change through sustainable resource management. Awareness-raising activities are planned with the support of different structures from the Department of Agriculture, primarily those from the National Office of Agricultural Council (NOAC), an office recently created and whose missions are presented in the Annex 5.

The overall objective is project ownership through sustainable actions accompanied by a change in behavior.
Thus, the results are the outcome of a participatory program involving all stakeholders.

Gender Approach

As it has been shown, women are especially targeted by the project, particularly because they are the ones that permanently live in the oasis, and are therefore very vulnerable to the effects of climate change. They have been consulted, through associations and women's cooperatives, during the exploratory phase of the project. A portion of these women then actively participated in the workshops.

List of women consulted during project preparation:

FULL NAME	ASSOCIATION /COOPERATIVE	REGION
BEN ATTMANE AICHA	COOPERATIVE DES FEMMES DE DEMAIN	TINJDAD
ALLAOUI RABHA	COOPERATIVE DES FEMMES DE DEMAIN	TINJDAD
BLADI HASSANA	COPPERATIVE ATTAWFIK	TINJDAD
MALIKA ZOUGGAR	ASSOCIATION OASIS FERKLA POUR L'ENVIRONNEMENT ET LE PATRIMOINE	TINJDAD
HAIFAA BEN SAAOUD	RESEAU ASSOCIATIF POUR LE DEVELOPPEMENT DURABLE DES OASIS	TINJDAD
EL ABDI RACHIDIA	**RESEAU ASSOCIATIF POUR LE DEVELOPPEMENT DURABLE DES OASIS**	TINJDAD
NAJIA EL GARAMI	COOPERATIVE FEMININE CHIYAHNA GIE ERFOUD PRODUITS ARTISANAT / COUSCOUS (25 adhérentes)	ERFOUD
RAJAA KHILI	COOPERATIVE FEMININE MY BRAHIM (35 adhérentes)	
-	COOPERATIVE FEMININE PAM PLANTES AROMATIUES ET MEDICINALES	TINJDAD
-	COOPERATIVE SLOWFOOD GIE ALNIF PRODUITS DE TERROIR DU MAIDER / HENNE ET CUMIN	ALNIF
-	**FEDERATION DES ASSOCIATIONS - ALNIF**	ALNIF
LAKRATI FATIMA	COOPERATIVE EL WAHA TRANSFORMATION DE DATTES	AOUFOUS

They will certainly be involved throughout the project as beneficiaries but also will play a role in its implementation. This involvement is facilitated in Morocco through initiatives conducted by INDH, which require women's participation in local human development committees.

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

Component 1: Improving adaptive capacities of the water sector

Baseline Scenario

Apart from a few rainy episodes, the last one being in 2008, the traditional oasis areas in southeast Morocco are experiencing a worsening water deficit. Studies conducted in the 90's in preparation of the Master Plan warned policy makers of the risks of water shortages that the traditional oases have been facing since the droughts in the 70's. Under these conditions, the effects of climate change resulting in greater irregularity in rainfall and their overall scarcity, coupled by an increase in temperatures, which accelerate evapotranspiration, risk gravely diminishing water availability for ensuring the viability of the oasis. These factors have irreversible consequences on the viability of traditional oasis agriculture and the functions it provides for ensuring sustainable development.

Scenario with the FA Project

Component 1 of the FA Project aims precisely to support concrete measures for improving water efficiency by refilling groundwater reserves and water conservation. The budget allocated by the FA will finance the total cost in the two priority sites of up to four (4) refilling structures to supply six (6) palm groves, whose networks will be restored taking water conservation into consideration. Water storage will help compensate for erratic rainfall, and the fact that the storage is underground will diminish the effects of evaporation, which today accounts for considerable losses. Restoring hydro-agricultural structures will reduce losses related to infiltration and evaporation (water will flow easier into the seguias, whereas today a major portion evaporates before arriving to the parcels because it stagnates in infrastructure that is in a poor condition). These water savings are measures for adapting to climate change, which causes a depletion of this precious resource.

In the site the most threated by a drinking water shortage, the project will finance exploration and feasibility studies for their exploitation. Indeed, where these saving measures are not sufficient for ensuring the primary need of drinkable water, adaptation requires the search for new resources.

Component 2: Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted zones

Baseline Scenario

In the oasis zones, the economic activities that contribute the most to the livelihoods of the populations directly depend on water: fruit trees, agriculture, animal husbandry, which are becoming scarce due to climate change. Tourism is indirectly affected, since it depends on the continuity of essential functions performed by the oasis. This activity relies on the agricultural landscape of the oasis, which cannot be maintained without water.

The main income generating activities in the oasis are thus threatened by climate change, exposing their population to great economic vulnerability.

Scenario with the FA Project

To cope with this situation, the FA Project will finance the total costs for adapting income generating activities to the constraints brought about by climate change by:

- Developing a sustainable oasis agriculture to combat water scarcity
- Empowering tourism in its resource management.

On the other hand, activities targeting the increase and diversification of income sources by:

- Diversifying and developing agricultural products
- Developing sustainable high-end tourism
- Training young adults and women in new careers

Component 3: Improving the ecosystems' resilience in response to climate change and variability

Baseline Scenario

Quality of life and environment are major attributes of the oasis zones. Threats associated with the uncontrolled concrete development and pollution combine with the effects of climate change (desertification, flooding, droughts) and endanger the area's capital. The three major problems that have been identified are as follows:

- Desertification accelerated by climate change and directly affects the population by deteriorating agricultural parcels and access roads
- Pollution due to human activity but that deteriorates the landscape and its resources, directly reducing the living conditions of the oasis population
- Concrete buildings replacing those in mud, coupled by an increase in temperatures caused by climate change make homes uncomfortable, or at least less expensive if the excessive heat is offset by air conditioning.

In addition these three aspects deteriorate the oasis landscape and thus the tourist appeal generating income for the population.

Scenario with the FA Project

To counter these effects, the project will develop a set of coherent and integrated actions for preserving the oasis ecosystems in the context of climate change in the selected palm groves:

- Fight against desertification
- Pollution control
- Developing value of adobe constructions compared to concrete to initiate a process of re-appropriating traditional materials and techniques, which are the best adapted to the climate conditions.

The call for projects financed through competitive funding guarantees efficient funding of these activities and the empowerment local stakeholders.

Component 4: Improving stakeholder awareness though the management and exchange of knowledge

Baseline Scenario

There is a large information gap between the actors in the oasis zones and a lack of informed public discussion on the effects of climate change on the local resources, particularly water and the arboricultural and architectural heritage. Under these conditions, there is a tendency to develop abusive behavior on behalf of special interests, which leads to a worsening of the initial state. This gap specifically relates to the younger generations and temporary residents (immigrants and tourists).

Scenario with the FA Project

To avoid this downward spiral, the FA Project will launch and fully finance the creation of an accessible documentation library, a local water committee responsible for leading local informed debates, and for defining and implementing a communication strategy as well as organizing a national seminar to spread this information on the national level.

Component 5: Strengthening the capacities of participants in the design and implementation of adaptation measures

Baseline Scenario

Analyzing the experiences of previously implemented projects in the oasis zones show that skills in collaborative management still remain inadequate. Under these conditions, the efficiency of interventions may be limited from the start of the project because of gaps in communication and after the project due to lack of participation.

Scenario with the FA Project

The FA Project will be responsible for the total cost of initiatives for strengthening collaborative management skills in order to successfully pinpoint actions, their implementation efficiency, and their sustainability.

J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project / programme.

In terms of sustainability, the proposed project will build on the strengths and weaknesses of other similar programs/projects carried out in the oasis region in Morocco or elsewhere in the MENA region in the areas of climate change adaptation, sustainable management of natural resources, and community development.

Sustainable management of natural resources in general and of oasis ecosystems in particular must rely on an integrated strategy for managing land, water, and biological resources, which considers the local population (producers and consumers) as an essential component of these ecosystems. One of the main weaknesses of certain projects in the oasis in the past has been the lack of an integrated ecosystem-based approach to development: the focus was almost always exclusively on water mobilization and the risks associated with overuse, soil degradation, the deterioration of environmental resources, and land abandonment due to climate change were not sufficiently taken into account. Today, it is increasingly accepted that the adaptability of natural capital can be greatly increased when it is associated with human, physical, and social capital. Therefore, putting greater accountability on local stakeholders in planning and implementing adaptation, investment, and skill building actions must be considered as a crucial element in the overall sustainability of said actions. In the same vein, the project should be very attentive to the social mobilization and the level of awareness of all sections of the oasis population (including women and youth) on the major issues of their ecosystems.

In terms of institutional sustainability, the project will rely on the following aspects:

- Working with existing institutions, both local and central for implementation, which will guarantee continuity at the end of the project
- Holding all local stakeholders accountable through a capacity building program that is well adapted to their specific needs
- Establishing an effective system for managing and sharing knowledge to capitalize on skills and integrate them into national policies.

The technical sustainability of project activities is based on the experience of similar projects, though the intervention methods and the technologies and techniques shared, which will be improved and scaled. The project will also seek sustainability by completing past investments in natural resources by supporting community-driven maintenance. During a consultation process, a tentative agreement was orally passed for the management and maintenance of the hydro-agricultural structures and desertification. Agreements developed based on agreements already used for this end (Annex 1) will formalize the commitment of the beneficiaries in order to ensure the sustainability of these structures. This formal signing will only take place once the project has been launched and the sites for structures have been precisely identified.

To strengthen the economic and financial viability, the project will support the dissemination of practices, technologies, and techniques for improving the productivity of agricultural activities and the resilience of the households involved. Communication and knowledge sharing

initiatives are an essential element for ensuring the program's sustainability. A close partnership will be established with sectorial programs, including for circulating technologies.

The environmental sustainability of project actions will be researched using interventions adapted to area's climate conditions. For the water sector, the project has focused on refilling groundwater sources and water conservation; actions that help sustainably improve water efficiency. To combat desertification, the project calls for partnerships for ensuring re-vegetation of the targeted zones. For the component regarding ecosystem resilience, the project interventions will be implemented according to the procedures stated in the call for projects, which should encourage the involvement of local organizations and promote sustainability and the spread of adaptation actions.

K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

By its goals of social development and environmental preservation through conserving water resources and oasis ecosystems, the negative environmental and social impacts of the project, in terms of the AF environmental and social policy, are minimal.
This project can be classified as Category B.

The literature review and the numerous site visits and meetings with project stakeholders and future beneficiaries have made it possible to evaluate all the types of environmental and social impacts included in the AF framework[33]. A particular attention was given for ensuring the presence or representation of vulnerable groups at the various workshops (see section H).

The table below provides a summary of the arguments for this Category B classification:

List of Environmental and Social Principles	No evaluation necessary for compliance	Justification of Potential risks/impacts – assessment required for compliance
Compliance with the law	x	All activities planned by this project are in accordance with Moroccan law pertaining to the environment, natural resource management, and citizen rights (see section E). They also respect the principles of international standards for such matters (e.g. Operational Policies of the World Bank, SFI Performance Standards).
Access and Equity	x	The participatory approach is and will continue to be used among all stakeholders. Communication surrounding the project is disseminated in a manner that is transparent and accessible to all (see components 4 and 5). Nevertheless, changing the water resource management generated by the project activities could have an impact on the populations downstream of the concerned watersheds. Downstream monitoring of the evolution of the social and economic fabric of these zones will be carried out throughout project implementation. The executing entity (PMU) will ensure that a dialogue is maintained with these populations.
Marginalized and Vulnerable Groups	x	The marginalized and vulnerable groups have been identified and are included in the decision-making process (see Part III : Implementing Rules).
Human Rights	x	The project fulfills the human rights of the vulnerable populations, including the right to food and drinkable water.
Gender equality and women's empowerment	x	The gender approach and respect for gender equality are two fundamental principles used in the

[33] See Adaptation Fund Board, "'ENVIRONMENTAL AND SOCIAL POLICY (APPROVED IN NOVEMBER 2013)''. Operational and Gudelines Paper

		development and the implementation of the participatory approach. Women are particularly targeted by the project (Component 2).
Fundamental Labor Rights	x	Morocco has ratified two international conventions (ILO): Convention 138: its prohibits child labor for children younger than 15 years old. Convention 182: it prohibits all of the worst forms of child labor for children between 15 to 18 years old. The Labor Code establishes 15 as the generally applicable minimum age for employment. Fundamental labor rights are respected in all the relevant activities: construction and infrastructure (see Section E) No child will work on the construction or any other activity. All the income generating activities developed concern only adults. Children will be concerned by environmental education in the school.
Indigenous people	x	Subject not involved in the project
Involuntary resettlement	x	No population in the zone will be subject to resettlement due to the project activities.
Protection of natural habitats	x	The oasian ecosystem is a natural habitat, all the activities that aim to preserve the ecosystem could be considered as protection of the natural habitats measures. The potential impact on natural habitats is very weak but it will be considered in the ESMP and will be monitoring during all the project.
Protecting biodiversity	x	Positive impact. Better management of water resources by the project will improve the conservation of biodiversity in the oasis zones.
Climate change	x	Overall positive impact. Some greenhouse gas emissions may occur during the construction of groundwater refilling structures.
Pollution prevention and resource efficiency	x	Skill building on knowledge relating to climate change will present the sources and types of pollution and the best practices to mitigate them. Nevertheless, there remains a risk for: - Changing the surface runoff, which could negatively impact the ecosystems downstream of the project watersheds. - Changing the water quality in the wadis along the segments affected by the construction of infrastructure - Polluting during the infrastructure construction phases. These impacts will be closely monitored during both the work and operational phases of these infrastructures. If necessary, mitigation measures will be taken.
Public health	x	Positive impact. Improving water resource management will reduce the risk of waterborne diseases related to the quality of drinking water. Promoting sustainable agro-ecology and agriculture will reduce the use of pesticides and herbicides that are dangerous for health.

Physical and cultural heritage	x	Positive impact. Without the project, the mud architecture, that is a very important part of the physical and cultural heritage of the oasis, is deteriorating. The project will develop this heritage and won't interfere with any existing access and use of physical and cultural resources,
Land and soil conservation	x	Positive impact. The improved management of floodwaters against erosion and land development (which are related), such as the implementation of trainings for the fight against desertification and soil conservation management will ensure long-term land and soil conservation for these oases.

In fact, it is clear that some of the project's impacts are mostly temporary/localized and are of low severity. They are located within two watersheds, or downstream of them. Because of their small size, they can be studied for this proposal. They are detailed in the following sections.

K1. Impacts and Risks in the Project Zone

In order to establish a clear understanding of the potential negative environmental and social impacts in the project zone, the planned activities will be assembled into two categories : (i) activities of a material nature (e.g. physical infrastructure), (ii) activities of an immaterial nature, or « soft » activities (e.g. organizational and management measures, skill building).

Impact of Physical Infrastructure:

A first set of measures focuses on the implementation of sustainable solutions for protecting water resources by constructing small physical infrastructure (Component 1).

This includes some small dams and thresholds that will be built in different strategic locations in each watershed, mainly upstream thereof, to enable the recharge of groundwater sources to feed the khettaras and reduce flooding.

These apparatuses cause minimal disruption to the environment. The area affected is minimal (approximately 40 ha, divided into six identified sites – see Part I). Given that they are centered on the wadi, bodies of water connected to those chosen will only very slightly impact private or public properties. Nonetheless, a precise inventory thereof should be made to consider, where appropriate, compensation measures.

This component also involves the restoration of concrete khettaras to prevent their destruction by floods.

It should be noted that other impacts are always minimal for these two types of intervention but nevertheless must be presented in two phases: the construction phase and the operational phase.

During the construction phase, at each threshold or hillside retention wall, site construction work and supplying construction materials and products can cause heavy and loud traffic of machinery and trucks, which are accompanied by greenhouse gas emissions and polluting air particles, dust emissions, and the trampling and compaction of soils located in their paths.

Furthermore, storing certain construction materials, such as cement and hydrocarbons for machines, can be a source of pollution for the soils, surface water, and ground water. Stored in an unfinished area (no protection against rain and runoff or on uncovered soils), these products can contaminate the soil and permeate deep down.

Finally, the hustle and bustle primarily caused by moving equipment could be a source of disturbance for the surrounding populations. Respecting normal working hours and moving equipment in an efficient way will reduce this inconvenience to a minimum.

Given the size and complexity of the works considered, and their progressive completion over time, these are considered weak impacts and will have no effect in the long-term.

During the works' operational phase, the only environmental impact that could exist is the degradation of the water quality due to water purification and algal blooms and a decreased efficiency in the apparatus' infiltration by blocking the permeation system.

A second set of measures is planned for restoring cultural heritage and constructing public infrastructures using local and traditional methods and materials (Component 3). This set of measures should take into account the impacts relating to the construction phase, which is similar to those from water infrastructure.

Impact of organizational measures

Given that improving the living conditions of the oasis population is a major objective of this project, the social impacts of the measures for these populations are entirely positive. These measures aim to reduce their vulnerability to climate change and the impacts that it can have on their income and lifestyle. For example, the appeal of these oasis areas will be enhanced, emigration will be mitigated, and resilient agricultural practices will be developed.

Each planned measure for the five components will be implemented keeping in mind the current social structure, the organization of various stakeholders, and their customs. The implementation of these activities will not upset the established order, but will rather use the existing means and channels appropriated by the oasis population. These measures also take a pro-environmental approach, which reduces current negative practices for the area and prevents those that could come about by improving living conditions.
Developing the tourism industry will take a sustainable development approach where environmental preservation and consideration of climate change impacts will be part of the communication and awareness building for tourists.

K.2 Impacts and Risks Downstream of the Project Zone

Groundwater recharge infrastructure has no impact upstream of the wadis but could affect downstream with the flow rate allowed for the khettaras and the ecosystems that follow.

In fact, the sizing of the hillside dams and weirs should take into account its aspects and therefore this particular analysis should be imposed during specific assessments at each infrastructure. The idea is to leave a sufficient flow rate to meet the minimum needs of the khettaras and downstream ecosystems.

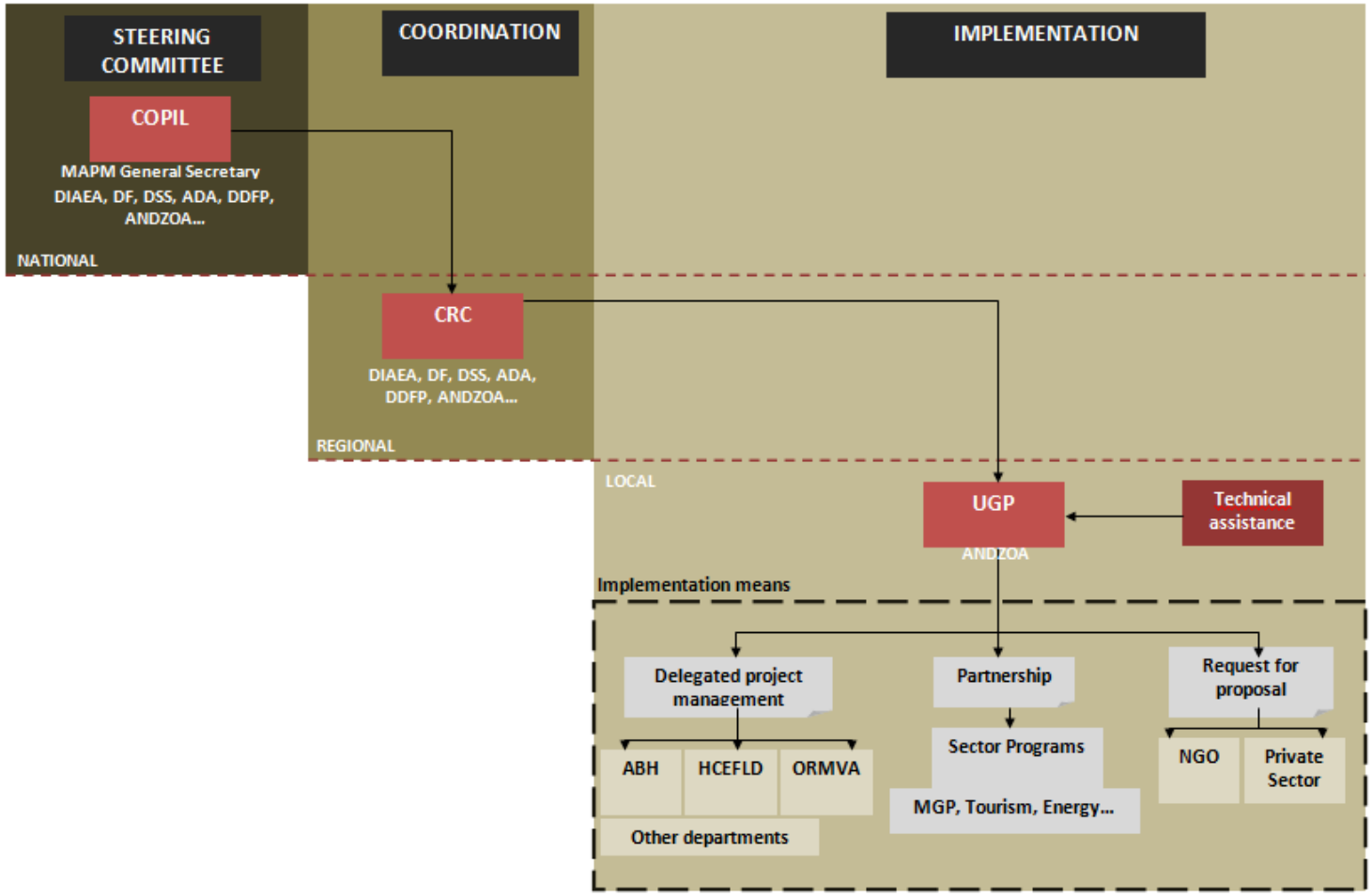
On the social level, the change in water resource management generated by the project activities could have an impact on the populations downstream from the watersheds concerned. The distribution of volumes between the two levels could indeed be changed. However, this change will not be significant and the distribution will be able to be managed more precisely because of the increased control over the resource through various control mechanisms.

In any case, the evolution of the social and economic fabric of these downstream areas will be monitored throughout the implementation of the project by the executing body, whose area of operation covers these zones.

The executing body will initiate a dialogue with these populations and the means for creating a ripple effect will also be studied to ensure that they benefit from the project, whether it be directly or indirectly.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Adequacy of project/program management arrangements.



A steering committee will be in charge of centrally directing the implementation of the project. They will be responsible for approving the five-year program and the project's annual action plans and for high-level coordination between the partners involved. This planning and these plans submitted for approval will be prepared by the Committee Secretariat (ANDZOA) based on proposals submitted by the project's Regional Coordination Committee (RCC) for both zones selected. The RCC will be in charge of developing these proposals based on projects submitted by the Project Management Unit (PMU). For Component 1, the projects submitted by the PMU for each zone will be subject to a specific interim study of each zone on the strategy for protecting palm tree water resources that will be completed *at the basins* of Gheris and Maider. For Components 2,3, and 4, the projects submitted by the PMU will be identified, evaluated, and coordinated on the level of three to four representative palm groves that will be equipped with Plans for Adapting and Developing the Oases (PADO), in both zones.

Steering Committee

The ***Steering Committee (SC)***, chaired by the Secretary General of the Ministry of Agriculture and Maritime Fisheries or the Director General of ANDZOA and composed of various stakeholders (ADA, DIAEA, DF, DSS DDFP, ONCA…), the Steering Committee is the supervising and validating body for all project activities. It validates the project procedures manual the specific project agreement to be signed between ANDZOA and ADA, annual programming (including the ESMP), the budgets and related documents, and reports on project progress and the results obtained. It also ensures that the project is consistent with sectorial policies and government programs. It will meet at least twice annually and whenever it is deemed necessary.

Regional Coordination Committee

The Project will establish a ***Regional Coordination Committee (RCC)***, which will have the following roles:

- Ensure interactions between the regional and local levels and the project's Steering Committee
- Mobilize local institutional actors (to encourage their participation in formulating and implementing the PADOs)
- Facilitate interactions between the local communities and development partners
- Ensure that all project agreements are implemented
- Capitalize on experiences and lessons learned from project interventions.

RCC meetings will take place every six months on a rotating basis in each province. The RCC will be made up of representatives from departments and institutions working within the four provinces concerned.

Project Management Unit

The Project Management Unit (PMU) will be established within ANDZOA under supervision of the director of oases zones development who will coordinate the monitoring and implementation of project activities with the ADA. The PMU will adopt an integrated and

crosscutting approach and will be based on the active participation and involvement of the beneficiaries on all levels of decision making. This PMU will be staffed by experienced professionals and will be supported by external technical assistance and expertise.

The institutional arrangements proposed are taken from lessons learned from previous projects. ANDZOA staff regulations allow the creation of a Management Unit for implementing a project. In this Unit, the administrative staff is hired from a call for applications and is engaged full-time for implementing the project's activities. Analyses and discussions conducted during the preparation of the project have agreed upon the necessity to establish a management unit by objectives.

This unit will be in charge of, among others, the coordination of all project activities, the organization of RCC activities, the promotion of project results, the ESMP, and the implementation of the communication strategy. The PMU will be composed of the following staff: National Project Coordinator; Rural Engineering Specialist; Oasis Agriculture Specialist; Environmental Specialist; Procurement and Financial Management Specialist; and an M&E Specialist.

As the national entity accredited by the AF, ADA is the only interlocutor vis-à-vis this Fund. It is responsible for:

- Transferring the donated funds to ANDZOA to carry out the project activities based on a work plan and an annual budget pre-determined by ANDZOA.
- Ensure that all work is done according to the project management procedures manual.
- Validate implementation and financial reports prepared by ANDZOA.
- Submit reports on the physical and financial status of the project to the AF.
- Validate supporting expenditure documentation for project activities and submit them to the AF to request reimbursement.
- Carry out supervision missions to inquire about the progress of the project and ensure that funds are used properly.
- Ensure that all procurement and fiscal management project procedures are being followed.

During the preparation of this proposal, a review of studies and diagnostics on the status of palm groves in the project zones will be conducted. This work will be taken up by a consultant in order to define the needs for adapting traditional oases in each of the zones and selecting three or four oases that will be subject to development and interventions.
Each oasis selected will be given a Plan for Adapting and Developing the Oasis (PADO) according to the terms of reference in the annex. These studies will produce the selection of a set of actions or micro-projects-responding to the anticipated outcomes-and co-financed by the project and the partners.

The actions/micro-projects will be the result of a participatory planning process to identify the priorities of the local communities among the pre-identified outputs. The promoters of these micro-projects will be groups of people and not just individuals. In addition, these micro-projects will have simple and concrete objectives and the private sector will be responsible for their implementation (artisans, laborers, educators). Each micro-project will include a management system, including maintenance and monitoring system.

The eligible projects will be selected based on their compliance with the framework of the project results in terms of diversifying livelihoods and oasis ecosystem resilience.

B. Measures for Financial and project/programme risk management

The project's main risks have been analyzed during the formulation in the intervention zones. The table below presents the risks according to the domains concerned, the level by category (major, moderate, substantial), and indicates the planned mitigation measures. The Project's annual performance reports will include comprehensive information on the implementation of these measures throughout the duration of the project.

The proposed project includes a range of risks ranging from moderate to substantial. Overall, it does not have any major risks, given that the project primarily concerns improving the living conditions of vulnerable groups in the oasis ecosystems subjected to the effects of climate change.

Type of Risks	Description	Level	Mitigation Measures
Institutionnal	The project is likely to suffer the consequences of inadequate staffing and a lack of qualified personnel, which affects some of the project stakeholders, particularly certain rural local authorities.	Moderate	The risk to the implementing agency is weak, given that ANDZOA has already shown an ability to carry out similar projects and appropriate training will be organized for its staff.
Institutionnal	The participatory approach promoted by the project runs the risk of being reduced or even diverted by local interest groups.	Moderate	The focus will be on communication and awareness-raising activities for the communities (also relating to property issues and consumer rights to natural resources) and will identify and implement transparent, participative, and inclusive processes for planning and implementation.
Technical	In light of past experiences showing the difficulties faced by similar projects covering geographically remote and disadvantaged areas, risks relating to the sustainability of actions still remain	Moderate to Substantial	The PMU will establish and monitor compliance with the agreements for structural maintenance, equipment, and acquisitions between the user representatives and the populations with the project managers

Technical	The groundwater refill structures could affect the access to resources in certain downstream sites	Moderate	The ESMP will anticipate the completion of environmental impact assessments before work is done on each structure under the terms of legislation and in accordance with the AF Guidelines
Environmental	Adverse climate conditions could have a negative effect on the success of the project.	Moderate to Substantial	The project aims to increase the systems' resiliency to climate hazards.
Financial	The project activities risk being delayed by the circuits for transferring funds.	Moderate	The IE has a wealth of experience in managing funds in the form of grants. The IE and the executing agency will strengthen the capacities of the personnel dedicated to the financial management of the project.

C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy.

The environmental and social policies of the Adaptation Fund are clear in terms of managing the risk of environmental and social impacts, including monitoring and evaluating the risks previously identified and any necessary mitigation measures. In summary, the risks identified for this project are the following:

Risk	Likelihood
- Pollution of water and soils and noise pollution for the populations during construction and restoration phases of the hydraulic infrastructures and cultural heritage buildings (Components 1 and 3).	Weak
- Negative change in the allocated rate downstream from the catchments considered (Component 1).	Weak
- Negative change in the social and economic fabric in these downstream areas (entire project).	Weak

To mitigate these risks and to avoid their potential consequences, an Environmental and Social Management Plan (ESMP) will be established, according to the guidelines normally recommended by international standards. The ESMP will:

- Introduce the project characteristics, its context, objectives, and expected results
- Characterize the social and environmental impacts
- Explain the procedures that the project stakeholders will follow to ensure good management practices and methods for mitigating environmental and social impacts
- Describe the anticipated mitigation measures for each impact, including who will be responsible for performing them and when they will be carried out, monitored, and evaluated.

The ESMP is also required by Moroccan legislation before giving authorization for constructing structures, but for the case of this project, it only concerns the groundwater refilling structures (Output 1.1.1). Restoration of the khettaras and seguias or the protection structures are not concerned because they do not change nor reallocate the quantity of mobilized water by one or the other, nor do they alter the route.

Thus, a provisional ESMP was established and is presented below. The definitive ESMP cannot be completed at this stage since the specific works sites have not been selected. The first activity of Component 1 involves carrying out the necessary additional studies on the potential sites in order to choose those that are most appropriate. The risks specific to the location of the works are therefore not identifiable before the project is launched.

Given that it is a Category B project, it is mandatory to conduct an ESMP, but will be, as permitted in Article 9 of the FA Environmental and Social Policy, detailed and implemented by the PMU upon approval of this proposal. The probability of risk is minimal and the construction of these works only represents 10% of the budget.

As the acting IE, the ADA is therefore committed, always in accordance with this article, to complete the ESMP once the sites are selected and before any construction is started, and to simultaneously transfer it to the AF, according to the format described previously and the guiding ideas presented below in the preliminary ESMP developed to facilitate the technical evaluation of the current proposal.

Preliminary ESMP

Steps

1) Complete the EIA
2) Analyze the risks identified by the EIA
3) Develop and implement the ESMP

Risk 1 can be addressed immediately by providing appropriate measures for mitigating disturbance pollution risks during the work preparation and construction phases of the project.

For Risk 2, it will be necessary to characterize the risk of changing flow outputs within each hydraulic infrastructure construction sub-project at the same time as the design study. To achieve this, there will be consultative meeting between all stakeholders of the basin in question and the downstream basin.

For Risk 3, changes in the social and economic tissue of the downstream basin implicated will be monitored throughout the lifespan of the project activities. A grievance mechanism will help in identifying these changes concretely. Based on these grievances, public consultations will then be established in order to resolve any potential issues. The number and extent of these public consultations will depend on the concrete impacts identified along the way. Therefore, it is impossible to estimate them at this time.

The table below summarizes the ESMP that will be implemented for the project:

	Risk 1	Risk 2	Risk 3
Impacts	Water and soil pollution, noise pollution for the populations during the phases for constructing and restoring hydraulic infrastructure and cultural heritage buildings	Adverse change in the flow rate allocated to the downstream watersheds considered	Adverse change in the economic and social fabric of these areas downstream
Mitigation Measures (Examples)	Use of modern machinery with low fuel consumptions, respect normal working hours, and optimize the movement of machinery, storing polluting liquids in sheds sealed off from water and soil contact.	Localized hydrological study for each hydraulic infrastructure Consultation meetings with stakeholders.	Strengthening the mechanism for collecting and managing grievances. Establishing a Public Consultation based on need identified.
Implementation	Contractors	PMU (External technical assistance) Contractors	PMU

Monitoring/Evaluation	Contractor, PMU	PMU, SC	PMU, SC
Costs	Included in the contractor's proposal	For localized studies : included in the contractor's proposal	Minimal, possibly included in the ANDZOA operational budget
Calendar	Work phase	Infrastructure study phase	Throughout the project

This table also identifies the stakeholders involved in managing the social and environmental risks: the contractors and the PMU for implementation, and the Steering Committee for the monitoring and auditing. The ESMP will be updated after each physical infrastructure is built, in order to present the actual situation of Risks 1 and 2, and every six months to follow the developments of Risks 2 and 3.

The management plan document will include the following sections:

– Summary of Potential Impacts
– Description of Planned Mitigation Measures
– Description of Planned Environmental Monitoring
– Description of Planned Public Consultation Process
– Description of the Responsibilities and Authorities for Implementation of Mitigation
– Measures and Monitoring Requirements
– Description of Responsibilities for Reporting and Review
– Work Plan including staffing chart, needs of capacity strengthening, proposed schedules of participation by various members of the project team, and activities and inputs of various government agencies
– Detailed Cost Estimates
– Mechanisms for feedback and adjustment

D. Monitoring and evaluation arrangements including budgeted M&E plan.

The activities will focus on establishing a monitoring and evaluating system for the project. The system will be designed and harmonized with those of other implemented biodiversity conservation and natural ecosystem management projects. The cost for monitoring and evaluation is estimated at US$0.075 million.

The M&E system will be designed as a management tool for the results, focusing on the impact, project outcomes, and the regular monitoring of activities of all the components.

The PMU will be responsible for all monitoring and evaluation aspects and will establish the operational tools to collect regional and local data.

Efforts will be made to fully empower national institutions in monitoring and evaluating the results of the project by ensuring that the system is closely related to the M&E systems of each of the participating institutions.

By producing timely, quality information, the M&E system will be an essential management tool that will assist in decision-making. The activities' results will be measured by a set of qualitative and quantitative indicators.

The PMU activities in terms of monitoring and evaluation will be based on the information of the indicators defined in the III-E section and according to the methodologies recommended in the AF guidelines, particularly the study titled Core Indicators Methodologies[34].

A workshop presenting the selected methodology will be organized at the start of the project, preferably during the first month. The progress of the project will be monitored through semi-annual reports.

The project will undergo a mid-term evaluation that will be carried out by an independent evaluator that will assess the project's progress as well as actions to improve its execution.

During the six months following the completion of the project, an independent final evaluation will be conducted.

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https://www.adaptationfund.org/sites/default/files/AFB.EFC_.14.6%20Core%20Indicator%20Methodologies.pdf

Budgeted M&E Plan

Activity	Responsible Entity	Cost in USD
Initial workshop	PMU	10000
Travel expenses	PMU	100000
Equipment and materials	PMU	100000
Mid-term evaluation	ADA	60000
Final evaluation	ADA	80000
Publications	ADA	60000
Total		410000

E. Provide a results framework for the project proposal, including milestones, targets and indicators.

Result	Indicator	Baseline	Target
Project Objective: Improve the adaptability of the Oasis populations to the impacts of climate change	Number of oases inhabitants vulnerable to the adverse effects of climate variability and change	There are no concrete adaptation measures currently being implemented in the project areas	By the end of the project, at least 4000 of the most vulnerable inhabitants in the project area will benefit from the proposed activities to cope with their vulnerability to climate change
Component 1 Improving adaptive capacities of the water sector	Development of water sectors' services responsive to evolving needs from changing and variable climate.	There is evidence on the shortages by basin being updated	At least 10% of households secure their access to water for drinking and irrigation.
Outcome 1.1 Improved joint regulation of ground and surface water through new sustainable hydraulic and protective structure management	Efficiency of mobilization	Available studies indicate the rate water mobilization by basin	Approximately 2 million m^3
Output 1.1.1 Replenishment structures for groundwater are built	Number of recharge structures	In the intervention sites, structures for exclusively recharging groundwater do not exist.	4 structures
Output 1.1.2 Structures for perimeters protection are built	Number of irrigated perimeters	Flooding reduces the rate of floodwater mobilization	6 perimeters
Output 1.1.3 Feasibility studies on the exploitation of deep-water resources intended for the dried up palm groves of the Maïder basin are carried out.	Feasibility studies by site	No deep borehole is used in the project zone to reduce the shortage of drinkable water	2 sites
Outcome 1.2 Vulnerable infrastructure allowing the improvement of water distribution efficiency are restored	Agricultural irrigation efficiency (%)	Efficiency ratios of the traditional networks are below 50% according to APP (Agency for the Partnership for Progress)	70% efficiency

Output 1.2.1 Khettaras are restored	Area irrigated (hectares)	Khettaras to be restored are identified. According to the 2005 PDRT, the restoration will allow the khettaras to pass from 2 to 5 L/s.	200 Ha
Output 1.2.2 Seguias are restored	Area irrigated (hectares)	SMH networks to be renovated are identified	200 Ha
Component 2. Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted areas	Percentage of households with diversified income sources and sustained climate-resilient alternative livelihoods.	The poverty rate in the zone remains especially high	At least 20% of families have diversified and improved their livelihoods through more resilient activities.
Outcome 2.1 Improved livelihoods of families due to the development of more resilient small scale agriculture	VA/ha	37000dh/ha (according to APP)	20% increase for an objective of MAD 45000 per ha
Output 2.1.1 Conservation technics are circulated and adopted	Number of trained farmers	The project's target areas have not received significant training	800 farmers. At least 400 women.
Output 2.1.2 Oasis agriculture products are developed and promoted	Number of products that are certified and are represented in fairs/trade shows	Experiments near the project zones have successfully developed attractive local agricultural sectors (argan, saffron, cheese, olive oil, and cactus).	4
Outcome 2.2 Developed non-agricultural economic activities help increase the resilience of the Oasis population	Number and type of economic units (existing or new) that develop in a manner adapted to climate change.	Experiments near the project zones have successfully developed high value non-agricultural sectors	At least 20 economic units
Output 2.2.1 Sustainable and responsible tourism, which faces up to climate change is developed	Number of tourism units that develop in a manner adapted to climate change.	The potential of responsible tourism is under-valued in the project's implementation zones (compared to the Dadès and Draa valleys).	At least 5 tourism units

Output 2.2.2 Other economic activities, particularly for youths and women, are supported and developed	Projects financed Trainings exist	The existing VSE support programs do not particularly support innovative adaptation projects.	20 projects, at least 50% managed by women 2 trainings
Component 3. Improving the ecosystems' resilience in response to climate change and variability	Number of oases that have reduced the threats to their ecosystem and preserved their heritage	The MEA/FAO/UNESCO/PACO studies have sounded the alarm	At least 4 oases
Outcome 3.1 Threats reducing the value of Oasis ecosystems are taken into account by municipalities	Number of oases that have reduced the threats to their ecosystem.	Consultation workshops have stressed the importance of the degradation of ecosystems	At least 4 oases participate in a dynamic for protecting the ecosystems.
Output 3.1.1 The fight against desertification is organized	Protected hectares	The fight against desertification is already well underway by the Water and Forests Commission, which has however reached a maximum given their current means.	40 ha
Output 3.1.2 Techniques for environmental cleanup are developed	Number of stakeholders trained	Techniques for cleanup are nearly inexistent in the oasis zones.	400 trained individuals (at least 50% women) with a treatment device installed.
Outcome 3.2 Preserved and Promoted Heritage	Number of solicitations for restoring post-project	Few landowners are currently interested in restoration or construction because they fear that their home will become a museum.	There are solicitations.
Output 3.2.1 Historic constructions are restored for new uses	Restored and used buildings	Restored buildings have a low-valued museum function (empty kasbah)	2 restored buildings used for a new purpose

Output 3.2.2 Traditional techniques and materials are reused for new constructions	New buildings using traditional materials	Currently, only high-end tourism structures use these techniques for new constructions.	2 new constructions
Component 4 Improving stakeholder awareness though the management and exchange of knowledge	Part of the targeted municipal populations are educated on climate change issues	The population has heard of climate change but it remains an abstract concept that has yet to be connected to changes in the area.	60% of households in the project zones
Outcome 4.1 Organized public debate on water and climate change	The importance of communicating on the issue of climate change	Informal debates exist but there is a lack of data and areas for expression needed to reinforce the message.	Media coverage
Output 4.1.1 An assessment of resources in the intermediary Gheris basin and Maïder is carried out	Access to documentation	Several studies and documentation are unavailable	The existence of a documentation library Study on accessible water resources
Output 4.1.2 A local council for water dialogue is operational	Number of thematic conferences organized by the Local Council on water	Debates on climate change issues remain national and centralized	6 regional thematic conferences
Outcome 4.2 Supported and developed local initiatives for communication	Population of targeted groups are educated on the overall issues relating to climate change	Communication/awareness campaigns are not targeted	Targeted content of communication/awareness campaigns
Output 4.2.1 An awareness and communication strategy is developed	Number of mass communication campaigns	The project intervention zones have not had any mass communication activities	4 mass campaigns
Output 4.2.2 A financing mechanism is implemented	Number of funded initiatives for raising the awareness of educated children, emigrants, and tourists	The project intervention zones have not had any targeted awareness activities	50 funded awareness projects

Component 5 Strengthening the capacities of participants in the design and implementation of adaptation measures	No. of Officials and beneficiaries trained with reinforced capacities in adaptation project management.	The project intervention zones have not had any capacity building activities	240 officials 400 oasis beneficiaries, at least 50% women
Outcome 5.1 Consolidated and developed adaptive capacities for climate change	Number of officials and beneficiaries whose adaptability to climate change has been strengthened.	There are major knowledge disparities between stakeholders	240 public service officials 400 oasis beneficiaries, at least 50% women
Output 5.1.1 the managers of public service are informed on the issues of climate change and introduced to adaptability measures for the main sectors	Number of training workshops and participants	Local and public officials have sectorial knowledge and are not well versed in the multi-sectoral effects of climate change.	12 training workshops (20 people/workshop) 50 participants for scientific conferences and beneficiary awareness forums
Output 5.1.2 Oasis beneficiaries are trained on innovative adaptability measures	Number of training workshops and travel/internships	The oasis beneficiaries are up to date on adaptation techniques and experiments conducted in neighboring countries.	20 workshops, (20 people/workshop) 15 trips (at least 50% women)
Outcome 5.2 Strengthened coordinated management capacities for climate change projects	Number of officials and beneficiaries whose ability to collectively manage climate change adaptation projects has been strengthened	The stakeholders are not familiar with the dialogue process in managing development projects	240 public service officials 400 oasis beneficiaries (at least 50% women)
Output 5.2.1 The participants (operators and beneficiaries) are trained in the designing and financing of projects	Number of training workshops being designed and funding of projects	The stakeholders are not aware of financing and monitoring-evaluation mechanisms for adaptation projects	12 workshops on the project cycle (20 people/workshop) 12 workshops on project financing (40 people/workshop) (at least 50% women)
Output 5.2.2 The participants (operators and beneficiaries) are trained on the implementation and joint management of projects.	Number of training workshops on the implementation and the coordinated management of projects and the number of participants	The stakeholders are not familiar with coordinated management mechanisms	12 workshops on the participatory approach (20 people/workshop) 12 workshops in conflict management and mediation (12 people/workshop) (at least 50% women)

F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Project Objective(s)[35]	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator
Component 1. Improving adaptive capacities of the water sector	Development of water sectors' services responsive to evolving needs from changing and variable climate	**Outcome 4:** Increased adaptive capacity within relevant development and natural resource sectors	**4.1.** Development sectors' services responsive to evolving needs from changing and variable climate
Component 2. Diversifying income sources and improving the living conditions of populations vulnerable to climate change in the targeted areas	Percentage of households with diversified income sources and sustained climate-resilient alternative livelihoods.	**Outcome 6:** Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	**6.2** Percentage of targeted population with sustained climate-resilient alternative livelihoods
Component 3. Improving the ecosystems' resilience in response to climate change and variability	Number of oases that have reduced the threats to their ecosystem and preserved their heritage	**Outcome 5**: Increased ecosystem resilience in response to climate change and variability-induced stress	**5.** Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress
Component 4 Improving stakeholder awareness though the management and exchange of knowledge	Percentage of targeted population educated on climate change issues.	**Outcome 3:** Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	**3.1.** Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses
Component 5 Strengthening the capacities of participants in the design and implementation of adaptation measures	No. of Officials and beneficiaries trained with reinforced capacities in adaptation project management.	**Outcome 2:** Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	**2.1**. No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**
Outcome 1.1 Improved joint regulation of ground and surface water through new sustainable hydraulic and protective structure management	Efficiency of mobilization **1.1.1** Number of recharge structures	***Output 4:*** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability.	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types).

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

Outcome 1.2 Vulnerable infrastructure allowing the improvement of water distribution efficiency are restored	Agricultural irrigation efficiency (%)		
Outcome 2.1 Improved livelihoods of families due to the development of more resilient small scale agriculture	No and type of economic units (existing or new) that develop in a manner adapted to climate change.	***Output 6:*** Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	**6.1.2.** Type of income sources for households generated under climate change scenario
Outcome 2.2 Developed non-agricultural economic activities help increase the resilience of the Oasis population			
Outcome 3.1 Threats reducing the value of Oasis ecosystems are taken into account by municipalities	Number of oases that have reduced the threats to their ecosystem.	***Output 5:*** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	**5.1**. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets)
Outcome 3.2 Preserved and Promoted Heritage	Number of solicitations for restoring post-project		
Outcome 4.1 Organized public debate on water and climate change	The importance of communicating on the issue of climate change	***Output 3***: Targeted population groups participating in adaptation and risk reduction awareness activities	**3.1.2** No. of news outlets in the local press and media that have covered the topic
Outcome 4.2 Supported and developed local initiatives for communication	Population of targeted groups are educated on the overall issues relating to climate change		
Outcome 5.1 Consolidated and developed adaptive capacities for climate change	Number of officials and beneficiaries whose adaptability to climate change has been strengthened.	***Output 2.1***: Strengthened capacity of national and regional centers and networks to respond rapidly to extreme weather events	**2.1.1.** No. of staff trained to respond to, and mitigate impacts, of climate-related events
Outcome 5.2 Strengthened coordinated management capacities for climate change projects	Number of officials and beneficiaries whose ability to collectively manage climate change adaptation projects has been strengthened		

Four Adaptation Fund Core Impact Indicators, will be monitoring and reporting according to the Adaptation Fund Methodologies for reporting adaptation Fund impact indicators (https://adaptation-fund.org/sites/default/files/AF%20Core%20Indicator%20Methodologies.pdf):

- **Number of Beneficiaries**

Project objective indicator: Number of oases inhabitants vulnerable to the adverse effects of climate variability and change

- **Assets Produced, Developed, Improved, or Strengthened**

Component 1 indicator: Development of water sectors' services responsive to evolving needs from changing and variable climate

- **Increased income, or avoided decrease in income**

Component 2 indicator: Percentage of households with diversified income sources and sustained climate-resilient alternative livelihoods.

- **Natural Assets Protected or Rehabilitated**

Component 3 indicator: Number of oases that have reduced the threats to their ecosystem and preserved their heritage

G. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Component	Results	Products	Activities	Cost (US$)
3,850,000	2,650,000	1,150,000	1.1.1.1 Carry out complementary studies of groundwater recharge structures on the potential sites identified	100,000
			1.1.1.2 Build infrastructure with the greatest potential	1,000,000
			1.1.1.3 Purchase of the follow-up equipment (piezometers).	50,000
			1.1.1.4 Ensure the follow-up evaluation in coordination with the HBA.	FTR
			1.1.1.5 Establish a maintenance agreement for the groundwater recharges structures.	FTR
		700,000	1.1.2.1: Carry out complete technical studies of protective infrastructure in the priority sites identified	100,000
			1.1.2.2: Build priority infrastructure.	600,000
			1.1.2.3: Establish a maintenance agreement for perimeter protection structures.	FTR
		800,000	1.1.3.1: Carry out an exploration/reconnaissance study through drilling for deep-water resources.	600,000
			1.1.3.2: Carry out feasibility studies to identify priority sites and their financing.	200,000
	1,200,000	900,000	1.2.1.1 Formalize the commitment of the beneficiaries in the restoration of the khettaras	FTR
			1.2.1.2 Lead the works on the restoration of the khettaras	900,000
		300,000	1.2.2.1 Formalize the commitment of the beneficiaries in the restoration work	FTR
			1.2.2.2 Carry out the restoration works on the irrigation water distribution networks: irrigation channels	300,000
429,400	429,400	429,400	1.3 Technical Assistance	429,400

1,729,400	**750,000**	**250,000**	2.1.1.1 Carry out a study on the experiences already undertaken in the zone or in similar zones abroad.	50,000
			2.1.1.2 Train new farmers on the conservation techniques and promote their circulation	200,000
		500,000	2.1.2.1 Support the producers in the certification process for their products.	200,000
			2.1.2.2 Promotion of oasis agricultural products.	200,000
			2.1.2.3 Encourage research on endemic species and their uses.	100,000
	979,400	**174,000**	2.2.1.1: Support the Tourism stakeholders to make the sector more accountable	74,000
			2.2.1.2: Carry out a study on niche tourism products to develop.	100,000
		805,400	2.2.2.1: Support small-scale local economic projects	400,000
			2.2.2.2: Offer training adapted to the context and needs of the oasis	405,400
1,440,000	**600,000**	**300,000**	3.1.1.1 Carry out a study to identify the priority sites	FTR
			3.1.1.2 Financial support for the Water and Forests Commission man-made and biological efforts	300,000
			3.1.1.3 Populations will be mobilized in the fight against desertification of housing and parcels of land.	FTR
		300,000	3.1.2.1 Study the impact of the oasis economic activities	20,000
			3.1.2.2: Train and equip the stakeholders concerned on environmental cleanup techniques	200,000
			3.1.2.3: Support community services, which aim to protect natural resources	80,000
	840,000	**440,000**	3.2.1.1: Carry out a study in order to identify the mud brick buildings to restore	FTR
			3.2.1.2: Restore and fix up the buildings with a heritage interest	360,000
		400,000	3.2.2.1: Study, bearing in mind town planning, the most pertinent house of public utility to be done in mud brick	FTR
			3.2.2.2: Construct said building	50,600
366,590	**140,000**	**60,000**	4.1.1.1: Implementation of a Documentation library	30,000
			4.1.1.2: Strengthening of the monitoring system for water resources in the project zones.	30,000

		80,000	4.1.2.1: Writing of a draft Charter on water and climate change in the Oases	30,000
			4.1.2.2: Organization of conferences on the themes of water and climate change	50,000
	226,590	**126,590**	4.2.1.1: Writing of a communication strategy	30,000
			4.2.1.2: “Mass” communication campaign	50,000
			4.2.1.3: Organization of a close out seminar	46,590
		100,000	4.2.2.1 Establishing of a list of Partner-organizations for awareness actions	FTR
			4.2.2.2 Management of call for projects on awareness.	100,000
480,000	**240,000**	**90,000**	5.1.1.1: Conduct climate change training modules	40,000
			5.1.1.2: Participation in scientific meetings and forums	50,000
		150,000	5.1.2.1: Conduct adaptation training modules	40,000
			5.1.2.2: Organizing trips and internships	110,000
	240,000	**120,000**	5.2.1.1: Conduct modules on the project cycle	60,000
			5.2.1.2: Conduct training modules on project financing	60,000
		120,000	5.2.2.1: Conduct training modules on the participatory approach	60,000
			5.2.2.2: Conduct training modules in conflict management and mediation	60,000
Creation and implementation of the ESMP				450,000

Subtotal	**8,315,990**
Execution Costs	**872,950**
Implementation Costs	**781,060**
TOTAL	**9,970,000**

Budget Notes

NB 1.1.1.1	Contracting experts for 5 months
NB 1.1.1.2	Constructing 4 structures. US$ 250,000/structure.
NB 1.1.1.3	Acquisition and operation of piezometers.
NB 1.1.2.1	Contracting experts for 5 months
NB 1.1.2.2.	Protection of 6 perimeters. US$ 100,000/protected perimeter
NB 1.1.3.1	Carrying out 2 exploratory drillings. US$ 300,000/drilling.
NB 1.1.3.2	Contracting an expert for 10 months
NB 1.2.1.2	Restoration of khettaras to supply 200 ha
NB 1.2.2.2	Restoration of seguias to supply 200 ha.
NB 1.3	Contracting an technical assistance.
NB 2.1.1.1	Contracting a consultant for 5 months
NB 2.1.1.2	Train 800 farmers. US$ 250/farmer.
NB 2.1.2.1	Support to the 4 sectors: assist the cooperatives in the certification process
NB 2.1.2.2	Promote the 4 sectors (producers travel to fairs, communication actions)

NB 2.1.2.3	Finance 3 research projects
NB 2.2.1.1	Support, in partnership with the tourism stakeholders, to 5 tourism units to help make their actions more environmentally conscious.
NB 2.2.1.2	Contracting un expert for 5 months.
NB 2.2.2.1	Envelope of US$ 400,000 to support twenty project through a request for proposals.
NB 2.2.2.2	2 trainings in partnership with OFPPT US$ 405,400 will pay 15 teachers for each training during 5 years (US$ 2800/teacher/year)
NB 3.1.1.2	The protection of one (1) ha by combining biological (purchase of young plant, contract someone to plant and irrigate them during 3 months) and mechanical control costs US$ 7,500 (purchase compartment and install them). This US$ 300,000 will protect 40 hectares.
NB 3.1.2.1	Contracting a consultant for 2 months
NB 3.1.2.2	Train and equip 400 beneficiaries. US$ 500/beneficiary.
NB 3.1.2.3	Envelope of US$ 80,000 to support community services through a request for proposals.
NB 3.2.1.2	Restoration of a mud building: US$ 180,000 : including US$ 16,000 for architect and feasibility study, and US$ 164,000 for the restoration (US$ 400/$m^{2)}$. 2 buildings will be resorted.
NB 3.2.2.2	1 bioclimatic construction = US$ 25,300 : including US$ 2,300 for architect and feasibility study, and US$ 23,000 for the construction. (US$ 230/m^2) 2 houses will be built.
NB 4.1.1.1	Contracting one person for 1 year for the establishment of a documentary library.
NB 4.1.1.2	Contracting an individual for part-time work (US$ 500/month) throughout the duration of the project.
NB 4.1.2.1	Contracting a consultant to prepare the draft charter through a participative approach
NB 4.1.2.2	Organizing and facilitating 5 thematic conferences.

NB 4.2.1.1	Contract for a consultant for 6 months.
NB 4.2.1.2	Costs for the communication campaign (travel, publications, media)
NB 4.2.1.3	Organizing and facilitating the close out seminar: US$ 46,590
NB 4.2.2.2	Envelope of US$ 100,000 to finance 50 awareness activities through a request for proposals.
NB 5.1.1.1	Organizing and facilitating 12 workshops for 20 people
NB 5.1.1.2	Inscription and travel costs for 50 beneficiaries
NB 5.1.2.1	Organizing and facilitating 12 workshops for 20 people
NB 5.1.2.2	Organizing and completing 15 trips/internships. 5 people per internship
NB 5.2.1.1	Organizing and facilitating 12 workshops for 20 people
NB 5.2.1.2	Organizing and facilitating 12 workshops for 20 people
NB 5.2.2.1	Organizing and facilitating 12 workshops for 20 people
NB 5.2.2.2	Organizing and facilitating 12 workshops for 20 people
NB 6	Completing the EIA and the general ESMP of the project, then the specific EIAs and ESMPs for each activity as necessary. US$ 450,000.

Breakdown of the execution costs (USD)

Year	2015	2016	2017	2018	2019	
Staff	65,810	65,810	65,810	65,810	21,937	
Travel expenses	51,293	69,681	6,452	6,452	6,420	
Equipment	87,184	55,723	34,426	34,426	25,716	
Monitoring-evaluation	59,874	64,381	34,794	34,794	16,156	
Total	**264,162**	**255,596**	**141,482**	**141,482**	**70,228**	**872,950**

Implementing Entity Management Fee use (USD)

Year	2015	2016	2017	2018	2019	
Staff	60,000	45,000	45,000	45,000	45,000	
Monitoring and evaluation		75,000			125,000	
Travel expenses	100,000		50,000			
Equipment and materials	24,000					
Audit	30,000	20,000	20,000	20,000	20,000	
Skill Building	57,060					
Total	**271,060**	**140,000**	**115,000**	**65,000**	**190,000**	**781,060**

H. Include a disbursement schedule with time-bound milestones.

	Upon Agreement signature	One Year after Start	Year 2	Year 3	Year 4
Scheduled Date	October 2014	January 2015	January 2016	January 2017	January 2018
Project Funds	2,372,700	4,007,500	1,552,850	323,850	59,090
Execution costs	264,162	255,596	141,482	141,482	70,228
NIE Fee	271,060	140,000	115,000	65,000	190,000
Total	**2,907,922**	**4,403,096**	**1,809,332**	**530,332**	**319,318**

Activities	Years of Execution				
	1	2	3	4	5
1.1.1.1 Carry out complementary studies of groundwater recharge structures on the potential sites identified					
1.1.1.2 Build infrastructure with the greatest potential					
1.1.1.3 Purchase of the follow-up equipment (piezometers).					
1.1.1.4 Ensure the follow-up evaluation in coordination with the HBA.					
1.1.1.5 Establish a maintenance agreement for the groundwater recharges structures.					
1.1.2.1: Carry out complete technical studies of protective infrastructure in the priority sites identified					
1.1.2.2: Build priority infrastructure.					
1.1.2.3: Establish a maintenance agreement for perimeter protection structures.					
1.1.3.1: Carry out an exploration/reconnaissance study through drilling for deep-water resources.					
1.1.3.2: Carry out feasibility studies to identify priority sites and their financing.					

1.2.1.1 Formalize the commitment of the beneficiaries in the restoration of the khettaras						
1.2.1.2 Lead the works on the restoration of the khettaras						
1.2.2.1 Formalize the commitment of the beneficiaries in the restoration work						
1.2.2.2 Carry out the restoration works on the irrigation water distribution networks: irrigation channels						
2.1.1.1 Carry out a study on the experiences already undertaken in the zone or in similar zones abroad.						
2.1.1.2 Train new farmers on the conservation techniques and promote their circulation						
2.1.2.1 Support the producers in the certification process for their products.						
2.1.2.2 Promotion of oasis agricultural products.						
2.1.2.3 Encourage research on endemic species and their uses.						
2.2.1.1: Support the Tourism stakeholders to make the sector more accountable						
2.2.1.2: Carry out a study on niche tourism products to develop.						
2.2.2.1: Support small-scale local economic projects						
2.2.2.2: Offer training adapted to the context and needs of the oasis						
3.1.1.1 Carry out a study to identify the priority sites						
3.1.1.2 Financial support for the Water and Forests Commission man-made and biological efforts						
3.1.1.3 Populations will be mobilized in the fight against desertification of housing and parcels of land.						
3.1.2.1 Study the impact of the oasis economic activities						
3.1.2.2: Train the stakeholders concerned on environmental cleanup techniques						
3.1.2.3: Support community services, which aim to protect natural resources						
3.2.1.1: Carry out a study in order to identify the mud brick buildings to restore						

3.2.1.2: Restore and fix up the buildings with a heritage interest					
3.2.2.1: Study, bearing in mind town planning, the most pertinent public building to be done in mud brick					
3.2.2.2: Construct said building					
4.1.1.1: Implementation of a Documentation library					
4.1.1.2: Strengthening of the monitoring system for water resources in the project zones.					
4.1.2.1: Writing of a draft Charter on water and climate change in the Oases					
4.1.2.2: Organization of conferences on the themes of water and climate change					
4.2.1.1: Writing of a communication strategy					
4.2.1.2: « Mass » communication campaign					
4.2.1.3: Organization of a close out seminar					
4.2.2.1 Establishing of a list of Partner-organizations for awareness actions					
4.2.2.2 Management of call for projects on awareness.					
5.1.1.1: Conduct climate change training modules					
5.1.1.2: Participation in scientific meetings and forums					
5.1.2.1: Conduct adaptation training modules					
5.1.2.2: Organizing trips and internships					
5.2.1.1: Conduct modules on the project cycle					
5.2.1.2: Conduct training modules on project financing					
5.2.2.1: Conduct training modules on the participatory approach					
5.2.2.2: Conduct training modules in conflict management and mediation					

PART IV: ENDORSEMENT BY THE DESIGNATED GOVERNMENT AUTHORITY FOR ADAPTATION FUND AND CERTIFICATION BY IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government

Mr. *Mohammed NBOU*, Director of studies, planning and prospective in the department of environment, Ministry of the Environment Water and Mines	***Date:*** February 4th, 2014

Please, refer to the endorsement letter attached in the annex 9.

B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (listed here: *National Strategy for Environmental Protection; National Charter for Environment and Sustainable Development; National Plan for Fight against Global Warming; Portfolio of CDM projects; New energy strategy; New Strategy for Water; Plan for protection against floods; Agricultural Strategy: Green Morocco Plan; National Stategy for the Development of Oases zones and Arganier Tree Zones*) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.

Mr **Hamid FELLOUN**
Implementing Entity Coordinator

Date: **February 07th, 2014**	Tel: 00 212 5 37 57 37 13 Email: h.felloun@ada.gov.ma / hfelloun@gmail.com

Project Contact Person: *Ms. Meryem ANDALOUSSI*

Tel: 00 212 5 37 57 38 13
Email: m.andaloussi@ada.gov.ma / Meryem.andaloussi@gmail.com

Annex 1 : Type of Agreement

المملكة المغربية

وزارة الفلاحة والصيد البحري

المكتب الجهوي للاستثمار الفلاحي لتافيلالت

عقـد الشراكـة

في مناطق الري الصغير والمتوسط

(مشروع تنمية المناطق الجبلية بإقليم الرشيدية، ميدلت و تنغير)

اعتبارا للاستراتيجية المرسومة في إطار التنمية الفلاحية للمكتب الجهوي للاستثمار الفلاحي لتافيلالت وفي إطار مشروع تنمية المناطق الجبلية بإقليم الرشيدية، ميدلت و تنغير الذي تم تحضيره من طرف المكتب الجهوي وبناء على قرارات الجمع العام لجمعية مستخدمي المياه للأغراض الزراعية المنعقد يوم 2012/06/10 ب ايت ابراهيم.، ومن أجل إنجاز و استغلال محكم لمشروع هيدروفلاحي داخل منطقة تدخل هذه الجمعية تم الاتفاق والتراضي بين :

– المكتب الجهوي للاستثمار الفلاحي لتافيلالت الكائن بالرشيدية والممثل في شخص مديره

من جهـة

وجمعية مستخدمي المياه للأغراض الزراعية لـ تغمرايت ابراهيم .....في شخص رئيسها

من جهة أخرى

على ما يلي :

الفصل الأول : التزامات المكتب الجهوي للاستثمار الفلاحي لتافيلالت.

بموجب هذا العقد يقوم المكتب بما يلي :

* إعداد تصميم تنمية القصور التابعة لدائرة السقوية داخل نفوذ الجمعية ؛
* إعداد دراسة المشروع ؛
* تهييئ برنامج الأشغال ؛
* إعداد ملفات طلب العروض ؛
* المساهمة في تمويل المشروع بنسبة ؛
* مراقبة الأشغال وتتبعها ؛
* إعداد منهج للصيانة وآلإستغلال ومنحها للجمعية.

الفصل الثاني : التزامات جمعية ...ايت ابراهيم......................

تلتزم الجمعية بما يلي :

* المساهمة في إنجاز المشروع و ذلك بتحسيس الفلاحين و توفير الظروف الملامة لإنجاز الأشغال (المسالك، برمجة أوقات السقي،...)

* المساهمة الفعلية في إعداد دراسة المشروع

* التطبيق الفعلي لبرامج الأشغال

* المساهمة في تمويل المشروع بنسبة : ....

* توفيراليد العاملة الضرورية لإنجازالمشروع

* القيام بصيانة التجهيزات للحفاظ على فعاليتها لمدة طويلة

الفصل الثالث :تلتزم الجمعية بإعداد تقرير مفصل عند نهاية كل سنة مالية حول المواضيع التالية :

* الأشغال المنجزة (صيانة شبكة الري وتنقيتها)

* مشاكل توزيع المياه ،

* أهمية مداخيل الجمعية ونفقاتها ،

* برامج الاشغال للموسم الموالي.

الفصل الرابع :يخضع هذا التعاقد لتغييرات ظرفية باقتراح من أحد المتعاقدين.

الفصل الخامس :أبرم هذا العقد لمدة سنتين تبتدئ من2014/05/06ويتجدد ضمنيا لفترة مماثلة إذا لم يطلب أحد الطرفين فسخه ستة أشهر على الأقل قبل نهاية فترة العقد. ويبلغ طلب الفسخ إلى الطرف الآخر كتابة.

الفصل السادس : يبقى الطرفان المتعاقدان خاضعين للنصوص القانونية الجاري بها العمل في ميدان العقود والاتفاقيات وخاصة قانون الالتزامات والعقود.

رئيس جمعية مستخدمي المياه

للأغراض الزراعية

مدير المكتب الجهوي

للاستثمار الفلاحي

لتا فيلالت

الجماعة مسؤولة عن تثبيت الإمضاء ت.وليست المسؤولة عن المضمون

Vu Pour la Légalisation

L - de la Signature - S -

تصحيح الإمضاء -ت-ا-

علي اها

2014

Translation of this agreement:

Kingdom of Morocco
Ministry of Agriculture and Maritime Fisheries
The Regional Office for the Agricultural Development of Tafilalet

Partnership Agreement in the Project zones for developing mountainous areas in the province of Errachidia, Midelt, and Tinghir.

Given that the strategy is designed as part of the agricultural development in Tafilalet and for developing themountainous areas in the province of Errachidia, Midelt, and Tinghir developed by the Regional Office.
Based also on the decisions of the General Assembly of the Water Users Association (WUA) organized on June 10th, 2011 in Ksar Ait Brahim for an effective implementation and operation of a hydro-agricultural project in the association's implementation zone.

Between the undersigned:

- The Regional Office for the Agricultural Development of Tafilalet (ORMVAT) represented by its Director

  First
- The Irrigation Water Users Association (AUEA) of Ksar Ait Brahim, represented by its President

  Second

It was agreed and decided as follows:
Article 1: Duties of the Regional Office for the Agricultural Development of Tafilalet (ORMVAT)
In accordance with the provisions of this act, the Office shall:

- Develop a development plan for the Ksours that are a part of the irrigated perimeter in the association's implementation zone
- Prepare a project study
- Prepare the files for project bids
- Participate in financing the project
- Audit and monitor the work
- Prepare a service and operation mode to be made available to the association.

Article 2: Duties of the Ait Brahim Association
The Association shall:

- Participate in carrying out the project by educating farmers and creating a favorable environment for the works (planning irrigation hours, etc.)
- Participate in effectively developing the project study
- Carry out the works schedule
- Participate in financing the project
- Provide the necessary labor required to realize the project
- Maintain the equipment to ensure their sustainability

Article 3: The Association shall prepare a detailed report at the end of each year regarding the following subjects:

- Work completed (maintenance of the irrigation network)
- Issues related to water distribution
- The accounts of income and expenditures of the association
- The work schedule for the upcoming year

Article 4: Changes can be made, if necessary, to the present contract upon request from one of the partners

Article 5: The time limit is two (2) years starting from May 6th, 2014 and can be subject to implicit renewal if no request for termination has been requested by one of the two parties before the end of the contract. The termination request is transferred to the other party in writing.

Article 6: The contractual parties remain subject to the applicable legal texts in the area of contracts and agreements, notably those of obligations and contracts.

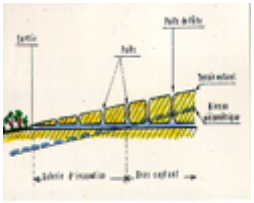
Director of the ORMVAT President of the AUEA

Annex 2: Main techniques used for Khettara restoration

Khettara restoration:

The output of a khettara ranges from 0 to 30 l/s and rarely covers an area exceeding 30 ha per unit. It is managed by a traditional system of water rights distribution based on the volumes of work completed by each claimant. Though the system is adapted to the arid climate, it still remains threatened by climate change in the absence of an integrated management system involving recharging and system restoration.

The most used techniques in these domains are presented as follows:

- Irrigation Water Catchment 	• The work almost always involves extending the head of the khettaras to drain more water and capture the maximum amount of groundwater. • Construction of access points every 15 to 20 linear meters (LM). • Construction of recharge structures to improve the khettaras' output. • Unit costs varies between MAD 2000 per LM to MAD 5000 per LM
- Abductor for Irrigation Water 	• Uncovered opening of the khettara up to 5-6 m deep along the surrounding land and its degree of resistance. • Construction of the gallery by reinforced concrete channels (L=0.5 to 0.6m and T=1.20m) with coverage and access points every 15 to 20 LM. • Unit cost varies from MAD 1000 per LM to MAD 2000 per LM
- Upstream section: ***Irrigation Water Distribution Network*** 	• Construction of the first and second irrigation networks to improve seguia efficiency. • Construction of water storage basins. • Installation of hydro mechanical equipment: valves • Unit cost varies from MAD 400 per LM to MAD 800 per LM
- Irrigation Parcel and Sprinklers 	• Establishment of irrigation systems for saving water. • Setting up a drip irrigation system. • Concreting sprinklers. • Improving the water tower. • Unit cost varies from MAD 50000 per Ha to MAD 120000 per ha

Annex 3: Main techniques used for enhancing the groundwater recharge

In theory, to permeate 6 Mm^3 per year on the basis of an 80% yield, a permeation system of 1000 l/s/ha should be developed with 40 ha of permeation basins on sites that can accommodate four (4) ten-hour floods each with an output of 1,300 l/s.
The main techniques used for enhancing the groundwater recharge are presented below:

Refill System	***Importance, Building Materials, and Estimated Costs of the Works***
Floodwater Weirs 	Mainly local materials: stone and cyclopean masonry, and sometimes reinforced concrete (for coverage or RCC). Allows the diversion of floodwaters through mid-sized diversion dams (diversion output is determined based on the water needs of irrigated crops, generally taken equal to 10 l/s/ha. The unit cost of these structures depends on the length of the work site, the extent of flooding in the wadi, the type of surrounding land, and other factors relating to the structures' geotechnics and stability. The unit cost of thresholds constructed in the oasis zone varies from MAD 2 Million to MAD 15 Million including intake structure and accessories.
Thresholds for Slowing Down Floodwaters	Several studies have been conducted on this subject to determine the effectiveness of this type of structure. The Ziz, Gheris, and Guir HBA have done similar studies in the zone. Refilling structures are being constructed in the basins feeding the heads of the khettaras. The unit cost of these systems varies depending on the number of refill sites, the size of the work, etc.
Bottomless Irrigation Canals	Masonry lock walls, the case for high flow canals, as is the case for the Moulay Brahim structure in the Tafilalet plain with a capacity of over 20 m^3/s. Refilling and soil enrichment.
Refilling Structures	Small-scale thresholds damming the tributary chaaba and temporarily storing floodwaters by improving the infiltration rate and then refilling them downstream of these sites. The unit cost varies from MAD 1 to 2 million per unit.
Hillside Dams	Average-sized dams, whose reservoir is generally intended for refilling and feeding livestock. Some hillside dams built in the 80's still fulfill their functions while others require maintenance and repairs.

Annex 4: National Agency for the Development of Oasis and Argan Tree Zones (ANDZOA)

In accordance with the law of its creation (law no. 06-10 published in BO no. 5900 on 12/13/2010), ANDOZA is in charge of developing, in coordination with government authorities, the bodies of elected officials and organizations concerned, a comprehensive development program of the areas of its operation, ensuring its implementation, monitoring its completion and its evaluation within the framework of sustainable development at the economic, social, cultural, environmental, and human levels in accordance with agreed upon guidelines and strategies.

To achieve this, the ANDZOA is responsible for the following tasks:

a) For the oasis zones:

- Monitor the preservation, protection, and development of the oases, particularly through the implementation of socio-economic projects
- Ensure, in accordance with current laws and regulations, the preservation and protection of the date palm (Phoenix dactylifera) for the quantitative and qualitative improvement of production
- Encourage agricultural investment and the structure of the line of production, marketing, and promoting date palm products, particularly in partnership with stakeholders
- Encourage a streamlining of water resource management and its development, and the fight against silting and desertification
- Encourage scientific research on protecting and developing the date palm and its products, as well as the oasis ecosystems, and ensure the implementation of a system for forecasting risks and the impacts of climate change on these zones and their environment
- Establish the necessary instruments for developing, executing, monitoring, and evaluating the completed projects in coordination and collaboration with the government regulatory authority, particularly in the areas of water management in the aforementioned zones, date palm plantation extensions, and the development of other plant and livestock species that are adapted to the oasis ecosystem.

B) For the geographic argan tree areas

- Carry out extensions of argan tree stands in accordance with forestry laws and regulations
- Conduct or supervise the completion of projects for developing, marketing, encouraging, and labeling argan tree products, particularly in the context of the program contract or convention to be agreed upon with the agency
- Structure the production and marketing chains of argan tree products in partnership with various stakeholders and in particular the implicated populations
- Encourage scientific research on protecting and developing the argan tree and the value of its products.

The Agency's area of operation includes the oasis zones located in the Saharan and pre-Saharan areas of Morocco, as well as the geographic areas of the argan tree (Argana

spinosa), therefore covering a total of 16 provinces and approximately 400 municipalities over five main regions: Oriental (including a part of the Figuig province), Meknes-Tafilalet (including the provinces of Errachidia and Midelt), Souss-Massa-Draa (all provinces), and Guelmim-Essmara (including the provinces of Tata, Guelmim, and Assa-Zag) and Marrakech-Tensift-Al Haouz (with the province of Essaouira).

At the organizational level, in addition to the Executive Management, ANDZOA is composed of four departments: Strategy and Partnerships, Administration and Finance, Development of the Oasis Zones, and Development of the Argan Tree Zones. It is an organization that is characterized by decentralized structures including, in addition to operational departments located in the regions, territorial departments for close monitoring over the entire area of intervention.

Annex 5: National Agricultural Council Office (ONCA)

The National Agricultural Council Office (ONCA) was created under Law 58-12 enacted by Dahir no. 1.12.67 of Rabii I, 1434 (January 16th, 2013). It is responsible for leading, coordinating, and monitoring the implementation of the national strategy for the council of agriculture.

Its missions, as stipulated by law, fall into four main components:

1- Council of Agriculture

- Apply government policy for the council of agriculture
- Ensure the development and promotion of international cooperation
- Accompany and support the farmers in their efforts for obtaining financial assistance and encouragement provided by the laws and regulations in effect
- Develop and apply innovative methods
- Ensure that the council of agriculture focuses on the gender approach.

2- Supporting professional organizations

- Support professionals in designing and implementing innovative agricultural projects and aggregation
- Provide support, coaching, training, and council to professionals in the agricultural production sector on production, marketing, and farm management techniques.

3- Agricultural development activities

- Contribute to the monitoring of agriculture solidarity projects in the field
- Contribute to statistical data collection pertaining to the sector
- Carry out marketing activities on agricultural inputs

4- Interface with Training and Research

- Disseminate the results of applied research and modern methods of production, development, and marketing agricultural products
- Ensure continued training for the council of agriculture and implement professional development programs, particularly though agreements with professional organizations, chambers of agriculture, and national training and research institutions

Annex 6: PV's of meeting with beneficiaries

ANDZOA
Agence Nationale pour le Développement des Zones Oasiennes et de l'Arganier

ANDZOA-Etude de caractérisation des palmeraies formant l'assiette de constitution de Groupement d'Intérêt Economique

Date: 17-04-2013.

Liste des participants GIE Palmeraie Fezouata

Nom	Prénom	Organisme	Fonction	Tél	Adresse électronique	Emargement
TARWATA	Abderrahim	Chef SCAV 02 Tamegroute		0676666878		[illegible]
Arfidi	Lobna	Ing.	ADI	0667445300	[illegible]	[illegible]
El Fquari	Omar	Ing.	ADI	0660324611		[illegible]
ElFadili	Mohamed	Ing.	ANDZOA	0661580199		[illegible]
BOUSRIFI	Salih	Président coop Jbel Bani	Hennet et vice président GIE		0668514912	[illegible]
ELHAMZAOUI	M'bark	Président coop	Amal Tamegroute. Administrateur GIE		0662285172	[illegible]
BOUCHAROUT	Ahmed	Trésorier coop	Amal Tamegroute		0666147322	[illegible]
ZAALAOUI	Md.	Trésorier coop. Jbel Bani			0672084710	Z_ALLOU

adi
Compagnie d'aménagement agricole et de développement industriel

المغرب الأخضر
LE MAROC VERT

الوكالة الوطنية لتنمية مناطق الواحات وشجر الأركان
ANDZOA
Agence Nationale pour le Développement des Zones Oasiennes et de l'Arganier

ETUDE CONCERNANT LA CONDUITE D'ETUDES DE CARACTERISATION DES PALMERAIES FORMANT L'ASSIETTE DE CONSTITUTION DE GROUPEMENT D'INTERET ECONOMIQUE _ ORMVA TAFILALT

ATELIER DE DIAGNOSTIC

ورشة التشخيص التشاركي

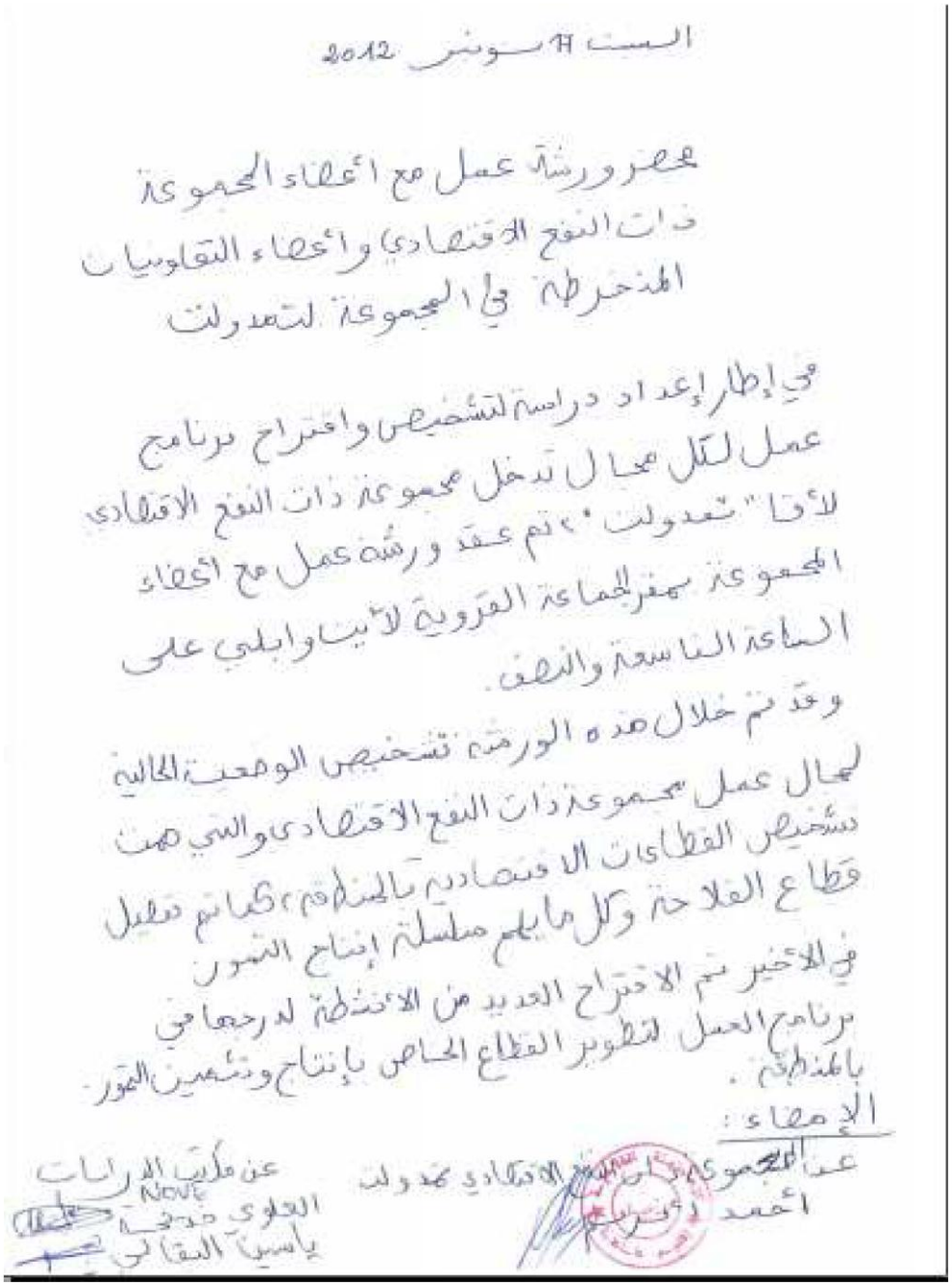
Liste de présence

Lieu Aoufous
Le 22/11/2012

Nom et prénom الاسم الكامل	Qualité الصفة	Organisme المنظمة	Email العنوان	Téléphone الهاتف
ASSOU ALBAZA	président coop et Agri	cop. FATH		06 68 07 84 70
GHAZI MBAREK	président coop et Agri	cop. TIN ZAZOUN		06 66 03 31 41
KARROUMI Ahmed	président coop ISSIDKE	cop ISSIDKE		06 27 63 51 55
Boukhalu Mohamed	Président coop GIE Taman	GIE	Aoufous centre gérée	0662 48 32 18
Fatima aoufana	membre	Coopérative Elwaha	Aoufous Centre	06 15 54 91 68
Boushaba Abdelghani	membre	Coopérative Takhedant	Ksar Dauira	0627 41 84 44
Boumeshad M'hamed	président COOP.	Cop Amal Salah	Blaghma	066001915 1
AOURAS Brahim	membre	Cop AAMAL SALAH	Blaghma	06-68-10-18-68

NOVEC

NOVEC
Filiale de CDG Développement



السبت 17 نوفمبر 2012

محضر ورشة عمل مع أعضاء المجموعة
ذات النفع الاقتصادي وأعضاء التعاونيات
المنخرطة في المجموعة لتمدولت

في إطار إعداد دراسة لتشخيص واقتراح برنامج
عمل لكل مجال تدخل مجموعة ذات النفع الاقتصادي
للأفا "تمدولت" تم عقد ورشة عمل مع أعضاء
المجموعة بمقر الجماعة القروية لآيت وابلي على
الساعة التاسعة والنصف.

وقد تم خلال هذه الورشة تشخيص الوضعية الحالية
لمجال عمل مجموعة ذات النفع الاقتصادي والتي همت
تشخيص القطاعات الاقتصادية بالمنطقة، كما تم تحليل
قطاع الفلاحة وكل مايلعم سلسلة إنتاج التمور
في الأخير تم الاقتراح العديد من الأنشطة لإدراجها في
برنامج العمل لتطوير القطاع الخاص بإنتاج وتثمين التمور
بالمنطقة.

الإمضاء:

عن المجموعة ذات النفع الاقتصادي تمدولت
أحمد [illegible]

عن مكتب الدراسات NOVEC
العلوي مدغي
ياسين البقالي

لائحة الحضور

ورشة عمل مع أعضاء المجموعات ذات النفع الاقتصادي

مجموعة ذات النفع الاقتصادي ولت للتمور لطاطا

في 16 نونبر 2012

الإسم	الهيئة	الصفة	الهاتف	التوقيع
ابيوك علي	تعاونية الجبر واغدن	الكاتب	06.09.98.85	
احمد دحمان	ج . د . (	مستشار	06.67.73.63.80	
محمد الله أحيو	تعاونية رعاية النخيل الواحة	رئيس	06.71.09.97.86	
عبد الرحمان ابو الكريم	تعاونية [illegible]	نائب الكاتب (رئيس) GIE	06 68 93 83 52	
اوعلا الزهرة	تعاونية افراعضر	نائبة الكاتب	0678563906	
الحسين منصور	تعاونية أفرا للنخيل والتمور	نائب الرئيس (مستشار) GIE	0678948605	Bmnsoub
احماد خليجة	تعاونية افر	عضوا		
احمو رقية	تعاونية افر	عضوا		
العوسكر زينة	تعاونية افر	عضوا		

NOVEC

NOVEC

Nom et prénom الاسم الكامل	Qualité الصفة	Organisme المنظمة	Email العنوان	Téléphone الهاتف
Abdelghani Aliani	President	C. Aliwiame de développement	Ksar Hennabou	0676 06 80 23
محمد قعزوزي	Ingenieur	NOVEC	\	065712 4110
حسن سلوي	Ingenieur			0650348699

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Annex 7: Report on the Consultation Workshop-Maïder

Alnif, July 16th, 2014

Project on Adaptations to Climate Change in the Oases Zones – Maïder Zone

Report on the Consultation Workshop

40 people attended the workshop:

- 28 from local development associations
- 2 from agricultural cooperatives
- 3 local elected officials
- 1 member of the Chamber of Agriculture
- 3 institutional actors
- 3 members of the Agro Concept Engineering Office

Participants:

LOCAL ASSOCIATIONS AND COOPERATIVES	
Oudir Lhou	ASSOCIATION AIT ZEGANE
BOUAZAMA ABDELLAH	ASSOCIATION ASSAAD
BENYOUSSEF ADDI	ASSOCIATION TAMDA POUR LE DEVELOPPEMENT
SABRI JAMAL	ASSOCIATION TASSAOUT
MOHAMED HEZBANE	ASSOCIAATION AFSSOU DE L'EAU POTABLE
KAMOUCH LAHCEN	ASSOCIATION AGRICOLE
RACHID BENSASS	ASSOCIATION LAAYOUNE POUR L'EAU POTABLE
YOUSSEF TAGHLAOUI	ASSOCIATION TAZOULAITE
MOHAMED SALMI	ASSOCIATION TACHOUFITE POUR LE DEVELOPPEMENT DURABLE
BENSALEM ABDELLAH	FEDERATION OF ASSOCIATIONS - ALNIF
ALI BAYCHOU	ASSOCIATION TAMEZMIGHCHTE
ACHEROUID HMAD	ASSOCIATION TAGUELGOULTE
ACHLOIOU MUSTAPHA	ASSOCIATION AFFAK- AIT LAHBIB
LHOU ELKABOURI	ASSOCIATION AFSSOU
ELBZIOUI ABDOLAH	ASSOCIATION BAELKHIR
HDDA KHARBOUCH	ASSOCIATION TAZOULAIT
SEGHIR MOHAMED	ASSOCIATION AZKOUR
MOHAMED TOUGRATI	ASSOCIATION TIRGUINE
EL AZZAOUI MOHAMED	ASSOCIATION OASIS TIAS
HAMZAOUI MOHAMED	ASSOCIATION ACHBAROU POUR LE DEVELOPPEMENT
BOUSSIF M.L.Y	ASSOCIATION MCISSI
MOUANA MOHAMED	ASSOCIATION TANGUERFA
BENYOUSSEF YOUSSEEF	FEDERATION DES ASSOCAITIONS -ALNIF
MUSTAPHA LAMRANI	G R A
MUSTAPHA IHMADI	ASSOCIATION BOUGAFER
OHAMMOU MOHAMED	ASSOCIATION REG
OUAHI M'BAREK	ASSOCIATION REG
OUHSSA HMED	ASSOCIATION LALLA MIMOUNA
IHMADI MOHAND	COOPERATIVE AGRICOLE
HSSAIN OUSSOUIA	COOPERATIVE FZOU

LOCAL ELECTED OFFICIALS	
BAIDAR MOHAMED	PRESIDENT COMMUNE RURALE ALNIF
LAHCEN BENATTMANE	PRESIDENT COMMUNE RURALE M'CISSI
MHAMED BEN BAMMOU	PRESIDENT COMMUNE RURALE HSSIA
PROFESSIONAL ORGANIZATIONS	
KABOURI OMAR	MEMBRE DE LA CHAMBRE D'AGRICULTURE- ALNIF
PUBLIC ADMINISTRATION	
ZOUINE MOHAMED	DIRECTEUR CENTRE DE MISE EN VALEUR- ALNIF
SAADA MOHAMED	AGENCE NATIONALE DE DEVELOPPEMENT DES ZONES OASIENS ET DE L'ARGANIER
LAHCEN RABACH	AGENCE NATIONALE DE DEVELOPPEMENT DES ZONES OASIENS ET DE L'ARGANIER
ENGINEERING OFFICE TEAM	
OMAR ALOUI	BUREAU D'ETUDE AGRO CONCEPT
AZZOUZ ZAKHJOUKHI	BUREAU D'ETUDE AGRO CONCEPT
OMAR SOSSEY ALAOUI	BUREAU D'ETUDE AGRO CONCEPT

Workshop Proceedings:

During the opening speech, ANDZOA representative Mr. Saada Mohamed recalled the general context of the project as well as the anticipated objectives of the workshop.

The workshop was then guided by a presentation that covered the following elements:

- ✓ What is the Climate Change Adaptation Fund (CCAF) and what are the steps and conditions for submitting funding proposals?
- ✓ Why is Morocco eligible for funding from the CCAF?
- ✓ Why choose the Oases zones?
- ✓ Presentation of project elements
- ✓ Presentation of next steps

The discussion was focused on the project elements in order to refine and complete them so that they properly identify and integrate the issues in the zone.

Workshop Photos

The discussion clearly highlighted the critical situation of the population living in the Maïder Basin with respect to the zone's shortage of drinking water. The solution currently adopted is to supply drinking water to the populations by tank trucks.

Then, the speakers presented the main characteristics of the Maïder Basin zone:

- Water scarcity: decreasing groundwater levels and poor groundwater quality
- Degradation of the oases
- Low efficiency of seguias during floods
- Low efficiency of khettaras
- Significant and rapid process of silting and desertification

Workshop Photos

The recommendations that have been made to remedy this situation are the following:

- Constructing three large dams in Oum Assaad, Hssia, and M'cissi
- Constructing hillside dams and diversion dams to slow down floodwaters (permeation) and to improve water distribution
- Constructing embankments against floodwater
- Rehabilitating khettaras
- Involving all partners without forgetting traditional social organizations: Jmaâ.

Interventions have also discussed the idea of developing the Acacia.

In this context, a vision for developing the Acacia zones has already been made by the Federation of Alnif Associations, which aims to fix the ecological imbalances in these zones and to preserve its natural heritage. This vision is based on 4 axes: (1) environmental protection, (2) protection of water resources, (3) combatting poverty, and (4) qualification of human resources.

The concept of the project would be to encourage planting of acacia in this area while enhancing the value of these plantations by using the plants for their resin, potential medicinal value, and other products.

Annex 8: Report on the Consultation Workshop- Intermediary Gheris

Goulmima, July 14th, 2014

Adaptations to Climate Change in the Oases Zones – Intermediary Gheris Zone

Report on the Consultation Workshop

32 people attended the workshop:

- 9 from local development associations
- 12 from agricultural cooperatives
- 3 elected officials
- 5 institutional actors
- 3 members of the Agro Concept Engineering Office

Participants:

LOCAL ASSOCIATIONS AND COOPERATIVES	
HASSAN ALLAOUI	ASSOCIATION OASIS FERKLA
BOU BRAHIM	ASSOCIATION MAKMANE
MAMADE ABDERAHMANE	ASSOCIATION BAHBOUT
ISMAIL BAMOU	ASSOCIATION DES USAGERS DE L'EAU DE CRUES POUR L'AGRICULTURE
HMED BEN AMAR	ASSOCIATION EL KHOURBATE POUR LA PRESERVATION DE L'ENVIRONNEMENT ET LE PATRIMOINE
ZEDDOUK ABDELMAJID	ASSOCIATION AL WIFAK
MALIKA ZOUGGAR	RESEAU ASSOCIATIF POUR LE DEVELOPPEMENT DURABLE DES OASIS
HAIFAA BEN SAAOUD	RESEAU ASSOCIATIF POUR LE DEVELOPPEMENT DURABLE DES OASIS
EL ABDI RACHIDIA	RESEAU ASSOCIATIF POUR LE DEVELOPPEMENT DURABLE DES OASIS
KARROUCH MOULAY LHASSAN	COOPERATIVE IFNI
BEN BGHAT LAHCEN	COOPERATIVE ASSAHRA
ABDESSALAM EL FATMI	COOPERATIVE ATTAWFIK POUR LE DEVELOPPEMENT
BOUBRIK MOHEMED	COOPERATIVE AGRICOLE AKROUZ
AIT TOUIRIK HSSEINE	COOPEATIVE AKROUZ
ALI ABDERAHMAN	GROUPE D'INTERET ECONOMIQUE (GIE)
MAGHLI LAKBIR	COOPERATIVE ANNAJAH
ESSRIRI LHHASSAN	COOPERATIVE AKHDIL
ABDESSALAM FILALAI	COOPERATIVE ATTAWFIK
Mme. BEN ATTMANE AICHA	COOPERATIVE DES FEMMES DE DEMAIN
Mme. ALLAOUI RABHA	COOPERATIVE DES FEMMES DE DEMAIN
Mme. BLADI HASSANA	COPPERATIVE ATTAWFIK
LOCAL ELECTED OFFICIALS	
LAHCEN MANIM	LOCALLY ELECTED OFFICIAL- COMMUNE RURALE FARKLA OULIA
MOHAMED CHOUKRI	LOCALLY ELECTED OFFICIAL - COMMUNE RURALE FERKLA ESSOULA
RACHID FERRAH	LOCALLY ELECTED OFFICIAL - COMMUNE RURALE GHRIS ESSOUFLI
PUBLIC ADMINISTRATION	
MOHAMED AFERKACH	COORDINATION DE L'OFFICE DE MISE EN VALEUR- GOULMIMA
BRAHIM OUYAKKEN	COORDINATION DE L'OFFICE DE MISE EN VALEUR AGRICOLE DE TAFILALAT
DROUK ALI	COORDINATION OFFICE DE MISE EN VALEUR AGRICOLE DE TAFILALAT

SAAADA MOHAMED	AGENCE NATIONALE DE DEVELOPPEMENT DES ZONES OASIENS ET DE L'ARGANIER
LAHCEN RABACH	AGENCE NATIONALE DE DEVELOPPEMENT DES ZONES OASIENS ET DE L'ARGANIER
ENGINEERING OFFICE TEAM	
OMAR ALOUI	BUREAU D'ETUDE AGRO CONCEPT
AZZOUZ ZAKHJOUKHI	BUREAU D'ETUDE AGRO CONCEPT
OMAR SOSSEY ALAOUI	BUREAU D'ETUDE AGRO CONCEPT

Workshop Proceedings:

During the opening speech, ANDZOA representative Mr. Saada Mohamed recalled the general context of the project as well as the anticipated objectives of the workshop.

The workshop was then guided by a presentation that covered the following elements:

- ✓ What is the Climate Change Adaptation Fund (CCAF) and what are the steps and conditions for submitting funding proposals?
- ✓ Why is Morocco eligible for funding from the CCAF?
- ✓ Why choose the Oases zones?
- ✓ Presentation of project elements
- ✓ Presentation of next steps


Workshop Photos

There were no comments on the presentation. All participants were satisfied with the presentation's content and found it interesting.

Workshop Photos

The discussion was focused on the project elements in order to refine and complete them so that they properly identify and integrate the issues in the zone.

Some participants suggested giving greater importance to the Oasis population as a central element to the Gheris Oasis system. Others insisted on the importance of the role of public intervention, particularly in terms of water conservation.

In the first component, "Improving the Water Sector's Ability to Adapt", all participants shared and defended the importance of working on saving water: having traditional farmers in the Oasis act as new investors in extensions. Water conservation, according to them, requires the following steps:

- Demarcating areas for water conservation (prohibited to drill for extensions within these areas)
- Tightening the control over water resources (Water Police)
- Monitoring solar pumping, which tends to be used excessively, given that its free
- Encouraging farmers to plant varieties of crops that are adapted to the local environmental characteristics: resistant, requires little water, etc.
- Optimizing floodwaters by recharging the groundwater using innovative ideas
- Restoring khettaras
- Constructing and restoring hillside dams and diversion weirs
- Developing territorial solidarity for transferring water from surplus basins into empty basins
- Facilitating procedures to receive grants from the Moroccan Green Plan for converting to a drip irrigation system.

For the second component, "Diversifying Sources of Income and Improving the Quality of Life for the Populations Vulnerable to Climate Change in the Target Areas", interventions have pointed to the long-standing ability of traditional agricultural practices and collective water management to ensure the development and the sustainability of the oasis. However, changes in lifestyle in recent years: loss of expertise, emigration, construction materials, etc. have all negatively impacted the oasis ecosystem. Future impacts of these changes coupled with climate change are not understood well enough today to slow down the deterioration of this ecosystem; for this, it is essential to provide awareness and access to information for the population.

The participants suggested the following activities:

- Ensuring that new professions proposed for this component are aligned with the specifics of the Oasis ecosystem
- Identifying crops that are adapted to the oasis
- Encouraging organic farming
- Growing local oasis varieties.

Other interventions have highlighted the problem of property and farmland fragmentation in the oasis. Stakeholders hope that the State will intervene, as seen in experiments conducted in other regions of Morocco or abroad, in order to find practical solutions that encourage investment in and the conservation of the oasis.

Other Recommendations:

- Place humans living in the oasis at the center of the Oasis development strategy
- Develop actions for animal husbandry, which is still a key local economic activity in the oasis areas
- Create a project for establishing animal and plant (Acacia) stocks to maintain and preserve the oasis ecosystem.

Annex 9: Letter of endorsement

Ministère Délégué auprès
du Ministre de l'Energie, des Mines
de l'Eau et de l'Environnement
chargé de l'Environnement

المملكة المغربية
ROYAUME DU MAROC

الوزارة المنتدبة لدى وزير
الطاقة والمعادن والماء والبيئة
المكلفة بالبيئة

0041

04 FEV. 2014

Letter of Endorsement by
The Ministry Delegate to the Minister of Energy,
Manes, Water and Environment in Charge of Environment

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

Subject: Endorsement for "Climate Change Project in Oasis Zones".

In my capacity as designated authority for the Adaptation Fund in Morocco, I confirm that the above national proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Oasis Zones in Morocco.

Accordingly, I'm pleased to endorse the project proposal with support the Adaptation Fund. If approved, the project will be implemented by the Agricultural Development Agency (ADA) and executed by the Agency for Development of Oasis areas and the Argan trees (ANDZOA).

Sincerely

Mr. Mohamed NBOU
Director of Studies, Planning and Prospective

Le Directeur des Etudes, de la
Planification et de la Prospective

Mohamed NBOU

9, Avenue Al Araar, Secteur 16, Hay Ryad, Rabat
9، شارع العرعار، قطاع 16، حي الرياض، الرباط
: 05 37 57 66 49 / 51 / 50 : 05 37 57 04 68
E-mail : info@environnement.gov.ma : البريد الإلكتروني