

Report No: ICR00001338

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(TF-52299)

ON A

GRANT

IN THE AMOUNT OF SDR 3.5 MILLION
US\$ 5.0 MILLION EQUIVALENT

TO THE

HASHEMITE KINGDOM OF JORDAN

FOR A

CONSERVATION OF MEDICINAL AND HERBAL PLANTS PROJECT (CMHPP)

December, 2010

CURRENCY EQUIVALENTS
(Exchange Rate Effective June 30, 2010)

Currency Unit = Jordanian Dinar (JOD)
1.00 JOD = US\$ 1.41
US\$ 1.00 = 0.7 JOD

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AARINENA	Association of Agricultural Research Institution in the Near East and North Africa
CAS	Country Assistance Strategy
CBD	Convention on Biological Diversity
CDD	Community-Driven Development
CEO	Chief Executive Officer
CMHPP	Conservation of Medical and Herbal Plants Project
DOF	Department of Forestry
EMP	Environmental Management Plan
EPP	Enhanced Productivity Program
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
FMR	Financial Monitoring Report
GA	Grant Agreement
GEF	Global Environment Facility
GIS	Geographic Information Systems
GOJ	Government of Jordan
GTZ	Deutsche Gesellschaft fuer Technische Zusammenarbeit
ICARDA	International Center for Agricultural Research in the Dry Areas
ICRR	Implementation Completion and Results Report
IFAD	International Fund for Agricultural Development
IPM	Integrated Pest Management
IPR	Intellectual Property Rights
ISRR	Implementation Status and Results Reportmn
IUCN	International Union for Conservation of Nature
JEPA	Jordan Exporters and Producers Association for Fruit and Vegetables
JFDA	Jordanian Foods and Drugs Agency
JICA	Japan International Corporation Agency
JRF	Jordan River Foundation
JSCD	Jordan Society to Combat Desertification
JSEP	Jordan Society for Environmental Protection
M&E	Monitoring and Evaluation
M/H	Medicinal and Herbal
MHP	Medicinal and Herbal Plants
MENA	Middle East and North Africa
MOA	Ministry of Agriculture
MOED	Ministry of Education
MOENV	Ministry of Environment
MOH	Ministry of Health
MOIT	Ministry of Industry and Trade

MOPIC	Ministry of Planning and International Cooperation
MOU	Memorandum of Understanding
MTR	Mid Term Review
NCARTT	National Center for Agricultural Research and Technology Transfer
NCARE	National Center for Agricultural Research and Extension
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organization
NSAD	National Strategy for Agricultural Development
PAD	Project Appraisal Document
PCD	Project Concept Document
PIP	Project Implementation Plan
PM	Project Manager
PMU	Project Management Unit
RSCN	Royal Society for the Conservation of Nature
SOE	Statement of Expenditures
STC	Special Tendering Committee
TA	Technical Assistance
TOR	Terms of Reference
UNEP	United Nations Environmental Programme
UNDP	United Nations Development Programme

Vice President: Shamshad Akhtar Country Director: Hedi Larbi Sector Manager: Luis Constantino Project Team Leader: Kanta Kumari Rigaud ICR Team Leader Turi Fileccia (FAO/CP)

HASHEMITE KINGDOM OF JORDAN
Conservation of Medicinal and Herbal Plants Project
(CMHPP)

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A. Basic Information			
Country:	Jordan	Project Name:	Conservation of Medicinal and Herbal Plants Project
Project ID:	P069847	L/C/TF Number(s):	TF-52299
ICR Date:	11/15/2009	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	HASHEMITE KINGDOM OF JORDAN
Original Total Commitment:	US\$ 5.0M	Disbursed Amount:	US\$ 4.92 M
Revised Amount:	NA		
Environmental Category: B		Global Focal Area: B	
Implementing Agencies:			
The Ministry of Planning and International Cooperation (through the Enhanced Productivity Programme (EPP))			
The National Center for Agricultural Research and Extension (NCARE)			
Royal Society for the Conservation of Nature (RSCN)			
Co-financiers and Other External Partners:			

B. Key Dates				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	05/09/2002	Effectiveness:		05/23/2003
Appraisal:	01/03/2003	Restructuring(s):	12/07/2009	
Approval:	05/06/2003	Mid-term Review:	11/10/2007	11/12/2007
		Closing:	12/16/2008	06/16/2010

C. Ratings Summary			
C.1 Performance Rating by ICR			
Outcomes:		Moderately Satisfactory	
Risk to Global Environment Outcome		Moderate	
Bank Performance:		Moderately Satisfactory	
Borrower Performance:		Moderately Satisfactory	
C.2 Detailed Ratings of Bank and Borrower Performance			
Bank	Ratings	Borrower	Ratings
Quality at Entry:	Moderately Satisfactory	Government:	Moderately Unsatisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory

Overall Bank Performance:	Moderately Satisfactory	Overall Borrower Performance:	Moderately Satisfactory
C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	Indicators	QAG Assessments (if any)	Rating
Potential Problem Project at any time (Yes/No):	Yes	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA):	None
GEO rating before Closing/Inactive status	Moderately Satisfactory		

D. Sector and Theme Codes		
	Original	Actual
Sector Code (as % of total Bank financing)		
General agriculture, fishing and forestry sector	100	100

Theme Code (as % of total Bank financing)		
Biodiversity	50	50
Gender	25	25
Other environment and natural resources management	25	25

E. Bank Staff		
Positions	At ICR	At Approval
Vice President:	Shamshad Akhtar	Jean-Louis Sarbib
Country Director:	Hedi Larbi	Joseph P. Saba
Sector Manager:	Luis F. Constantino	Salah Darghouth
Project Team Leader:	Kanta K. Rigaud	Nicole Glineur
ICR Team Leader:	Turi Fileccia (FAO/CP)	
ICR Primary Author:	Turi Fileccia (FAO/CP)	

F. Results Framework Analysis

Global Environment Objectives (GEO) and Key Indicators (as approved)

The Global Environmental Objective (GEO) is the improved conservation and sustainable use of Medicinal and Herbal (MH) plants (several of which are rare and endemic, and thus of global importance) at the national and the local levels through achieving specific targets over and above the baseline scenario: (i) establishing a framework of M/H (medicinal/herbal) plant biodiversity conservation and management; (ii) strengthening institutions and implementing a coordination program; (iii) promoting in-situ conservation and sustainable use of M/H plants in 2 pilot sites; and (iv) designing and implementing a communication strategy.

Revised Global Environment Objectives (as approved by original approving authority) and Key Indicators and reasons/justifications

(NA)

(a) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	A framework for M/H plant biodiversity conservation and management is established.			
Value (quantitative or Qualitative)	No system exists	Framework established	N/A	A framework is available. At project completion, a permanent institutional focal point of a National Program on MH is being appointed at NCARE; the institution is acknowledged by all stakeholders. A governing Program Committee is being established that includes all key partners: MOPIC-EPP/RSCN/NCARE/JRF and JEPA.
Date achieved	01/03/2003	05/06/2003		06/16/2010
Comments (incl. % achievement)	The foundations of a functional framework have been created. At project completion, the momentum is high. The focal point (NCARE – Biodiversity Directorate) has its own operational budget; an action plan is being prepared; MOPIC-EPP is devoting one of its poverty alleviation budget lines with an allocation of 0.5 million JD to the Program. All stakeholders appreciate this solution. The Program Committee (PC) would be chaired, <i>ad-interim</i> , by MOPIC-EPP, and subsequently the stakeholders will select a permanent chair. The PC will have to seek further financing means for a medium term action plan. Achievement: 80%.			
Indicator 2 :	Institutions strengthened for implementing a coordination program.			
Value (quantitative or Qualitative)	Some capacity exists at individual institutions' level (RSCN and NCARE).	Project partners' institutional capacity is strengthened, and the level of	N/A	Institutional capacity has been highly strengthened by the project at each individual institution's level. All stakeholders acknowledge the

		coordination in implementing is established.		value of a sustained coordination mechanism. Post-project coordination will have to be ensured through the appointed focal point and by the specifically established (at the end of the project) Program Committee. Strategic links with local, regional and international institutions are developed.
Date achieved	01/03/2003	05/06/2003		06/16/2010
Comments (incl. % achievement)	The participating institutions have boosted their individual human resource base, technological and management capacities. These have also been exposed to a long interaction and coordination experience, which appears to go beyond the existence and achievements of the Project Management Unit (PMU). Cooperative agreements with national institutions and universities; with Lebanese and Palestinian stakeholders, and with ICARDA and the Association of Agricultural Research Institution in the Near East and North Africa (AARINENA) have been developed. A phased exit strategy of the coordination mechanism through the PMU should have been foreseen in the project design. Achievement: 80%.			
Indicator 3:	In-situ conservation and sustainable use of MH plants in 2 pilot sites promoted.			
Value (quantitative or Qualitative)	Biodiversity conservation culture available (but not MH plant specific) only at one site (through RSCN), including baseline survey data collected.	MH plants <i>in-situ</i> conservation and <i>ex-situ</i> sustainable use are promoted in the Mujib Reserve area (and surroundings) and in the Central Upper Slopes of the Jordan Rift Valley.	N/A	<i>In-situ</i> conservation capacity in the Mujib reserve for MH plants is highly enhanced and consolidated through physical, system-type and human resources investments; <i>in-situ</i> conservation of MH plants in the Central Upper Slopes of the Jordan Rift Valley is promoted at 12 hotspots including <i>ad hoc</i> physical, system-type and human resources investments. Shared responsibilities have been formally agreed for a sustained monitoring program among concerned stakeholders (who are site-specific responsible). Mujib reserve sustainable use of MH plants is promoted with two individual small farmers

				<p>and an unspecified number of households who grow MH plants in their home gardens; with a cooperative farming society of 128 members; and through a long term agreement on grazing rights with a small ruminants herders' society of 35 members (~ 500 households).</p> <p><i>Ex-situ</i> to Central Upper Slopes and around hotspots sustainable use is promoted with 23 poor families and 3 small farmers.</p> <p>In addition, sustainable MH plants business promotion has been undertaken with 9 NGOs, and about 58 farmers under rainfed conditions. Support has also been provided to 10 champion medium/large scale farmers for export-oriented MH plant cropping. Organic farming is being promoted.</p>
Date achieved	01/03/2003	05/06/2003		06/16/2010
Comments (incl. % achievement)	<p>Undoubtedly, the highest achievement of the project both in terms of conservation as well as for sustainable use capacity. Many experiences may be categorized as best practices that carry a value that goes beyond the project. Achievement: 100%.</p>			
Indicator 4:	Communication strategy designed and implemented			
Value (quantitative or Qualitative)	Strategy unavailable	Strategy available	N/A	<p>The promotion of public awareness on a national scale through the implementation of formal and informal education and awareness initiatives in all aspects of M/H plants conservation and sustainable use is widely acknowledged as achieved.</p>
Date achieved	01/03/2003	05/06/2003		06/16/2010
Comments (incl. % achievement)	<p>The PAD does not specifically articulate on indicators and modalities for achieving the target of a formal strategy. A proper and formal strategy document has actually not been elaborated. Undoubtedly, a strategy has <i>de facto</i> been implemented and the arena</p>			

of stakeholders has been enlarged including government and non-government institutions, private sector and civil society, who are now widely aware of the importance of this sub-sector and are actively participating in the conservation and sustainable use of M/H plants in Jordan.

Achievement: 80%.

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Number of in-situ and ex-situ conservation sites established with rare and endangered species recorded and protected.			
Value (quantitative or Qualitative)	Baseline botanical information available for Mujib Reserve.	Rift and Mujib Pilot conservation sites are established with rare and endangered species recorded and protected. Ex-situ cultivation trails of MH plants established.	N/A	<p>Baseline update and a <i>ad hoc</i> botanical survey performed: 554 species recorded including 221 MH plants in the Upper Slopes (5 new- to Jordan flora - rare species identified and two new families registered); and 412 species recorded in Mujib, of which 146 are MH plants. Database, genebank and herbarium for MH plants implemented.</p> <p>Threatened species and source of threats identified; management plans for <i>in-situ</i> conservation finalized.</p> <p>Rehabilitation through replanting initiated. Signs of vegetation recovery in the enclosures, evident.</p> <p>Community-based and farmer-centered support programs implemented.</p>
Date achieved	05/23/2003	06/30/2007		06/16/2010
Comments (incl. % achievement)	Conservation and associated management plans and their implementation are most evident achievements of the project. It is unfortunate that those related to the Central Upper Slopes have occurred at a somewhat late stage of the project, which otherwise			

	might have shown realizations beyond expected targets. Achievement: 90%.			
Indicator 2:	Level of public awareness & education in environmental topics related to promoting pro-conservation cultivation and production practices.			
Value (quantitative or Qualitative)	NA	Environmental education delivered to communities and schools. Training and public awareness campaigns including those for women implemented	N/A	<p>A significant level of environmental education has been delivered through different means and media.</p> <p>About 4500 students have been made aware and have knowledge about MH plants. An educational garden on rare and threatened MH plants has been established at Mujib reserve RSCN HQ open to school students; a lab on conservation, utilization and extraction MH plants oils is also available therein. In the Central Upper Slope areas, 5 gardens have been created, attached to local schools, adjacent to Hot spots.</p> <p>As a beyond target achievement, textbooks and curricula have been developed and endorsed by the Ministry of Education, and thus included at primary (from grade 3 to 12) and agricultural professional school levels.</p>
Date achieved	05/23/2003	12/16/2009		06/16/2010
Comments (incl. % achievement)	<p>Much training and awareness-raising has been done, and a curriculum for nationwide teaching has been developed. All such activities have <i>de facto</i> constituted the communication and knowledge management thrust on MH plants brought forward by the project. People of Jordan are more aware of MH plants' value and a wider group of stakeholders now exists in the country. Achievement: 100 %.</p>			

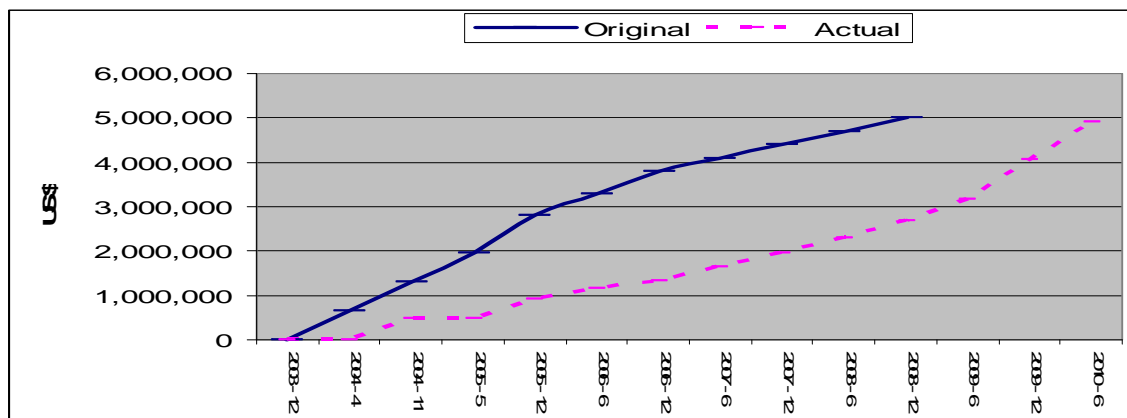
G. Ratings of Project Performance in ISRs¹

No.	Date ISR Archived	GEO	IP	Actual Disbursements (US\$ millions)
1	12/08/2003	Satisfactory	Satisfactory	0.00
2	04/28/2004	Satisfactory	Satisfactory	0.25
3	11/11/2004	Satisfactory	Satisfactory	0.49
4	05/06/2005	Satisfactory	Satisfactory	0.49
5	12/21/2005	Satisfactory	Satisfactory	0.92
6	06/22/2006	Satisfactory	Satisfactory	1.15
7	12/20/2006	Satisfactory	Satisfactory	1.33
8	06/28/2007	Satisfactory	Satisfactory	1.65
9	12/13/2007	Moderately Satisfactory	Moderately Satisfactory	1.96
10	06/26/2008	Satisfactory	Satisfactory	2.31
11	12/29/2008	Satisfactory	Satisfactory	2.69
12	06/21/2009	Moderately Satisfactory	Moderately Satisfactory	3.16
13	12/22/2009	Moderately Satisfactory	Moderately Unsatisfactory	4.06

H. Restructuring (if any)

Not Applicable

I. Disbursement Profile



¹ It is to be noted that a six points rating system (adding two intermediary categories MS= moderately satisfactory; and MU= moderately unsatisfactory) was introduced only in late 2007. Before that and since 1999, a four point system (including, HS= highly satisfactory; S= satisfactory; U= unsatisfactory; HU= highly unsatisfactory) was in use. The unavailability of intermediary categories (MS and MU) has influenced the actual ratings provided in the ISRRs of the CMHPP till June 2007.

1. Project Context, Global Environment Objectives, and Design

1.1 Context at Appraisal

Jordan's flora is rich and diverse, including four bio-geographical regions and thirteen vegetation types. The country's strategic location at the junction of three continents: Europe, Asia and Africa, further enhances its global bio-diversity importance. Medicinal and herbal (M/H) plants are distributed from the eastern desert to the western highlands and from the semi-arid north to the extremely arid south, covering roughly 20 percent of Jordan's rangelands and forest areas. The importance of these plants as a source of preventive and/or curative health value (for both people and livestock) as well as herbs for food preparation is well recognized by Jordanian people. A total of 485 species of medicinal plants, which belong to 330 genera and 99 families have been reported including several rare and endemic, thus of global importance².

The Government of Jordan (GOJ) signed the Convention on Biological Diversity (CBD) since 1992. A National Environmental Action Plan (NEAP) was prepared in 1996, and in 1998 the Government, in collaboration with UNEP and UNDP, prepared the Country Biodiversity Study; the purpose of the study was to ensure the conservation of the broadest range of biodiversity and its rational use. In December 2002, GOJ endorsed the National Strategy for Agricultural Development (NSAD) for the decade ending in 2010. The strategy highlights the importance of conserving and expanding M/H plants in environmental and production systems. Despite the general commitment of Government reflected in all referred documents, there was inadequate knowledge concerning species that are used, their distribution, modalities of collection and on prevailing threats on M/H plants. As for species which are cultivated, while there is evidence of an increased domestic demand, information on how demand is satisfied, on businesses and on trade is largely unreliable.

Thus, the Conservation of Medicinal and Herbal Plants Project (CMHPP) was conceived to start operationalizing the country's global commitments and as the first initiative to address conservation issues of M/H plants. Specifically, the Project was also designed to seek GoJ's poverty reduction and rural development objectives. Jordan's authorities are well aware of the importance of prudent management of scarce natural resources, which is why one of the four 2003 Bank Country Assistance Strategy (CAS) pillars included "improving water resource management and environmental protection" to which the project contributes. The Bank and the GEF have collaborated with GOJ in implementing a number of conservation activities (Strengthening of RSCN and Conservation of the Dana Wildlands Project; the Gulf of Aqaba Environmental Action Plan Project; and the "Second Tourism Development Project). Thus, the Bank's involvement in the GEF-assisted M/H plant projects would have allowed valuable lessons to be incorporated into the proposed project and affords the opportunity to promote an exchange of ideas, facilitate cross-fertilization with other GEF projects and create an M/H plants network. The Project's objectives were also consistent with GEF's Operational Strategy for Biodiversity, GEF's Program 1 on "Arid and Semi-Arid Zone Ecosystems", as well as Program 13 for the "Conservation and Sustainable Use of Biological Diversity Important to Agriculture". Besides few exceptions, an assessment on the state and use of M/H

² The endemic species include: *Iris petrana*, *Cousinia dayi*, *Plantago maris-mortui*, *Crucianella transjordanica*, *Centaurea procurrens*, *Scrophularia nabataerum*, *Tamarix tetragyn*, and *T. palaestina*. Rare species include: *Adiantum capillus-veneris*, *Sternbergia clusiana*, *Pistacia atlantica*, *Caralluma aaronis*, *Pergularia tomentosa*, *Equisetum ramosissimum*, *Crocus moabiticus*, *Micromeria sinaica* (endemic; also on IUCN list), *Teucrium leucocladum*, *Ajuga chamaeipyitis*, *A. iva*, *Lavandula pubescens*, *Withania obtusifolia* and *W. somnifera*. (Oran and Al-Eisawi, 1994)

plants of the larger Mediterranean area was yet lacking and thus the survey provided by the project would contribute significantly towards the global goal of developing a conservation and sustainable use strategy for this important group of plants.

1.2 Original Global Environmental Objectives (GEO) and Key Indicators (*as approved and stated in the PAD*)

The **Global Environmental Objective** is the **improved conservation and sustainable use of M/H plants (several of which are rare and endemic, and thus of global importance) at the national and the local levels** through achieving the following targets over and above the baseline scenario: (i) establishing a framework for M/H plant biodiversity conservation and management; (ii) strengthening institutions and implementing a coordination program; (iii) promoting in-situ conservation and sustainable use of M/H plants in 2 pilot sites; and (iv) designing and implementing a communication strategy. Accordingly, the **Project Development Objective (PDO)** is to **design and test models to improve the conservation of medicinal and herbal plants and the livelihood of the communities**; through the management and sustainable use of MH plants for human and livestock needs in the Mujib Nature Reserve and the Central Upper Slopes of the Rift Valley (the two project sites) in Jordan while ensuring effective in-situ protection of threatened habitats and ecosystems in these areas.

The project's agreed **key performance indicators (KPI)** are:

- a. Capacity established to sustainably manage the wild genetic resource base of MH plants (linked to GEO i/ii);
- b. Threats to MH species are diminished and key biodiversity areas are identified and protected (linked to GEO iii);
- c. A database, gene pool and monitoring system are established and operational (linked to GEO i/iii);
- d. Active participation of communities in conservation, management and income generating programs established in project areas (linked to GEO ii/iii);
- e. Livelihoods of rural communities improved (linked to GEO iii/iv);
- f. Public awareness, including environmental education of MH plants improved (linked to GEO iv).

1.3 Revised GEO (*as approved by original approving authority*) and Key Indicators, and reasons/justification. **N/A**

1.4 Main Beneficiaries

At the global level and national level, benefits would accrue from: (a) the protection of endangered, particularly endemic species, (b) the sustainable use of M/H plants and natural habitats, (c) improved agro-pastoral practices, (d) better water management and reduced erosion, (e) enhanced capacity building of government agencies, research institutes and communities, and (f) income generation for disadvantaged communities. At the regional level, the project would promote an exchange of ideas and thus build capacity in dealing with the protection of M/H plants. Also, there would be a gene pool and a source of material to expand the production of endangered or rare M/H species in Jordan and the region. Direct

beneficiaries would be the rural communities living in and around the project sites³, which include the poorest segment of the population. Project investments in terms of on-farm improvements, guidelines for plant management, and marketing channels would target farmers with a special focus on women, who are the most important producers and processors of M/H plants.

1.5 Original Components (*as approved*)

Component 1: Institutional Strengthening (US\$2.54 million). This component is designed to strengthen the institutional and technical capacity of key players. It would: (a) develop and provide an organizational mechanism for project implementation *via* a Project Management Unit (PMU); (b) develop inter-sector links among government and public bodies, NGOs, the pharmaceutical industry, consumers, and producers; and regulatory instruments; (c) develop intellectual property rights (IPR) policy and guidelines for indigenous knowledge and use of M/H plants for medical and other purposes by humans and livestock; (d) establish health and safety standards for M/H plants and products; (e) establish a national M/H plants database/GIS and plant gene bank and herbarium collection; and (f) capacity building through designing and implementing a training program. (Links with KPI a. and c.)

Component 2: Pilot-Sites Conservation (US\$6.92 million). This component was designed to effect *in-situ* conservation and use of M/H plants; and to support *ex-situ* cultivation to relieve *in-situ* pressure. Two pilot areas are targeted for *in-situ* conservation project activities: (a) the Mujib Nature Reserve adjacent to the Dead Sea, and (b) and the Central Upper Slopes of the Rift Valley covering the Madaba area. Activities at the two sites, under healthy competition bases, are implemented respectively, by the Royal Society for the Conservation of Nature (RSCN) and by the National Center for Agricultural Research and Extension (NCARE)⁴. *Ex-situ* cultivation was planned to involve: (a) villagers/farmers for on-farm pilot crop propagation and cultivation trials of M/H plants, and (b) pilot-prototype farm demonstrations at ECOHERB Farms of Jordan including IPM, organic farming, contract farming and adoption of internationally acknowledged processing standards practices. (Links with KPI b., d. and e.)

Component 3: Public Awareness and Education (US\$1.25 million). This component includes the development of public education (including school and college curricula) and mass awareness campaigns on the relevance of conserving and managing Jordan's M/H plants and their importance in the country's biodiversity. It consisted of two sub-components: (a) environmental education, and (b) public awareness. (Links with KPI f.)

Component 4: Income Generation Activities (US\$3.5 million): M/H Quality Enhancement, Product Development. The purpose of this component is to add value to M/H plants for local use and exports by producing organically-grown and certified plants, ensuring proper handling and grading of M/H plants and using the correct processing procedures to ensure quality products. Three sub-components are included: (a) standardization of M/H plants raw

³ A total of seven villages are located on the edges of the Mujib reserve with a total population of about 20,000. In the Central Upper Slopes of the Rift Valley, the main locations are Irbid, Ajloun-Jerash, west of Amman to Salt, with an estimated population of 1.5-2 million people (Department of Statistics of the Hashemite Kingdom of Jordan).

⁴ The National Center for Agricultural Research and Technology Transfer (NCARTT) became NCARE in 2007.

materials and processing, (b) product promotion, and (c) facilitating access to micro-credit. (Links with KPI d. and e.)

1.6 Revised Components. **The original project components were not revised.**

1.7 Other Significant Changes

The Grant Agreement was signed on May 23, 2003 with project effectiveness on June 16, 2003. The actual launch workshop was organized only on April 12, 2004. This delay was due to deferred decision regarding the Implementing Agency house (eventually confirmed at EPP of MOPIC) and as a related matter, to the postponed appointment of a Project Manager (01/2004) and of the PMU (completed on 01/2005). The PAD identified private sector partner (ECOHERB) for the *ex-situ* conservation work (Component 2) was considered unsuitable by MOPIC and was replaced by another player on 10/2005. The Project Technical Committee (PTC) was not formed; and the coupling of an international expert to the Project Manager (PM) of the PMU as envisaged in the PAD never occurred. Differently, the PMU availed itself of technical advice as required, through *ad hoc* consultancies.

A first revision of the Grant Agreement (GA) was requested on July 5, 2005 and effected on May 8, 2006. In the original GA the incremental operating costs were limited to “office furniture and supplies, audit costs, and local transportation”. This list was a constraint and the first Amendment of the GA relieved this constraint by including several other types of expenditures. A second revision, reallocation of proceeds, was requested by the Government on June 26, 2007 in order to better achieve the stated project objectives. This was discussed during the Mid-Term Review (MTR). At that point (12, 2007/01/2008), only US\$ 1.9 million of the total grant amount had been disbursed. The reallocation was approved on March 19, 2008, after approval of MTR conclusions. A third and final reallocation of the grant proceeds was agreed on March 5, 2009. An extension of the closing date from December 16, 2008, to December 16, 2009 but further extended to June 16, 2010 was effected on December 7, 2009 (through a Restructuring Paper), based on a revised procurement and action plan and with the expectation that thereby some crucial planned activities could be completed.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

The Project was prepared over the course of a four-year period 1999-2003, starting from a Government request for a project and a subsequent PDF-B preparation grant phase (through several studies and surveys), which enabled the definition of the project context and an ample set of baseline data and information. The design responded well to the needs and comparative advantage of the country in focusing on this important conservation task and interesting niche market related to M/H plants. This was a pioneering project; background analyses were sound; and the rationale for Bank management and for GEF of the grant was also strong. The first three components were ambitious but well designed. However, the inclusion of a full-fledged fourth component – Income Generating Activities –, which aimed at boosting the M/H plant related business through standardization, product development and financing instruments, was overambitious. This investment would have been better positioned with a more mature sub-sector situation. Differently, the piloting nature of the initiative may have as well included lighter M/H plant business trials attached to the 2nd (with the *ex situ* activities) or to the 3rd (together with the public awareness and education activities) but avoiding the risk of adding management complexities to an already elaborate project. Indeed, component-related problems arose at the very start. With this realization by project implementers, an early or even later – when the issue became manifest – restructuring of the project components would have probably been beneficial.

The Project Appraisal Document (PAD) structure and outline belongs to an older generation of projects. Similarly, the Project Design Summary therein contained⁵ does not follow the more modern arrangement of a Results Management Framework (RMF). This has involved a difficult re-alignment of the design and agreed indicators to the actual outcomes realized by the project. The lack of RMF-structured baseline data, and the availability of substantially output-oriented indicators somewhat limits the straightforward assessment of project achievements. Nevertheless, the project must eventually be assessed against its original main six PDO KPIs and GEO targets/indicators, while any other system is to be considered of a forcing nature.

Most stakeholders in Jordan and the World Bank attribute the most significant design weakness as that related to the implementation arrangements, and to the decision to place the PMU into the EPP of the MOPIC. Alternative options (NGOs, Ministry of Agriculture) were explored but it is similarly an unanimous conclusion that at the time the decision was taken, the selected option was the most suitable in terms of both operational and counterpart financing readiness. The decision to directly involve RSCN and NCARE in project implementation was sound, since these institutions had technical knowledge and interest. However, given the global objectives of establishing a permanent program management framework and of strengthening the participating institutions who would eventually be assigned a permanent task, a planned exit strategy from PMU-centred operations should have been foreseen at design stage.

2.2 Implementation

No major factors outside government or implementation agencies' control occurred during project life, with the only exception of the poor performance of the substitute private sector partner in charge of key *ex situ* activities, who had been selected after the decision to discard the one that had been identified at appraisal⁶. Otherwise despite the specified milestones in the GA, the principal implementation agency EPP-MOPIC, significantly delayed the appointment of the PM and of the PMU, and as a consequence the launch workshop was only held April 12-13, 2004; almost one year after project effectiveness while PMU staff were all hired during 2004 and 2005. Overall, due to the late activation of the project's main implementation conduit –the PMU–, the project suffered an operational delay of about two years after its effectiveness. As a result, during this period but also afterwards, too many operational decisions were actually placed with the chair of the Project Steering Committee (PSC) who has been represented by the Secretary General (SG) of MOPIC throughout project life (5 officials have succeeded to the role of SG during CMHPP). Undoubtedly, implementation task decisions were attributed to higher coordination and policy making positions which could not guarantee required and efficient follow-up capacity. Typically, the importance of the PSC in the case of the CMHPP is even more crucial than in normal circumstances as it brought together, with voting powers, the CEOs of all involved implementing agencies (NCARE, RSCN, the private sector representative, the PM and the SG). During CMHPP's life, the PSC meetings occurred with an irregular frequency: highest till 2006, *nihil* in 2007, lowest from 2008 till mid-2009, and normalizing only then onwards to project completion. This has led to inadequate management efficiency and has allowed insufficient flexibility of the PM and the

⁵ See Annex 1, Project Design Summary of the Project Appraisal Document (PAD), Report No: 25468-JO dated March 20, 2003.

⁶ After MOPIC's decision to cancel ECOHERB FARMS JORDAN's participation to the CMHPP another company, IRIS-Pindstrup was contracted. This company highly underperformed and its contract was eventually terminated after one year, wherein the decision was taken to focus on Champion Farmers.

PMU as envisaged in the PAD. On the contrary, the lack of a functional PSC has *de facto* belittled the leadership of the PM, which at times appears to have had a mere executive role of MOPIC decisions.

The CMHPP was a complex undertaking at all times in terms of both project activities and implementation arrangements. Risks and issues have been identified during Bank supervision missions and flagged out in the Implementation Status and Results Reports (ISRRs). However, it was only during MTR that all outstanding technical and implementation issues were systematically identified and mitigation measures and recommendations were agreed upon among parties. From then onwards albeit belatedly, and thanks also to a more attentive supervisory activity on the part of the Bank, the CMHPP overall management acquires an increased efficiency, including improved participatory processes among the concerned implementing agencies.

Procurement and disbursement (see Disbursement Profile) was less efficient particularly at the early stages of the project. The lack of EPP's experience in channeling GEF/Bank funds was a further issue. Bank and GOJ's procurement provisions and the implementation complexity of the project that had a multi-agency structure would have justified a different set-up whereas ad hoc procurement power delegations are given to actual implementers from the very start. As regards to financing (see Annex1, Project Costs and Financing), the PMU estimates that 72.2 percent of total baseline costs (or 68.5 percent of total financing required, when contingencies are included) have been made available for project expenditures. Out of the total available GEF sources, 98.4 percent have been spent. With respect to GOJ only EPP, NCARE and to a lesser extent JEDCO, have contributed up to 30.8 percent of the contributions estimated at appraisal stage. Contributions from other public sector entities though never materialized. Nevertheless, even after the withdrawal of the appraisal-stage identified private sector partner (ECOHERB FARMS JORDAN), involved Jordanian parties (mainly RSCN but including beneficiaries and other private sector participants [JRF, JEPA, Champion Farmers]) have contributed 120.9 percent of what was estimated at appraisal.

Project implementation was delayed significantly, causing the postponement of the completion date by 1.5 years. Although by and large, CMHPP has implemented all foreseen investments, many activities were hurried during the last year of its life, hindering its capacity to show evidence on actual impacts.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

Although the PAD stated that “a well-designed M&E system is critical to ensure the project's timely and successful implementation and to enhance its impact through a systematic analysis of lessons learned and their effective dissemination”, the design was not consistent in providing specific investments to this end. Nevertheless, a simplified M&E system was set up by a dedicated PMU specialist recruited by mid-2005. This included straightforward M&E mechanisms at the PMU, and replicated at NCARE and RSCN. The M&E system enabled the monitoring of the four components and their sub-components, and the PMU provided Quarterly Progress and Annual Reports in a timely manner. The summary of monitoring results against each component is provided in Annex 2.

An excel-based MIS was also created but not maintained due to the termination of the M&E specialist's contract ahead of project completion. The project e-filing system has not been structured adequately and did not allow the electronic archiving of documents and reports generated by the project. The project paper archive is reported to be eventually transferred to NCARE. An elementary but not-professional project website was created by project staff but with little maintenance and updating.

Annual beneficiary surveys were not undertaken, but a general assessment was made during a stakeholder workshop held in November 2009. The PAD-recommended scientific surveys to be undertaken every two years “to monitor M/H plants and the farming systems, and evaluate changes” are carried out only once. The six indicators identified in the PAD for purposes of tracking progress are not related to quantity-based targets, are somewhat qualitative in nature and do not easily lend themselves to periodic monitoring. The botanical surveys have highlighted the threats on MH plants, which offer the benchmarks to be regularly monitored (in the Mujib reserve and at the 12 Hotspots of the Central Upper Slopes). A Rangeland Survey concluded that grazing pressures in the Mujib Reserve have decreased (on file).

The GEF’s biodiversity tool was applied in July 2008, repeated in May and in September 2009, and again at closing of the project in June 2010. These allowed for the tracking on the achievements of the project for biodiversity aspects. The findings show that there was a slight increase in biodiversity between the first two points in time and that it held basically steady between May and August of 2009.

2.4 Safeguard and Fiduciary Compliance

The project was classified as Environmental Category B, and it therefore has an Environmental Management Plan (EMP), which is dated October 2002, and which includes environmental mitigation and M&E measures. An in depth review in February 2008 found general compliance of the Project with the EMP.

Financial management assessments by the Bank took into consideration audit, reporting, budgeting, staffing, and flow of funds issues. This was judged as satisfactory. Regarding the audits, all audit reports were submitted to the Bank with clean opinions. For the 2008 audit report, the Bank requested some modifications, which were addressed satisfactorily. According to the design of the PMU, there was one person responsible for both procurement and financial management. The Bank flagged this issue during the MTR in the fall of 2007, viewing it as a possible conflict of interest. The matter was resolved in November 2008 when a part-time F&M Specialist was appointed, who was retained till December 2009.

Although procurement procedures under CMHPP were not *per se* particularly complex, problems often arose during project implementation. Despite the fact the GA contained additional provisions to be followed when conducting national competitive bidding, throughout the project period both the World Bank procurement guidelines as well as those of GOJ were applied. To this end, a Special Tendering Committee (STC) was instituted. Abiding to dual provisions led to significant delays. Work plans and activity plans underwent frequent changes, requiring update approvals by the PSC chair and, when needed, Bank no-objections. Moreover, the PMU could not submit timely the updates of the procurement plan because of unaligned STC administrative internal clearances.

2.5 Post-Completion Operation/Next Phase

The foundations of a functional framework for MH plant biodiversity conservation and management have been created through the project. At project completion, the momentum is high and a permanent institutional focal point of a national program on MH is being appointed at NCARE. The institution is acknowledged by all stakeholders. A governing Program Committee is being established that includes all key partners: MOPIC-EPP/RSCN/NCARE, the Jordan River Foundation (JRF) and the Jordan Exporters and Producers Association (JEPA)⁷. The designated focal point (NCARE – Biodiversity

⁷ JRF and JEPA were not Implementing Agencies but became important partners in the implementation of the 4th project component.

Directorate) has its own operational budget, and a 12-month action plan is being prepared. MOPIC-EPP is devoting one of its poverty alleviation budget lines with an allocation of 0.5 million JD to the program. The Program Committee (PC) would be initially chaired, *ad-interim*, by MOPIC-EPP, and subsequently the stakeholders will select a permanent chair. The PC will have to seek further financing means for a medium term action plan.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

The Government attaches high priority to the biodiversity conservation agenda. The Project's objectives remain highly relevant to Jordan, even more than in 2003. During the project period, Jordan's tourism in general and the ecotourism industry in particular has expanded significantly, amounting now to over 10 percent of GDP (2009). In a way, the M/H project is strengthening Jordan's reputation and image as a conservation-oriented destination. In this respect, conservation societies (such as RSCN) who also have a role as ecotourism operators are using M/H plants to promote country's image. In addition, marketed fresh herbs have increased from 15,000 tons in 2004 to about 27,000 tons in 2009⁸, while exports although on a slight increase are still at low volumes. Hence, there was and there continues to be a high domestic demand for M/H plants, which are part and parcel of the local culture in food preparations and in the therapy of human and livestock illnesses and diseases. This is well documented in many papers and documents produced by the CMHPP (see Annex 9).

Conservation and sustainable use of M/H plants are indeed part of the country's development strategy (NSAD, National Poverty Alleviation Strategy, National Strategy for Youth, Childhood National Plan, National Desertification Strategy, etc.); and importantly, the objectives of the project are aligned to its Environmental Strategies (National Environmental Strategy, National Biodiversity Strategy Action Plan), and contribute towards taking action on the country's global commitments (CBD, UNFCCC, UNCCD, Agenda 21).

At the same time, over-harvesting, increasing grazing pressure and urban/agricultural encroachment over natural habitats need full understanding of their effects on biodiversity in general and on M/H plants' population in particular. Also needed are systems in place to sustainably conserve/protect/monitor natural flora and grow plants for cultural and commercial uses. Moreover, Jordan has one of the world's lowest levels of water resources availability, and the Kingdom's water per capita amount (140 cubic meters per year) represents around 14 per cent less than the world's water poverty line. In the view of the institutional stakeholders (Ministry of Agriculture, MOPIC, MOENV, etc.), ICARDA, concerned non-governmental institutions (RSCN, JRF, JEPA) and the international community in Jordan (FAO, WB, USAID), growing M/H plants has important potential as a means against water scarcity (less demanding than widely cultivated vegetables) and as a niche market both for the local market and for exports (including income generation for poor segments of the society through value additions). Typically, the project also responds to the CAS goal of poverty reduction in that (i) commercialisation of M/H plants and their health-care uses are key components of GOJ's poverty alleviation objectives; and (ii) project sites are located in marginal areas where poverty issues prevail. To this end the location of the project in EPP, which program oversees actions in the poverty pockets of the country, has certainly been functional.

A sound diagnosis of the issues was made during PDF-B and project preparation phases. The design was highly relevant to stated objectives in terms of project components, investments

⁸ Source JEPA; data of Amman, Zarqa and Irbid wholesale markets.

and implementation arrangements but with few redundant elements. A slightly lighter design and a different balance of sub-components and activities would have avoided complexities without lessening the project's overall capacity to meet its objectives.

3.2 Achievement of Global Environmental and Project Development Objectives

Given that the CMHPP is supported by GEF, the project achievements have been assessed against both the GEO *four* targets/indicators and the PDO *six* key performance indicators contained in the PAD. As discussed (see Data Sheet), (i) the foundations of a functional framework for M&E of plant biodiversity conservation and management have been created (80% achievement); (ii) the participating institutions have boosted their individual human resource base, technological and management capacities (80% achievement); (iii) the highest achievement of the project has been both in terms of conservation as well as for sustainable use capacity of M/H plants (100% achievement); and (iv) although a formal strategy document has actually not been elaborated, a strategy has *de facto* been implemented and the arena of stakeholders has been enlarged (80% achievement).

The PDO was aligned to the GEO. The project had to pilot models to improve the conservation and sustainable use of M/H plants while also ameliorating the livelihood of local communities. The project's achievements towards the objectives are hereafter discussed against the six foreseen key performance indicators (see Annex 2 for details).

Key Performance Indicator #1: Capacity established to sustainably manage the wild genetic resource base of M/H plants.

Capacity at the level of the two main designated Implementing Agencies (RSCN and NCARE) was established to enable their faculty for *sustainable management* of the wild genetic resource base. This was done by increasing or developing the **human resources** of the two entities. RSCN has retained most of the staff which had been specifically recruited during the project (a M/H plant socio-economist - a function the NGO was lacking- and five ladies specialized in M/H plant processing); and has even absorbed staff that had worked in the PMU (the Training and Awareness specialist). The NGO has also improved the qualifications and expertise of the staff involved in project activities (and has assigned higher corporate responsibilities to staff that performed during CMHPP) and is now in better condition to manage conservation activities in the Mujib reserve and to interact with the communities living in the surroundings. In the case of NCARE, the five staff which had been seconded to project activities including to the PMU (the M&E specialist), now constitute the core resources that *inter alia*, will manage the 12 hotspots established, the database, the genebank and the herbarium, the advisory activities with farmers and local communities, and M&E functions. On top of this, about 50 percent of the M/H plant-related research grants (18) promoted⁹ by the project have allowed the upgrading of NCARE research staff to MSc and PhD degrees. The CMHPP has also provided significant **physical and system-type investments** at the organizations' headquarters and on-site levels, which have increased their overall capacities (building infrastructure, site protection fencing, water harvesting and electricity, mobility means, communication and visual devices, monitoring equipment, etc.). Important instruments have been realized by the project such as: the Intellectual Property Rights (IPR) policy guidelines; and the Health and Quality M/H plants' and products' Standards; enlargement of the institutional stakeholder arena in this area by organizing specific endorsing committees (i.e. MOA, MOIT, MOH, MOPIC and the Jordanian Food and Drugs Agency [JFDA]). All such capacity is expected to allow the sustained functioning of the future M/H Plant National Program to be established within NCARE, and overseen by a specific Program Committee.

⁹ At least one of such research works is a candidate for a special award due high scientific value of the thesis on antioxidant properties of hypercin.

Key Performance Indicator #2: Threats to M/H species are diminished and key biodiversity areas are identified and protected.

The pilot biodiversity areas have been identified at two sites (Mujib reserve and Central Upper Slopes of the Rift Valley). Threats in the two areas have reportedly diminished: key areas may now be protected in Mujib through enclosures, additional rangers, and also by working with surrounding communities in a participatory manner to develop mutually agreed management/grazing plans. In the Mujib area, a botanical updating survey had indicated the prevalence of 146 M/H plant species (out of over 400) and the level of threat of each.

A botanical survey covering 2000 km² identified wild M/H plant resources and the biodiversity of the Upper Rift Valley of Jordan. The methodology has allowed the determination of the levels of threats and the uses of the M/H plants. About 2100 different species of plants were found (overall 2500 species are reported in Jordan), of which 221 were classified as M/H plants (about 50% of those known in Jordan). Population density and list of endangered species have been reported. Five M/H new rare species have been identified and two new families registered. Twelve hotspots have been demarcated in the Upper Slopes, in which fenced areas are well protected, allowing comparison and participatory learning with the local communities outside the fence areas which continue to be grazed and herbs harvested. In these spots, under NCARE supervision, management plans have been agreed with all the jurisdictional institutions which are competent for each hotspot (but including the Mujib reserve under RSCN); biodiversity inventories inside the fenced areas have been undertaken at all sites with some vegetation rehabilitation through replanting where deemed necessary; and botanical monitoring surveying is scheduled. Thus, the foundations have been set for sustained increased protection at these sites, which are laid for system expansion to other sites in Jordan.

Studies and maps showing grazing intensities are now available. In all protected areas, as shown by subsequent monitoring, there is ample evidence of vegetation re-growth even of species that could not be found during initial surveying.

Key Performance Indicator #3: A database, gene pool and monitoring system are established and operational

A Biodiversity and Genetic Resources Directorate including a M/H plants department was established within NCARE. Under the CMHPP, NCARE created an Oracle-based database of M/H plants including photos, information on the location where specimens have been collected, and about cultural practices on how to best grow some of the plants in gardens and on farms. The functionality of the database is being upgraded. For the time being the 221 M/H plant species identified in the two pilot areas have been reported in the database but all other species recorded in Jordan (over 554) are planned to be included. The database will eventually be connected to NCARE's website. A GIS-database function is at work but not yet available in the website. Otherwise, a Google-earth base mapping exercise of all hotspot sites and enclosures has been elaborated.

NCARE has experience with developing best cultural practices, to breed plants, to multiply and propagate them. It is also equipped to preserve the gene pool and has storage facilities and procedures to keep it under cold dry conditions and to be inspected periodically according to international standards. By the end of the project the total number of M/H seeds in the seed bank of NCARE amounted to 120 plant types. In addition, 204 plant samples are kept in the herbarium (out of 221 species identified, and excluding only the endangered species which purposely have not been picked).

NCARE signed an agreement with all other concerned parties to sustain the management and monitoring of the M/H plants hotspots identified by the project. These other institutions include the Royal Botanical Garden, the Forestry Directorate of MOA, the Ministry of Municipalities (Dier Yousef Municipality), and the Jordanian Hashemite Fund for Human Development (JUHD).

Key Performance Indicator #4: Active participation of communities in conservation, management, and income generating programs established in project areas

Communities around the Mujib reserve have been involved in participatory development of management plans for in situ and for areas adjacent to them. Importantly, an agreement has been reached with a Cooperative of sheep herders. An area¹⁰ of 25 km² is allowed for grazing inside the reserve applying clear management criteria: use of caves and water springs; rotational grazing areas; and a defined carrying capacity. A monitoring plan is also agreed so to fine-tune the management plan. An additional value of this agreement is that herders are now patrolling the reserve and report illegal hunting and harvesting. This has resulted in diminished pressure in the reserve.

In the hotspot areas of the Upper Slopes, several meetings have been held with community groups to come to agreed management plans with demarcated boundaries for different management schemes. Both around the Mujib Reserve as well as the 12 hotspots, income-generating programs supported by the Project have been piloted.

Key Performance Indicator #5: Livelihood of rural communities improved

The pilot nature of the project allows only for preliminary indications on the potential the M/H plant business can have on livelihoods improvement.

In the Mujib reserve agreements have been piloted by RSCN with two individual farmers. Such farmers are able to have incremental income from their M/H plant plots in the order of 150 Jordanian Dinars per month (representing some 30-40 percent of estimated total monthly income). A more significant agreement has been made with a farming Cooperative of some 130 members. For this cooperative, contract growing arrangements are being initiated with bulk buyers. The herders' Cooperative that has an agreement on grazing rights inside the reserve brings together 500 households. RSCN has also started a pilot initiative by processing and packaging herbal teas and products; the business has allowed RSCN to retain on a permanent basis 5 women. Raw material is sourced from the pilot farmers, from home gardens of the local farming community and from outside area sources. The initial sales are calculated by RSCN at around 16,000 JD per year. The business is promising and is attracting more farmers. In the *Ex-situ* areas to Central Upper Slopes and around the hotspots, sustainable use has been promoted with 23 poor families and 3 small farmers. In addition, sustainable MH plants business promotion has been undertaken with 9 NGOs, and about 58 farmers under rainfed conditions. Reportedly, NCARE calculates that some 14 tons of M/H plants have been produced at an approximate value of 40,000 US\$. JRF is promoting MH plant production under organic farming conditions and a solid private sector partner has been engaged to support marketing arrangements. Support has also been provided to 10 champion medium/large scale farmers for export-oriented MH plant cropping. Trial shipments by JEPA are showing interesting results in terms of international (Gulf, Europe) orders being placed to exporters in the range of few tons (3-10) per week to start with that can generate some 5-15,000 US\$ weekly at farmgate.

Key Performance Indicator #6: Public awareness, including environmental education of M/H plants improved

CMHPP has done much training and awareness-raising. All such activities have *de facto* constituted the communication and knowledge management thrust of MH plants brought forward by the project. People of Jordan are more aware of MH plants' value and a wider group of stakeholders now exists in the country. The bases have been set for a sustainable communication on MH plants to present and future generations. MH plants school curricula

¹⁰ Which is about 12 percent of the total Mujib reserve area (212 km²).

have been prepared in cooperation with MOED, which has endorsed them for inclusion in formal education at primary and agricultural professional school levels. Environmental educational tools and school books have been prepared and implemented and about 4500 students have been made aware and have received information about MH plants. Educational gardens on rare and threatened MH plants have been established open to school students. Special workshops for awareness raising, several training courses, study tours and farmers' visits have involved in all some 3500 participants. In addition, public awareness materials in terms of CD/DVDs, posters, TV broadcastings, special booklets, and newsletters have been produced.

3.3 Efficiency

The Project did not require cost recovery, and the financial resources made available to the beneficiaries were all transferred as grants to small farmers, champion farmers and members of NGOs. Furthermore, the benefits of most of the *in-situ* conservation investments are dedicated to protecting public/global commons, as premised for GEF biodiversity grants, and they are not readily quantifiable. Consequently, economic or financial rates of return are not calculated. Nevertheless, M/H commodity chain analyses performed during the project; show that interesting gross margins are generated from different M/H plants to all chain operators: 40-55 percent for farmers; 9-29 percent for traders; and about 13-15 percent for retailers.

In terms of cost effectiveness, the outcomes of the project have been achieved by spending about 70 percent of the originally estimated costs. The objectives related to the first two components were achieved to the extent assessed by spending respectively 98 and 94 percent of allocated financial amounts. Interestingly, the third component of the project – public awareness and education – is to be considered satisfactory spending about a quarter of the amount estimated necessary, though it included much in-kind and complementary spending on the part of the implementing partners (*primus inter pares*, RSCN). Conversely, for the fourth component, possibly the most premature at design and complex during implementation, only about 19 percent of the allocated monies have been spent. Although there cannot be evidence on achievements in case all appraisal foreseen resources were made available, it is possible that these may have been even higher.

3.4 Justification of Overall Outcome Rating

When considering the project strictly against its PDO's output/outcome indicators, and taking into account its pilot nature, the project should be rated by and large, as satisfactory. As discussed in 3.2 above, the PDO indicators that have been selected to measure project achievements all demonstrate that these are significant. However, the careful analysis of the GEO stated specific objectives / expected outcomes reveal that there are moderate shortcomings that impede a full satisfactory rating. There is ample evidence that all involved institutions (RSCN, NCARE, and others brought on board by the project such as JRF, JEPA, and JEDCO) have been strengthened and are now full-fledged stakeholders capable of running jointly a national M/H plant program. There is also no doubt that *in-situ* conservation and sustainable use of MH plants has been promoted by the project in (and beyond) the two designated pilot sites. This is an unprecedented result for Jordan which carries high values and important lessons for the entire region, and globally. With regard to the 'communication strategy' it cannot be stated that this was formally 'designed and implemented' as predicated in the PAD. Nevertheless, the achievements of the public awareness and education investments are there to show that the communication thrust and activities of the project have enabled a unanimously recognized result that goes beyond expectations, obtained in a very cost-effective manner.

As far as the establishment of a framework for MH plant biodiversity conservation and management is concerned, this can only be considered as an 'expected to be achieved'

outcome but not a consolidated achievement. At the time of the ICRR, the eventual determinations of the primary implementing agency – MOPIC – have yet to be formalized. The declared intentions to designate NCARE as the focal point of a National M/H plant Program with a specific Action Plan; the will to institute a Program Committee that brings together all major stakeholders with voting powers; the announcement that EPP will provide seed capital for the Program to integrate that of NCARE; are all positive indications. As mentioned, the design of the project should have had embedded modalities and means to pursue this objective which it did not. The mainstreaming of the project implementation directly with the actually concerned institutions (NCARE and RSCN) or at least the gradual phasing out of the PMU mediation, would have better prepared the grounds for the envisaged program framework.

Lastly, the unbalanced implementation pace of CMHPP and the significant delays at project start have obliged the project to an overextended completion date and have constrained implementers to concentrate and hurry major investments during the last eight to twelve months. This situation has highly frustrated all involved players and has also biased the general perception on the overall quality of the project. It has also impeded project investments to provide full evidence of the impact these would generate. The overall rating is thus: **Moderately Satisfactory**.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

The CMHPP has been gender balanced in many instances. Female professional staff of the core institutional partners (RSCN and NCARE) have actively participated in project activities covering roles of responsibility which have been maintained at project completion; women employment has been enhanced; and among the beneficiaries who were involved in capacity building/training activities, implementation of MH plants productive investments, and also in research grants for MSc/PhD degree acquisition, women have had highest opportunities and performances.

(b) Institutional Change/Strengthening

Further institutional strengthening has occurred for the participating institutions and stakeholders who already had prior interests and commitments in biodiversity conservation in general and for M/H plants in particular. The project has also enlarged the group of stakeholders with an interest to support conservation and sustainable management of Jordan's biological resources.

(c) Other Unintended Outcomes and Impacts

The Integrated Ecosystem Management Project, approved in 2007, benefited from the experience of the CMHPP; it is being implemented by RSCN under a Steering Committee headed by MOENV with a PMU within RSCN. ICARDA also attributes a 'spill over' effect of the project into the Water and Livelihoods Initiative of USAID which has a regional value (Lebanon, Palestine, Iraq, Yemen, Egypt, Syria and Jordan) that promotes stakeholders' knowledge and experience sharing on best use of limited water resources.

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

An informal beneficiary survey through questionnaires prepared by the PMU was undertaken during the closing stakeholder workshop held on November 23-25, 2009. There was general consensus that M/H plants are a strategic but also profitable business sector, which requires close collaboration of concerned government agencies with the private sector. Project studies and results should be widely disseminated and further investment should address value addition areas for pharmaceutical and oil extraction enterprising but also packaging, marketing, product promotion, training and knowledge management. General knowledge has

improved for all respondents but specific know-how on agricultural practices and post harvest technologies improved for 80 percent of producers/exporters. Increased income was a perceived result for 50 percent of respondents while cultivated areas under M/H plants increased according to about ¼ of all respondents; while it doubled according to local community and cooperative members. Interestingly, NCARE is indicated as the right institutional focal point for a national program and the need for a program committee including all major interested parties is endorsed by all respondents.

4. Assessment of Risk to Development Outcome

Program continuity for conservation and protection of M/H plants is likely ensured because of the vested interest with at least two of CMHPP's main players: NCARE and RSCN. The former has a biodiversity and genetic resources directorate, has instituted a specific M/H plants department with a small but dedicated budget; and is designing a twelve month Action Plan. RSCN continues to be in charge of the Mujib Reserve and is in a position to upscale the experience and capacity acquired during CMHPP in the other protected areas under its mandate. The JRF has undersigned a sustained assistance agreement with the local communities and cooperatives with which it has undertaken specific project activities (for organic farming of M/H plants) which has a validity of 10 years. As regards to sustainable use of M/H plants and business promotion, all champion farmers, producing NGOs and other private sector members interviewed during this ICRR have shown concrete interest to consolidate the investments made during the project and to further invest in this growing sector. The JEPA has also declared the will to assist its members to improve exports of M/H plants and products. Confirmation – which ought to occur during project's grace period - is warranted that MOPIC will champion and allocate financial resources for the institution of a National Program. Risk rating is considered: **Moderate**.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

The Project was subject to a Quality Enhancement Review Meeting held on February 11, 2003. The panel was supportive of the project design of this "pioneering project". Performance at identification, preparation and appraisal of the project was satisfactory. However, it would have been much more advisable to have had on board a PM accompanying the Project as early as preparation and presentation to the Board. In addition, the Bank did not foresee (and had no mitigation measures in place) the exclusion which later occurred of the selected private sector partner (ECOHERB). The overall delay of about two years before actual start of project activities implies an underestimation of the readiness for implementation.

(b) Quality of Supervision

Bank management has been kept informed on project progress and performance through 13 ISRRs. The project has been supervised and managed, respectively, by three Task Team Leaders (TTLs). The first TTL led the identification throughout the appraisal phases. From mid-2005 through to June 2008, including MTR there was another TTL, and thereon the third and last TTL who continued supervision work till project completion. Delays, slow disbursement, and implementation shortcomings, which have been all duly highlighted in the ISRRs, have been considered not severe enough and the project has been always rated as 'Satisfactory' for 8 successive reports. This was a somewhat obligatory decision due to the fact that a new rating system, which included intermediate rating categories (MS and MU), was available only in 2007. Due to security reasons in one instance (end 2005) but perhaps also due to insufficiency of supervision resources (as stated in one ISRR), the project was monitored only through PMU progress reports for over one and half year (from May 2005 to

December 2006). A first ‘Moderately Satisfactory’ rating is given at MTR, occurred in November 2007. This rating is upgraded again to ‘Satisfactory’ during 2008 when it is decided to extend the project duration and allow it time and resources to meet expected outcomes. The project is supervised attentively during this period and the last two ISRRs rate it rightly as ‘Moderately Satisfactorily’. Bank supervision of procurement matters followed the project diligently. Despite the challenges posed by the design of the project, Bank supervision, albeit variably over the project duration, paid attention to the issues and bottlenecks – working with the client to overcome the challenges (e.g. private sector participation). The quality of supervision and hands-on attention in the second part of the project (from MTR till the end) allowed the client to deliver on the project both on the ground and on disbursements. This was made possible through a decision to restructuring the project, particularly through reallocation of the procurement plan, to meet the objectives in a satisfactory manner.

(c) Justification of Rating for Overall Bank Performance

Due to the highlighted underestimations at Entry; unbalanced performance and insufficient investment during supervision; and somewhat tardy decision making on actions to be taken to adjust implementation pace, overall Bank performance is rated as **Moderately Satisfactory**.

5.2 Grant Recipient

(a) Government Performance

The Government of Jordan had commitment and recognized the potential in an innovative, ambitious and somewhat complex project. MOPIC – which is also the GEF institutional focal point – has represented the Grant Recipient in the CMHPP. MOPIC provided the Chair to the Project Steering Committee, which though met irregularly during project life. There has also been a high turnover of PSC Chairs. It has performed variably in providing the required guidance and backstopping to its Enhanced Productivity Program (EPP), which had been delegated to house the project and to which the PMU was answerable. Significant delays and implementation shortcomings were mitigated tardily. MOPIC should have assisted the selected institution –EPP– by appropriate staffing, and facilitating it by simplifying procurement arrangements. Some critical decisions have regarded: (a) no PSC meetings convened for over 1 year; (b) inadequate support to specific project outputs agreed in the PAD and GA (e.g. IPR, beneficiary assessment); (d) insufficient facilitation for a number of activities and actions (e.g. training and awareness, PMU staff hiring/substitutions). MOPIC however showed highest ownership and worked hard during the last extension on its commitment to deliver both on the ground and on disbursements (which as regards the GEF grant at closing were 98%). The Government provided about 31 percent of the planned counterpart funding but was certainly instrumental in leveraging a contribution of other Jordanian sources, which eventually over performed at about 121 percent of appraisal estimate.

(b) Implementing Agency or Agencies Performance

The EPP of MOPIC was the host of the PMU. The EPP had no previous experience of Bank and GEF projects, rules and procedures. The PMU was only fully staffed and had office space and internet connectivity in 2005, even though the Project was effective in May 2003. Afterwards its work was sometimes hampered by excessive bureaucracy. The PMU itself often did not operate as an effective PMU, but more like a coordination unit. It was not always appropriately staffed. Although NCARE and RSCN as the main implementers were often hindered by delays and additional burdens with procurement and financial issues over and above their own technical work; these operational implementing agencies, that are now charged to ensure program continuity, have performed adequately and satisfactorily. RSCN and NCARE have the legal mandate and through the project, have received adequate technical and human capacity building to maintain and continue working on related research and development aspects of conservation and sustainable use of M/H plants.

(c) Justification of Rating for Overall Grant Recipient Performance

Taking into account the achievements of the key players that have to ensure continuity of a National Program as well as of the shortcomings of the implementing partners that however are destined to phase out, the general assessment of the Grant Recipient performance is rated as **Moderately Satisfactory**.

6. Lessons Learned

The CMHPP has been an occasion to learn important lessons. The following are highlighted as most significant to have a carry-over effect on future investments:

- Make a case study, build on project success stories, and disseminate unique documentation for possible replications. The CMHPP story should not go forgotten. There have been very significant and unprecedented achievements in terms of (i) *in situ* biodiversity conservation; (ii) sustainable *ex situ* M/H plants' experiences; (iii) dual effect on poverty alleviation and livelihoods improvements, and concrete private sector business opportunities (to be sought however with attentive organization and timing); (iv) considerable expansion of human resources' capacity; (v) high success in civil society awareness raising; and lastly, (vi) the production of wealthy knowledge-base including papers and documentation. GEF and the Bank should take stock and promote all such achievements.
- A project that carries an institutional target for its sustainability after completion requires specific mechanisms in its design. When a project has an important 'institutional building' value and objective – a community of partners for its continuity, in the case of CMHPP – it is outmost important that its design is also consistent and that approaches and mechanisms are embedded that can operationally ensure the result. In addition, such investments would largely benefit by involving international stakeholders who form part of a broader constituency and can act as champions and independent brokers. For CMHPP, an exit strategy from the PMU and the handing over of direct implementation and coordination responsibilities to the NCARE, RSCN and others should have been planned at least during the last year of project operations.
- Project design needs to be simple and focused on its main objective. An investment that is geared at creating a long term thrust out of an unprecedented pilot should minimize in its design all complexities and avoid over-abundance of objectives while privileging only the fewer key components and activities that can guarantee realistic and concrete impact. The 'income generating' component of the project should have been more practically positioned in a follow up investment. Conversely, a knowledge management activity would have been more in tune and would have allowed higher cohesiveness and integration among project stakeholders.
- Project management, where feasible, should be housed in within an appropriate existing institution. The CMHPP experience, once again confirms that PMUs in general are not only – by design – unsustainable management structures which come to an end at any project's completion; but they often are also detrimental to project smooth functioning and may be counterproductive to the creation of concrete and permanent institutional capacity. Development projects' management structures, in particular when capacity exists (like in the case of CMHPP through RSCN and NCARE) ought to be mainstreamed within existing institutions.
- Task management turnovers warrant more caution and when unavoidable, be accompanied by transitional arrangements. The CMHPP shows a case that Bank management would need to use in future projects and activities. The project has been managed by three TTLs, and in the interim phases between one and the successive TTL, remote supervision appeared unattended. A rule should be adopted that when a TTL hands-over the management responsibility to another she/he should organize a joint

supervision mission for smooth continuity. Adequate supervision resources must be guaranteed at all times.

- The M&E function always requires adequate investment and funding. A well designed and implemented monitoring and evaluation system is key for any project. This is even more important in the case of a project with a ‘global’ conservation/protection and natural resources sustainable use thrust. Design and investment allocation need to be consistent. In the case of CMHPP this is a lost opportunity.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/Implementing Agencies

During ICR mission, interviews with all Implementing Agencies and partners have been carried out. According to the EPP management the project has offered a very important natural resources’ protection case but also a business opportunity for the country and for the Jordanian stakeholders. For this reason, GOJ will continue in its endeavor in terms of institutional and financial commitment. This was also confirmed by the SG of MOPIC. According to RSCN, the project has created capacity and knowledge which have strengthened the institution. However, the implementing modalities and mechanisms have hampered smooth execution and have strongly limited the actual potential. As a result, the institutional set-up created by the project is still weak and insufficiently integrated. NCARE is totally committed to fulfill the mandate of the national MH focal point and the investments made through the project have all provided the grounds for this capacity. It is the opinion of NCARE that a framework has been created which now needs strengthening. The ICRR mission concurs with the majority of the stakeholders that a system has been created including capacity and knowledge on MH plants conservation and sustainable use. What is now needed is the urgent political endorsement and activation of a National Program.

(b) Cofinanciers

None

(c) Other Partners and Stakeholders

Important partners of the CMHPP have been JRF; the JEPA and JEDCO among others. According to JRF, the project was a *quasi* unique opportunity for local communities and cooperatives to become protagonists of an important national initiative. Given JRF’s statute commitment to sustainability of operations they get involved in, it appears likely that organic farming will be a further business – but also a sustainable resource use – opportunity for MH plants and importantly, with the farming communities of Wadi Araba. This would also compensate for the little impact that was generated by many ‘last minute’ activities of the project. For JEPA, the project offered significant public good values which have enabled marketing lessons to the emerging private sector that can now upscale investment. Given the small dimension of the Jordanian farming community, the likeliness of a shared impact is also there. In the opinion of JEDCO, the fourth component of the project (Income Generation) has shown its design weakness in that it overestimated the capacity of the farmers to take up the business at an adequate scale. In addition, it would have been beneficial to introduce from the very beginning a cost-sharing approach with willing investors. JEDCO also highlights that individual partners have apparently worked in isolation with little integration and sharing of experiences. This comment is common to many stakeholders including individual farmers.

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in US\$ Million equivalent)

Components	Appraisal Estimate (US\$ millions)	Actual/Latest Estimate (US\$ millions)	Percentage of Appraisal
1. INSTITUTIONAL STRENGTHENING	2.40	2.36	98.3%
2. PILOT-SITES CONSERVATION	6.51	6.12	94.0%
3. PUBLIC AWARENESS AND EDUCATION	1.08	0.29	26.8%
4. INCOME GENERATION	3.50	0.65	18.6%
5. PDF-B	(0.35)	(0.35)	100.0%
Further commitments as of 16/6/2010		0.32	
Total Baseline Cost	13.49	9.74	72.2%
Physical Contingencies	0.24	-	
Price Contingencies	0.48	-	
Total Project Costs			
Project Preparation Facility (PPF)	0.00	-	
Front-end fee IBRD	0.00	-	
Total Financing Required	14.21	9.74	68.5%

(b) Financing (for Appraisal estimate see Annex 5 of PAD)

Source of Funds	Type of Co-financing	Appraisal Estimate (US\$ millions)	Actual/Latest Estimate (US\$ millions)	Percentage of Appraisal
Borrower/Recipient (incl. NCARE; JEDCO)		7.00	2.16	30.8%
Global Environment Facility (GEF)		5.00	4.92	98.4%
Other sources (RSCN, private sector, beneficiaries)		2.20	2.66	120.9%

Note: The GEF disbursement figure is a preliminary estimate since the project has a grace period (until December 16, 2010) to finalize all outstanding payments.

Annex 2: Outputs by Component

Jordan – CMHPP Results Management Framework		
PDO	Output/Outcome Indicators	Project Results
Design and test models to improve the conservation of medicinal and herbal plants and the livelihood of the communities; <i>through the management and sustainable use of MH plants for human and livestock needs in the Mujib Nature Reserve and the Central Upper Slopes of the Rift Valley in Jordan while ensuring effective in-situ protection of threatened habitats and ecosystems in these areas.</i>	<ul style="list-style-type: none"> Capacity established to sustainably manage the wild genetic resource base of MH plants; Threats to MH species are diminished and key biodiversity areas are identified and protected; A database, gene pool and monitoring system are established and operational Active participation of communities in conservation, management and income generating programs established in project areas; Livelihoods of rural communities improved; Public awareness, including environmental education of MH plants improved. 	<p>yes</p> <p>yes</p> <p>yes</p> <p>yes</p> <p>yes, high potential</p> <p>yes</p>
GEO	Output/Outcome Indicators	Project Results (commented)
Improve conservation and sustainable use of MH plants (several of which are rare and endemic, and thus of global importance) at the national and the local levels by achieving specific targets over and above the baseline scenario.	<ul style="list-style-type: none"> A framework for M&E plant biodiversity conservation and management established; Institutions strengthened for implementing a coordination program; In-situ conservation and sustainable use of MH plants in 2 pilot sites promoted; A communication strategy designed and implemented. 	<p>yes</p> <p>yes</p> <p>yes</p> <p>a system established</p>
Component objectives	Result Indicators	Project achievements (commented)
Component 1: Institutional Strengthening Establish an operational PMU including technical, administrative, finance, procurement, M&E, and training (functions).	<ul style="list-style-type: none"> PMU fully functional and operational by project start up. Training needs identified and implemented. M&E system implemented. 	<p>The project was housed under the EPP of MOPIC. The PMU, established with delay (about two years from project start), was staffed with (some functions at one time combined or separated): Manager (6.5 years), M&E sp. (4.5 years), T&A sp. (2 years), Finance-Accounting</p>

		<p>(combined for 2 years with Procurement Finance alone since 2006 to date), Procurement sp. (3 years), and a technical/administrative support staff (2 years), and a driver (6.5 years).</p> <p>A simple M&E system was established. This has ensured the normal reporting. A simplified excel-based MIS was created but not maintained. It did not allow archiving documents and reports generated by the project. An elementary but not-professional project website was created by project staff (with some IT assistance from MOPIC staff) but with little maintenance and updating.</p> <p>The foreseen international TA for project management was never implemented. Some PMU staff training was undertaken under component 3.</p> <p>The project e-filing system has not been structured adequately.</p> <p>FMR has been regular and all audit reports have certified as adequate the project financial management.</p> <p>The foreseen high caliber and authoritative PMU was not established by MOPIC. Instead, a technically capable but institutionally weak structure of professionals was created within the ministerial house (EEP) which did not have specific experience of directly managing similar projects and little if any exposure to WB rules and regulations. However, at the</p>
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<p>Strengthen institutional collaboration and develop crucial inter-sector links (MOA, MOH, pharmaceutical industry, producers, and consumers).</p>	<ul style="list-style-type: none"> – Technical committee between relevant stakeholders established, improving partnership. 	<p>time of project start EPP was probably the most viable housing alternative which was also able to ensure (through MOPIC) required counterpart resources. Major issues have regarded an unbalanced and at times, subdued relationship with the chair of the SC; major procurement complexities for a project that required more flexible and expeditious mechanisms; and a somewhat late subsidiary assistance on the part of the WB supervisors.</p> <p>The project activities were overseen with formal approvals at required times by an ad hoc Steering Committee (SC), chaired by the Secretary General of MOPIC (5 since 2003). A technical committee was never established. Nevertheless, the PMU was reinforced by the interaction with the management of the two main implementing partners: NCARE and RSCN. In addition, the PMU interacted for a number of private sector related activities with JEDCO, JEPa and JRF. Some collaboration with the RBG also occurred.</p> <p>A number of cooperation and collaborative agreements have been undersigned with relevant institutions.</p> <p>NCARE and RSCN specifically recruited or seconded staff (about 15 each) for the project activities under their own responsibility. The two organisations have retained key technical staff at project completion.</p>
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		<p>It is being (by MOPIC) decided to formally appoint the Biodiversity and Genetic Resources Department of NCARE as the national focal point for MH plants and products. The PMU is thus handing over to this entity all the documentation and archive (hard and soft) of the project. An agreement is also taken for the establishment of new SC, and including as members all major stakeholders of the CMHPP (MOPIC, MOA-Department of Forestry, MOIT, RSCN, RBG, JEPa, JEDCO, JFDA) and with external members such as ICARDA, FAO, WB.</p>
Develop Intellectual Property Rights (IPR) policy and guidelines	<ul style="list-style-type: none"> - IPR policy and guideline drafted and adopted 	<p>IPR policy and guidelines (for indigenous knowledge and use of MH plants for medicinal and other purposes by humans and livestock) have been developed.</p> <p>A comprehensive workshop with participation of MOA, MOIT, MOH, MOPIC and JFDA among others, was conducted where major stakeholders have endorsed the IPR guidelines.</p> <p>(a sensitive issue eventually addressed by PMU against many odds)</p>
Establish health and safety standards for MH plants and products.	<ul style="list-style-type: none"> - Regulatory function improved; - Technical committee on standards and testing established - Standards published. 	<p>51 MH plant/products' standards have been developed and formally endorsed by the Jordanian Food and Drugs Agency (JFDA).</p> <p>The JFDA is the mandated public entity to test, maintain and officialise to the public all standards. Publication will be done following the legal protocols and schedules.</p>
Establish a national MH plants	<ul style="list-style-type: none"> - Floral species recorded (#) 	<p>The genebank at NCARE</p>

database, a GIS and update gene bank.	<ul style="list-style-type: none"> - Extinct species recorded and stored (#) - GIS map created - Database website launched and updated regularly 	<p>has been upgraded with records of MH plants in terms of 120 seeds in the seed bank; and 204 samples in the herbarium (out of 221 identified, excluding only the endangered species which purposely have not been picked).</p> <p>NCARE has inputted all the information of MH plants in its Oracle-based database. Its overall functionality is however being still upgraded by IT trained scientists.</p> <p>The GIS-database function is not an easy undertaking (as acknowledged universally), and thus is not yet fully available. A Google-earth base mapping exercise of all hotspot sites and enclosures has been elaborated at NCARE.</p> <p>The database is to be connected to NCARE's website, which will also reflect its continuous updating.</p>
Enhance technical and managerial capacity of stakeholders	<ul style="list-style-type: none"> - Farmers (m/f) trained in IPM, organic farming, cultivation of MH plants (#). - 18 graduate students selected for applied research grants 	<p>An extensive training program has been prepared and implemented.</p> <p>Farmers have been trained on IPM practices (32/ 15 F-female); on organic farming (28/ 12 F); on fresh herbs production and techniques (234/130 F); on utilization of MH plants (90/ 60 F); on conservation of wild species (107/ 40 F); on marketing herbs (27/ 5 F). Three workshops conducted on MH plants processing and formulations.</p>

		<p>MOPIC and PMU staff have attended a workshop on project impact evaluation; and 1 staff trained on EIA.</p> <p>Study tours & specialized training courses have been organized: (10) in Egypt, Syria, Lebanon, Cyprus, Italy, China, Israel, and Denmark; (14) in Egypt for NGO members; (14) in Egypt for research and extension agents (RSCN & NCARE staff); (9) in Egypt for Fresh Herbs producers and exporters (JEPA).</p> <p>Researchers (11) participated in Scientific conference in Malaysia and Turkey; (4) trained on redlist conservation, in Birmingham/ London; farmers participated at 3 International Trade fares.</p> <p>(the value/impact of such training activity has not been formally assessed by the PMU; however RMF requires only numerical indicators)</p> <p>The project has supported 18 graduation theses (13 MSc and 5 PhD; 8 female [F] candidates). At least one (F) is a candidate for a special award due high scientific value of the thesis on antioxidant properties of hypercin. Many research activities have continued support by NCARE research programme (list is available).</p>
<p>Component 2: Pilot-Sites Conservation</p> <p>Establish two pilot sites (Mujib and Rift Valley).</p>	<ul style="list-style-type: none"> - Endangered species protected (#) - Site management plans formulated (#) - Areas covered by site management 	<p>Thorough baseline updating (for Mujib) and a botanical survey (for the Upper slopes of the Rift Valley) have been prepared. Maps for the distribution of H&M plants and their communities were</p>

	<p>plans recorded (ha).</p>	<p>produced.</p> <p>A study identifies the threats on MH plants. Studies and maps showing grazing intensities are now available. Grazing arrangements with local community established. At the Mujib reserve, an enforcement and protection strategy is enhanced through providing: advanced visual and audio communication means, equipment for rangers, and patrol plan (environmental protection policy enforced in cooperation with environment police forces). In the Upper Slopes 5 MH new rare species identified and two families registered. Threatened species and source of threats identified.</p> <p>The management plan for <i>in-situ</i> conservation of 12 hotspots in the Central Upper Slopes of the Jordan Rift Valley has been finalized. Enforcement means: protection and monitoring tools; fencing of enclosures; seeds and seedlings (rehabilitation), motor cycles, water reserves, provided. For the nursery of the Royal Botanical Garden: guard rooms, furniture, conservation tools (rechargeable lights, binoculars, and electrical generator), and sign tools. Intensive Monitoring Inventory Survey for hot spots has been conducted. A report on records MH plants and status is available.</p> <p>Rehabilitation through replanting initiated. Evident signs of vegetation recovery in the enclosures are apparent. Community based</p>
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Record and protect rare and endangered species.	– Hot spots identified (#)	<p>support program prepared and implemented around HS. 23 micro and 3 small income generating projects around Hot Spots established for poor community members.</p> <p>4 hotspots identified and location maps produced for the Mujib reserve; and 12 Hot spots identified with 9 enclosures fenced in the Upper Slopes.</p> <p>Monitoring programme established and shared with all responsible parties.</p>
Record local knowledge and usage of MH for day to day health care needs.	– Local knowledge and usage recorded (#)	<p>In a related manner, a socio-economic survey has been conducted; pilot products therein developed and the cultivation of highly demanded MH plans launched; seeds of rare species gathered for multiplication. In another study, active components and list of chemicals constituents of MH plants have been reported.</p> <p>The Facility Centre realized towards the end of the project at the RSCN-managed Mujib Nature Reserve, would need to have, among others, the function of recording local knowledge and usage of MH.</p>
Establish methods for propagation and cultivation.	– (missing)	NCARE has conducted 18 research topics on conservation, sustainable use; agricultural practices, chemical constituents and propagation of MH plants.
Establish a training programme.	– Training participants recorded	(see also component 3) For the Mujib reserve, an outreach, education and capacity building programme has been developed; target groups have been defined, a training need

<p>Establish ex-situ cultivation trials and establish prototype farms.</p>	<ul style="list-style-type: none"> - Ex situ trials conducted (#) - Organic farming labels developed - Contract farming models standardized - Environmental training participants recorded (#) 	<p>assessment conducted and training program designed and implemented. 20 workshops and 6 seminars conducted for local communities. A visitors guide for the Facility Centre, leaflets and pamphlets, and a MH plants garden is initiated.</p> <p>Also in the Upper Slopes areas, comprehensive training & awareness program is established. NCARE organizes demonstrations, field days, and media dissemination. The three MH plants research stations (also with extension / nursery functions) mandated (because initiated by the project) are: Maru (at Ramtha); Rabba; and Mashaqar.</p> <p>A breeding program is established and implemented over four seasons at 2 NCARE Research Stations focusing on 3 crops: Anise; Cumin and Fenugreek. Seed multiplication also implemented as well as best cultural practices established focusing on 6 crops; Anise; Cumin, Fenugreek, Black cumin, Caraway and Fennel. IPM of MH plants demonstrated at Dier Alla Research Station. Sustainability is ensured through NCARE research programs structure.</p> <p>RSCN has started a pilot initiative by processing and packaging high value herbal teas and products. These are retailed at the sales point in Amman; at the 6 sales outlets of the managed Reserves; are wholesaled to two hotels and also specifically branded for coffee shops. Raw material is sourced from the champion farmers, home gardens of</p>
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		<p>local farming community and from outside area sources. The business is promising and is attracting more farmers. It has also allowed RSCN to retain 5 women which were working on the project.</p> <p>Agreements have been established by RSCN with two individual farmers (each dedicating some 2000 m2 for cultivation of MH plants) by providing them with some operational support, drip irrigation facilities, tools and seedlings. Such farmers are able to have incremental income from these plots in the order of 150 JD per month. One of them is expanding his activities. A more significant agreement has been made with a farming society of some 130 members with 500 dunums, who will eventually dedicate some 6-10 dunums to MH plants cultivation. Contract growing arrangements are being initiated with bulk buyers.</p>
<p>Component 3: Public awareness and education</p> <p>Deliver environmental education to communities and schools.</p>	<ul style="list-style-type: none"> - Curricula for formal and informal environmental education includes information on MH plants (#) - Children knowledgeable about importance of local MH species - Training course established for environmental education 	<p>RSCN has prepared MH plants school curricula in cooperation with MOED, which has endorsed them for inclusion in formal education at primary and agricultural professional school levels.</p> <p>Environmental education tools and school books have been prepared and implemented by RSCN and about 4500 students or 50% of total student population living around Mujib Reserve have been made aware and have received information about MH plants.</p> <p>An educational garden on</p>

<p>Develop training and knowledge sharing tools, and implement awareness campaigns including those for women.</p>	<ul style="list-style-type: none"> - Targeted communities-based training workshops undertaken (#,year) - Beneficiaries receiving educational material (#) - 1800 farmers visit 60 areas - Project website launched and updated monthly 	<p>rare and threatened MH plants has been established at Mujib reserve RSCN HQ open to school students, as wells as a lab on conservation, utilization and extraction MH plants oils. Three special workshops were conducted for training and awareness raising.</p> <p>Also in the Upper Slope areas, 5 gardens have been created, attached to local schools near to Hot spots.</p> <p>During project life 17 training courses were held and about 360 persons attended. A total of 34 workshops; 9 field days; 36 study tours have included in all some 3500 participants.</p> <p>In terms of public awareness material : 50 CDs; 3 posters; 3 panels; seasonally, three-TV broadcastings; 3 special booklets; newsletters and a website have been produced.</p> <p>Farmers' visits to different conservation and production areas have been organized.</p> <p>(It is widely acknowledged that public awareness on MH plants, products, conservation/protection needs, and cultivation business opportunities are now widespread in Jordan).</p>
<p>Component 4: Income generation</p> <p>Complete nationally and internationally accepted certification of organically grown produce.</p>	<ul style="list-style-type: none"> - Certified farmers (#) 	<p>The Jordan River Foundation (JRF) has been contracted. Two Pilot sites have been established and equipment installed; crops planted; production and marketing started.</p> <p>Training for farmers and relevant stakeholders has been conducted.</p>

Suggest advice standards for harvested MH plant products.	<ul style="list-style-type: none"> – Committee provides advice on standards 	<p>Organic farming cultivation of MH plants demonstrated at Sharhabeel Research Station.</p> <p>GAP material for farmers is used on production pilot sites for organic farming and to develop and endorse organic quality standards.</p> <p>Reference is in the IPR and health and safety standards.</p> <p>Advanced training on production and export of fresh herbs has been conducted by JEPA.</p>
Offer advice for processed MH processed products.	<ul style="list-style-type: none"> – Committee provides advice on standards 	<p>JEPA and JRF advise.</p>
Adoption of quality control measures for MH plant products.	<ul style="list-style-type: none"> – Quality testing laboratory established and operational 	<p>JEPA, JRF; and JEDCO trains farmers to export fresh herbs.</p>
Development of products by communities/private sector	<ul style="list-style-type: none"> – New product lines developed or enhanced (#) 	<p>Community based support program, comprehensive training and awareness program has been completed.</p>
Identify market, market intelligence, export opportunities, and build partnership with pharmaceutical sector.	<ul style="list-style-type: none"> – Information compiled on all aspects of trading – Partnership with pharmaceutical sector established and regular meetings held 	<p>Two studies (Feasibility of producing MHP in Jordan; a marketing study and commodity chain analysis) guide investment purposes. Such studies have been disseminated to growers and interest groups.</p> <p>JEPA export market intelligence is being upgraded and advice is provided.</p> <p>Growing of fresh herbs for export has been supposedly promoted by the project (the only initiative of this sector). Farmers have bene trained</p>

<p>Make available micro-credit to individual and communities of MH plant initiatives.</p>	<p>– Loans portfolio (amount)</p>	<p>on export capacity to Europe. JEPA has organized 4 test shipments to Gulf states and Europe.</p> <p>No formal partnership with the pharmaceutical industry has materialized. This segment of the private sector is normally slow to engage (over ambition at design stage). RSCN is however assisting and supporting a farming society around the Mujib Nature Reserve, to engage in a contract growing arrangement with the medicinal products branch (Dilas) of an important Jordanian pharmaceutical company.</p> <p>The Agricultural Credit Corporation (ACC) is providing small credits for small farmers, rural women and NGOs to grow MH plants.</p> <p>EEP/MOPIC has deliberated to establish income generating projects in poverty pocket areas and to this end, has allocated 0.5 million JD on fast track for 2010/2011.</p>
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Annex 3. Economic and Financial Analysis

No attempt has been made to calculate economic or financial rates of return for the Project due to the inherent difficulty in quantifying the investments for “public good” environmental operations. A M/H commodities’ chain analysis show considerable gross margins for all operators.

The incremental costs cover project expenditures of activities that have global benefits. The baseline expenditure scenario was calculated to establish current and planned funding amounts for activities that would occur without the Project. The estimated difference between the cost of the baseline scenario and the cost of GEF's alternative represents the incremental costs.

The incremental costs contributed to: (i) achieving global environmental benefits through conserving rare and endangered M/H plant species; (ii) completing a database and gene pool of all M/H plants in Jordan; (iii) strengthening the institutional framework; (iv) developing mechanisms for sustainable use; and (v) enhancing public awareness of global environment issues pertaining to M/H plants conservation. GEF's actual contribution towards the incremental costs is US\$4.9 million, with estimated additional contributions of about US\$3.98 million from GOJ, RSCN, and the private sector, while the total project costs, exclusive of the PDF-B, were originally estimated at US\$14.21 million.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Supervision/ICR			
Lina Abdallah	Operations Officer	MNSUR	
Robert Bou Jaoude	Sr Financial Management Specia	MNAFM	
Diana C. El Masri	Consultant	MNAFM	
Lina Fares	Procurement Specialist	MNAPR	
Dahlia Lotayef	Sr Environmental Spec.	MNSEN	
Ernst Lutz	Consultant	MNSEN	
Jad Raji Mazahreh	Financial Management Specialis	MNAFM	
Adriana Moreira	Sr Environmental Spec.	LCSSEN	
Sylvie M. Pittman	Temporary	MNSSD	
Kanta K. Rigaud	Sr Environmental Spec.	MNSEN	
Imad Saleh	Lead Procurement Specialist	EAPPR	
Claudia Sobrevila	Sr Environmental Spec.	ENV	
Angela Marie Walker Gary	Operations Officer	MNSSD	
Turi Fileccia	Sr Agronomist	FAO-CP	
Banu Setlur	Environmental Specialist	MNSSD	

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	US\$ Thousands (including travel and consultant costs)
Lending		
FY00		1.60
FY01		33.29
FY02		42.79
FY03		112.59
FY04		34.61
FY05		10.38
FY06		0.00
FY07		0.00
FY08		0.00
Total:		235.26
Supervision/ICR		
FY00		0.00
FY01		0.00
FY02		0.00
FY03		0.00

FY04		19.98
FY05	2	20.86
FY06		22.30
FY07		24.93
FY08		52.05
Total:	2	140.12

Annex 5. Beneficiary Survey Results

A stakeholder workshop was held on November 23-25, 2009 (see Annex 6). In this occasion an informal beneficiary assessment was undertaken through questionnaires prepared by the PMU. A total of 26 participants responded, categorized in three groups: decision makers, champion farmers/exporters, and members of local community and cooperatives. Respondents confirmed GOJ's commitment and interest for the Project. There was general consensus that M/H plants are a strategic but also profitable business sector, which requires close collaboration of concerned government agencies with the private sector. Project studies and results should be widely disseminated and further investment should address value addition areas for pharmaceutical and oil extraction enterprising but also packaging, marketing, product promotion, training and knowledge management. General knowledge has improved for all respondents but specific know how on agricultural practices and post harvest technologies improved for 80 percent of producers/exporters. Increased income was a perceived result for 50 percent of respondents while cultivated area under M/H plants increased according to about ¼ of all respondents while it doubled according to local community and cooperative members. Interestingly, NCARE is indicated as the right institutional focal point for the program and the need for a national committee including all major interested parties is endorsed by all respondents.

Annex 6. Stakeholder Workshop Report and Results

(From the Report on Proceedings of the Closing Workshop of the Conservation of Medicinal and Herbal Plants Project; 20-21 November 2009, Dead Sea- Jordan)

Introduction

The Conservation of Medicinal and Herbal Plants Project (CMHPP) emerged from the crucial needs of the country to conserve wild Medicinal and Herbal plant resources and to promote an economical promising and value adding MH plant sector. Thus, it received governmental and non-governmental appreciation and support. Positive feedback was obtained throughout from all stakeholders (from subsistence farmers to the private sector). The project was the first to address the conservation of MH plants and give priority to their sustainable use. Furthermore, it initiated and strengthened the institutional and technical capacity of key partners, including for the first time, partnering with the private sector; addressing the root causes of biodiversity loss and barriers to sustainable use; moving away from supply driven research towards demand responsive applied research on the ground; and fostering product and market developments, through participatory approaches involving all stakeholders.

Objectives

The main objective of the Closing Workshop of the CMPH is to take stock of achievements, share insights, challenges, and constraints and draw lessons learned. The workshop aims to: (a) get feedback from the different beneficiary groups and stakeholders: this is very important for the ICR, particularly since no beneficiary survey has been undertaken; (b) share about achievements/outputs/outcomes; (c) discuss lessons-learned, including challenges, constraints what actual or possible solutions are to the constraints; and (d) how the work on MH plants can be sustained, and what roles the Ministry of Agriculture, NCARE, RSCN, the private sector, NGOs, and communities can play to extend and scale up this important work.

Participants

105 persons attended the closing workshop representing the following entities:

- World Bank
- Ministry of Planning and International Cooperation
- Ministry of Agriculture
- National Centre for Agricultural Research and Extension

Recommendations

By Decision Makers

- Endorse a national committee including MOPIC, NCARE, RSCN, Private Sector, Universities, MOA, and other interested parties to follow up on medicinal and herbal plants activities.
- NCARE, Agro-biodiversity and medicinal and herbal plants Research Program would be the focal point of potential efforts on medicinal and herbal plants, and in coordination with Universities, research centers, and all relevant institutions.
- Utilize the remaining funds of the Project in training and capacity building
- Promote cooperation in the field of medicinal and herbal plants at regional and international levels (ICARDA and others)
- Intensify training and capacity building for farmers, local community and staff at implementing agencies by providing funds from MOPIC.

- Promote awareness and keep farmers, communities, NGOs and other interested parties informed about the medicinal and herbal plants.
- Conduct deep and detailed socio-economic studies including feasibility of production and in which chain the added value is higher.
- Connect the pharmaceutical enterprises.
- Develop and continue legislation, guidelines and policies relevant to conservation of genetic resources to avoid export and contraband of these genetics.
- Support connection and networking among all parties.
- Support the development of JFDA laboratories.

By Champion Farmers

- Intensify training and capacity building for farmers and exporters as well as JEPA members and extension agents of public sector in the field of production, marketing, and post harvest technologies
- Promote the specialized and advance training courses for farmers and exporters in the developed countries
- Specialized study tours are highly needed to get acquainted on success stories and activities starting from land preparation, cultivation, production and end in post harvest technologies (packing, packaging, cold chain). Potential study tour countries: Far East Asia, Latin America, and Cyprus
- Recruit experts on day to day advice, and their sustained advice for the whole agricultural season and including production, post harvest, and marketing matters.
- Establish a national references committee including both private and public sectors, with mandate to create services for MH plants industry and organize the relation between relevant parties. The national committee may include the following parties (qualified farmers and exporters; JEPA; NCARE; MOPIC; JEDCO, MOPIC, and ACC). However, members of the project steering committee giving the priority to be members in this committee
- Establish a specialized cooperative to associate all MH plants farmers and exporters with a mandate to serve the MH plants beneficiaries and coordinate relations between relevant entities.
- Future international and regional projects to target private sector. i.e. JEPA, role of governmental offices and donors including monitoring, supervision, and follow up.
- Budget of future projects should include a significant share for infrastructure (post harvest technologies, and marketing facilities)

Cooperatives and Local Communities

- Intensify technical training for production staff
- Establish a private marketing corporation with mandate to facilitate marketing of MH plants
- Budget of future projects should include a significant share for infrastructure (post harvest technologies, and marketing facilities)

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

The Recipient institution, MOPIC, has not submitted its own ICR yet. In May 2010 the PMU produced a draft ICR document. A few extracts (slightly edited) of this document are quoted below:

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- The PMU was supposed to have more independency and enforcement (capacity) headed by a prominent high caliber (manager). MOPIC dropped this requirement and (initiated recruitment) of (a) lower caliber (manager) which was rejected by the Bank two times, then the Steering Committee came (end of 2003) to agreement to appoint an acting (March 2004) then permanent (mid 2005) PMU manager/project coordinator. Moreover, the PMU was (attached) lower in the hierarchy of the MOPIC; the PMU head became accountable to EPP director instead to Steering Committee head (the Secretary General). The Bank agreed/tolerated that decision and the practice.
- ECOHERB Farms of Jordan (EFJ) was an idea developed during PDF-B preparation phase to function as private sector partner. It aimed to establish a profit oriented investment entity for pooling and benefiting from technical know-how provided to the project in terms of production and processing of MH plants on advanced large scale business and working parallel to project implementation as hub for information and encouragements of other farmers on contract-farming bases. Before launching the project, this selection procedure was objected; hence (new) selection through open competition was initiated (in Oct. 2003).
- PSC has held 41 meetings during implementation period (June 2003- April 2010), while from Dec. 2006 until February 2008, no meetings were held despite crucial implementation circumstances. (M) meetings were not regularly conducted and voting practice never used. The PSC experienced during implementation period (2003-2010) inconsistency in chairman position; (5) Secretary Generals have changed and in each change valuable time was spent to introducing the project values to the new chairman. Chairman of the PSC as MOPIC Secretary General was dominating although the directors of executing agencies of (NCARE & RSCN and PS) are more concerned; they often claimed less consultation and involvement. Rotating chairman position would have been more useful option.
- The disbursement went very slow due to a) delays in the replenishment () and b) due to the practice where the PMU had to comply with both the Government and the WB procedures in terms of procurement and financial treatment.
- The TTL has changed (three) times during the course of implementation. In each change the PMU lost reference and guidance for a while, this accumulated to general implementation delay. ... Since July 2008 the project received better response and follow up from the Bank team. The Bank's missions were crucial in supporting and expediting implementation; main findings and recommendations were used by the PMU for improvements and as tool for enforcement that contributed significantly to successful implementation especially during extension phases.
- The project had complex () objectives that have to be reached through integrated efforts of multi players. This complexity had the advantage of managing concerted efforts of research, development, awareness and capacity building at the same time, but it had the difficulty of coordinating different entities. Most problematic was to work with local communities and rural farmers (even champion farmers).

- (With) reference to the achievements of the project in relation to the PDO and GO, the project has made concrete contributions to the conservation of MHP through targeted *in-situ* conservation measures in the Mujib Reserve and in the hotspots of the Upper Slopes. Furthermore, the sub-projects and socio-economic activities with communities to cultivate MHP are (planned) in the understanding that these will reduce the pressure () in the wild.
- The following were achieved ():
 - a. New mechanisms for partnerships and working methods established
 - b. (F)unctioning models with community NGOs, and private sector operate beyond project life
 - c. Maintenance and upgrading the Gene bank at NCARE ongoing.
 - d. Major threats identified in Mujib Reserve (grazing, heavy cutting by population, decline in indigenous knowledge).
 - e. Major threats in Upper Slopes (change in land use, over grazing, illegal cutting of MH plants, fires, stone and sand quarries)
 - f. MH plants database established and networking ongoing.
 - g. Communities around Mujib Reserve involved in conservation (grazing agreement, zoning plan, patrol plan).
 - h. Community-based support program in Upper Slopes ongoing # 23 poor families
 - i. Income generating activities in Upper Slopes established (13).
 - j. Informal education improved (MH garden, MH lab, materials for locals and 4500 students (50% of total) around Mujib Reserve; formal education (RSCN & MOE).
 - k. In Upper Slopes, 14 Training need assessments resulted 44 courses, where 24 workshops conducted (500 participants)
 - l. New research program on biodiversity & MH plants established at NCARE.
 - m. A new model for conservation established in Upper Slopes with local community (12 hotspots).
 - n. 8 initiatives by champion farmers & 8 NGOs have been launched
 - o. Vegetation cover increased by (24%) in Mujib.
 - p. 17 students (5 PhD & 12 M.SC), out of 15- graduated & continue work with their entities.

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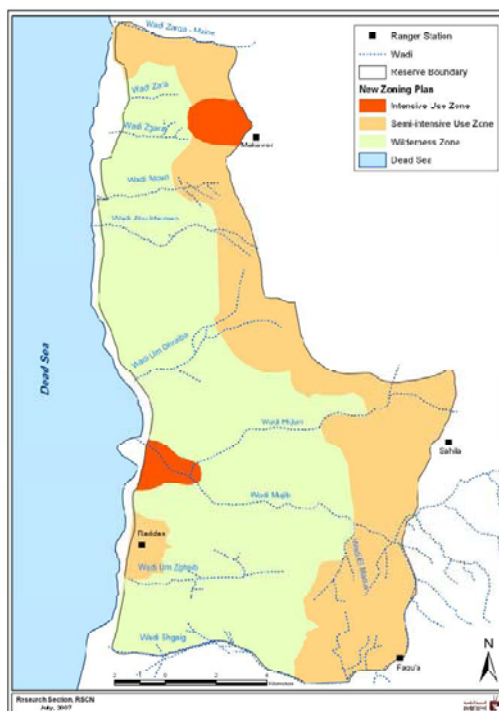
Annex 8. Comments of Co-financiers and Other Partners/Stakeholders

(No formal document and comments provided)

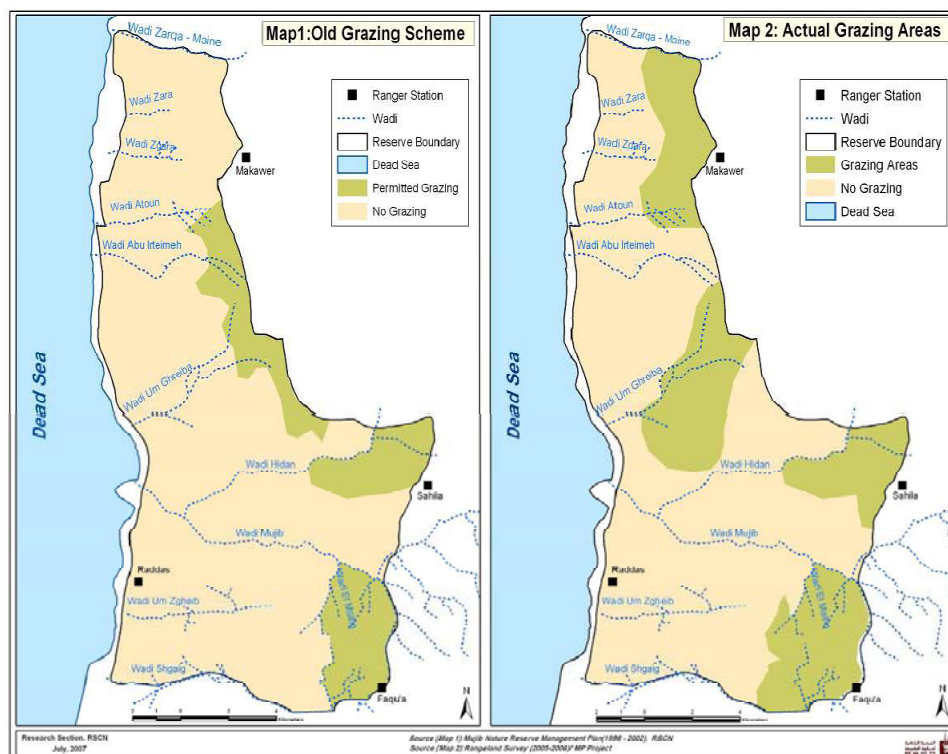
Annex 9. List of Supporting Documents

Document	Author	Title, Year
PAD	World Bank	Conservation of medicinal and Herbal Plants Project, March 2003
Grant Agreement	GEF-WB	GEF Trust Fund Agreement
Aide Memoires, ISRs	WB	All official archived documents
CMHP Project document	NCARE	Hot Spots: Site description and management, May 2010
CMHP Project document	PMU	ICR, May 2010
CMHP Project document	Amer Jabarin	A Feasibility Study on Medicinal and Herbal plants Production in Jordan, September 2009
CMHP Project document	Karim Corporation for Agribusiness Development	Medicinal Plants Socio-Economics Survey, April 2002
CMHP Project document	Mohammad Samir El-Habbab, Mohammad Hamdan	Commodity Chain Analysis for Medical and Herbal (MH) Plants in Jordan, October 2009
CMHP Project document	Jordan River Foundation	Development and Implementation Of Organic Farming For Medicinal Herbs Of Jordan, May 2010
CMHP Project document	Jordan River Foundation	A Market Study For Organic Products In Jordan: A Consumer Response And Willingness To Pay For Agricultural Crops, October 2009
CMHP Project document	Al-Majal Studies, Consultations & Research, Dawud Al-Eisawi	Botanical Survey in the eastern upper slopes of the Jordan Valley, April 2008
CMHP Project document	SIPS	Health safety and quality standards for MH plants and their products: Food, Cosmetic and Pharmaceutical Standards, September 2009
CMHP Project document	RSCN	Inventory of Medicinal and Herbal Plants September 2001
CMHP Project document	Dr. M. Abu Zanat/RSCN	Range land survey in Mujib reserve, September 2006
CMHP Project document	Pharma Plant	Investments opportunities in M/H plants sector, 2005
CMHP Project document	Dr. Talal Abu Raja'/ RSCN	Ethno Pharmacology study in Mujib reserve, September 2006
CMHP Project document	SIPS	IPR guidelines and Policy, September 2009
CMHP Project document	Lamia AL Rae'i/RSCN	Anthropological Component of the Medicinal Plants Project in Mujib, January 2007
CMHP Project document	Talal ABURJAI/RSCN	Ethno Pharmacological Study of Medicinal and Herbal Plants in Mujib Nature Reserve and Surrounding Area, April 2006
CMHP Project document	Saqer M. Herzallah, RSCN	Optimization Of Extraction Conditions Of Essential Oils From Dried Rosemary, Sage And Thyme, And Evaluation Of The Toxicity And Antiseptic Properties Of The Extracted Oils, June 2009
CMHP Project document	Mahfouz Abu-Zanat, RSCN	Native Vegetation Assessment and Development of Grazing Plans for Mujib Nature Reserve, 2005
CMHP Project document	Dawud Al-Eisawi, RSCN	Mujib Nature Reserve Vegetation Community Analysis
CMHP Project document	RSCN	Processes for Development of Community-Based Grazing Management in Mujib Nature Reserve, November 2007
CMHP Project document	PMU	GEF Biodiversity Tools, 7/2008; 5/2009; 9/2009
Guide	Dawud M.H. Al Eisawi	Wild Flowers of Jordan, 1998

Mujib Reserve New Zoning Plan (RSCN)



Mujib Reserve Grazing Areas (RSCN)



Central Upper Slopes of the Rift Valley. Hotspot and Enclosure Google Map: Kufr Asad Station (NCARE). Latitude (N) 3611159; Longitude (E) 752367



Central Upper Slopes of the Rift Valley. Hotspot and Enclosure Google Map: Al-Mansoura Botanical Garden (NCARE). Latitude (N) 3615537; Longitude (E) 755047

