IFAD – SCCF GEF PROJECT

JORDAN – IRRIGATION TECHNOLOGY PILOT PROJECT TO FACE CLIMATE CHANGE IMPACT IN JORDAN

TERMINAL EVALUATION REPORT

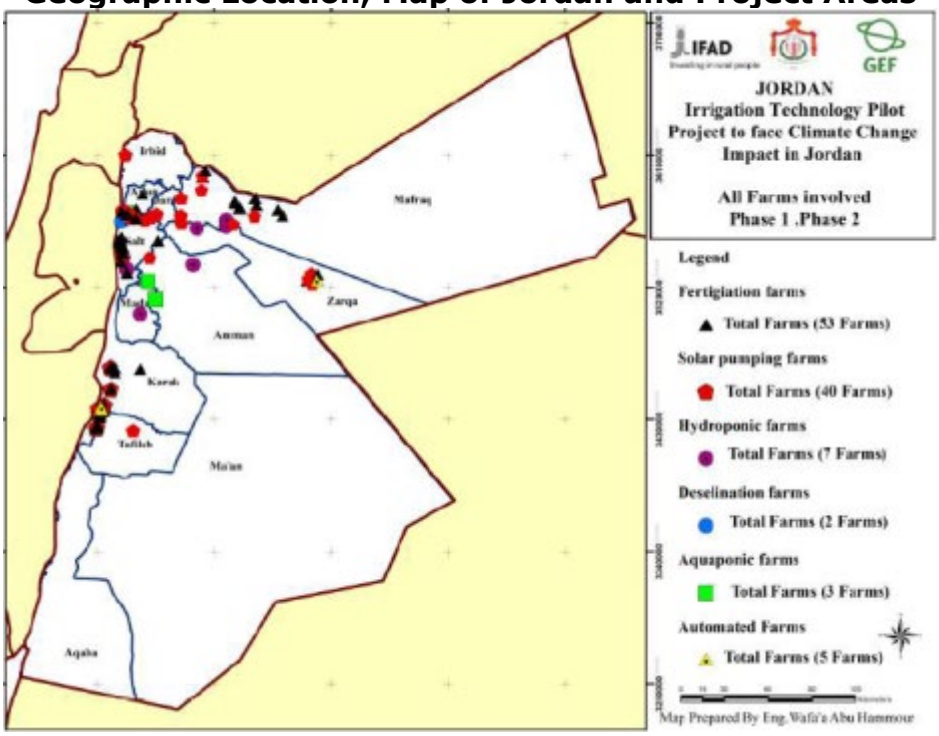
MARCH 2018

Contents

Currency Equivalents:

Currency Unit = Jordan Dinar (JD)
EUR 1.00 = JD 0.87
USD 1.00 = JD 0.70
JD 1 = USD 1.41
1 hectare = 10 dunum

Geographic Location, Map of Jordan and Project Areas



List of Abbreviations

ACC	Agriculture Credit Corporation
APR	Annual Project Reports
AWPB	Annual Work Plan and Budget
B/D	Benefit/Cost
CBD	United Nations Convention to Biological Diversity
CBJ	Central Bank of Jordan
CC	Climate Change
dHRS	Dutyion Root Hydration System
EFA	Economic and Financial Analysis
EIRR	Economic Internal Rate of Return
EU	European Union
FA	Financial Agreement
FFS	Farmer Field School
GCF	Green Climate Fund
GEF	Global Environment Facility
GIZ	German Corporation for International Cooperation GmbH
HR	Human Resources
IFAD	International funds for Agricultural Development
ITA	International Technical Assistance
ITPP	Irrigation Technology Pilot Project to Face CC Impact in Jordan
JD	Jordan Dinar
JEDCO	Jordan Enterprise Development Corporation
JU	Jordan University
JVA	Jordan Valley Authority
M&E	Monitoring and Evaluation
M&EO	Monitoring & Evaluation Officer
MOA	Ministry of Agriculture
MoF	Ministry of Finance
MoP	Ministry of Planning
MoPW	Ministry of Public Works
MoWI	Ministry of Water and Irrigation
MTR	Mid-Term Review
NCARE	National Centre for Agricultural Research and Extension
NPV	Net Present Value
NRM	Natural Resources Management
NTA	National Technical Assistance
PC	Project Coordinator
PIR	Project Implementation Reviews
PMU	Project Management Unit
PSHF	Poor smallholder farmers
R&D	Research and Development
REGEP	Rural Economic Growth and Employment Project
RIMS	Results and Impact Management System
SC	Steering Committee
SCCF	Special Climate Change Fund
SER	Shadow Exchange Rate
SERF	Shadow Exchange Ratio Factor
TER	Terminal Evaluation Report
TET	Terminal Evaluation Team
TNC	Third National Communication to the UNFCCC
ToC	Theory of Change
TOT	Training of Trainers
TSAT	Technical Support & Advisory Team
UNCCD	United Nations Convention to Combat Desertification

UNFCCC	United Nations Convention to Climate Change
USAID	United States Agency for International Development
USD	United States of America Dollar
VAT	Value Added Tax
WFP	World Food Programme
WP	With Project
WOP	Without Project
WUA	Water Users Associations

1. Project Identification Table

GEF Project ID: 4036

GEF Focal Area: Climate Change

Funding Source: SCCF

Project duration: 48 months

Country: Jordan

Project Title: Irrigation Technology Pilot Project to Face Climate Change Impact in Jordan (ITPP)

GEF Implementing Agency: IFAD

Executing Agencies: Ministry of Planning and International Cooperation; Ministry of the Environment; National Center for Agricultural Research and Extension

GEF Agency Approval Date: 05/08/2011

Description: To reduce the vulnerability to climate change of the agricultural system in Jordan, particularly from its impacts on water resources, by testing innovative and efficient water-use technologies.

Cost to the GEF: 2,000,000 USD

Co-Financing: 6,713,500 USD

2. Executive Summary

1. This Terminal Evaluation Report (TER) was initiated by IFAD as the Implementing Agency of the GEF Project "Irrigation Technology Project to face Climate Change Impact in Jordan" (ITPP), referred to as the GEF Project in this report, with the aim of providing a comprehensive and systematic account of the performance of the completed project by assessing its design, implementation, and achievement of objectives.

2. The ITPP/GEF project was designed in 2009, approved in 2012, redesigned in 2013 and entered into force in January 2014 with the signing of the Financing Agreement (FA). GEF implementation is scheduled to finalize on the 31st of June 2018. The budget of the project is the sum of USD 2,000,000 of GEF direct contribution, plus USD 6,713,500 in-kind contribution from the Government of Jordan, NCARE, Jordan University and Project Beneficiaries. By the project closure date of 31 December 2018, 77.89% of the GEF budget (USD 1,557,834.79) was spent.

3. The project was designed to upscale innovative irrigation technologies to reduce the vulnerability to climate change of the agricultural system in Jordan and particularly from its impacts on water resources by testing innovative, environmental friendly and water-use efficient technologies. The main target group consists of small-holder farmers, which are the most vulnerable ones to climate change impacts as a result of their poverty level. The project is responsive to the GEF Focal Area: Climate Change, Special Climate Change Fund – Technology Transfer.

4. The project was articulated around three Outcomes. Outcome 1 - *Identification, implementation and expansion of irrigation technologies in Jordan* includes two Outputs: Output 1.1 - *Scoping, installation and implementation of the technologies*, which involves the identification of suitable technologies, the selection of sites/beneficiaries, the designing, purchasing, installation effective use and monitoring of the selected equipment; Output 1.2 - *Strengthening the enabling environment for sustainability of the introduced technologies in Jordan*, which involves the improvement of the supportive policies and financing mechanisms to support technology adoption at national level, and the support of the private sector for the production, certification and dissemination of the new technologies. Outcome 2 - *Training, capacity building and communication* includes two Outputs: Output 2.1 - *Enhancing farmers' capacity to install, use and maintain the selected technologies*, which focuses on training professionals, farmers and local stakeholders, extension services, and decision-makers on the climate adaptation value, installation, use and maintenance of the new technologies, through workshops, on-farm demonstrations, field visits, and learning courses; Output 2.2 - *Increasing the awareness at national and local levels on the potential of selected technologies as an adaptation measure*, which focuses on the designing and implementation of tailored awareness raising campaigns, and the development of awareness materials to support campaigns and capacity building. Outcome 3 – *Project management*, implies the establishment of the mechanisms and the human resources needed for effective management, oversight, coordination, monitoring and evaluation of the project.

5. The PMU in charge of GEF implementation is composed of a Project Coordinator (PC), with the assistance of a financial assistant, Procurement Officer, M&E Officer, and technical staff for project operational and field support, all of them provided by NCARE. A Technical Support and Advisory Team (TSAT) provides technical support to the project during the implementation of activities related to each pilot site. A Steering Committee (SC) chaired by NCARE, provides advice and guidance on strategic directions, project implementation and cooperation among all key stakeholders.

6. The TER was conducted as an in-depth evaluation using a mixed-methods approach, including: (i) a desk review of project documents available at the time of the mission; (ii) interviews and meetings in Amman with project team and other stakeholders; and (iii) field visits and interviews with project beneficiaries in the different Governorates where project activities were implemented. The evaluation was led by an independent consultant (Pedro Regato), who was supported in his tasks by a Finance Expert (Elisabeth Dombori), a Procurement Expert (Walid Dhouibi) and an Economic and Financial Analysis Expert (Agnese Tonnina), with the collaboration and backup of the IFAD Country Representative (Saeb Khresat). A field mission to Jordan took place on 17-28 March 2018.

7. The evaluation assessed and rated the project with respect to the ten, interrelated parameters or categories (A-J) proposed by the GEF Office of Evaluation. The categories are fully described in Section 6 of this report - Assessment of Project Results and Impact. The success of project implementation was rated on a scale from 'highly unsatisfactory' to 'highly satisfactory', with partial ratings for each category and an overall rating for the project.

8. Based on this exercise, the TER concludes that the overall project balance is moderately unsatisfactory, and that outcomes could not be fully achieved within the implementation timeframe.

9. The most notable successes of the project so far are: (i) The work on technology innovation developed by some contractors, who provided considerable improvements for the hydroponic equipment and for the solar water desalination system; (ii) Despite not always being accessible to the poorest farmers, the new equipment has yielded promising results in terms of the preliminary environmental and socio-economic benefits; (iii) The constant interaction with ACC and MoA has led to the establishment of loans with no interest for the purchasing of the equipment supported by ITPP.

10. The most serious shortcomings so far are: (i) the difficulty and/or inability to fully access the target group – poor smallholder farmers, with special focus on women-headed households – due to the technological scale and high cost of the equipment selected; (ii) the considerable project delays preventing the completion of most project activities and outputs, and the generation of concrete results from the use of most of the equipment by the project beneficiaries, who did not have time to use it in agricultural production within the time frame of the project; (iii) the absence of planning tools (e.g. Theory of Change model, M&E plan, AWPB, procurement plan) that have prevented an effective implementation and adaptive management of the project; (iv) the limited use of continued international technical assistance that would have been critical to ensure that NCARE staff, service providers and beneficiaries reach the necessary understanding and capacity to apply climate-resilient agronomic systems and techniques, and effectively adopt the new technologies; (v) the limited partnership development with other relevant stakeholders in Jordan that are active in the development and use of similar technologies; and (vi) the lack of strategic decisions to anticipate activities to create enabling conditions (e.g. transferring of know-how and awareness raising through training and learning tours) that would have been possible through partnerships with relevant stakeholders. These are the critical areas that the IFAD and the executing agency will have to pay most attention to, in future follow up of ITTP project.

11. The TER also looked at lessons learned, based on the main successes and challenges assessed. Five main lessons have been identified, which are presenting general conclusions from the standpoint of the design and implementation of the project and have the potential for wider application and use beyond this project. These are presented in Section 7 of this report with the following headings:

A. Project coaching and backup;
B. Learning and access to best available knowledge;
C. Empowerment of local communities to maximize the impact of technology development and field investments;
D. Partnership building and outsourcing; and
E. Planning the process for the effective adoption and use of new technologies.

12. Finally, the TER delivered a set of twelve recommendations that are cross referenced to the main conclusions and suggest actionable proposals for improvement of any future project. A summary is provided here below.

Recommendation	Comment
R1: It is recommended to involve in the best participatory way the target group in all phases of the project, from the design, planning, implementation and monitoring, so that a most accurate and consensus decision-making in the type of investments to be supported is made.	• The objective group – PSHF - and the environmental and socio-economic constraints that condition its adaptive capacity are the main reason that justifies the development of an IFAD-led project within the framework of the GEF program. • The planned investments must be adapted to the needs and purchasing power of this group.
R2: A theory of change should be developed at project design and/or start-up phase for making visible and explicit the rationale behind what we do and why, and the causal package of activities plus assumptions that together are expected (and sufficient) to contribute to the intended results.	• The TER recommends that in future projects, the implementing agency develops a "theory of change" model that helps visualize the linkages between project Impact, Outcomes, Outputs and Inputs.
R3: A well-established baseline situation and monitoring and reporting mechanism should be established as a prerequisite for adaptive management, to systematically test assumptions in order to adapt and learn.	• The TET recommends for future projects that the development of the necessary tools for project planning and of adaptive management becomes an essential and necessary requisite for the executing agency, and that IFAD establishes effective mechanisms to ensure that they are met (e.g. the existence of project planning and adaptive management tools as a precondition for first disbursement).
R4: Speed up expenditure, investment and procurement.	• The TET recommends for future projects that the executing agency makes sure that a competent accounting team dedicated to the project and accounting software are in place before start-up, and that these aspects become a precondition for disbursement, as well as the planning and adaptive management tools mentioned in Recommendation 4.
R5: On-the-job training for the project team.	• The TET recommended that IFAD on-the-job training on the GEF and IFAD policies and procedures and fill major knowledge gaps within the project team – i.e.

	in the areas of M&E, procurement and finance management, project cycle. The training could take the form of learning visit abroad (for instance, accompanying the beneficiaries on the visits already scheduled within the different activities), or other in-situ training opportunities that can eventually contribute to an improvement of staff performance.
R6: Increase the visibility of the project, open it up to the national stakeholders, and improve interaction with institutional partners, consultants, and other projects.	• The TET recommends for future projects that SC and TSAT are established in an appropriate manner, with a good representation and clear commitment on the part of their members, and effective mechanisms for their regular involvement in the implementation of the project.
R7: Establishing mechanisms for an effective project implementation process is essential to ensure the timely and effective delivery of the project outputs and outcomes, and the realization of the causal assumptions (theory of change model).	• TET recommends for future projects that a project implementation planning process is based on the theory of change model following a step-wise approach to complete the necessary actions to address each step and achieve the expected results. Moreover, the TET recommends that the project team make use of practical project implementation tools, such as Gantt charts, to help show the "dependency" between activities (e.g. what activities can only begin after the completion of others), the start and finish dates of the elements of the project, etc. This will help avoid project implementation delays and failures due to the absence of the necessary conditions to achieve project results, namely realistic planning of project activities.
R8: International technical assistance (ITA) is a major need in development projects, especially in the context of climate change, to ensure that beneficiaries and service providers acquire the necessary understanding and capacity to apply climate-resilient agronomic systems and techniques, and an effective adoption and adequate use of the new technologies.	• IFAD should ensure that future projects provide continued assistance by one or more international experts to the project team to guide them through the various steps necessary to effectively and efficiently fulfil the expected results. In fact, one of the comments provided to the TET by the project staff has been the lack of adequate and continued technical support over time, that should have come always from the same qualified expert, instead of the more punctual assistance NCARE received from different experts, sometimes with discordant messages. IFAD should also help the project team understand the importance of using the available funds for international technical assistance effectively.
R9: Innovation in technology development should be conditioned both by the environmental constraints to be adapted and the socio-economic context of the poor smallholder farmers, in a way that is compatible with their purchasing power.	• The TET recommends that in future projects, the executing agency makes a detailed mapping exercise to identify and learn about already existing initiatives on climate-resilient technologies for poor farmers in Jordan and other countries with similar environmental and social constraints, and seek for partnerships to build on what exists and provide innovative solutions that improve what has already been done.
R10: Extension period (Need for follow-up).	• The TET agreed with NCARE's request to have an extension of three months in order to complete all

	the commitments that were contracted before the project completion date (31 March 2018). Although this will not allow completing many of the planned activities, at least the purchase and installation of the planned equipment will be completed, and field data on the benefits provided by the use of part of this equipment throughout a production cycle will be collected and analysed. • In the extension period, NCARE will need to ensure proper completion of on-going contracts. This is meant to only complete the delivery of already contracted goods and services with no room for new contracts. Moreover, NCARE will need to collect field data from all farmers who have already used the equipment in order to analyse preliminary results to improve the M&E report and complete the GEF tracking tool. A report describing results, benefits, cost-effectiveness, and lessons learned should be delivered to IFAD at the end of the extension period.
R11: Design an effective system and ensure selection of qualified staff for the collection and analysis of M&E data, and the measurement of environmental, social, and economic indicators.	• The TET recommends for future projects that the development of a baseline situation and a complete and effective M&E plan becomes a precondition for first disbursement to the executing agency. Moreover, the GEF implementing agency should make sure that the executing agency has the necessary skills and understanding of its requirements and those of the GEF regarding M&E, tracking tools, etc.
R12: Ensure the transferring of lessons learned under ITPP to IFAD/REGEP project and future projects on climate change adaptation and agriculture production in Jordan.	• The IFAD REGEP project executed by the implementing agency JEDCO in close partnership with NCARE and other private and public partners will keep financing trials and demonstrations of new technologies building on ITPP experience. REGEP should support the capacity development needs to NCARE staff and other extension/research agents – including WUAs - to be sufficiently skilled to guide farmers in the effective implementation of the new technologies. This is an opportunity to bring international expertise – which was planned under ITPP – to enrich national knowledge on new technologies. Once trained, NCARE personnel will be able to fulfil their mandate to provide regular support to ITPP supported farmers – and other farmers in Jordan - in the selection, installation and management of agriculture production equipment. The REGEP project also represents a good opportunity to complete the lobby and advocacy work foreseen under ITPP to create a supportive policy framework and financing opportunities for poor farmers willing to adopt climate-resilient technologies.

3. Introduction and Background – The Project

1. Jordan is one of the world's most water-scarce countries. Water scarcity is a leading constraint in the agriculture sector. The region is heavily dependent on seasonal rainfall, while drought years reduce yields sharply and leave smallholders food-

insecure. The impact of climate change is expected to further exacerbate water scarcity in Jordan, negatively affecting agriculture, a sector that is one of the main water consumers in the country.

2. The shift towards irrigated agriculture to meet the country's need for food must be managed very carefully in light of Jordan's scarce water resources. Currently, irrigated agriculture consumes about 60 percent of the country's water resources. This share is expected to decrease as water will be prioritized for domestic and industrial uses. Research results in Jordan indicate that an increase of temperature by 2ºC would increase irrigation demand by 18 percent while a 10 percent reduction in precipitation would result in an increase of approximately 5 percent in irrigation demand.

3. Nationwide, 60 percent of Jordan's agricultural land is rainfed, and the remaining 40 percent irrigated. The irrigated agriculture contributes 90 percent of the total value of production. This demonstrates the vast productive advantage that irrigation water brings to agricultural land in Jordan.

4. The Terminal Evaluation Report (TER) mission of the Irrigation Technology Pilot Project to Face Climate Change Impact in Jordan (ITPP) took place in Jordan from 17 to 28 March 2018. The objective of the TER mission was to assess project implementation progress and impact. The scope of the TER mission was to provide a comprehensive and systematic account of the performance of the completed project by assessing its design, implementation, and achievement of objectives.

5. Photos and information relevant to the visited sites are compiled in KMZ files compatible with Google Earth engine.

6. **Project Description.** The project aims to upscale innovative irrigation technologies to reduce the vulnerability to climate change of the agricultural system in Jordan and particularly from its impacts on water resources by testing innovative, environmental friendly and water-use efficient technologies. The project was designed in 2009, approved in 2012, redesigned in 2013 and entered into force in January 2014 with the signing of the Financing Agreement (FA). The National Centre for Agricultural Research and Extension (NCARE) is the Lead Project Agency. The ITPP project became operational in January 2014, the project completion is scheduled on 31 March 2018 and closure on 30 September 2018.

7. According to the project Financing Agreement (FA), the ITPP is funded by a USD 2,000,000 grant from the Global Environment Facility (GEF) and co-financed in kind equivalent to the total amount of USD 6,713,500, for a period of 4 years. Contributions are provided by (i) the Hashemite Kingdom of Jordan equivalent to the amount of USD 1,362,500; (ii) the National Centre for Agricultural Research and Extension (NCARE) equivalent to the amount of USD 3,185,000; (iii) Project beneficiaries equivalent to the amount of USD 1,601,300; and (iv) the University of Jordan (JU) equivalent to the amount of USD 564,700.

8. The project had to be slightly re-designed as the previously selected dHRS technology did not show success in Jordan. IFAD and the Government took the joint decision that SCCF resources would no longer be used for that technology because of limited expected success and benefit. This adaptive management decision led to a delay of the implementation phase of project. The main challenge was to replace the previously identified dHRS technology with other water saving technologies that could be successful in Jordan and benefit the target beneficiaries.

9. The approach of this project revolved around the link between technology transfer, climate change adaptation and rural development. The project is set to promote

technically reliable, economically competitive, environmentally-sound, and socially-accepted sustainable irrigation technology for the agricultural sector in different agro-climatic production regions of Jordan, strengthening the enabling political and financing conditions for farmers to invest in climate-resilient technologies, creating awareness among the farming community on the need to conserve and efficiently use of natural resources, and helping beneficiaries to overcome hesitation in adoption of new technologies.

10. The project was articulated around three outcomes:

11. **Outcome 1**: *Identification, implementation and expansion of irrigation technologies in Jordan*. It includes two outputs:
Output 1.1: *Scoping, installation and implementation of the technologies*, which involves: (i) identification and selection of implementation sites and beneficiaries; (ii) assessment of on-farm conditions and fine-tuning the design of the selected equipment and infrastructure; (iii) technical installation; (iv) technical support to the beneficiaries for the effective use of the equipment and infrastructure; and (v) monitoring of results from agriculture production based on the new equipment and infrastructure.

Output 1.2: *Strengthening the enabling environment for sustainability of the introduced technologies in Jordan*, which involves: (i) assessment of policy gaps and needs to enhance the adaptive capacity of the agriculture sector in Jordan, and support the adoption of climate-resilient technologies; (ii) certification of the new technologies; (iii) identification of financing mechanisms to support technology adoption at national level; and (iv) support role of the private sector in the production and dissemination of climate-resilient technologies in Jordan.

12. **Outcome 2**: *Training, capacity building and communication*. It includes two outputs:
Output 2.1: *Enhancing farmers' capacity to install, use and maintain the selected technologies*, which focuses on training professionals, farmers and local stakeholders, extension services, and decision-makers on the climate adaptation value, installation, use and maintenance of the new technologies, through workshops, on-farm demonstrations, field visits, and learning courses.
Output 2.2: *Increasing the awareness at national and local levels on the potential of selected technologies as an adaptation measure*, which focuses on: (i) the designing and implementation of tailored awareness raising campaigns through public media, workshops, seminars, and study tours, targeting farmers, extension workers, relevant private sector entities, and public institutions at the national and local level across Jordan; and (ii) the development of awareness materials to support campaigns and capacity building.

13. **Outcome 3**: Project Management. It implies the establishment of the mechanisms and the human resources needed for effective management, oversight, coordination, monitoring and evaluation of the project, following the normative IFAD and GEF requirements for regular reviews of AWPB, preparation of project inception report, supervision plan, M&E plan, baseline scenario, PIR, APR, MTR, TER, among others. Capturing and disseminating lessons-learned and best practices for sustainable irrigation practices are an essential component of the project.

14. The principal executing agency for the project was the Ministry of Planning and International Cooperation (MoPIC), with implementation undertaken by the National Centre for Agricultural Research and Extension (NCARE). A small Project Management Unit (PMU) played the key role in project execution. The PMU was co-

headed by a Project Coordinator (PC), with the assistance of a financial assistant, a Procurement Officer and, M&E officer, and technical staff for project operational and field support, all of them provided by NCARE. A Technical Support and Advisory Team (TSAT) provided technical support to the project during the implementation of activities related to each pilot site. A Steering Committee (SC) chaired by NCARE, provided advice and guidance on strategic directions, project implementation and cooperation among all key stakeholders. The members of the SC are the main stakeholders, including representatives from MOPIC, MOE, MWI, MOA, ACC and others identified by NCARE.

15. The main target group consists of small-holder farmers, which are the most vulnerable to climate change impacts as a result of their poverty level. Due to farm size and climatic constraints, the improvement of farm incomes is largely dependent on the efficient use of the scarce water resources, optimal use of soil and nutrients, and the access to renewable sources of energy. The project targeted 322 pilot sites in the Jordan Valley and the Highlands covering 330 ha, selected according to the following, six criteria: (i) climate change vulnerability; (ii) potential to substitute freshwater with poor quality water for agriculture; (iii) availability-willingness of smallholder farmers to participate; (iv) potential to turn non-utilized land into productive land; (v) availability of brackish water; and (vi) lack of electrical grid network.

16. The mission team wishes to express its appreciation to the Director General of NCARE Dr. Nizar Haddad, the NCARE project staff members, the project beneficiaries, contractors and partners met by the team, and particularly to the Project Coordinator Dr. Mohammed Jitan for his full support during the Terminal Evaluation Mission.

4. Scope, Objective and Methods of the Evaluation

13. As stated in the Terms of Reference, the objectives of the Terminal Evaluation Report (TER) are:

- To assess the effectiveness of project implementation, or the extent to which project objectives were met, and to document the immediate results and impacts of project interventions;
- To assess the relevance of project interventions at the time of project design and in today's context;
- To review the project costs and benefits and the efficiency of the overall project implementation process, including IFAD's and partners' performance.
- To assess the prospects of sustainability of project benefits beyond project completion;
- To generate and document useful lessons from implementation that will help improve IFAD's or Borrower's future programming and designs;
- To identify any potential for the replication or up-scaling of best project practices;
- To evaluate the relevance of the implemented strategies and approaches as well as their contribution to reaching the development objectives pursued by the project; and
- To appreciate the implementation context and modalities, including those relating to the interactions between the project, the beneficiaries and the implementing partners.

14. The evaluation work was carried out by a team formed by an Environmental and Climate Change Adaptation Expert, a Finance Expert, a Procurement Expert, and an Economic and Financial Analysis Expert, with the collaboration and backup of the IFAD Country Representative. The detailed scope of the TER and the criteria used to assess the project's progress are shown in the Terms of Reference in Annex D to this document.

15. The TER was conducted as an in-depth evaluation using a mixed-methods approach, including: (i) a desk review of project documents[1] and other relevant publications/reports; (ii) a field mission to Jordan, between 17 and 28 March 2018; (iii) and an Economics and Financial Analysis (EFA).

16. The primary objective of the terminal evaluation EFA was to validate the technical and financial viability of the new production activities of the project's beneficiaries. The main parameters examined for this purpose were the impacts of project interventions on farm productivity, natural resource management, cash flows, family labour, and household incomes. At the same time, in order to assess the economic viability of the project as a whole, a comparison between actual project costs (real spending) and achieved benefits from overall project activities is performed using the incremental cash flow approach. Benefits produced (in the ex-post analysis), or to be expected from project activities in the following years after project closure, are compared to the "without project situation" in order to assess the incremental value of project activities, following the incremental approach, which shows target beneficiaries whether the risk of engaging in new activities is worthwhile. The "without project" scenario usually gathers information and data from the baseline

[1] ITPP project design and project re-design documents, ITPP supervision reports, AWPB, M&E report, progress reports from project staff in charge of the implementation of the different technologies, ITPP progress reports, PIR, TORs, Poznan questionnaire, contracts with contractors and bid evaluation reports, excel tables with beneficiaries' information, agreements with beneficiaries, MTR, GEF Tracking Tool progress report

report. However, in this specific case, the baseline report was not conducted. The data for the "without project" scenario, as well as data from the preliminary results of the use of new technologies after one production year (fertigation) were collected by the terminal evaluation team (TET) during the field visits.

17. The TET carried out interviews and meetings in Amman with the Hashemite University, the REGEP Project Director at JEDCO, NCARE Director General, and NCARE staff in charge of the project coordination, implementation, administration, procurement and M&E. Five field visits were organised in the Governorates of Azraq, Balqa (Jordan Valley), Madaba, and Ghor Al-Safi Department (Karak Governorate), to meet and interview eleven beneficiaries and four contractors dealing with technology innovation. The evaluation team also gathered baseline information from project sites (beneficiary farmers), and data about preliminary project results from the use of the only technology (fertigation) that was applied throughout a full production year.

18. The TER also built on the findings and recommendations of a MTR mission carried out in March 2017, aimed at assessing ITPP implementation. The report delivered after this mission included a set of recommendations for the final phase of the project.

19. During the interviews, the team gathered information on progress made so far, issues and problems encountered, the results achieved, and pending issues to complete the expected outputs. The questions followed a structure that, whenever possible, took into consideration the baseline conditions and trends in relation to the intended project outcomes and impacts, and sought plausible evidence to attribute such outcomes and impacts to the actions of the project and to document their sustainability beyond project completion.

20. The evaluation assessed and rated the project with respect to the ten, interrelated parameters or categories (A-J) proposed by the GEF Office of Evaluation. The success of project implementation was rated on a scale from 'highly unsatisfactory' to 'highly satisfactory', with partial ratings for each category and an overall rating for the project. The matrix with the rating system is included in Annex E.

5. The Theory of Change

21. According to the "Guidelines for GEF Agencies in Conducting Terminal Evaluation for Full-sized Projects", in the absence of project's theory of change, the evaluators developed it based on information collected through consultations and written documents.

22. The project was based on the theory that the climate change vulnerability of agriculture production systems on which poor smallholder farmers depend in Jordan will increase in the absence of the implementation and expansion of climate-resilient technologies that suit their needs and purchasing power.

23. The second theory informing the project is that improved policies and financial mechanisms, coupled with technology development and capacity building programs tailored to the poor, can be leveraged to empower (economically and socially) poor smallholder farmers, with special reference to women-headed households.

24. The expected impact of ITPP was "poor smallholder farmers, especially women headed households, increase their adaptive capacity and well-being through enhanced investments in climate-resilient technologies and better access to knowledge, and extension and financial services. This is translated into: (i) improved farmland in terms of soil and water conservation, reduced salinization, improved soil fertility and carbon storage; (ii) higher benefits in terms of improved yields, efficient use of resources, and reduced emissions and production costs; (iii) a large number of population of the concerned groups with the ability to effectively apply the new technologies and transfer knowledge; (iv) the existence of relevant policies and economic incentives supporting the adoption and dissemination of climate-resilient technologies; and (v) the wide availability of certified equipment accessible to poor smallholder farmers.

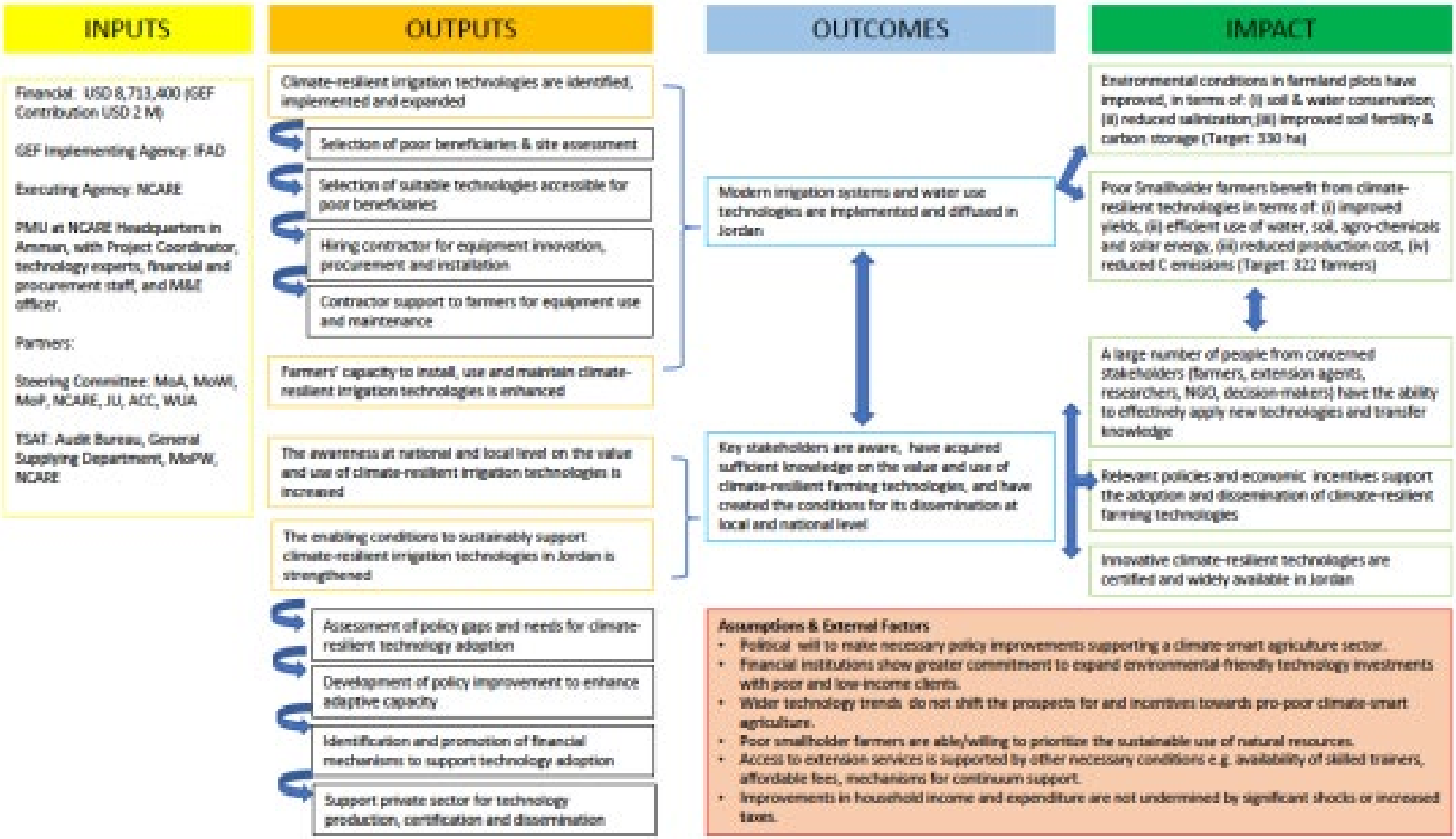
25. The outcomes of the project were:

- Modern irrigation systems and water use technologies are implemented and diffused in Jordan.
- Key stakeholders are aware of climate-resilient farming technologies, have acquired sufficient knowledge on their value and efficient use, and have created the conditions for their dissemination at the local and national levels.

26. ITPP would also deliver:

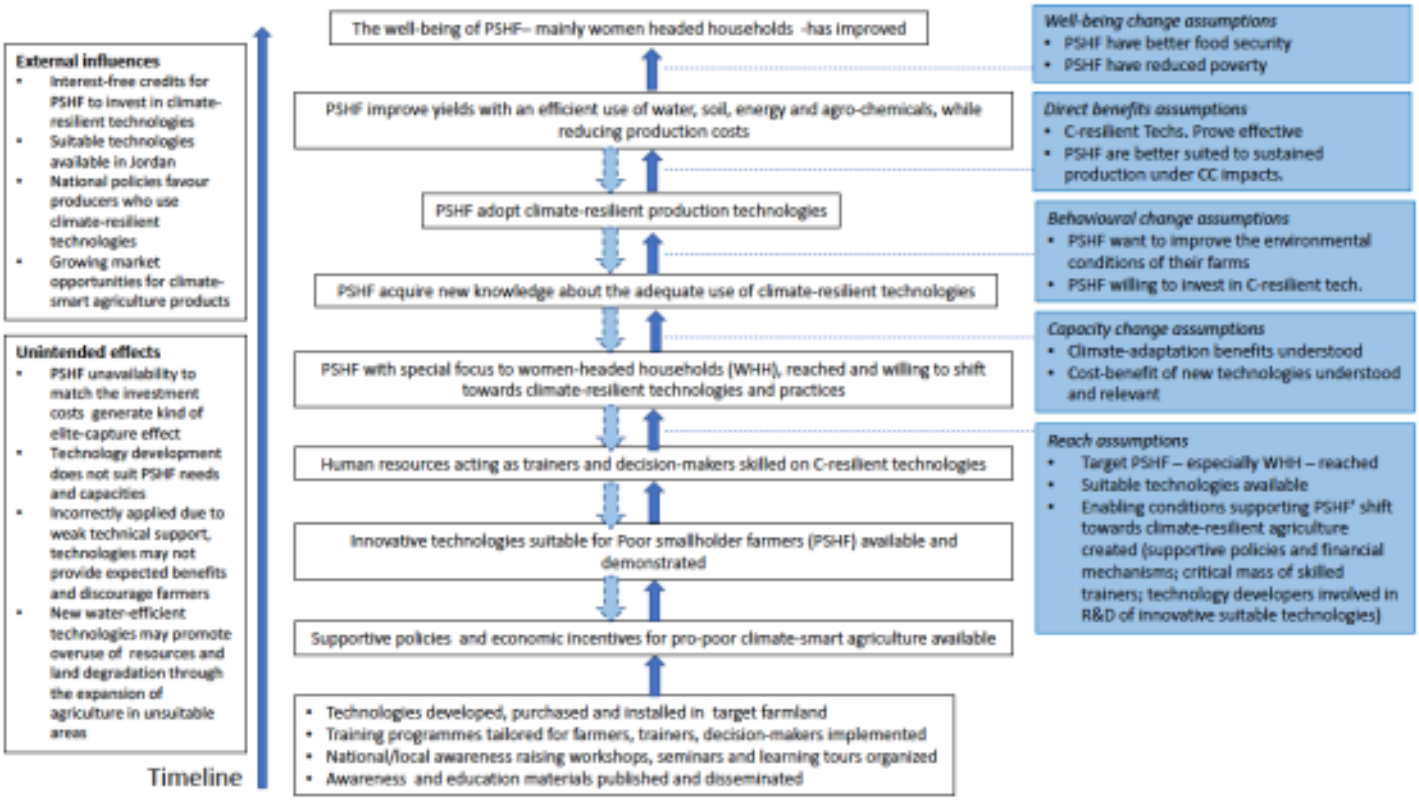
- Improved and new policies supporting pro-poor climate-resilient agriculture;
- Increased availability of approved/certified technologies in Jordan;
- Availability of financial products for poor smallholder farmers to invest in climate-resilient technologies.

Figure 1. Table with linkages between ITPP Impact, Outcomes, Outputs and Inputs



27. The theory of change represents how and why it is expected that a project intervention will contribute to an intended result. But it is clear that rather more than the intervention activities are needed; also needed is the realization of the causal assumptions. The theory of change depicts a causal package of activities plus assumptions that together are expected (and sufficient) to contribute to the intended results.

Figure 2. ITTP Project Theory of Change



28. The key assumptions underlying the theory of change were as follows:

i. That supportive policies and financial mechanisms will lead to increased opportunities for the adoption of climate-resilient technologies and agronomic practices by poor smallholder farmers (PSHF);
ii. That national technology developers can benefit from ITPP and similar international development projects to do innovation through R&D, aimed at improving the production capacity of PSHF under a climate change scenario, and upscale the dissemination of successful equipment through the supportive policies (e.g. technology certification) and financial mechanisms (e.g. specific financial products to facilitate farmers' investments in these technologies);
iii. That a critical number of trainers trained and professionally developed organizations (e.g. extension services; water users association) have a positive impact on the effective adoption and efficient use of climate-resilient technologies by farmers;
iv. That PSHF are easily targeted if suitable technologies are designed and available, and pro-poor financial mechanisms are developed and accessible;
v. That on-farm pilot demonstrations with adequate and sufficient technical support facilitate farmers' understanding of the climate adaptation benefits in terms of resource use efficiency, gaining an economic advantage while also reducing environmental burdens, and demonstrate the cost effectiveness of investing in such technologies;

vi. That successful pilot demonstration results can have a catalytic effect generating behavioural change of an increasing number of PSHF willing to improve the long-term environmental conditions and production capacity of their farms and consequently invest in climate-resilient technologies;
vii. That PSHF' investment and use of new climate-resilient equipment, coupled with adequate technical support from extension and research organizations, result in higher yields, with wider economic, social and environmental benefits;
viii. That the use of climate-resilient agriculture production systems and technologies by PSHF increases their adaptive capacity and well-being.

6. Assessment of Project Results and Impact

A. Achievement of Outputs and Activities

Overall Rating: Moderately Unsatisfactory (MU: 3)

29. The GEF activities have suffered mild to considerable delays due to a very slow project start-up and to significant management and implementation problems (see section B3, further below). As a result, the project success in producing the expected outputs, both in quantity and quality, has been limited.

30. Most of the investments foreseen in Output 1.1, that represent about 73% of the GEF funding, have been procured, and were on track for completion within the project timeframe. By 31st March 2018 (initial project completion date) 30 solar systems for water pumping with a total cost of USD 519,870, and 7 hydroponic systems with a total cost of USD 202,751, were still pending with the commitment to be completed before the end of the requested extension period of 3 months. The total number of farmers benefiting from the purchasing of climate-resilient technologies was 102, which represents 31.6% of the target beneficiaries mentioned in the ITPP project re-designed document approved by the GEF in 2013. However, in terms of hectares of farmland affected by the new technologies, the total number (359 ha) is slightly higher than the target (330 ha) because the project beneficiaries own on average more hectares than what was calculated in the project design.

31. Considerable delays in selecting the project beneficiaries, and in relation to the delivery of the equipment by contractors, has prevented, in most cases, the use of the installed equipment and therefore the demonstration of their benefits in terms of improved production and efficient use of resources. Only 20 fertigation systems had been installed by March 2017, early enough to allow these farmers to use the new equipment throughout a production cycle.

32. In order to draw up some conclusions, the evaluation team met few farmers who were able to use the new equipment on fertigation and solar pumping, and who obtained promising initial results: (i) farmers saved more than half of the amount of fertilizers previously used, and were able to have a uniform distribution of nutrients that helped improve the quality of the product; (ii) yield increased between 28 percent and 62 percent; and (iii) energy cost was reduced by 67 percent. In the case of hydroponic system, the evaluation team met one farmer who made an economic analysis of the expected benefits that will be obtained with the new equipment, who expects to double production compared with an old hydroponics equipment under use in the same area.

33. Output 1.2 was not achieved. The significant delays and excessive time that the project staff dedicated to follow the contractors for the delivery of the equipment and infrastructure, reduced the capacity of the project team to address this output. No policy assessment was carried out, nor has any lobby and advocacy action implemented, aimed at developing or strengthening policy frameworks. Likewise, no action towards the certification of technologies occurred. As previously mentioned, the only positive element that directly or indirectly relates to this output is the permanent contact between NCARE, MoA and ACC that has led to the establishment of loans with no interest for the purchasing of the equipment supported by ITPP (see section B1 below).

34. Output 2.1 was not achieved either. The completion of all planned training was not foreseen within the three-month extension of the project due to the fact that as of March 31st (initial project completion date) this service had not been contracted to any organization (it was foreseen that the university of Jordan would do it). Delays in

the purchasing and installation of the equipment and infrastructures in the selected farmland plots (Output 1.1) made it impossible to carry out the training foreseen in Output 2.1. The project team argued that delays in the purchasing and installation of the equipment have prevented the organization of training courses for farmers, extension agents and trainers. Supposedly, the in-situ availability of the equipment - which has only been carried out at the end of the project - was a necessary condition to organize the training courses, that involved field demonstrations. Only two training sessions were organized for 20 farmers benefiting from the fertigation system with only one fertilizer tank that was installed by March 2017. Other limited training activities for individual farmers were carried out by the contractors during the installation of the equipment, in the framework of Output 1.1. Moreover, one NCARE staff was trained on aquaponics in Wageningen University (Netherlands).

35. In terms of awareness raising (Output 2.2), the project has designed and published awareness materials (brochure, poster and booklet) about the fertigation equipment. The completion of all planned awareness raising activities – publication of awareness materials for all the different equipment and implementation of an awareness campaign through public media, seminars, workshops, and learning tours - is not foreseen within the three-month extension of the project due to the fact that as of March 31st (initial project completion date) these services had not been contracted to any organization.

B. Attainment of Project Objective and Outcomes

Overall Rating: Moderately Unsatisfactory (MU: 3)

B1. Relevance

36. The project design is consistent with the focal areas and operational program strategies of the SCCF. It is also well aligned and contribute to the priorities of the sectorial strategies and policies of the Government (see section F further below) in the environmental, agriculture, and water management sectors, such as the Third National Communication (TNC) to the UNFCCC, the National Strategy for Agriculture Development (NSAD), the Poverty Reduction Strategy (PRS), the aligned National Action Plan (NAP) to Combat Desertification in Jordan, and the Water Strategy, among others. Throughout the project life, NCARE interacted with decision makers at the MoA and with the Agriculture Credit Corporation (ACC) to identify opportunities to facilitate farmers' access to the climate-resilient technologies and future upscaling.

37. Seven years after project design (2012-2018), Jordan has made significant progress in supporting climate-resilient technologies to enhance the agriculture sector through an efficient use of the natural resources. The ITPP project has facilitated this process to a certain extent. More specifically, during the project life (2012-2018), ACC signed an official letter with NCARE to support farmers' investments in fertigation equipment through loans with no interest, and 360 farmers benefited for a total amount exceeding JD 4 million. In December 2016, the Ministry of Agriculture announced that loans with no interest would be provided to farmers willing to practice hydroponics. In December 2017, ACC allocated 20 million JD interest free to support solar pumping projects. The Secretary General of Ministry of Water & Irrigation has declared in March 2018 that desalination is the strategic solution to face the water challenges in Jordan, and the EU will support desalination with solar energy within its green energy vision for Jordan with € 90 million. However, the delivering process at design was not fully appropriate, project design faced problems regarding the inadequacy of the scale and cost of the proposed technologies to the target beneficiaries.

38. NCARE is collaborating with other actors in the region to develop research on new technologies that help reduce groundwater abstraction, making an efficient use of saline water and increasing agriculture yields and farmers' wellbeing. For instance, the joint Jordan-Palestine Authority-Israel AGRISOL project (2015-2016) implemented by NCARE, the University of Haifa, the German Jordanian University, the Central and Northern Arava Research and Development, the Env. & Protection Research Institute of Gaza, and the Ben Gurion University, aimed to develop a more resource-efficient and cost-effective alternative to brackish water irrigation by designing, developing and testing an innovative desalination system for application at farm-scale to the production of irrigation water and high-value crops in semi-arid environments.

39. NCARE has been monitoring the interventions of other partners using the same technologies promoted by the project, such as the WFP support to pilot hydroponic projects in the Azraq Syrian refugee camp, and the US Embassy support to hydroponic practices in Jordan. However, in the framework of ITPP, NCARE did not collaborate with any partner involved in the testing and upscaling of climate-resilient technologies.

Rating: Moderately Unsatisfactory (S: 3)

B2. Effectiveness

40. So far, the project's outcomes have been achieved only to a very limited extent. As previously mentioned (section A), only quantitative results were obtained in Output 1.1 (equipment purchasing and installation), no action occurred under Output 1.2, and very little was done under Outputs 2.1 and 2.2.

41. The GEF activities have suffered mild to considerable delays in the case of Output 1.1, due to a very slow project start-up and to significant management and implementation problems (see section B3, further below). The most advanced parts of Output 1.1 were: (i) innovation in technology development, and (ii) the purchasing and installation of new equipment in the farmland plots of project beneficiaries. However, in most cases there was no time to obtain quantitative results because farmers did not have enough time to use the installed equipment at least during a productive cycle. In terms of innovation and technology development, the project achieved significant results. Some constructors did extraordinary R&D work to improve the design of the solar desalination system and the hydroponic system (see Section D for further details).

42. The very late procurement and installation of most of the equipment – significant part of it will be installed only during the extension period of 3 months ending June 30 – have prevented the organization of the training activities targeting farmers, trainers/extension agents (Output 2.1). The justification provided by the project team is that the training should have begun after the installation of the different equipment, which would have been used to show its usefulness and functioning. Only 2 training sessions were organized for 20 farmers benefiting from the installation of fertigation equipment by March 2017. Most of the activities of Output 2.2 were not carried out for the same reason. Only awareness materials about fertigation (leaflet, poster and booklet) were designed and published, and no activity related to the awareness raising campaign was implemented. Activities of Output 1.2 were not implemented.

43. Based on the theory of change, there is little likelihood that the GEF can still catch up to achieve the project outcomes and objective. Looking at the ITTP Project Theory of

Change (Figure 2), most of the causal package of activities plus assumptions that together are expected to contribute to the intended results did not occur. Table 1 provides information about the ITPP project causal link assumptions and associated risks.

Table 1. Analysis of ITPP Project Causal Link Assumptions and risks

Causal link assumptions	Degree of control	Supporting actions needed beyond core activities	Associated risk
Reach assumptions			
Target PSHF – especially WHH - reached	High	Intervention needs to know its target population and how to reach them.	**High** A wrong approach that has prioritized the technological scale against the target population group has prevented PSHF from being involved in the majority of cases.
Suitable technologies available	High	Intervention needs to assess and select technologies that suit PSHF needs.	**High** In spite of the significant efforts made by the project to innovate in the development of equipment, the technological scale was above the purchasing power of PSHF.
Enabling conditions supporting PSHF' shift towards C-resilient agriculture created (supportive policies and financial mechanisms; critical mass of skill trainers; R&D on innovative suitable technologies)	Medium	Intervention needs to assess gaps and needs in terms of policies and financial mechanisms, capacities, and technology development, and plan for actions to overcome constraints.	**Medium** No action regarding supportive policies and capacity development of trainers/extension agents occurred. Partly thanks to the project, financial mechanisms were established by ACC and the MoA to facilitate "no interest" credits to farmers willing to invest in certain technologies (fertigation, solar pumping, hydroponics). The project supported R&D on innovative equipment, although the technological scale was beyond the purchasing power of PSHF.
Capacity change assumptions			
Climate-adaptation benefits understood by PSHF	High	Requires good understanding of adaptation knowledge, capacity and needs of PSHF (with disaggregated analysis) and planning of awareness raising.	**High** Target unreached. Due to project delays, the equipment installed, in its majority, has not been used, so its benefits have not been demonstrated. Moreover, no awareness raising activities were organized.
Cost effectiveness of new technologies understood and relevant	High	Requires good understanding of adaptation knowledge, capacity and needs of PSHF (with disaggregated analysis) and planning of awareness raising.	**High** Target unreached. Due to project delays, the equipment installed, in its majority, has not been used, so its benefits have not been demonstrated. Moreover, no awareness raising activities were organized.
Behavioural change assumptions			
PSHF want to improve the environmental and productive	Medium		**High** Target unreached. Due to project delays, the equipment installed, in its majority, has not been used,

conditions of their farmlands			so its benefits have not been demonstrated. Moreover, no awareness raising activities were organized.
PSHF willing to invest in C-resilient technologies	Low		**High** Target unreached. Due to project delays, the equipment installed, in its majority, has not been yet used, so its benefits have not been demonstrated. Moreover, no awareness raising activities were organized. No policy development/improvement occurred. Financial mechanism support pro-poor investments developed.
Direct benefits assumptions			
C-resilient technologies prove effective	High		**High** Due to project delays, the equipment installed, in its majority, has not yet been used, so its benefits have not been demonstrated. Moreover, no awareness raising activities were organized.
PSHF are better suited to sustained production under CC impacts	Medium		**High** Target unreached. Due to project delays, the equipment installed, in its majority, has not been used yet, so its benefits have not been demonstrated. Moreover, no awareness raising activities and ToT programmes were organized.
Well-being change assumptions			
PSHF have better food security	Low		**High** Target unreached. Poor project results prevent long-term impact beyond project life.
PSHF have reduced poverty	Low		**High** Target unreached. Poor project results prevent long-term impact beyond project life.

44. The casual pathway of the project did not yield the intended project results and impacts. The main constraint was the risk associated to the "reach assumptions", as the reach group was not precisely the right group, that is PSHF. The project followed this approach: conditioning the selection of beneficiaries to the selected equipment instead of conditioning the selection of equipment to the targeted poor population. As a result, the technological scale of the selected equipment was unsuitable to PSHF. The high costs of most of the proposed technologies and the need to co-finance 25 percent prevented many PSHF to be targeted. The project activities aiming to create enabling conditions – supportive policies and financial mechanisms, and critical mass of skilled trainers/extension agents – did not occur, which further reduced the capacity of the project to achieve the expected results. A more or less external influence with a positive effect on the upscaling of the project interventions was the establishment of "no interest" credit lines by ACC to support farmers in the acquisition of fertigation, solar pumping and hydroponic equipment.

45. The second main constraint is related to the inability of the project to provide concrete results that demonstrate the environmental and socio-economic benefits of the installed equipment. Project delays have prevented farmers from using the equipment, at least throughout a whole production cycle, which has increased the risks associated with the "behavioural change assumptions" and "direct benefits assumptions". Moreover, the non-implementation of the foreseen training activities

targeting farmers and trainers/extension agents, has increased the risks associated with the capacity change assumptions.

46. One particular future challenge that deserves attention is the impact that the investments in the project areas will have on the adaptive capacity of the project beneficiaries to improve agriculture production while making an efficient use of water, energy, soil and nutrients. While it was easy to hit the quantitative target of 330 hectares of productive farmland where climate-resilient technologies were installed, achieving their full potential benefits (e.g. an economic advantage, greater water-use efficiency and wider environmental benefits) will require that NCARE experts and extension agents provide a meticulous and skilled technical support continued over time. Farmers generally lack adequate means and incentives to know whether the irrigation practices implemented with the installed equipment will have adequate water-use efficiency, and thus on-farm water efficient levels. In the absence of appropriate technical advice, incorrectly applied new irrigation technologies can cause losses arising on investments made by farmers, decreasing farmers' interest to adopt these technologies and thereby the overall sustainability.

47. In this sense, the evaluation team recommends that NCARE and IFAD in current and future joint projects overcome major constraints that have prevented ITPP to achieve the expected results and impacts, through the following measures:

Table 2. Recommendations to overcome major constraints and options for their implementation.

Recommendation	Option for its implementation
1. Build a critical mass of extension and research experts with the necessary resources, knowledge, and operational capacity to guide farmers through the effective implementation of the new technologies – e.g. regarding crop suitability, crops' water requirements, irrigation scheduling techniques, crops' yield response to different irrigation management strategies, environmentally-sound means to lower resource burdens from inputs and pollutants.	• IFAD REGEP project, executed by the implementing agency JEDCO in close partnership with NCARE and other private and public partners, will keep financing trials and demonstrations of new technologies building on ITPP experience. REGEP should support the necessary capacity development needs of NCARE staff and other extension/research agents – including WUAs - to guide farmers in the effective implementation of the new technologies. This is an opportunity to bring international expertise – which was planned under ITPP – to enrich national knowledge on new technologies. • Enhancing the technical and institutional capacity of WUAs for the effective management of the water supply chain and efficient use of irrigation water helps prevent distancing individual farmers' practices (e.g. higher pressure on underground water pumping) from the WUA responsibilities and avoid that the adoption of efficient irrigation technologies leads to an increase in the irrational use of water. • Once trained, NCARE's personnel will be able to fulfil its mandate to provide regular support to farmers in the selection, installation and management of agriculture production equipment.
2. Design an effective M&E plan and undertake accurate and regular data gathering from the	• NCARE project team – M&E Officer and the coordinators of the different technologies made a special effort during the 3 months extension

project beneficiaries in the demonstration farmland plots over the next few years for achieving better understanding of the irrigation management practices followed by farmers and the resulting environmental and socio-economic benefits.	period, to develop and implement a M&E plan with adequate indicators, means of verification and protocols for the collection of field data. It is critical to ensure continuity in the collection of M&E data as part of NCARE's mandate over the next years. • The IFAD REGEP project provides the opportunity to consolidate ITPP field demonstration interventions and compare M&E results with REGEP trials and demonstrations.
3. A knowledge-exchange system involving national and international partners engaged in efficient irrigation technologies in Jordan - with special focus on PSHF and WHH - should be promoted by NCARE and IFAD, in a more or less formal way, so farmers can achieve the full potential benefits of the technological investment already adopted.	• In the framework of REGEP project, NCARE and IFAD should seek collaboration with other national and international organizations supporting the transfer of efficient irrigation technologies to PSHF and WHH, such as WFP, GIZ and USAID, as well as WUAs. • The farmers participating in the NCARE FFS under the REGEP include members of WUAs in the Jordan Valley, which can open up important opportunities for collaboration and knowledge-exchange.
4. Lessons learned from field demonstration results should be drawn, to feed position papers that support lobby and advocacy actions aiming to ensure a supportive policy and institutional framework for the adoption and dissemination of efficient irrigation systems and technologies.	• Given the numerous difficulties behind water management (e.g. institutional and governance complexities in the distribution and pricing of water resources; farmers' interest to increase groundwater pumping, thus abstracting more water from aquifers while distancing their individual practices from any WUA responsibility), current (REGEP) and future joint IFAD/NCARE projects should prioritize knowledge management actions, with a thorough analysis of the results to extract good practices and prepare policy briefs to advocate for policy and institutional improvements and financial mechanisms that facilitate the adoption and effective use of climate-resilient technologies by PSHF. • REGEP Component 1 includes a sub-component (Knowledge Management, Learning and Policy Support) with the objective to extract lessons learned and best practices to feed national policy development, and Component 1 includes a sub-component (Management and Rural Finance Policy Support) aiming to increase access to a range of appropriate financial products for the target group (rural households below the poverty line, and vulnerable rural households above the poverty who are at high risk of falling into poverty).

48. The IFAD REGEP project, executed by the implementing agency JEDCO in close partnership with NCARE and other private and public partners, represents a good opportunity to complement and scale-up ITPP activities after the project closure, therefore generating concrete results in terms of socio-economic and environmental benefits produced by the use of the installed equipment, capacity development of farmers and trainers (NCARE and extension/research agents), and advocacy actions

to improve policies and financial products for PSHF. REGEP will keep financing trials and demonstrations of new technologies building on ITPP experience and will establish a fund to part-finance investments required by farmers, farmers associations, processors and exporters to obtain accreditation and to upgrade key aspects of their businesses.

49. It is crucial that REGEP help empower and train NCARE experts and other extension agents as trainers on the technologies that the ITPP has developed and disseminated, so they can fulfil the task to support beneficiaries in their effective management, solve problems, and ensure the expected results in terms of enhanced production (higher quality products), sustainable use of water, energy, soil and nutrients, and improved livelihoods. Once the work in the field takes off and produces concrete results, it will be important to ensure that the outputs are used to inform/influence the policy processes. In this sense, REGEP project includes policy and advocacy work to create effective incentives for farmers that facilitate access to climate-resilient technologies.

50. Project visibility is still inadequate, mainly because most technologies (except for one type of fertigation system) were not implemented, and because of the failed delivery of the planned policy and advocacy, capacity development, and awareness raising campaign.

Rating: Moderately Unsatisfactory (MU: 3)

B3. Efficiency

51. The project suffered serious delays due to several reasons: (i) project re-design with amendments agreed with GEF in regards to the planned technologies (the project became effective in January 2014 with expected completion by March 2018); (ii) delays in the start-up due to late establishment of PMU at NCARE; (iii) management problems that led to the replacement of the project director; (iv) weak administrative capacity with respect to fiduciary related issues; (v) improper preparation of bidding documents and management of contracts; (vi) no recruitment of external technical assistance; (vii) lack of a regular reporting process; (viii) the excessively long consultation with farmers on the adoption of proper technologies led to the exclusion of 2 of the 8 pre-selected technologies. For instance, greywater technology was supposed to make use of greywater from the farms, but in the case of isolated farms, there is not enough greywater generated for the technology to be really efficient. Also, buried diffusers were discarded due to farmers' distrust about having sub-soil irrigation systems which do not allow them to observe any potential problem and its location; (ix) the request to the applicants to provide in cash matching contribution (initially fixed at 50 percent and later reduced to 25 percent), resulting in a very late selection of beneficiaries; and (x) delays from the hired contractors to design innovative modifications to improve technologies, and deliver the equipment.

52. The project Financial Management suffered for lack of dedicated financial staff who are aware of IFAD requirements. Although the Ministry of Finance has a Financial Management System which is not fully operational, it is not used for projects which require specific reporting from Donors. ITPP transactions are recorded manually; this constitutes a fiduciary high risk element as it can lead to data modification and alteration. The review of bank accounts and reconciliations revealed nothing unusual and a review of statement of expenditure items noted that all reviewed expenditures were fully supported. The quality of Financial Management can be rated as moderately unsatisfactory. Contributions from other co-financiers such as Government of Jordan, NCARE, in-kind contributions from Farmers and contributions from the University of Jordan were not disclosed in 2016 financial statements and this

led the Auditors to qualify them. The mission recommends that the contributions be disclosed in the 2017 and 2018 financial statements.

53. The Auditor report for financial year 2018 – covering the period upto project completion date of 3o June 2018 has been received and was rated as satisfactory.

54. Until 2016, only 7.4% of the GEF budget (USD 148,036.81) was spent, of which 41.6% in equipment, 38.5% in project staff, 8.4% in training and publications, 8.1% in national technical assistance, and 3.4% in studies. Improvements were registered in early 2017, when the new project director took position and provided better guidance to the project implementation team, while significant efforts were done to train the project staff and accelerate the purchasing and installation of equipment. At that time, the MTR (March 2017) informed that "the project is now ready to fully develop its outreaching strategy", including the purchasing and installation of all the equipment, the implementation of training on the different technologies, the organization of workshops and seminars to disseminate the results with the beneficiaries and partner agencies, and the designing, publication and dissemination of awareness materials. However, no training (Output 2.1) and awareness raising activities (Output 2.2) were implemented or contracted before the project closure, and only materials on fertigation were published.

55. By the project previously scheduled completion date of 31 March 2018, 32.8% of the GEF budget (USD 655,862.32) was spent and 4.09% (USD 789,129.50) more was contracted and committed to be spent between first April and 30 September 2018, which will represent a final total expenditure of the GEF budget of 77.89% (USD 1,557,834.79). The expenditure by category is as shown in the table 3 below.

Table 3. GEF Budget (USD) expenditures at project closure

Items	Initial allocation	Revised allocation	Expenditures as of project closure date	Expenditure %	Variance (Revised allocation – Expenditures)
Studies	30,200	30,000	4,992.95	16.64%	25,007.05
Technical Assistance	1,521,600	210,000	45,468.08	21.65%	164,531.92
Training & Workshops and publication	114,000	30,000	28,073.34	93.58%	1,926.66
Vehicles and Equipment	35,000	1,640,000	1,359,779.46	82.91%	280,220.53
Consultants	9,200	0	-	0	0
Project staff	90,000	90,000	119,520.96	132.80%	(29,520.96)
Unallocated	20,0000			-	-
Total	**2,000,000**	**2,000,000**	**1,557,834.79**	**77.89%**	**442,165.21**

56. The accumulated delays affected the expenditure and consequently on the achievement of the project results. Under-expenditure was particularly important on technical assistance and studies. At the time of the mission, because most equipment was still being installed, the socio-economic and environmental impact could not be assessed. Besides, no data have been made available by NCARE to the TET about results from the 20 beneficiaries who already installed and used fertigation equipment.

57. The project did little effort to establish collaboration frameworks with other partners and stakeholders active in the same domain, whose experience could have contributed to the ITPP training awareness activities, through the organization of

learning tours and the inclusion of their best practices in workshops and seminars. This seriously harmed the efficiency of the GEF project.

58. In terms of co-financing, the project contributed with 88.3% of the expected contribution at project design. The expected co-financers and proportional amounts at project design largely do not match with the real ones after project completion. The Government only contributed with customs and VAT exemptions for a total amount of USD 374,329.20 (27.5% of the expected contribution), and NCARE contributed with human resources, office space and staff transportation to the field at a cost of USD 856,508.45 (26.9% of the expected contribution). The University of Jordan did not provide the expected contribution, as this consisted of the coverage of human resources and organization of the training courses and workshops that had not yet taken place at project closure.

Table 4. Materialization of co-financing (USD x 1000)

		The Government	NCARE	Beneficiaries	Jordan University	Total
Expected at Project Design	In-kind	1,362.5	3,185	1,601.3	564.7	6,713.5
	Cash	-	-	-	-	-
Reported at project closure	In-kind	374.3	856.5	4,394.4	-	5,625.2
	Cash	-	-	301.9	-	301.9
Percentage of actual co-funding against expected amount		27.5	38.6	293.3	0	88.3
Administered by the project management		-	856.5	-	-	558.9

59. In the case of the project beneficiaries, the real contribution largely exceeded the expected amount at project design (293.3%). The in-kind contribution was estimated on the basis of different items: (i) labour cost; (ii) land rental cost; (iii) warehouse rental cost; (iv) cost of the existing irrigation and water pumping equipment in the farmland plots; (v) cost of the seedlings; (vi) cost of fences; (vii) cost of agrochemicals used; (viii) transportation cost; (ix) electricity cost; (x) irrigation water cost. The cash-contribution corresponded to 25% of the cost of the equipment purchased.

60. The only co-financing that was administered by the executing agency (NCARE) was the human resources and office space that the organization put at disposal of the project together with field transportation cost. The type of in-kind contribution provided by the project beneficiaries was administered by themselves, as part of their operating expenses and land renting cost.

61. The mission was not able to analyse the cost-benefit of the different technologies due to the lack of results derived from their use in the majority of cases. Also, the mission was not able to ascertain that the *fit-for-purpose* principle had been achieved because NCARE did not carry out any analysis of: context and risk, value and complexity of technologies that have been procured and provided to farmers.

62. Meanwhile, and following the GEF guidelines in conducting terminal evaluation, the Economic and Financial Analysis Expert (Evaluation Team) undertook an economic and financial analysis (EFA) to help determine preliminary results and assess the

short- to long-term benefits of the project investments. The TET, with the support of NCARE staff and the interviewed beneficiaries, gathered information about baseline conditions and results from the use of the fertigation equipment in a number of farmland plots. For the other equipment, the TET gathered information about baseline conditions and expected improvements from the use of the new equipment based on other experiences in Jordan and bibliographic data. The EFA provides evidence regarding the expected long-term benefits (10 years' time) for farmers from the use of the project investments (see Annex G).

Rating: Unsatisfactory (U: 2)

C. Sustainability of Project Outcomes

Overall Rating: Moderately Unsatisfactory (MU: 3.4)

C1. Institutional

63. ITPP Output 1.2 project was dedicated to identifying policy needs and financing mechanisms to support technology adoption, and Outcome 2 to supporting, among others, governmental institutions at both national and local levels and increasing their capacity and awareness about the climate adaptation value of the proposed technologies.

64. Institutional sustainability is being pursued through a mixed approach including the organization of training and learning visits to successful case studies and best practices abroad (Output 2.1), the development of technical assessments to inform decision making (Output 1.1), the organization of national-wide and local awareness campaigns using public media, workshops, seminars and study tours, and the support to the analysis (Output 2.2), and the improvement and amendment of key laws and regulations (Output 1.2). In spite of all these foreseen actions, the road to achieving a conducive institutional and governance framework capable to sustain project outcomes and benefits still looks long and uphill. The accumulated delays seriously impacted on the achievement of the project results under Outcomes 1 and 2, preventing the project team to inform decision-makers about the demonstrated benefits of the supported technologies, organize training with the support of the field demonstration sites, and undertake the foreseen local and national-wide campaigns.

65. However, NCARE has interacted with ACC and actively sought the creation of financing opportunities for the replicability and upscaling of the project technologies that, despite not having produced results in the scope of the project, demonstrated their effectiveness in terms of climate change adaptation in other countries of the Mediterranean region. This has yielded the important results already mentioned in section D2. Moreover, the long-term engagement of IFAD in Jordan is a reassuring element towards the achievement of stronger institutional capacity and more informed decision-making processes.

66. The project has enhanced the capacity of NCARE to fulfil its mandate to provide support to farmers in the selection, installation and management of agriculture production equipment, and thereby contribute to increase their adaptive capacity to climate change.

Rating: Moderately Satisfactory (MS: 4)

C2. Environmental

67. Jordan is among the poorest countries in the world on the basis of per capita water availability, with only 147 m3 per person per year (2010), far below the international water poverty line of 500 m3[2]. Currently total uses exceed the renewable supply, which is fixed at less than 130 m3 of renewable water resources per person per year. Hence, the main environmental risk that can undermine success and sustainability of project outcomes is the fast degradation of soil and water resources, due to the heavy abstraction of groundwater and maladaptive practices in agriculture.

68. Like all arid lands, Jordan is extremely sensitive to the impact of climate change. According to the TNC (2014), the overall CC vulnerability assessment for the water sector in Jordan falls in the categories of "high" and "very high". The impact of reduced precipitation, increased temperatures, drought/dry days and evaporation, will result in less recharge and therefore less replenishment of surface water and groundwater reserves, salinization, surface water contamination, soil erosion, desertification, disappearance of small springs and discharge reduction of major springs. The TNC classifies as "moderate" and "high" the overall CC vulnerability for the agriculture sector in Jordan. The forecasted increased temperature, decreased precipitation, increased frequency and intensity of extreme weather events all will negatively impact crop production.

69. Preliminary findings from the use of fertigation and from the use of the same technologies in other arid regions, allows us to predict a significantly positive effect in terms of environmental benefits. These include: (i) more efficient use of water and significant reduction in the amount needed; (ii) the use of saline and residual water allow the allocation of better-quality freshwater resources to human consumption; (iii) the reduction in the amount of agrochemicals has a positive impact on soil and water pollution, and on the production expenses by farmers; (iii) the replacement of diesel and electricity grid by solar energy entails a reduction of energy-caused pollution, a more widespread access to energy, and reduction of farmers' production costs; and (iv) the adoption of hydroponic techniques leads to reduced soil degradation caused by salinization.

70. As mentioned in Section A, the TET could draw some conclusions from interviews with some beneficiaries who used the fertigation equipment, showing significant environmental and socio-economic benefits: (i) farmers saved more than half of the amount of fertilizers previously used, and were able to have a uniform distribution of nutrients that helped improve the quality of the product; (ii) yield increased between 28 percent and 62 percent; and (iii) energy cost was reduced by 67 percent.

71. To this end, the TER recommends that IFAD supports the Government of Jordan to secure additional climate finance - mainly IFAD/ASAP, GEF SCCF and GCF- for the development of new initiatives that can build on the work of NCARE to increase the resilience of the society and agroecosystems to climate change and reduce the risk of future disasters. The IFAD/REGEP project will also give continuity to the field demonstration of the technologies supported by the project, contributing to the delivery of concrete results on their efficiency in the use of resources and production improvements, and thus demonstrating their environmental sustainability.

Rating: Moderately Satisfactory (MS:4)

C3. Social

72. Social sustainability is being pursued through a mixed approach including the implementation and expansion of modern irrigation systems and water use

[2] Al-Bakri, J.T. et al (2013). Impact of climate and land use changes on water and food security in Jordan: implications for transcending "the tragedy of the commons". *Sustainability* 2013, *5*, 724-748; doi:10.3390/su5020724

technologies (Outcome 1) and the enhancement of farmers' capacity and awareness on the climate change adaptation potential of these technologies (Outcome 2). The accumulated delays seriously impacted on the achievement of the project results under Outcomes 1 and 2, preventing the beneficiaries from demonstrating the socio-economic benefits of the supported technologies, and curtailing the training planned to ensure their effective use and maintenance. As previously mentioned, the enhancement of NCARE's capacity to fulfil its mandate to support farmers in the selection, installation and management of agriculture production equipment, will help overcome this gap, thereby contributing to the socio-economic sustainability beyond project completion.

73. A shortfall of the project has been its limited ability to reach the original target group – very poor smallholder farmers – which resulted in targeting some medium farmers, due to the cost of the technology and the need for co-financing on behalf of the farmers. Some of the farmers interviewed by the TET had medium means – enough to access new technologies and make them less vulnerable to climate change. Indeed, the technological approach pursued by the project has allowed the development of innovations that will have a high impact on the country's agricultural productive capacity, but which will be inaccessible for poor farmers in the short and medium term. In order to reach the SCCF climate change adaptation objective "to meet human development needs of the world's poor", it would probably had been better to develop innovations on a smaller scale. Such approach would have allowed the original target group to access new technologies with lower costs, and meet in-kind co-financing, e.g. through the provision of the workforce needed for their installation.

Rating: Moderatley Unsatisfactory (MU: 3)

C4. Technical

74. The approaches promoted by the project are viable from a technical point of view and have incorporated innovation through R&D implemented by some contractors (e.g. solar desalination system and hydroponics). The project has contributed to a very relevant technological development at national level, with great perspectives of being applied by other farmers and of achieving significant improvements for a competitive and adaptive agricultural production, with an efficient use of resources and savings in production.

75. The farmers who have benefited from these technologies received the necessary technical capacities from contractors to operate them. However, the fact that they have not yet been able to use them for agricultural production poses a challenge for these farmers once the project is completed. It is expected that NCARE and the same contractors will continue to support them, at least during the first production cycle after the closure of the project.

Rating: Moderately Satisfactory (MS:4)

D. Catalytic Role and Replication

Overall Rating: Moderately satisfactory (MS: 4)

76. The ITPP GEF project included many elements of innovation that are potentially suitable for upscaling and replication and that have the potential to contribute to changes in policy, institutional behaviour, or even economic and investment patterns. Two very innovative areas of work with a high potential for catalytic effect are related to modifications of the hydroponic equipment (e.g. increase the height of the

greenhouse by 0.7 m and change the position of the windows for a better ventilation and less time to get rid of hot air; substitute all the welding joints by a special galvanized coupling in thickness of 5mm to connect the joint parts of the greenhouse with galvanized screws and bolts) and the improvements of the solar water desalination system (e.g. solar desalination improvement with a less solar panels and minimal number or absence of batteries to help reduce equipment and maintenance costs, long-lasting aluminium structure resistant to strong winds up to 145 km/hour, and improved desalination equipment providing higher water purity and higher quantities per hour, that makes the system one of the largest solar desalination in Jordan).

77. Because the project has suffered considerable delays and most activities had not produced the expected results by the scheduled end of the work, it was difficult for the TER to evaluate the catalytic role of ITPP and the impact of its innovative dimension. The project has not had the opportunity to yield concrete results from the investments made through Outcome 1 and to demonstrate their adaptive capacity and replication potential beyond the project life span. However, it is hoped that if and once results are obtained in the forthcoming years, NCARE will make sure that the information and lessons learned are transferred to more and more farmers and to decision-makers, thereby contributing to the establishment of financing mechanisms to support the future adoption of the technology at the national level.

78. On the institutional and policy side, despite the lack of delivery of Output 1.2 and Output 2.1, the positive interaction between NCARE, ACC and decision makers at the MoA, has resulted in new funding opportunities for farmers to invest and upscale the adoption of the proposed climate-resilient technologies.

79. Overall, the GEF project had a "catalytic role", that remains however difficult to assess. However, high replication potential cannot reach the target group - PSHF - due to the high cost of the proposed technologies, but is accessible to farmers of medium to high purchasing power. The fulfilment of such potential remains one of the main challenges to be faced by NCARE.

E. Stakeholders' Participation and Public Awareness

Overall Rating: Moderately Unsatisfactory (MU: 3)

E1. Stakeholders' Participation

80. The project design identified a wide array of stakeholders concerned with the purchasing and use of efficient irrigation technologies from the administration (MoP, MoWI, MoA, MPW, MoE), academic/research institutions (University of Jordan), private sector (ACC, WUAs), and international development agencies (USAID, WFP). Most of these actors did play a role in the project, to a greater or lesser extent, by providing capacity development services (e.g. University of Jordan), opportunities for exchanges and learning visits (e.g. project sites from USAID and WFP projects), policy assessment (e.g. MoA, MoWI, MoE), and technical support and advise.

81. The MTR informed that: (i) In the specific case of hydroponics "cooperation is expected with USAID, Jordan University (JU), private sector, MoA, MoWI, and Techno-University after the implementation of the technology"; (ii) in the case of water desalination, "a workshop is planned with decision makers (JVA, MoWI, universities) to increase the interest and the adoption of this technology by other farmers"; (iii) "the project is planning to contact JU to support the training and participate to the workshops as moderator"; and (iv) "Workshops should be organized with the participation of all beneficiaries of the project, interested farmers, policy

makers (MoA, MoF, MoWI, JVA), universities and the Civil Society". However, no major contacts to promote cooperation have so far occurred with most of these actors.

82. In the case of the University of Jordan, which had been included as a major partner in the approved project document with an expected in-kind contribution of USD 564,700 mainly for the organization of training and workshops, its participation was limited to the selection of new technologies in the redesign of the project. The significant implementation delays have prevented the organization of training and workshops, which would have been the main contribution and assignment of this institution.

83. NCARE has interacted with ACC, within and outside ITPP framework, to promote the establishment of interest free credits to encourage and facilitate the acquisition of climate-resilient agriculture production equipment by farmers. As previously mentioned, ACC developed interest free credits for fertigation, solar pumping and hydroponics, creating opportunities for the upscaling of these equipment.

84. The project Steering Committee (SC), that included one member from each of these organization - MoP, JU, MoWI, MoA, WUA, ACC – as well as 3 NCARE members (Project Director, Finance Officer, and NCARE Director General) met only once at the beginning of the project, to agree on to establishment of cash contribution (25%) for the project beneficiaries. The Technical Support and Advisory Team (TSAT) formed by the same 3 NCARE members as in the SC, and one member from each of the following organization – Audit Bureau, MoPW, General Supplies Department – only provided support in terms of procurement.

85. All the above indicate that the project could have been more effective in establishing collaborations and benefiting from the participation of key actors in the knowledge sharing, project implementation, and creation of political opportunities for the dissemination of the promoted technologies.

86. According to the M&E report (March 2017) farmers were not always consulted and involved in the selection and monitoring of the service providers for the purchasing and installation of the equipment: (i) only fertigation contractors were evaluated very positively except in some cases due to installation delays; (ii) Solar pumping had bad evaluation in 62 percent of cases, hydroponics in 50 percent of cases and aquaponics in 100 percent of cases, mainly due to delays in the installation. This contributed to a perception of low quality of the service and to a poor interaction between both actors. The opinion of farmers regarding the service providers is shown in the below table:

Table 5. Opinion of the beneficiaries on responsiveness of service providers.

Activity	**Farmer opinion (1 to 5, 5 highest positive score)**
Fertigation	4
Solar Pumps	3
Hydroponics	2
Aquaponics	2
Desalination	NA
Automated Irrigation System	NA

87. According to the M&E report, the majority of project beneficiaries had a very good opinion regarding collaboration, problem solving and assistance from NCARE staff in the purchasing and installation of the different technologies.

88. Because no M&E report was produced after March 2017, no further information is available regarding opinions from most beneficiaries. The 11 farmers met by the TET provided very positive feedback on the quality and quantity of NCARE's support in the

process of purchasing and installing the equipment, and in most cases the high quality of the contractors' work was highlighted - except for the solar pumping that has accumulated huge delays (mainly because of delays in importing invertors from China). It should be noted that in some cases the contractors developed innovative systems with significant improvements (see Section D), which will be used for the first time by project beneficiaries. Some beneficiaries mentioned that this is the first time they are exposed to a development project that brings concrete improvements of production technologies, making them accessible to farmers to improve production while coping with climate-change impacts.

Rating: Moderately Unsatisfactory (MU: 3)

E2. Poverty focus

89. According to the redesigned document approved by the GEF, the ITPP project focuses on promoting a pro-poor and community-based approach to technology transfer. The project is meant to target poor farmers beneficiaries and the project redesign approved by the GEF included 6 criteria for the selection of sites, from which 2 criteria made reference to the improvement of livelihoods of poor communities:

Table 6. Criteria for the selection of sites that refer to poor communities

Small Holder farmer's availability/willingess to participate	IFAD's mandate is centered on the need to support **the livelihood of poorer communities**. Therefore, areas where small farmers are available and could potentially be available to join the project
Potential to turn non-utlilized smallholder land to productive land	The possibility of turning smallholder non-productive land into productive land without putting pressure on the existing water regime is an attractive issue to **improving livelihood of poor communities** in Jordan.

90. Although the design of the project gave priority to the poorest farmers, different reasons eventually led to a selection of farmers with a medium purchasing power. The TET surveyed approximately 10 percent of the stated beneficiaries. Of these, 62 percent had a medium purchasing. The decision to ask beneficiaries for a 25 percent (initially 50 percent) cash contribution to match the total cost of the equipment has been used to justify the fact that only farmers with a medium purchasing level showed interest in acquiring the equipment. However, if the same type of equipment had been adopted at a smaller scale – as for instance the small scale hydroponic equipment used by the WFP in their pilot project to expand work opportunities in Azraq refugee camp - the much lower cost would have made the investment attractive and accessible for smallholder poor farmers.

Rating: Moderately Unsatisfactory (MU: 3)

E3. Gender Concerns

91. The TET could not find any mention to a proper gender focus and to women-related issues in the whole project document. This probably means that a gender analysis was not undertaken at project design, and that gender concerns were not properly addressed during implementation. When discussing with the project team, it became clear than the poorest farmers are women-headed households, mainly widows or women who live alone with their children for different reasons. According to the project team, the difficulty of the project to target women has to do with the decision to request a 25 percent cash contribution. However, as previously mentioned, the same type of equipment at a smaller scale would have made the investment accessible to poor women-headed households. As a consequence, the project has totally failed to benefit the poorest population group, mainly women, and in fact

followed an approach opposite to what it should have been: conditioning the selection of beneficiaries to the selected equipment instead of conditioning the selection of equipment to the targeted poor population.

92. Only 8 out of 110 beneficiaries were women (7.3%). In terms of project staff, 2 NCARE lead experts (the experts in charge of automated irrigation and solar water desalination technologies) out of 6 were women. According to the MTR, the project trainings and workshops are expected to have great impact on women as in 2015, the Jordan Engineers Association stated that the number of women engineers in Jordan exceeded men by 26 percent. However, the project ended with almost no training delivered, meaning that this gender objective was not fulfilled, either.

Rating: Unsatisfactory (U: 2)

E4. Public Awareness

93. The public awareness raising activities within the project are related to the design and implementation of an awareness campaign (Output 2.2), including the publication of awareness materials and the organization of public media, seminars, workshops, and study tours. As previously mentioned, project delays and management constraints have prevented the implementation of the activities necessary to complete output 2.2. Only fertigation materials were designed and published (brochure, poster and booklet), and no awareness raising events were organized at the closure of the project. The project extension of 3 months does not include awareness raising actions and the completion of the missing publications as they were not yet contracted by 31st March 2018.

Rating: Unsatisfactory (U: 2)

F. Country Ownership and Driveness

Overall Rating: Moderately Satisfactory (S: 4)

94. The rationale, approach, and objectives of the GEF were consistent with the priorities outlined in the strategies and action plans reviewed during the desktop research phase, namely:

95. Jordan Poverty Reduction Strategy (PRS) 2013-2020. Strategic Pillar 4 "Pro-poor Agriculture and Environment" focuses on rural development and includes food and agricultural production as a source of livelihood, employment and income generation for the rural poor, particular in rural pockets of poverty, food security, rural development, preservation and sustainable use of natural resources, particularly land and water. This pillar also ensures mainstreaming of environmental sustainability throughout the whole strategy as a cross-cutting activity. It contains measures against land degradation and preservation of and rational use of water resources, and also considers measures aimed at preparing for pro-poor climate change adaption.

96. The Water Strategy was prepared by the Ministry of Water and Irrigation (MWI) and the National Strategy for Agricultural Development (NSAD) was prepared in response to the increased demand for water and the scarcity of its supply. The strategy stresses the need for improved water resources management with particular focus on the sustainability of present and future uses. Special emphasis is given to protect Jordan's water resources against pollution, quality degradation, and depletion.

97. The Water Strategy and NSAD call for the following actions:

- Use of marginal water for agricultural uses, especially when such use may relieve pumping from groundwater aquifers;
- Enhance farm irrigation efficiencies;
- Promote automation of on-farm irrigation networks and their operation, and train farmers on advanced water management techniques;
- Improve the technical and managerial capabilities of the agricultural sector to cope with probable climate and environmental changes and absorb their consequences;
- Improve the efficiency of irrigation and promote good water management in the Valley;
- Maximize the economic and social returns of water resources used in irrigation
- Introduce and apply environment friendly production systems and technologies when using treated wastewater in agriculture; and
- Develop agricultural production systems that enhance the efficiency of surface water use.

98. The Third National Communication to the UNFCCC (TNC, 2014) proposes the following adaptation measures that are addressed by the ITPP project:

- Improvement of water use efficiency through drip irrigation;
- Decentralized wastewater treatment is a viable option for farmers with a capacity of 200 m3 per day. However, because of knowledge and financial constraints, only few households in the TNC study area own and operate such treatment units;
- Desalinization: clean energies such as solar and wind can be used for brackish water and groundwater desalinization at a local, small scale;
- Development and adoption of adaptive technologies and innovation through research and on-farm demonstrations;
- Modification of policies, implementation of action plans, and integration of CC adaptation into cross-sectoral policy and institutional systems at national and regional levels in a consistent way.

99. The global environmental benefits of soil and water conservation through the use of climate-resilient technologies are in compliance with the spirit and objectives of the GEF, UNFCCC, UNCCD and CBD, which have all been ratified by the Government of Jordan.

G. Preparation and Readiness

Overall Rating: Moderately Unsatisfactory (MU: 3)

G1. Project Design

100. The initial project approved by the GEF at the end of 2011 had to be slightly re-designed as the technology for high efficient and salted water irrigation that had been selected (Dutyion Root Hydration System-dHRS) did not prove successful in Jordan after the pilot testing carried out NCARE staff in several sites. IFAD and the Government were no longer willing to invest the SCCF resources in this technology as limited success and benefit would be expected. Hence, the project went through a re-designing process that caused a delay of 2 years for the implementation stage, which eventually took off in January 2014. The main challenge of the re-design phase was to replace the previously identified dHRS technology with other water saving solutions that could be successful in Jordan and benefit the target beneficiaries. As a result of the consultation process organised by the project team with experts from the Jordan University (JU) and NCARE, eight new technologies were identified: (1) fertigation; (2) solar water pumping; (3) small scale brackish water desalination using solar energy; (4) hydroponics; (5) aquaponics; (6) computerized irrigation system; (7) reuse of greywater in irrigation; (8) buried diffuser for subsurface micro-pressurized

irrigation. The project document includes a very detailed technical description of the new proposed technologies, their environmental and agronomic benefits, and a reasoned justification for its inclusion in the project.

101. The project outcomes and outputs are improperly framed. They are not expressed as a sentence in the past tense (e.g. "implemented", "identified" "strengthened" "enhanced", and "Increased") which makes it easier to determine and measure the degree of success. The project document has a detailed logical framework, but indicators lack the definition of the target, which is needed to assess project contribution to the achievement of results. In some cases, indicators are too ambitious (Output 1.2 indicator "type and number of relevant policies and frameworks developed or strengthened), while in others they are insufficient (e.g. only one indicator in Output 1.1 that is not related to the main part of the output related to the implementation and expansion of technologies). Neither the Inception Workshop, nor the only available AWPB of the project, included the preparation of a proper M&E plan with precise and measurable performance and impact indicators, according to defined targets.

102. Outcome 2 "Training, capacity building and communication" is insufficiently defined, and Outcome 1 "Implementation and expansion of modern irrigation systems and water use technologies in Jordan" appear somehow ambitious considering the time frame, the available resources, and the proposed outputs and planned activities. Project interventions had a "pilot demonstration" approach with limited capacity for expansion within the project timeframe. Policy development and enhancement, technology certification and increase availability of financial products for farmers (all included in Output 1.2) required the establishment of strategic partnership frameworks with key actors and a solid advocacy plan, based on a good knowledge of the real possibilities of developing and/or enhancing relevant policies in the time frame of the project. The partnership arrangements were insufficiently developed and the project document did not include an exhaustive description of potential national and international partners and providers of international technical assistance with clear roles and responsibilities negotiated prior to project implementation.

103. An important condition not included in the project design but with important impact on its implementation is the decision that the beneficiaries would co-finance in cash 25 percent of the cost of the project investments. Although the rationale for this decision was reasonable - 25 percent co-funding would ensure that the beneficiaries would have the motivation needed to assume responsibilities in the proper use and maintenance of the technologies – in practice it represented a barrier for the poorest segment of the target group.

104. The project was well designed from the technical point of view, in terms of climate adaptation value, and technical description of the proposed technologies. However, project design faced problems regarding:

- the inadequacy of the scale of the proposed technologies to the target beneficiaries that, as stated in the project, are "*the small-holder farmers which are most vulnerable a result of their poverty level*", due to the important overlapping between climate change vulnerability, desertification and poverty level. In most cases, the target farmers could not afford to invest in the proposed technologies due to the high costs (i.e. the solar desalination system costed more than USD 70,000; about USD 20,000 for aquaponics and hydroponic systems; about USD 16,000 for solar panels for water pumping) and the enormous difficulty of providing the 25 percent requested.
- Despite having redesigned the project with the replacement of the initial technology with new systems, an inadequate evaluation respect to the target groups forced the project to carry out new technical adjustments. The reuse of

greywater technology is supposed to collect greywater from the farm, but in the case of the isolated small farms owned by poor farmers, there is not enough greywater generated for the technology to be really efficient. The lack of consultation of farmers in the selection of the technologies resulted in their eventual rejection of the buried diffuser irrigation system, on the ground that buried system is not visible and prevents the farmer from spotting possible problems.

- The involvement of smallholder farmers in the decision-making at project design would have also prevented the selection of too costly technologies. The water desalination technology with solar energy was insufficiently budgeted at project design: its real cost proved almost three times the foreseen one (more than USD 70,000) and largely beyond poor farmers' capacity to afford the matching contribution.

Rating: Moderately Unsatisfactory (MU: 3)

G2. Project targeting

105. As previously mentioned, the project has reached some beneficiaries beyond the initial very poor target groups (*the small-holder farmers which are most vulnerable a result of their poverty level*), due to the high costs of most of the proposed technologies and the need for co-financing. The co-financing requirement, together with the high cost of the selected technologies has been a barrier for the involvement of the target group – PSHF and WHH.

106. While a consultative process with the participation of poor farmers would have probably led to the selection of cheaper technologies, this could have harmed the high technology innovation dimension of the project. A compromise between the SCCF technology transfer mandate and the accessibility to smallholder poor farmers should have been reached.

107. The total number of farmers benefiting from the purchasing of climate-resilient technologies was 102, which represents 31.6% of the target beneficiaries mentioned in the ITPP project re-designed document approved by the GEF in 2013.

108. In terms of the area covered by the project investments, the total number (359 ha) is slightly higher than the target (330 ha) because the project beneficiaries own on average more hectares than what was calculated in the project design. In terms of geographic targeting, the project has successfully covered all the governorates where agriculture is an important development sector (see project map).

Rating: Unsatisfactory (U: 2)

H. Monitoring & Evaluation

Overall Rating: Unsatisfactory (U: 2)

M&E Design

109. The Monitoring and Evaluation exercise at project design failed to establish adequate sets of indicators for each output, with a clear target. The document approved by GEF includes a chapter describing how M&E will be implemented and a list of indicators in the Project Result Framework, but no specified mid-term and final targets. During the inception workshop and after start-up, NCARE did not produce a proper M&E plan with precise and measurable performance and impact indicators, according to defined targets. The AWP produced in 2015 did not provide "precise and

measurable performance indicators" as stated in the project document, and the absence of AWP in the following years prevented the necessary revision of the initial indicators and the definition of precise targets.

110. The project did not carry out a baseline assessment, which makes it difficult to analyse to what extent the project's investments and their use have improved the initial starting situation. The TET gathered information from the some beneficiaries and the project staff in order to estimate baseline conditions from the sites where the fertigation equipment was installed in 2017 and used during one full year production period, so that results could be determined and the impact assessed (see Annex G).

M&E Plan Implementation

111. So far, the project has produced only one M&E report in March 2017, one Progress Implementation Review (PIR) for the period 1 July 2016-30 June 2017, and a Poznan program questionnaire for the same period. The GEF tracking tool was not completed until the end of the project, despite the support of the TET.

112. M&E has only gathered data from Output 1.1, which represents the main expenditure (73 percent) of the GEF funds. The M&E report included information and an analysis of the equipment purchase and installation process, basic information about the beneficiaries, the type of water they use, the type of crops they grow, and their geographic distribution in the Jordan Governorates. The indicators used were: (i) number of completed installations; (ii) farmers' opinion about NCARE support; (iii) farmers' opinion about the quality of the contractors' work; (iv) farmers' opinion about the training provided by the contractor company; and (v) farmers' opinion about the expected future benefits from the new technologies.

113. The M&E report delivered in March 2017 did not include data about Outputs 1.2, 2.1 and 2.2. The report also did not include data from Outcome 1 indicators (Production - total and per unit of water used - in the agricultural systems using the new technologies; Quantity of water saved through use of new technologies; Increase in earnings associated with use of new technologies), and Outcome 2 indicators (nº of individuals with increased skills for adaptation technology; % of the target groups with an increased awareness level for adaptation technology), which would have allowed to better evaluate the impact of the project.

114. In order to overcome M&E constraints and information gaps, the TET gathered baseline information, and interviewed farmers to obtain data on the preliminary results obtained after the use of new equipment and the expected benefits in the following years. As already mentioned in Section A, some farmers obtained very promising preliminary results from the use of the new equipment on fertigation and solar pumping. The Economic and Financial Analysis (Annex G) provides information about the expected shot- to long-term benefits from the project investments.

115. The implementation of the M&E plan is running behind schedule, and the M&E officer will need to catch up fast to gather data and evaluate project results during the proposed 3 months of extension. From now till the end of the extension period (30 June 2018), the M&E officer and NCARE project team should: (i) gather the best available baseline data for each of the selected indicators, with detailed information from the project beneficiaries (e.g. soil and water management practices, amount and cost of inputs, employees and their cost, yields, benefits, etc.) and their farmland plots before the use of the new technologies; (ii) compile detailed information of concrete results from all farmers that have already used the new equipment in a production season; (iii) analyse changes comparing results with baseline situation; (iv) complete gaps in the GEF tracking tool; and (v) identify lessons learned and formulate recommendations.

116. During the interview with the TET, the M&E Officer admitted his lack of understanding of, and ability to complete the GEF tracking tool. The same happened with the technical team in charge of coordinating the procurement, installation and implementation of the equipment for the different technologies. In order to overcome this problem, the TET spent time during the evaluation mission to clarify the contents of the tracking tool, and fill it together with the NCARE staff, making use of all the available information. Some data gaps should be completed by NCARE project team throughout the extension period.

I. IFAD Supervision and Backstopping

Overall Rating: Moderately Satisfactory (MS: 4)

117. IFAD supported the GEF project design process, and the project start-up and review. In order to overcome the negative impact of the change of project director in 2015 and the consequent standstill of the project, IFAD supported NCARE with four implementation support missions, and with a full-time project management consultant.

118. While recognizing the value of the support provided by IFAD, NCARE mentioned a number of aspects that have negatively impacted the execution of the project:

- IFAD's proposal to ask for cash contribution to farmers made it difficult for poor farmers to benefit from the equipment, and some scientists who disagreed with that decision decided to no longer support the implementation of the project. The cash contribution requested to farmers also generated a problem in the project financial management: the money was collected by NCARE but, at the time of the evaluation mission, it was not yet clear how this would be used. IFAD understands that these funds should be returned to the GEF, along with the unspent balance of the project.
- NCARE pointed out that more training from IFAD would have been necessary for the project coordinator and project staff to improve their management skills. This was clear in the case of the difficulties faced for the establishment and implementation of an effective M&E system (see Section I).
- NCARE also reported that the technical assistance provided by IFAD could have been better thought out: instead of sending different consultants from time to time, it would have been more efficient to provide more continued assistance from the same consultant, who would have always kept the same criteria, and better understood the problems.

119. Based on the above, the TER makes the following considerations:
- The fact of requiring a cash contribution by the project beneficiaries to match the cost of the equipment would not have been a problem if that decision had been properly understood, shared and incorporated in the financial management of the project. Poor farmers had difficulties in accessing the equipment provided by the project, not because of the 25 percent contribution, but due to the project's selection of a technological scale beyond their economic capacity. As already mentioned, the same type equipment at a smaller scale would have made it accessible for smallholder poor farmers.
- The decision to ask for a matching contribution should have been clarified and agreed with NCARE, and a good understanding should have been reached on how to incorporate the additional funds into the financial management system of the project. For instance, the cash contribution would have allowed to increase the number of target beneficiaries.

- NCARE's suggestion for a more continued technical support by the same consultant is a very reasonable one, and should be incorporated in future IFAD projects, especially those with a strong environmental component. The capacity of the executing agency, generally linked to a governmental institution, on environmental matters and on the scope of GEF projects is often limited and requires an important guidance and effort on the part of IFAD throughout the project life span. Such technical support should include training on project cycle, management issues and technical knowledge on the interface between agriculture production, social and environmental benefits.

J. Complementarity with IFAD Strategies and Policies

Overall Rating: Moderately Satisfactory (MS: 4)

120. The project has been designed to address climate change impact to the agriculture sector in the country, through the transferring of climate-resilient technologies, combining the enhancement of the adaptive capacity of poor smallholder farmers, concrete investments for improving agriculture production with an efficient use of resources, and the development of enabling conditions – namely awareness raising, supportive policies and financial mechanisms facilitating the acquisition of equipment by PSHF. Project design has also identified a number of stakeholders, including governmental institutions, private sector and entrepreneurs, research and scientific institutions, and the international donor community. The project document shows a good understanding of the issues to be addressed and is thus highly relevant to IFAD strategies and policies.

121. The rationale, objective and outcomes of ITPP were well aligned to IFAD's Climate change strategy (2010), which states the need to "*support innovative approaches to helping smallholder producers build their resilience to climate change*", and to "*inform a more coherent dialogue on climate change, rural development, agriculture and food security*". The project is also relevant to the IFAD's Environment and Nature Resource Management Policy (2012), especially: Core principle 1: *Scaled-up investment in multiple-benefit approaches for sustainable agriculture intensification*; Core principle 3: *Climate-smart approaches to rural development*; Core principle 4: *Greater attention to risk and resilience in order to manage environment- and natural-resource-related shocks*; Core principle 6: *improved governance of natural assets*; and Core principle 7: *promote livelihood diversification*. The project also responds to the IFAD Strategic Framework 2016-2025, especially to: Strategic Objective 1 (SO1): *Increase poor rural people's productive capacities*, and Areas of thematic focus *Access to agricultural technologies and production services*, and *Inclusive financial services*; and SO3: *Strengthen the environmental sustainability and climate resilience of poor rural people's economic activities*.

122. Despite project design, the project implementation has failed to reach the target group - PSHF – and consequently to meet IFAD's Overarching Goal: "Poor rural people overcome poverty and achieve food security through remunerative, sustainable and resilient livelihoods". It is expected that the positive ITPP results in terms of technological development can be applied on a smaller scale, for the development of equipment suitable for PSHF and in line with their purchasing capacity. IFAD REGEP project represents a good opportunity to the transfer of knowledge acquired under ITPP to be applied in the aforementioned way.

123. Finally, IFAD is committed to the scaling up of project achievements, by feeding lessons learned into REGEP project and possibly through the development of a new GEF intervention in the near future.

7. Conclusions and Rating

124. Based on the above sections, the TER concludes that the overall project balance was moderately unsatisfactory (overall rating: 3.3), and that expected outcomes were only achieved to a limited extent within the scheduled timeframe, even taking into account the requested extension of 3 months.

125. The most notable successes of the project were: (i) The work on technology innovation developed by some contractors, who provided considerable improvements for the hydroponic equipment (e.g. increase the height of the greenhouse by 0.7 m and change the position of the windows for a better ventilation and less time to get rid of hot air; substitute all the welding joints by a special galvanized coupling in thickness of 5mm to connect the joint parts of the greenhouse with galvanized screws and bolts) and for the solar water desalination system (e.g. solar desalination improvement with a less solar panels and minimal number or absence of batteries to help reduce equipment and maintenance costs, long-lasting aluminium structure resistant to strong winds up to 145 km/hour, and improved desalination equipment providing higher water purity and higher quantities per hour, that makes the system one of the largest solar desalination in Jordan); (ii) Despite not being accessible to the poorest farmers, the new equipment has yielded promising results in terms of the preliminary environmental and socio-economic benefits. However, the biggest challenge faced by the beneficiaries is the lack of continued assistance from experts and service providers to allow them adopt sustainable agronomic practices, and make an appropriate use of the new technologies; (iii) The constant interaction with ACC and MoA that has led to the establishment of loans with no interest for the purchasing of the equipment supported by ITPP.

126. The most serious shortcomings were: (i) the difficulty and/or inability to reach the target group – poor smallholder farmers, with special focus on women-headed households – due to high cost of the equipment; (ii) the considerable project delays preventing the completion of most project activities and outputs, and the generation of concrete results from the use of most of the equipment by the beneficiaries, who did not have time to use it in agricultural production within the time frame of the project; (iii) the absence of planning tools (e.g. Theory of Change model, M&E plan, AWPB, procurement plan) that have prevented an effective implementation and adaptive management of the project; (iv) the limited supply of continued international technical assistance that would have been critical to ensure that NCARE staff, service providers and beneficiaries get the necessary understanding and capacity to apply climate-resilient agronomic systems and techniques, and effectively adopt the new technologies; (v) the insufficient capacity of NCARE staff to effectively implement the project; (vi) the very limited partnership development with other relevant stakeholders in Jordan that are active in the development and use of similar technologies; and (vii) the lack of strategic decision to anticipate activities to create enabling conditions (e.g. transfer of know-how and awareness raising through training and learning tours) that would have been possible through partnerships. These are the critical areas that the IFAD and the executing agency will have to pay most attention to, in future follow up of ITTP project.

8. Lessons Learned

A. Project coaching and backup

127. Most of the activities of the project only took off at the end of 2017 due to different delays and project coordination problems. The initial phase of implementation of a GEF project is critical to its successful completion and the achievement of the objectives. It is important that the implementing agency ensures robust coaching and supervision at this stage and makes sure that staff members gain a full understanding of the purpose of each intervention, the synergies between the different components of the project, and the relationship to coaching at this stage is well invested, as it speeds up the start-up of the work plan and avoids frustration of the team, paying off at later stages.

B. Learning and access to best available knowledge

128. The local staff is critical in determining the degree of success or underperformance of the project. The implementing agency should make sure that all staff gain and keep an adequate level of empowerment, capacity and motivation throughout the project lifetime. It is important to provide adequate training at the time when staff take up their position, and put in place mechanisms for on-going learning, through a regular assessment of capacity. Moreover, projects addressing complex issues such as climate change adaptation and the replacement of conventional agriculture by climate-resilient agronomic systems and technologies, requires continued support of international experts with solid knowledge and experience in guiding and training project teams, service providers and beneficiaries from areas with similar environmental and socio-economic problems.

129. Learning visits to best practices and case studies abroad are a valuable tool for the motivation of civil servants and decision makers, during capacity building process linked to policy objectives. Experience shows that the beneficiaries of these programs often return to their countries with renovated motivation and energy. Service providers' staff and members of local community groups and producers' organizations also greatly benefits of these experiences, which enhance their motivation as additional benefits.

C. Empowerment of local communities and service providers to maximize the impact of technology development and field investments

130. Like in many similar projects, the GEF in Jordan should have put in place an effective participatory process through which local communities contribute to the project designing, planning, implementation and monitoring plans, eventually identifying priority investments that suit their needs and are compatible with their purchasing power, to be covered through project funds. This would have avoided the selection of technologies at a scale and cost inaccessible to the target group. In this way, the good work of innovation and development carried out by the contractors will have been directed towards more modest and accessible equipment for poor farmers.

131. Early and adequate awareness, and continued capacity building support and empowerment of the communities and service providers is critical since the very early stages of the project, so as to ensure that the communities are exposed to innovative ideas and options for the sustainable management of natural resources. If this does not happen, farmers will inevitably choose well-known options, which might not necessary be the most conducive to the achievement of the project objectives - the most beneficial for the environment and their development – or will face a high risk of misusing the new equipment, which may result in inefficient use of resources and ultimately in a lack of interest in investing in such technologies.

D. Partnership building and outsourcing

132. Projects such as the ITPP, whose work-plan is composed of a broad range of actions touching on areas of expertise (e.g. technology development and certification, policy and advocacy, negotiation of financial incentives with financial institutions, capacity building and awareness raising) that have not been previously dealt with by the baseline intervention, or are indeed new to the country, are those that most benefit from the involvement of as many partners as possible, and where outsourcing is most beneficial. In these cases, the mapping of all potential partners and the negotiation of good and clear outsourcing agreements, including national and international service providers, are critical early steps of the project. ITPP would have probably benefited of a more proactive and open attitude in this direction. Several partners interviewed during the terminal evaluation mission felt that the approach of the GEF was rather bureaucratic and not conducive to the establishment of a frank and constructive spirit of collaboration.

E. Planning the process for the effective adoption and use of new technologies

133. Experience shows that the main ingredients for a successful adoption of new agronomic systems and technologies are: (i) a close collaboration since the very early stages between all concerned stakeholders, especially researchers, extension agents, civil servants, farmers and the private sector; (ii) the establishment of on-farm trials supported by strong local champions – leading farmers and/or highly skilled pioneer research/academic/NGO; (iii) participatory technology development, education and training; (iv) the design of a sound implementation strategy; and (v) the existence of a supportive policy framework. ITPP project design has taken into consideration all this ingredients (see Section 5), but insufficient attention was paid to creating enabling conditions (e.g. creating and strengthening supportive policies and rural finance; awareness raising and capacity development of farmers and service providers) for the effective adoption and use of the new technologies in the long-term.

134. Within the context of climate change adaptation, adopting climate resilient agronomic systems and technologies represents a fundamental change in the management of resources (water, soil, agrochemicals, energy), and the selection of suitable crops and varieties. Understanding and effectively using new agronomic approaches and NRM techniques adapted to the local circumstances of each agro-ecological zone requires continued support over time (every three to six months), especially by international experts who have a high experience of addressing and solving problems in other projects with similar social and environmental problems. In the absence of appropriate and continuous technical support overtime, farmers may incorrectly applied the new irrigation technologies having a negative impact in the investments made, and consequently decreasing farmers' interest to adopt these technologies. Moreover, new investments with insufficient guidance and awareness may lead to the over-extraction of underground water and cultivation of lands unsuitable for cultivation, with an increase in the environmental impact in the medium or long term. ITPP project design proposed the establishment of a TSAT, that should have been integrated by well-skilled national and international experts to support the preparation and implementation of agronomic production plan incorporating CC adaptation considerations, and sustainable NRM requirements based on the agro-ecological conditions of each demonstration site and farmland plot.

135. The training component of Output 2.1 should have been entrusted to the Jordan University (JU). The process included training of trainers (TOT) or service providers, and training of farmers. Unfortunately, due to problems in the planning process, no training under the responsibility of JU was carried out and/or contracted before the

project closure, what has prevented it from being re-scheduled in the 3-month extension period. A lesson learned in this process is that, in case of continued capacity building needs of this kind, it is important to carefully plan and ensure the continuity of the process, so as to make the most of the already existing knowledge related to the agronomic systems and technologies supported by the project, from both other partners in Jordan and from abroad (partners with solid experience in technology development under similar environmental and socio-economic context). The hiring of ITA, in addition to Jordan academic/research organization, would have been extremely beneficial to maximize knowledge transfer to the final beneficiaries (farmers and service providers) throughout the project (before, during and post-installation of new equipment).

9. Recommendations

136. The TET formulated the following recommendations for the 3 months extension period and the sustainability of the project results beyond the project termination, which are divided according to five areas: (A) targeting; (B) project management and governance, (C) achievement of project objectives, (D) monitoring and evaluation, and (E) Follow up after project closure.

A. Targeting

Recommendation 1: It is recommended to involve in the best possible way the target group in all phases of the project, from the design, planning, implementation and monitoring, so that a most accurate and consensus decision-making in the type of investments to be supported is reached.

137. The objective group – PSHF - and the environmental and socio-economic constraints that condition its adaptive capacity are the main reason that justifies the development of an IFAD-led project within the framework of the GEF program. That is why the planned investments must be adapted to the needs and purchasing power of this group, instead of the opposite. The TET gathered the perception that NCARE did not carry out a satisfactory participatory process, involving the target group – with special focus on women headed households - in analysing their problems and needs and in making decisions to identify opportunities and select suitable technologies that help increase their adaptive capacity.

138. The TER recommends that in future projects IFAD pays special attention to make sure the executing agency makes an effort to keep coherence between the project interventions and the target group.

B. Project Management and Governance

Recommendation 2: A theory of change should be developed at project design and/or start-up phase so as to make visible and explicit the rationale behind what we do and why, and the causal package of activities plus assumptions that together are expected (an sufficient) to contribute to the intended results.

139. The TET gathered a certain perception that the project implementation team was too focused on the procurement and installation of the equipment, losing the perception of the project globally, and the steps necessary to achieve the expected results. The TET recommends that in future projects, the implementing agency develops a "theory of change" model that help visualize the linkages between project Impact, Outcomes, Outputs and Inputs.

Recommendation 3: A well-established baseline situation and monitoring and reporting mechanism should be established as a prerequisite for adaptive management, to systematically test assumptions in order to adapt and learn.

140. A major obstacle in the effective management of the project was the absence of detailed baseline data, the lack of development and periodically updating of project planning tools (e.g. M&E plan, AWPB, procurement plans), and the insufficient gathering of information and reporting of the intermediary steps that are needed to fulfil the project outputs and outcomes. Despite repeated requests by IFAD and the coaching carried out, the project team did not develop these planning tools, so the reporting was highly insufficient. This prevented the team from understanding the

problems and proposing effective solutions to overcome them, while adapting the project to changes in the context in which it develops. Moreover, the limited results from the use of the installed equipment were not gathered and analysed to assess cost effectiveness and environmental and socio-economic benefits, and consequently the formulation of lessons learned.

141. The TET recommends for future projects that the development of the necessary tools for project planning and of adaptive management becomes an essential and necessary requisite for the executing agency, and that IFAD establishes effective mechanisms to ensure that they are met (e.g. the existence of project planning and adaptive management tools as a precondition for first disbursement).

Recommendation 4: Speed up expenditure, investment and procurement

142. The GEF project had serious problems of under-expenditure and delays in the procurement process. Under-spending is, of course, an indicator of the delays in implementation and the consequent risk of not fulfilling outputs and outcomes. The lack of technical qualification on the staff, and of an effective planning and management mechanism was a major constraint for an effective financial management. The TET recommends for future projects that the executing agency sets up a competent fiduciary (accounting and procurement) team dedicated to the project with accounting software before start up, and that these aspects become a precondition for disbursement, as well as the planning and adaptive management tools mentioned in Recommendation 4.

Recommendation 5: on-the-job training for the project team

143. IFAD relies on local experienced professionals. The TET recommends that IFAD should assess whether there is room to provide more on-the-job training required to understand the GEF and IFAD policies and procedures, and fill major knowledge gaps within the project team – i.e. in the areas of M&E, sustainable NRM and climate change adaptation, procurement and finance management, project cycle. The training could take the form of learning visits abroad (for instance, accompanying the beneficiaries on the visits already scheduled within the different activities), or other in-situ training opportunities that can eventually contribute to an improvement of staff performance.

Recommendation 6: Increase the visibility of the project, open it up to the national stakeholders, and improve interaction with institutional partners, consultants, and other projects.

144. The TET gathered the impression among interviewees that the GEF had a low-profile and a weak identity of its own. The TET recommends that in other projects, such as REGEP, that will help upscale ITPP results, IFAD and NCARE should practice a stronger leadership to better communicate ITPP objectives and specificities. This will require an effort to interact more and better with partners and stakeholders, raise awareness on the project benefits, and identify creative ways to increase public participation. Increased interaction is particularly important for partners that are instrumental to transfer technology innovation to poor smallholder farmers (e.g. the WFP interventions on hydroponics in the Azraq Syrian refugee camp).

145. In practice, the GEF so far has worked with a very limited intervention of the SC and the TSAT. This is an important deficiency in the effective project performance and fulfilment of high quality management standards. The TET recommends for future projects that SC and TSAT are established in an appropriate manner, with a good

representation and clear commitment on the part of their members, and effective mechanisms for their regular involvement in the implementation of the project.

B. Achievement of Project Objectives

Recommendation 7: Establishing mechanisms for an effective project implementation process is essential to ensure the timely and effective delivery of the project outputs and outcomes, and the realization of the causal assumptions (theory of change model).

146. The project team failed in defining the process or pathways through which the project outcomes are brought into being. The lack of a theory of change model prevented understanding the concatenation of assumptions and the steps necessary to achieve the objectives. For instance, the project should have initially worked on the creation of awareness and an enabling environment (e.g. critical mass of trainers trained, supportive policies and financing mechanisms) as a precondition for the adoption and diffusion of technologies. The justification given by the project team that no training or awareness activities could be organized before the complete installation of the equipment is rather questionable. On the contrary, the existence of good practices from similar technologies already developed in other places of Jordan or abroad would have allowed to anticipate the training of trainers and awareness actions at early stages of the project, also allowing to understand possible barriers and problems in relation to the investments planned, and their suitability to the target group.

147. TET recommends that future project implementation planning processes are based on the theory of change model following a step-wise approach to complete the necessary actions to address each step and achieve the expected results. The TET also recommends that the project teams make use of practical project implementation tools, such as updated procurement plan and Gantt charts, to help show the "dependency" between activities (e.g. what activities can only begin after the completion of others), the start and finish dates of the elements of the project, etc. This will help avoid project implementation delays and failures.

Recommendation 8: International technical assistance (ITA) is a major need in development projects, especially in the context of climate change, to ensure that beneficiaries and service providers acquire the necessary understanding and capacity to apply climate-resilient agronomic systems and techniques, and an effective adoption and adequate use of the new technologies.

148. Project teams often lack the capacity to address complex issues such as adaptation to climate change, effective participation of local communities, and the incorporation of sustainable NRM approaches and technologies in local development actions. Understanding and effectively using new approaches and techniques of natural resource management requires continued support over time (every three to six months), especially by international experts who have a high experience of addressing and solving problems in other projects with similar social and environmental contexts. Unfortunately, the project did not use the funds that had been allocated for this type of technical assistance.

149. IFAD should ensure that future projects provide continued assistance by one or more international experts to guide the project teams through the various steps necessary to effectively and efficiently fulfil the expected results. In fact, one of the comments provided to the TET by the project staff was the lack of adequate and continued technical support, that should have come always from the same qualified expert, instead of the more punctual assistance NCARE received from different

experts, sometimes with discordant messages. IFAD should also help the project team understand the importance of using the available funds for international technical assistance effectively.

Recommendation 9: Innovation in technology development should be conditioned both by the environmental constraints and the socio-economic context of the poor smallholder farmers, in a way that is compatible with their purchasing power. In the future, it is recommended to adapt the scale of technology to the socio-economic context of the beneficiaries, so that the innovations developed by the contractors are accessible to them, even with the condition of co-financing.

150. Technology transfer and innovation has been the main success of the project. However, innovation did not address the challenges to provide low-cost adaptive options for poor small-holder farmers. In this sense, the project team could have established partnerships with organizations such as the WFP, which has provided basic equipment for hydroponic cultivation to benefit women in refugee camps, and have directed innovation and development in the improvement of equipment accessible to the poorest.

151. The TET recommends that in future projects, the executing agency makes a detailed mapping exercise to identify existing initiatives on climate-resilient technologies for poor farmers in Jordan and other countries with similar environmental and social constraints and seek partnerships to build synergies and provide innovative solutions.

Recommendation 10: Extension period (Need for follow-up)

152. The TET supported NCARE's request to have an extension of three months in order to complete all the commitments that were contracted before the project completion date (31 March 2018). Although this did not allow the completion of all planned activities, at least the purchase and installation of the equipment was completed, and field data on the benefits provided by the use of part of this equipment throughout a production cycle could be collected.

153. The TET recommends for future projects that the executing agency: (i) develops, maintains and updates the M&E plan, AWPB and procurement plan; (ii) gathers and analyses the baseline situation to help compare results (ex-post analysis) with the situation before project interventions (ex-ante analysis).; (iii) ensures adequate training of the staff on project cycle, M&E, participatory methodologies, gender issues, the technical issues of the project, and on the specific requirements and policies of the GEF implementing agency and the donor; (iii) ensures the necessary technical support – mainly through ITA - to the project beneficiaries and service providers to ensure the necessary understanding and skills in the implementation and use of climate-resilient agronomic practices and equipment, complying with the environmental requirements and policies of the government, international treaties, donor and the lead project agency (IFAD) (e.g. FAO Int. Code of Conduct on the distribution and use of pesticides, included in the legal agreement).

C. Monitoring and Evaluation

Recommendation 11: Design an effective system and ensure qualified staff for the collection and analysis of M&E data, and the measurement of environmental, social, and economic indicators.

154. The project M&E suffered from several problems: (i) lack of baseline situation; (ii) lack of M&E plan; (iii) lack of revision of the preliminary indicators defined in the project design document (Result framework); (iv) lack of definition of the targets (intermediary and final) for each indicator; (v) limited understanding of GEF tracking tool by M&E Officer and technical project staff; and (vi) insufficient staff qualification. All this led to a limited collection of data throughout the life of the project, which impeded an adaptive management and the analysis of the yielded results.

155. The TET recommends for future projects that the development of a baseline situation and a complete and effective M&E plan becomes a precondition for first disbursement to the executing agency. Moreover, the GEF implementing agency should make sure that the executing organization has the necessary skills and understanding of its requirements and those of the GEF regarding M&E, tracking tools, etc.

D. Follow-up after project closure

Recommendation 12: Ensure the transfer of lessons learned under ITPP to IFAD/REGEP project and future projects on climate change adaptation and agriculture production in Jordan.

156. The IFAD funded REGEP project, executed by the implementing agency JEDCO in close partnership with NCARE and other private and public partners, will keep financing trials and demonstrations of new technologies building on ITPP experience. REGEP should support the necessary capacity development needs for NCARE staff and other extension/research agents – including WUAs - to be sufficiently skilled to guide farmers in the effective implementation of the new technologies. This is an opportunity to bring international expertise – which was planned under ITPP – to enrich national knowledge on new technologies. Once trained, NCARE personnel will be able to fulfil its mandate to provide regular support to ITPP supported farmers – and other farmers in Jordan - in the selection, installation and management of agriculture production equipment. REGEP also represents a good opportunity to complete the lobby and advocacy work foreseen under ITPP to create a supportive policy framework and financing opportunities for poor farmers willing to adopt climate-resilient technologies.

157. the TET recommends that IFAD supports the Government of Jordan to secure additional climate finance - mainly IFAD/ASAP, GEF SCCF and GCF- for the development of new initiatives that can build on the work of NCARE to increase the resilience of the society and agro-ecosystems to climate change and reduce the risk of future disasters.

Annex A

Agenda of the Terminal Evaluation Mission

Day	Date	Activity	Location
Friday/Saturday	16/17/03/2018	Arrival of the evaluation team	Amman, Hotel
Sunday	18/03/2018	Meeting with NCARE director General Dr. Nizar Haddad and with the Project Team: Overall project presentation + Presentations of the activities implemented for each of the 6 climate-resilient technologies.	NCARE Headquarters/ Baqa
Monday	19/03/2018	Filed visits: solar pumping sites	Azraq Governorate
Tuesday	20/03/2018	Field visits: fertigation site, solar desalination site, aquaponic + solar pumping site	Jordan Valley
Wednesday	21/03/2018	Filed visits: fertigation + solar pumping sites, automated irrigation site	Ghor Al-Safi
Thursday	22/03/2018	Filed Visit: Hydroponic site	Madaba
Friday	23/03/2018	Evaluation team work: assessment of gathered information; Meeting with Hashemite University – Irrigation Specialist	Amman
Saturday	24/03/2018	Evaluation team work: assessment of gathered information; Meeting with REGEP Project Director	Amman
Sunday	25/03/2018	Meeting with the Project Team (General Discussion)	NCARE Headquarters
Monday	26/03/2018	Field Visit: automatize irrigation system	Azraq Governorate
Tuesday	27/03/2018	Wrap-up meeting with NCARE General Director and project team, recommendations and suggestions.	NCARE Headquarters

Wednesday	28/03/2018	Departure of the team

Annex B

List of Documents Reviewed/Consulted

- Biagini, B. & S. Dobardzic (2011) Accessing Resources under the SCCF
- GEF (2017) Guidelines for GEF Agencies in Conducting Terminal Evaluation for Full-sized Projects
- GEF Programming Strategy on Adaptation to Climate Change for the Least Developed Countries Fund and the Special Climate Change Fund (GEF/LDCF.SCCF.16/03/Rev.01, May 5, 2014)
- Ghermandi, A. et al.: Solar-powered desalination of brackish water with nanofiltration membranes for intensive agricultural use in Jordan, the Palestinian Authority and Israel (AGRISOL). (in.bgu.ac.il/en/bidr/ziwr/AGRISOL/Pages/default.aspx)
- IFAD - Environmental and Nature Resource Management Strategy, August 2012
- IFAD - Climate Change Strategy, May 2010
- IFAD – Strategic Framework 2016-2025
- IFAD Questionnaire GEF Poznan Program to GEF Agencies (2017)
- IFAD – Rural Economic Growth and Employment Project (REGEP) – Final Project Design Report (2014)
- ITPP AWPB report (2015)
- ITPP Bid evaluation reports
- ITPP Contracting files
- ITTP Convention between NCARE and beneficiaries of purchased equipment
- ITPP Design Project Document – Final (2011)
- ITPP Re-design Project Document – Final (2013)
- ITPP financial files
- ITPP Mid-Term Review Report (March, 2017)
- ITPP M&E Report (March, 2017)
- ITPP PIR Report (2017)
- ITPP procurement files
- ITPP Progress Report – Automated Irrigation (March, 2018)
- ITPP Progress Report – Aquaponics (March, 2018)
- ITPP Progress Report – Fertigation (March, 2018)
- ITPP Progress Report – Hydroponics (March, 2018)
- ITPP Progress Report – Solar desalination (March, 2018)
- ITPP Progress Report – Solar pumping (March, 2018)
- ITPP purchase orders and supporting documents
- Jordan National Strategy for Agriculture Development
- Jordan Poverty Reduction Strategy (2013)
- Jordan Third National Communication to the UNFCCC (2014)
- Ministry of Environment – Integrated Investment Framework for Sustainable Land Management in Jordan (2015)
- Ministry of Water and Irrigation – National Water Strategy of Jordan, 2016-2025
- Request for IFAD No Objection submitted by NCARE and No-Objection Letters sent by IFAD to NCARE
- ITPP Audit Report (2016)

Annex C

List of Interviewees

Name	Charge/Position/Institution	Date
Sufyan Al Muhtaseb (Al Doha Company)	Project beneficiary – Automated irrigation system	26/03/2018
Fai & mai	Contractor – Automated Irrigation	26/03/2028
Mohamed Qinah	Hashemite University – Irrigation Specialist	26/03/2018
Osama Al-Ziod	Project beneficiary – Solar irrigation pump	19/03/2018
Al-Shayish Al-Khraisha	Project beneficiary – Solar irrigation pump	19/03/2018
Dr. Samia Akroush	REGEP Project Director at JEDCO	24/03/2018
Dr. Sa'eb Khresat	IFAD Representative in Jordan	Throughout mission
Turki H. Al-Khraisha	Beneficiary – Solar water pump	19/03/2018
Eng. Sammer E. El-Naimat	Contractor (solar water desalination system)	20/03/2018
Hasan Abusido	Project beneficiary – Solar Desalination System	20/03/2018
Abdelafid Said Al Refa'i	Project beneficiary – Aquaponic & Irrigation Solar Pump	20/03/2018
Ahmed Khalaibe	Project beneficiary - Fertigation	20/03/2018
Abdelhalim Grale	Project beneficiary – Fertigation & Irrigation Solar Pump	21/03/2018
Dr. Sarif Rawashda	NCARE Station at Ghor Al-Safi Department	21/03/2018
Mohamed Isbitan	Project beneficiary – Fertigation & Irrigation Solar Pump	21/03/2018
Imad Gweihan	Project beneficiary – Computerized Irrigation System	21/03/2018
Mustafa Baggeh	Contractor (Engineering Corporation for Agriculture and Trading)	22/03/2018
Osam Al Daaga	Project beneficiary - Hydroponic	22/03/2018
Eng. Heba shwabkeh	Researcher Aquaponics	Throughout mission
Eng. Mai Diab	Researcher Irrigation Solar Pump	Throughout mission
Eng. Uday Naimat	Researcher Irrigation Solar Pump	Throughout mission
Eng. Eelaf obeidat	Researcher Fertigation	Throughout mission
Ms. Nahla elyan	GEF Assistant for the Director General for Financial issues	Throughout mission
Eng. Naser Al Shayeh	GEF Director of Project Procurements	Throughout mission
Mr. Amjad Birjas	GEF Financial Director	Throughout mission
Eng. Nidal bader	GEF Technical Coordinator Hydroponics & Aquaponics	Throughout mission
Eng. Ala'a Wahbeh	GEF Technical Coordinator Computerized Irrigation System	Throughout mission
Dr. Nizar Haddad	NCARE Director General	Throughout mission
Dr. Mohamed Jitan	GEF Project Director	Throughout mission
Eng. Mahmoud Swalha	GEF Technical Coordinator Irrigation Solar Pump	Throughout mission
Dr. Luna Al-Hadidi	GEF Technical Coordinator Water Desalination	Throughout mission
Omar Abdul Hadi	GEF M&E Officer	Throughout mission
Dr. Asaad al-khader	GEF Technical Coordinator Fertigation	Throughout mission

Annex D

Extract from the Terms of Reference for the TER

OBJECTIVE OF THE TERMINAL EVALUATION MISSION

The terminal evaluations that are conducted at the end of project implementation, are expected to provide a comprehensive and systematic account of the performance of a completed project by assessing its design, implementation, and achievement of objectives. They are expected to: promote accountability and transparency; facilitate synthesis of lessons; provide feedback to allow the GEF IEO to identify issues that are recurrent across the GEF portfolio; and, contribute to GEF IEO databases for aggregation and analysis.

The scope of a terminal evaluation will depend upon the project's theory of change, its objectives, supported activities, M&E design and implementation, and the context in which the project was designed and implemented. The terminal evaluation report will clarify the key questions that the evaluation seeks to answer, the interventions assessed, the geographical and demographic coverage, the methods used, and the time period under review.

In most cases, terminal evaluations will include field visits, and interviews with key stakeholders; review of project documents, project M&E data, audit reports, and mid-term reviews; and information from independent sources.

More precisely, the detailed objectives of the terminal evaluation process include the following:

- To assess the effectiveness of project implementation, or the extent to which project objectives were met, and to document the immediate results and impacts of project interventions.
- To assess the relevance of project interventions at the time of project design and in today's context.
- To review the project costs and benefits and the efficiency of the overall project implementation process, including IFAD's and partners' performance.
- To assess the prospects of sustainability of project benefits beyond project completion.
- To generate and document useful lessons from implementation that will help improve IFAD's or Borrower's future programming and designs.
- To identify any potential for the replication or up-scaling of best project practices.
- To evaluate the relevance of the implemented strategies and approaches as well as their contribution to reaching the development objectives pursued by the project.
- Appreciate the implementation context and modalities, including those relating to the interactions between the project, the beneficiaries and the implementing partners.

Outcome ratings will take into account the outcome achievements of the projects against its expected targets. Project outcomes will be rated on three dimensions: a. Relevance: Were the project outcomes congruent with the GEF focal areas/operational program strategies, country priorities, and mandates of the Agencies? Was the project design appropriate for delivering the expected outcomes? b. Effectiveness: The extent to which the project's actual outcomes commensurate with the expected outcomes? c. Efficiency: Was the project cost-effective? How does the project cost/time versus output/outcomes equation compare to that of similar projects? d. Rating Scale for Outcomes: An overall outcome rating will be provided on a six-point scale (highly satisfactory to highly unsatisfactory) after taking into account outcome relevance, effectiveness, and efficiency.

COMPOSITION AND TASKS OF THE MISSION

Team leader – Pedro Regato

- Undertake in-depth analysis of the existing project documentation: project reports and documents (supervision reports, MTR report, progress reports, AWPB, etc.), M&E data, any surveys or specific studies undertaken by the project, PMU and service providers' records and the records of the groups supported by the project.
- Carry out field visits and discussions with all stakeholders (beneficiaries; national partners; service providers; platforms; etc.) on all the activities implemented by the project.
- Analyse the project's theory of change, including description of: the outputs, outcomes, intermediate states, and intended long-term environmental impacts of the project; the causal pathways for the long-term impacts; and, implicit and explicit assumptions. The project's objective(s) should also be included within the theory of change.
- Select and visit a large sample of project sites, or locations where project activities took place, in order to collect impressions and feelings, verify that reported interventions took place, confirm that they met expected quality standards and beneficiaries' needs, or to take note of the external context of project intervention.
- Seek the necessary contextual information to assess the significance and relevance of observed performance and results;
- Compile the project Tracking tool;
- Refer to GEF Guidelines on Terminal Evaluations to analyse all aspects and impacts of the project;
- Undertake in depth consultations with the project team.
- Undertake the preparation of the Project Terminal Evaluation report (TER).

Finance Expert – Elisabeth Dombori

- Review project financial management, accounting system, and audit processes;
- Review project expenditure and Government contribution;
- Review the status and utilisation of the Project Accounts and carry out a thorough review of expenditures;
- Assess adequacy of disbursement arrangements and authorized allocations;
- Contribute to the write up of report, in particular, inputs to the main body on (a) Financial Management; (b) Disbursement; (c) Counterpart funds; and (d) External Audit.

Procurement Expert – Walid Dhouibi

- Review compliance with the financing agreement;

- Support the project in ensuring that all procurement is undertaken by completion;
- Review procurement actions and procedures applied to determine compliance with IFAD procurement guidelines;
- Contribute to the write up of the report, in particular, inputs to the main body

Economic and Financial Analysis Expert – Agnese Tonnina

- Collect and analyse relevant quantitative and qualitative data;
- Based on the information collected in the field, prepare a complete estimate of project economic and financial benefits;
- Prepare and analyse the with and without project situations;
- Assess the financial and economic feasibility of the proposed activities of the project;
- Contribute to the preparation of the report in close collaboration with the mission leader;
- Draft relevant sections in report related to Economic and Financial Analysis.

National Consultant – Saeb Khresat

- Support the organization and contribute to field visits and discussions with all stakeholders (beneficiaries; national partners; service providers; platforms; etc.) on all the activities implemented by the project.
- collect relevant data from secondary sources, such as national and local statistics, other donors' statistics, the civil society, private sector entities (trade associations, universities, etc.).
- Liaise with project staff and NCARE.
- Organize meetings and focus groups with beneficiaries in project areas.
- Assisting in the preparation of the Project Terminal Evaluation report (TER).

CALENDAR AND ORGANISATION OF THE MISSION

The mission will take place in Jordan, from 17 to 28 March 2018. The mission team will meet NCARE staff involved in the project coordination, implementation and monitoring, as well as relevant people from project partners. The team will also attend field visits to different governorates in Jordan to meet and interview a sub-set of project beneficiaries.

EXPECTED RESULTS

The mission will prepare a Project Terminal Evaluation report (TER) following the outline presented in the present ToRs. The preparation of the technical documents of each consultant will be made from home after the mission. The first draft TER will be prepared shortly after the end of the terminal evaluation mission and submitted electronically by the mission's Team Leader to the CPM, not later than 10 April 2018.

The draft TER will be circulated among main stakeholders for review and consolidated, written comments will be sent to the mission's Team Leader.

Annex E

TER/PCR RATING MATRIX

A six-point rating scale is used to assess the overall project achievement. The levels of evaluation are as follow: highly satisfactory – HS = 6 (the project had no shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency); satisfactory – S = 5 (the project had minor shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency); moderately satisfactory - MS = 4 (the project had moderate shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency); moderately unsatisfactory - MU = 3 (the project had significant shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency); unsatisfactory - U = 2 (the project had major shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency); highly unsatisfactory - HU = 1 (the project had severe shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency).

The following table summarizes the scores provided by the terminal evaluation team for all main evaluation criteria and performance assessment questions:

Table of Overall Detailed Ratings

CRITERION	COMMENTS' SUMMARY	RATING (1 to 6)
A. Achievement of Outputs and Activities	Most of the investments foreseen in Output 1.1, that represent about 73% of the GEF funding, have been purchased and installed, and seem reasonably set out for completion within the project timeframe. However, most farmers were unable to use the equipment and demonstrate the environmental and socio-economic benefits. Output 1.2 was not achieved and it is not expected to be completed during the extension period. Output 2.1 was not achieved either. In terms of awareness raising (Output 2.2), the project has just designed and published awareness materials (brochure, poster and booklet) about the fertigation equipment. The completion of all planned awareness raising activities is not foreseen within the three-month extension of the project	3 –Moderately Unsatisfactory
B. Attainment of Project Objective and Outcomes		3 - Moderately Unsatisfactory
B1 Relevance	The project is consistent with the focal areas and operational program strategies of the SCCF. It is also well aligned and contribute to the priorities of the sectorial strategies and policies of the Government. Seven years after project design (2012-2018), Jordan has made significant progress in supporting climate-resilient technologies to enhance the agriculture sector through an efficient use of the natural resources. The ITPP project has facilitated this process to a certain extent.	3 - Moderately Unsatisfactory
B2. Effectiveness	However, the delivering process at design was not fully appropriate, project design faced problems regarding the inadequacy of the scale and cost of the proposed	3 – Moderately Unsatisfactory

	technologies to the target beneficiaries. As previously mentioned (section A), only quantitative results were obtained in Output 1.1 (equipment purchasing and installation), no action occurred under Output 1.2, and very little was done under Outputs 2.1 and 2.2. Based on the theory of change, there is little likelihood that the GEF can still catch up to achieve the project outcomes and objective. Looking at the ITTP Project Theory of Change (Figure 2), most of the causal package of activities plus assumptions that together are expected to contribute to the intended results did not occur.	
B3 Efficiency	The project has suffered serious delays. The project Financial Management suffered for lack of dedicated financial staff who are aware of IFAD requirements. The quality of Financial Management can be rated as moderately unsatisfactory. Contributions from other co-financiers such as Government of Jordan, NCARE, in-kind contributions from Farmers and contributions from the University of Jordan were not disclosed in 2016 financial statements and this led the Auditor to qualify them. The mission was not able to analyse the cost-benefit of the different technologies due to the lack of results derived from their use in the majority of cases. Also, the mission was not able to ascertain that the *fit-for-purpose* principle was achieved because NCARE has not carried out any analysis of: context and risk, value and complexity of technologies that have been procured and provided to farmers.	2– Unsatisfactory
C. Sustainability of Project Outcomes		3.4– Moderately Unsatisfactory
C1. Institutional	The road to achieving a conducive institutional and governance framework capable to sustain project outcomes and benefits, still looks long and uphill. The accumulated delays seriously impacted on the achievement of the project results under Outcomes 1 and 2, preventing the project team to inform decision-makers about the demonstrated benefits of the supported technologies, organize training with the support of the field demonstration sites, and undertake the foreseen local and national-wide campaigns. Environmental. Preliminary findings from the use of fertigation and from the use of the same technologies in other arid regions, allows us to predict a significantly positive effect in terms of environmental and climate change	4 – Moderately satisfactory

	adaptation benefits.	
C2. Environmental (including Climate Change)	A major failure of the project has been its inability to reach the original target group - poor smallholder farmers. In fact, many of the farmers interviewed by the TET had medium means that did not prevent them from accessing new technologies, and that make them less vulnerable to climate change. Indeed, the technological approach pursued by the project has allowed the development of innovations that will have a high impact on the country's agricultural productive capacity, but which will be inaccessible for poor farmers in the short and medium term.	4 – Moderately Satisfactory
C3. Social		3 – Moderately Unsatisfactory
C4. Technical	The approaches promoted by the project are viable from a technical point of view, and have incorporated innovation through R&D implemented by some contractors (e.g. solar desalination system and hydroponics). The project has contributed to a very relevant technological development at national level, with great perspectives of being applied by other farmers and of achieving significant improvements for a competitive and adaptive agricultural production, with an efficient use of resources and savings in production.	4 – Moderately Satisfactory
D. Catalytic Role and Replication	The ITPP GEF project includes many elements of innovation that are potentially suitable for upscaling and replication, and that have the potential to contribute to changes in policy, institutional behaviour, or even economic and investment patterns. On the institutional and policy side, despite the lack of delivery of Output 1.2 and Output 2.1, the positive interaction between NCARE, ACC and decision makers at the MoA, has resulted in new funding opportunities for farmers to invest and upscale the adoption of the proposed climate-resilient technologies.	4 – Moderately Satisfactory
E. Stakeholders' Participation & public Awareness		3- Moderately Unsatisfactory
E1. Stakeholders' Participation	The project design identified a wide array of stakeholders concerned with the purchasing and use of efficient irrigation technologies from the administration (MoP, MoWI, MoA, MPW, MoE), academic/research institutions	3 – Moderately Unsatisfactory

	(University of Jordan), private sector (ACC, WUAs), and international development agencies (USAID, WFP). However, most of these actors did not play a role in the project, which did not benefit from the planned capacity development services (e.g. University of Jordan), opportunities for exchanges and learning visits (e.g. project sites from USAID and WFP projects), policy assessment (e.g. MoA, MoWI, MoE), and technical support and advise.	
E2. Poverty Focus	Although the design of the project gave priority to the poorest farmers, different reasons eventually led to a selection of some farmers with a middle purchasing power.	3 – Moderately Unsatisfactory
E3. Gender Concerns	Only 8 out of 110 beneficiaries were women (7.3%. In terms of project staff, 2 NCARE lead experts (the experts in charge of automated irrigation and solar water desalination technologies) out of 6 were women. According to the MTR, the project trainings and workshops are expected to have great impact on women as in 2015, the Jordan Engineers Association stated that the number of women engineers in Jordan exceeded men by 26 percent. However, the project ended with almost no training delivered, meaning that this gender objective was not fulfilled, either.	2 – Unsatisfactory
E4. Public Awareness	Project delays and project management constraints have prevented carrying out the awareness raising activities necessary to complete output 2.2. Only fertigation materials were designed and published (brochure, poster and booklet), and no awareness raising events were organized at the close of the project. The project extension of 3 months does not include awareness raising actions and the completion of the missing publications as they were not yet contracted by 31st March 2018.	2 - Unsatisfactory
F. Country Ownership & Driveness	The rationale, approach, and objectives of the GEF are consistent with relevant Governmental priorities outlined in the strategies and action plans. The global environmental benefits of soil and water conservation through the use of the proposed climate-resilient technologies are in compliance with the spirit and objectives of the GEF, UNFCCC, UNCCD and CBD, which have all been ratified by the Government of Jordan	4 – Moderately Satisfactory
G. Preparation and Readiness		3 – Moderately Unsatisfactory
G1. Project Design	The project document has a detailed logical framework, but indicators lack the definition	3 – Moderately

	of the target, which is needed to assess project contribution to the achievement of results. Neither the Inception Workshop, nor the preparation of the only available AWPB of the project, included the preparation of a proper M&E plan with precise and measurable performance and impact indicators, according to defined targets. The project was well designed from the technical point of view, in terms of climate adaptation value, and technical description of the proposed technologies. However, project design faced problems regarding t6he inadequacy of the scale and cost of the proposed technologies to the target beneficiaries.	Unsatisfactory
G2. Project Targeting	the project has reached the expected target groups (*the small-holder farmers which are most vulnerable a result of their poverty level*) in a very limited way, due to the high costs of most of the proposed technologies and the need for co-financing.	2 - Unsatisfactory
H. Monitoring & Evaluation	During the inception workshop and after start-up, NCARE did not produce a proper M&E plan with precise and measurable performance and impact indicators, according to defined targets. The AWP produced in 2015 did not provide "precise and measurable performance indicators" as stated in the project document, and the absence of AWP in the following years prevented the necessary revision of the initial indicators and the definition of precise targets. The project did not carry out a baseline assessment, which makes it difficult to analyse to what extent the project's investments and their use have improved the initial starting situation. So far, the project has produced only one M&E report in March 2017, which only includes quantitative data regarding Output 1.1: the installation of equipment, as well as farmers' opinion regarding NCARE support, quality of contractors work and training provided. No M&E data was provided about: (i) results from the use of the equipment installed before March 2017, (ii) about Outputs 1.2, 2.1, and 2.3, and (iii) about Outcome indicators.	2 – Unsatisfactory
I. IFAD Supervision and Backstopping	While recognizing the value of the support provided by IFAD, NCARE mentioned a number of aspects that have negatively impacted the execution of the project: (i) decision about asking farmers for 25% of cash contribution to match investments cost; (ii) insufficient provision of training to project staff; (iii) insufficient and inadequate technical assistance from consultants with different criteria.	4 – Moderately Satisfactory

J. Complementarity with IFAD Strategies and Policies	The rationale, objective and outcomes of ITPP are well aligned to IFAD's policies. However, despite project design, the project implementation has failed in reaching the target group - PSHF – and consequently in meeting IFAD's Overarching Goal: "Poor rural people overcome poverty and achieve food security through remunerative, sustainable and resilient livelihoods".	4 – Moderately Satisfactory
Overall Rating		**3.3 – Moderately Unsatisfactory**

Annex F

GEF Tracking Tool – Updated for the TER

(Included in a separate file)

Annex G

Economic and Financial Analysis – Working Paper

(Included in a separate file)

Annex H

FORM C-10 - REGISTER OF CONTRACTS

Reporting Period: From Feb 2016 to March 2018

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Contract Serial No.	**Financier**	**Contract No.**	**Percentage of Financing**	**Type of Procurement**	**Description of Works, Goods, Consulting/Other Services**	**Name and Address of Contractor/Supplier**	**Contract Coordinator**	**Date of Contract Signing**	**Contract Duration and Delivery Period**	**Contract Amount (in JOD)**	**Contract Amount (inUSD)**	**Category No. as per the Financing Agreement**	**Reference to the Approved Procurement Plan/AWPB**	**Prior or Post Review**	**Remarks and Date of IFAD 'No Objection'**
CONTRACTS ESTABLISHED FOLLOWING OPEN TENDERS															
1	IFAD	ITPP-G-2015-01B	100%	Agricultral Eqeupment	Fertigation	Fai&Mai company	Finance Minster	09/10/2016	Immediatel y	19 380,00		Goods		Prior	
2	IFAD	ITPP-G-2015-02B	100%	Agricultral Eqeupment	Solar Pumps	Delma Construction Co.	Finance Minster	20/06/2016	113 days	125 000,00		Goods		Prior	
3	IFAD	ITPP-G-2015-03B	100%	Agricultral Eqeupment	Hydroponics	The Eng.Corp for Farming&Trading	Finance Minster	05/02/2018	90 days	45 000,00		Goods		Prior	
4	IFAD	ITPP-G-2015-04B	100%	Agricultral Eqeupment	Aquaponics	The Eng.Corp for Farming&Trading	Finance Minster	29/09/2016	120days	40 470,00		Goods		Prior	
5	IFAD	ITPP-G-2015-05B	100%	Agricultral Eqeupment	Desalination	Almajjara Lkhadraa Company	Finance Minster	23/01/2017	90days	48 800,00		Goods		Prior	
6	IFAD	ITPP-G-05B-2017	100%	Agricultral Eqeupment	Automated Irrigation	Fai&Mai company	Finance Minster	31/12/2017	60days	16 500,00		Goods		Prior	
7	IFAD	ITPP-G-06-2017	100%	Agricultral Eqeupment	Hydroponics	The Eng.Corp for Farming&Trading	Finance Minster	10/10/2017	120Working days	98 750,00		Goods		Prior	
8	IFAD	ITPP-G-07-2017	100%	Agricultral Eqeupment	Solar Systems for Pumping Water In farms	JVZahraEst.Jordan river	Finance Minster		90days		519 870,00	Goods		Prior	
10	IFAD	ITPP-G-08-2017	100%	Agricultral Eqeupment	Fertigation	Fai&Mai company	Finance Minster	14/02/2018	60Working days	114 000,00		Goods			
11	IFAD	ITPP-G-08-2018 Addendum# (1)	100%	Agricultral Eqeupment	Fertigation	Fai&Mai company	Finance Minster		60Working days	36 000,00		Goods			
12	IFAD	ITPP-G-09-2017	100%	Agricultral Eqeupment	Desalination	Almajjara Lkhadraa Company	Finance Minster		120days	55 000,00		Goods			

14	IFAD	ITPP-G-10-2018	100%	Agricultral Eqeupment	Vehicles	Motor vehicle trading Co. & Transjordan Co.	Finance Minster		Two weeks/end of march 2018	73 600,00		Goods			
								1468389,041	948519,0409	672 500,00	519 870,00				
PURCHASE ORDERS															
16	IFAD	Award Decision# 12/2017	100%	electronics	GPS devices	General Computers & Electronics Co	Finance Minster	16/3/2017	4 weeks	1 065,00		Goods			
17	IFAD	Award Decision# 13/2018	100%	Publications	Publications	Al Yamama Press	Finance Minster	18/2/2018		821,00		Goods			
18	IFAD	Award Decision# 62/2016	100%	electronics	Air conditioning	General FROZEN Company	Finance Minster	08/07/2016	a week	539,00		Goods			
19	IFAD	Purchase Order # 239/2017	100%	Office consumables	Office consumables	Baydaa Company	Finance Minster	12/11/2017	Immediatel y	187,20		Goods			
20	IFAD	Purchase Order	100%	Office Furniture	Carpet	Akram Kadimat Company	Finance Minster	03/03/2016	Immediatel y	180,00		Goods			
21	IFAD	Purchase Order	100%	electronics	Refrigerator	Mohamed Naif Company	Finance Minster	31/12/2015	Immediatel y	110,00		Goods			
22	IFAD	Purchase Order	100%	electronics	HP laser jet	COMPUTER SCIENCE HOME	Finance Minster	30/12/2015	Immediatel y	199,00		Goods			
23	IFAD	Purchase Order	100%	Office Furniture	Safe	Afaq Company	Finance Minster	09/07/2016	Immediatel y	300,00		Goods			
24	IFAD	Purchase Order	100%	Office Furniture	Carpet	Akram Kadimat Company	Finance Minster	24/2/2016	Immediatel y	85,00		Goods			
25	IFAD	Purchase Order	100%	Office Furniture	Office Furniture	Afaq Company	Finance Minster	23/2/2016	Immediatel y	495,00		Goods			
26	IFAD	Purchase Order	100%	Office Furniture	Office Furniture	Afaq Company	Finance Minster	04/12/2016	Immediatel y	380,00		Goods			
27	IFAD	Award Decision # 128/2017	100%	Computers	HP Probook 450 G4	COMPUTER SCIENCE HOME	Finance Minster	12/12/2017	Immediatel y	1 460,00		Goods			
28	IFAD	Award Decision # 131/2017	100%	Computers	Epson طابعة l1455 inkjet	COMPUTER SCIENCE HOME	Finance Minster	12/12/2017	Immediatel y	1 500,00		Goods			
29	IFAD	Tender # 3/2016	100%	Computers	Computers	Glory For Technology Services	Finance Minster	07/10/2016	Immediatel y	1 830,00		Goods			
										9 151,20	**12907,19323**				