Draft Work Plan of Medicinal and Aromatic Plants (MAP) in Arid and semi-arid zones of Morocco

PROJECT TITLE: Biological Diversity, Cultural and Economic Value of Medicinal, Herbal and Aromatic Plants in Morocco

REFERENCES: Request 5 for Section 108 Funds (Moroccan dirhams)

Background

The project on "**Biological Diversity, Cultural and Economic Value of Medicinal, Herbal and Aromatic Plants in Morocco** " was developed jointly by ICARDA, INRA Morocco, ARS/USA and USDA-FAS. USDA-FAS funded the project.

A first preparation workshop was held at INRA-Settat on 9 February 2005 and was attended by 34 participants including researchers, extension agents and farmers to discuss the potential activities and target species and sites. A second workshop was held at INRA Rabat (Unité de Recherche Amélioration Génétique) on February 11-13, 2005 to work on the plan of work for the duration of the project. It was attended by scientists from INRA-Morocco and from ICARDA.

The project document and the outcome of the meeting held on the 9 February 2005 were discussed and used to develop a logical frame work matrix for the project. After ample discussion it was decided to consider this project as a pilot and investigation project and therefore should concentrate on fewer species and sites and gather relevant and needed socio-economic information on the importance and opportunities of MAPs in Morocco. Both ex-situ and in situ/on-farm conservation methods will be adopted and a holistic approach including technological, add-value, institutional and policy options will be followed. This pilot project will develop a sound approach to allow for scaling out and scaling up of the efforts of conservation of MAP species in different ecosystems in Morocco. It will conduct field surveys on major biotic and abiotic constraints for major PAM in Morocco, document the local knowledge, and investigate the economic importance and market opportunities of MAPSs. This project will also consolidate the research on MAPs at INRA Morocco and will adopt a participatory approach for transferring the available technologies. This project will also allow the exchange of experiences between Morocco, USA and countries in North Africa and West Asia. Moreover, it will strengthen the partnership between INRA Morocco, ARS/USA, USA Universities and ICARDA.

Goal of the Project :

(a) A comprehensive diversity collected and conserved: endangered species identified; niches of biodiversity identified for in-situ conservation; a herbarium and database established; genetic variability assessed; promising genotypes with chemical and medicinal properties identified.

(b) Degree of cultivation, marketing and processing assessed; constraints to the sustainable development of the sector identified; the cultural role of medicinal and herbal plants assessed; recommendations for research, policy and management made.

(c) A mechanism established for coordination and information exchanged within and among countries, and creation of a safety duplication of ICARDA germplasm with germplasm gathered from morocco as well as from Tunisia, Egypt, Jordan, and from other arid and semi-arid areas.

(d) Improved techniques for commercial production developed.

Objectives of the Project :

The overall objective of the project is to support the conservation, management, and sustainable utilization of medicinal and herbal plants in morocco while ensuring effective in situ protection of threatened habitats and ecosystems. The project's specific objectives are to:

1- Prepare national database on indigenous medicinal and herbal plants, with a view to assess their usage, status, and eco systems.

2- Conserve, manage, and sustainably use, both in situ and ex situ, medicinal, herbal and aromatic plants in arid and semi-arid areas.

3- Institutionally strengthen collaborating agencies, i.e scientific research institutes, faculties of pharmacy, extension services, universities, NGOs, etc, to add value to medicinal herbal and aromatic plants through processing, chemical analysis and marketing.

4- Improve public awareness of the importance of medicinal plants and build on traditional knowledge and cultural heritage.

Plan of Work 2005-2007

Target areas and species :

- Target areas are the Arid and Semi Arid regions of Morocco with emphasis on: Chaouia, Rehamna, Abda, Chichaoua.

- Cereal based systems: The promotion of cultivation of **Cumin, Fenugreek** and **Coriander** will be conducted in Settat region;

- Irrigated areas (small irrigation): the activities will focus on the Integrated Pest Management of **Mint** at Guisser, Ben Ahmed, Chemiaa areas and on the Integrated Crop Management for **Fennel** at Sidi El-Mokhtar. If possible, verification trials on IPM of mint could be conducted starting the second year at Tiznit and Meknes regions, known as other major mint growing areas in Morocco. Other aromatic species could be associated with mint;

- The cultivation of some species will be introduced at farmers' fields: **Caper** will be promoted at Safi region, ***Muscari comosum*** at Guisser. Domestication trials (cultivation) will be conducted at experiment stations at Settat and Belfaa for **Thymus, *Muscari comosum*, Oregano** and other important species;

- Management plans will be developed and tested for in situ conservation of **Thymus** populations in three natural habitats (Boulaouane forest, Argana and Oulmes), and ***Muscari comosum*** at Guisser region;

- Additionally, the project will provide technical backstopping for the introduction of selected MAP species in existing or to be created home gardens and nurseries. Women farmers will be targeted by this activity.

Project logical frame work matrix

The process of development of project activities was launched during the meeting held at INRA-Settat on 9 February 2005 and attended by 34 persons including researchers, extension agents, university professors and farmers. The meetings held at INRA-Rabat on 11-13 February 2005 have allowed the development of the logical frame work matrix including activities which can be conducted during the project duration and with the support provided. The process of identification of key stakeholders, members of the project team and collaborating farmers, NGOs and private sector will be initiated soon to discuss the proposed outputs and activities and agree on responsibilities and implementation arrangements. The time table and budgets are presented in the annex 2.

Project teams and partners

The project will involve many stakeholders: scientists, farmers, NGOs, private sector, policy makers.

The following table is regrouping proposed persons to lead the teams of different project outputs. Mr. El-Hachmi Aouragh will oversee the overall implementation of the project activities from INRA Morocco, Dr. Mohammed El Mourid from ICARDA and Dr. Ibrahim Shaqir from ARS/USA.

Table 1- Team leaders and institutions

Outputs	**Morocco**	**ICARDA**	**ARS/USA**
Socio-economic studies including market studies	Fatima Nassif	Kamal Shideed	Ibrahim Shaqir
Conservation in situ and ex situ of MAP	Hassan Ouabbou (ex situ), Chaouki Al Faiz (in situ)	Ahmed Amri	??
Demonstration of technological and management options	Saadia Lhaloui El Hachemi Aouragh	Mustapha El Bouhssini	??
Investigation of add-value options and increasing awareness	Fatima Nassif	Ahmed Amri	??
Enabling policies and institutional environments	Fatima Nassif	Ahmed Amri	??
Strengthening national and regional/international networking	El Hachemi Aouragh	Mohammed El Mourid	Ibrahim Shaqir

Implementation

The team leaders will lead a group of scientists who will develop the detailed protocols for the activities they are in charge.

A start up workshop will be organized with all stakeholders in order to present the plan of work and agree on final document.

Monitoring and evaluation

There will be an annual technical meeting (September 2005) to present and discuss the results and to establish work plan and exit strategies for the project in the presence of main collaborators and key stakeholders. An ARS/ICARDA/INRA supervision mission will be organized at least once a year and as needed depending on the progress of the project. Final project evaluation will be organized at the end of the project.

Table 2-: MAP project Logical Framework Matrix

Objectives/Outputs	**Indicators**	**Means of verification**	**Assumptions**
Development objective Contribution of MAP to improvement of livelihoods enhanced			
Immediate Goal Conservation, Management and Sustainable utilization of MAP in selected dryland ecosystems promoted	Cultivation of selected MAP enhanced and add-value options promoted	Number of field cultivated with target MAPs; Number of accessions and species conserved ex situ and in situ	Market opportunities available Willingness of local communities to participate
Outputs 1. Current status of MAP in Morocco documented; 2. MAP in situ and ex situ conservation initiated;	Reviews and surveys conducted Three collection missions conducted in project region, Oulmes and Argana regions; Two in situ conservation pilot sites identified at Boulaouane et Guisser Arboretum and herbarium developed Two home gardens, one nursery and one seed cleaning, unit supported	Report and databases available Number of accessions collected and conserved Management plans developed and discussed with local communities Number of species conserved in arboretum and herbarium Number of trained men and women on nursery management, seed production and home gardening	Studies available Willingness of local communities to apply the management plans

3. Technological and management options tested and demonstrated;	Surveys conducted on constraints	Reports	Willingness of local communities to work together
	Domestication trials conducted of Thymus, Oregano and Muscari at two experiment stations and farmers fields;	Reports on Preliminary results of domestication	
	Accessions and varieties of selected MAP species evaluated for agronomic and genetic traits;	Number of accessions and populations selected	
	Demonstration trials conducted on integrated crop management on mint, coriander, fenugreek, cumin and fennel;	Number of trials and number of farmers participating in farmers' schools	
4. Add-value options investigated and awareness increased;	Two training courses on processing of selected MAPs;	Number of men and women trained	
	Technical backstopping and support provided to community-based pilot processing initiatives (cumin, capers and mint);	Three community-based initiatives established	
	Stakeholders workshop organized;	Number and qualifications of participants	

	Various public awareness supports developed;	Number of leaflets, mass media interviews and participation to fairs	Existence of national efforts or committee on PGR
5. Enabling policy and institutional environment proposed;	Review;	Review report	
	Training workshop on ITPGRFA CBD and other conventions;	Number of trained stakeholders	
	Participation to national efforts on development of PGR access and benefit sharing legislation.	Specific Map legislation recommendation proposed	Willingness of key stakeholders to create a network
6. National and regional/international networking strengthened.	Stakeholders analysis conducted;	List of stakeholders available	
	Meetings with major national stakeholders to discuss the creation of MAP network;	Number of meetings	
	Participation to regional networks;	Number of collaborating networks and institutions	
	Coordination unit and project teams formed	Technical and steering committees formed	
Activities 1.1 Review of existing literature			

information on MAP in Morocco; 1.2 Document local knowledge on the use of MAP in project sites; 1.3 Conduct market channels and opportunities of selected MAP's; 1.4 Conduct household survey on the importance of MAP species. 2.1 Conduct agro-ecological characterization of selected sites (including the use of GIS); 2.2 Collect MAP germplasm in selected regions; 2.3 Initiate/establish pilot areas for in situ conservation; 2.4 Establish an arboretum and a herbarium at INRA; 2.5 Promote the use of MAP in home garden and nurseries. 3.1 Assess biotic and abiotic constraints of selected MAP; 3.2 Explore the possibilities of domestication (of selected) spontaneous species; 3.3 Evaluate and characterize(genetic, agronomic) the germplasm of selected species; 3.4 Identify crop management options for researchable aspects/ issues;			

3.5 Demonstrate integrated crop management packages using farmers' field schools. 4.1 Train local communities on add-value technologies (harvesting, processing, packaging, storage, and libeling, etc.); 4.2 Initiate a pilot action on community add-value action; 4.3 Organize a stakeholders workshops to promote marketability of MAP; 4.4 Develop public awareness supports (leaflets, mass media, participation to fairs,…); 4.5 Initiate research on active compounds of selected MAP species. 5.1 Review of existing policies and institution dealing with MAP; 5.2 Enhance capacities building of key stakeholders on policies and legislation related to Plant Genetic Resources conservation; 5.3 Contribute to development of national PGR access and benefit sharing legislation. 6.1 Identify key stakeholders at the local and national level;			

6.2 Contribute to the establishment of national MAP network; 6.3 Activate the participation of Morocco to AARINENA MAP network and other regional networks; Establish coordination setup for implementation and monitoring of project activities.			

Annex : Final Project Document

Request 5 for Section 108 Funds (Moroccan dirhams)

Biological Diversity, Cultural and Economic Value of Medicinal, Herbal and Aromatic Plants in Morocco

A. DESCRIPTION OF PROJECT

The overall objective of the project is to support the conservation, management, and sustainable utilization of medicinal and herbal plants in Morocco while ensuring effective *in situ* protection of threatened habitats and ecosystems. The project will be located near Settat, a region characterized by large rainfed grain farms. Because of the lack of income alternatives in this area, this region will be one of the most severely affected as the FTA eventually results in increased imports of US grains and pulses. Medicinal plants offer one of the few viable cropping alternatives to grains in this area. This project is an extension of an on-going project in Tunisia, and is envisioned to extend further to other arid and semi-arid countries in the region.

B. MARKET OVERVIEW

Introduction

One of the major difficulties of assessing the importance of medicinal and aromatic plants and developing a strategy for their conservation and sustainable use is the lack of hard facts about which species are used, what is their detailed distribution, how they are collected or harvested, which species are in cultivation and where, and what are the quantities involved in collection, consumption, and trade. Trade statistics are unreliable as is the identity of the material traded under such names as oregano, covering plants belonging to more than one genus and several species.

There has been renewed interest in recent years in phytotherapy as well as an increasing awareness for the conservation and sustainable use of biodiversity for local people by local people. The project is seen as a means to generate income and to sustainably utilize and conserve

biodiversity by numerous Moroccan stakeholders that are concerned with medicinal and herbal plants who agree there is a large commercial potential not yet exploited.

Trade Impact

Because of the extreme vulnerability of Moroccan grain producers, in the FTA negotiations wheat was identified as one of 3 so-called "explosive" commodities, and other grains and pulses were highly sensitive. This project aims to explore alternative income generation in a rainfed region that relies on grains and has few other alternatives (e.g., tourism).

In the Settat region, more than 80 percent of the area is devoted to grains (bread wheat, durum wheat, and barley) and pulses. With no large irrigation projects nearby, the region depends on rainfall, which in a normal year is about 350 mm (14 inches) a year, less than in the Texas panhandle. Production varies dramatically, depending on rainfall. In some years, the Settat region can account for up to 15 percent of Moroccan durum wheat production and almost 10 percent of Moroccan production of bread wheat and barley. About 80 percent of farmers in this region have less than 12 acres of land. This area would be one of the most vulnerable in Morocco when/if producer prices for grains are reduced. Without irrigation, there are few other crops suitable for planting, as well as few other economic opportunities.

Morocco has long been a major market for US grains. By offering vulnerable grain producers a possible alternative to cereal production, this project will help lessen the negative impact of the FTA on one of the most vulnerable sectors in the Moroccan economy, thereby reducing opposition to the FTA and facilitating the market for U.S. wheat and barley, as well as pulses.

C. PERFORMANCE INDICATORS

Goal

(a) A comprehensive diversity collected and conserved; endangered species identified; niches of biodiversity identified for *in-situ* conservation; a herbarium and database established; genetic variability assessed; promising genotypes with chemical and medicinal properties identified.

(b) Degree of cultivation, marketing and processing assessed; constraints to the sustainable development of the sector identified; the cultural role of medicinal and herbal plants assessed; recommendations for research, policy and management made.

(c) A mechanism established for coordination and information exchange within and among countries, and creation of a safety duplication of ICARDA germplasm with germplasm gathered from Morocco as well as from Tunisia, Egypt, Jordan, and from other arid and semi-arid areas.

(d) Improved techniques for commercial production developed.

Objectives

The overall objective of the project is to support the conservation, management, and sustainable utilization of medicinal and herbal plants in Morocco while ensuring effective *in situ* protection of threatened habitats and ecosystems. The project's specific objectives are to:

1. Prepare a national database on indigenous medicinal and herbal plants, with a view to assess their usage, status, and ecosystems;
2. Conserve, manage, and sustainably use, both *in situ* and *ex situ*, medicinal, herbal and aromatic plants in arid and semi-arid areas;
3. Institutionally strengthen collaborating agencies, i.e. scientific research institutes, faculties of pharmacy, extension services, universities, NGOs, etc. to add value to medicinal herbal and aromatic plants through processing, chemical analysis and marketing;
4. Improve public awareness of the importance of medicinal plants and build on traditional knowledge and cultural heritage.

Activities

- Collect and conserve local species
- Identify and establish *in situ* conservation sites
- Characterize the biology and agronomy of selected species
- Conduct chemical analysis for selected species
- Survey cultural and economic values of herbal, medicinal and aromatic plants
- Develop a CD ROM with information on available germplasm, habitat and distribution, use, published reports, etc.
- Promote involvement of NGO and private sector
- Enhance regional and international networking
- Conduct field days and awareness workshops

Participants

- The Centre d'Aridoculture (Arid Agriculture Center) is part of the **Institut National de Recherche d'Agronomique (INRA)**, the major research body of the Ministry of Agriculture. The Center was created in 1980 by USAID and the Mid-America International Agricultural Consortium (MIAC), a 5-state consortium comprising Nebraska, Missouri, Kansas, Oklahoma, and Iowa. Because of this connection, INRA Settat has long had close links to US scientists.

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- The **International Center for Agricultural Research in the Dry Areas (ICARDA)** is one of 16 international agricultural research centers that make up the CGIAR system. Based in Aleppo, Syria, ICARDA has a regional office in Tunisia that has been working with FAS/RSED for several years. ICARDA is currently managing six 108-funded projects for RSED in Tunisia, including a project similar to this one on medicinal plants.

- USDA's **Agricultural Research Service (ARS)** will provide expertise and guidance for this project.

Project Management and Evaluation.

The ICARDA office in Morocco will manage the funds and the project. (See Annex I.) Money will be provided in 2 tranches. The first tranche will be provided at the beginning of the project. The second will be provided after one year, following an interim progress report submitted to the Agricultural Affairs Office, Embassy Rabat. At the end of the project, a final report, including a record of expenses, will be submitted by ICARDA to Carol Kramer-LeBlanc, Director, FAS/ICD/RSED, with a copy to AgRabat.

This table shows the allocation between the 3 research partners, but the funds will be managed and distributed fully by ICARDA Morocco.

Contributions from Other Parties

ICARDA, INRA Settat, and ARS will make in kind contributions consisting of:

-- salaries of ICARDA, INRA and ARS scientists;

-- support staff expenses at all 3 institutions

-- laboratory and equipment usage.

ANNEX I

Title: **Biological diversity, cultural and economic value of medicinal, herbal and aromatic plants in Morocco**

Country: Morocco and the USA

Institution: *Centre d'Aridoculture* (Center for Arid Agriculture), INRA Settat

Principal Investigators:

	In INRA (Morocco)	**In ICARDA (Tunisia)**	**In the USA**
Name:	Dr. Mohamed El Gharous	Dr. Mohamed El-Mourid	Dr. Ibrahim Shaqir
Title:	Director	Regional Coordinator	
Institution:	INRA Settat	ICARDA	USDA-ARS-OIRP
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Start date: 1 August 2004 **End date:** 31 July 2006

Funds Requested: Total: 2,663,400 Dirhams (eq. US$292,600 at $1 = 9 Dh)

Check Payable to: ICARDA
Check Sent to: Dr. Mohamed El Mourid, Regional Coordinator

INRA Authorized Representative Signature: _____
Dr. Hamid Narjisse

ICARDA Authorized Representative Signature: _____
Prof. Dr. Adel El-Beltagy

USDA-ARS-OIRP Authorized Representative: _____
Ms. Arlyne Meyers

Submitted By AgRabat **May 2004**