

**SUSTAINABLE MANAGEMENT OF NATURAL
RESOURCES AND IMPROVEMENT OF
MAJOR PRODUCTION SYSTEMS OF
THE ARABIAN PENINSULA**

EXECUTIVE SUMMARY

OF

**ICARDAs Regional Program for the Arabian Peninsula
Phase II**

**SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES AND
IMPROVEMENT OF MAJOR PRODUCTION SYSTEMS OF THE ARABIAN
PENINSULA. PHASE II**

EXECUTIVE SUMMARY

1. INTRODUCTION

The Arabian Peninsula is faced with the challenges of developing more sustainable land and water use, preserving its environment and heritage, and sustaining its population. Addressing these challenges will require innovative research in a number of areas, including:

- Improvement of on-farm water management and water use efficiency
- Development and use of alternative water sources.
- Restoring the productivity and arresting the degradation of rangelands.
- Developing protected agriculture.
- Re-evaluating traditional practices and indigenous knowledge.

The issues of water, productivity, sustainability and environment are closely interconnected. Unless current practices change, the result will be rapid depletion of water resources, loss of indigenous species and knowledge, and destruction of the natural resource base. This program seeks to address these research needs. An innovative research program, conducted by the NARS with assistance from ICARDA, will develop economically viable technologies and management practices as well as the associated legislation and policies to support their adoption by end-users. Such a program will enhance agricultural knowledge systems in the region for the benefit of the people of the Arabian Peninsula as well as other arid regions of the world.

**2. BACKGROUND: PHASE I OF THE ARABIAN PENINSULA
REGIONAL PROGRAM**

A Regional Program for *Strengthening Agricultural Research and Human Resource Development in the Arabian Peninsula* was initiated in 1996, with financial support for three years (1997-1999) from the Arab Fund for Economic and Social Development (AFESD) and the International Fund for Agricultural Development (IFAD). The Program is coordinated by ICARDA and implemented in partnership with the national programs of Bahrain, Kuwait, Qatar, Saudi Arabia, the Sultanate of Oman, the United Arab Emirates and the Republic of Yemen.

The Program was established with the overall objective of increasing food security in the Arabian Peninsula, through the increased productivity of crops and livestock based on the optimization of water use efficiency, conservation of natural vegetation, prevention of soil degradation and desertification, and strengthened cooperation among the participating countries and with regional and international organizations.

During Phase I, the following priority research areas were established: (1) On farm water use and irrigation management; (2) Rangeland, shrubs, irrigated forages and livestock; (3) Abiotic stresses; and (4) Protected agriculture, supported by activities in agroecological characterization and human resources development

ICARDA coordinates and manages the Regional Program through a full-time Regional Coordinator located in ICARDA's regional office in Dubai. Two full-time international senior scientists, one in water management and the other in protected agriculture, have been recruited to the Program to support the research program. A management system has been established at both the national and regional levels. In each country, one national scientist has been appointed as a National Coordinator, responsible for implementation and coordination of the approved national workplan. Results of the past season's work and workplans for the next season are presented and discussed during Annual Coordination Meetings. A Regional Steering Committee has been formed which approves the program's annual research and training workplans, evaluates program activities and decides on future directions.

3. COOPERATING PARTNERS

Cooperating partners include Ministries of Agriculture, Agricultural Authorities and agricultural research institutions in the seven countries of the Arabian Peninsula. Each country has a designated National Coordinator. The Partners are:

State of Bahrain, Ministry of Housing and Agriculture.

State of Kuwait, Public Authority for Agricultural Affairs and Fish Resources (PAAAFR)

State of Qatar, Ministry of Municipal Affairs & Agriculture

Kingdom of Saudi Arabia, Ministry of Agriculture and Water

Sultanate of Oman, Ministry of Agriculture and Fisheries

United Arab Emirates, Ministry of Agriculture and Fisheries

Republic of Yemen, Ministry of Agriculture and Irrigation, and

The International Center for Agricultural Research in Dry Areas (ICARDA)

4. PROPOSED PROGRAM FOR PHASE II

The program is structured according to the three main production systems: open field irrigated production systems, range/forage/livestock based systems, and protected agriculture systems, with the underlying objective of conserving the limited water resources and the fragile rangelands of the Arabian Peninsula. These three major components, supported by components in agroecological characterization and in institutional strengthening and capacity building, are closely inter-related. Improving the efficiency of water use in agriculture is a major objective throughout all three systems. Work on abiotic stresses (heat, drought and salinity) will continue, with a view to identifying plant species and genotypes that are best adapted to the harsh environments and production systems of the region.

Greater integration of research within countries will be achieved through the production system approach, while greater integration across countries will be achieved through enhanced networking within each component of the project, with scientists from national teams exchanging information and consolidating their research across the region. Research will shift from researcher-managed on-station trials to applied and adaptive research and technology testing in participation with the intended end-users. The project will identify selected pilot sites within each country, where packages of the improved technologies and management practices developed by the project will be verified at the system level. These sites will serve to demonstrate the improved systems to the farming community, as well as national decision-makers, with a view to encouraging rapid adoption and impact.

5. PROGRAM DURATION

The program proposed for this second phase represents a long-term strategy for research and technology transfer, and requires sufficient duration in which to test and validate potential technologies and management practices as well as the necessary legislative and policy interventions that may be required. A minimum of five years is needed to achieve the specified outputs, and funding is sought to support a five-year second phase (2000 - 2004).

6. GOAL AND OBJECTIVES

The overall goal Phase II is:

The development of more productive and sustainable rangeland and irrigated production systems, including protected agriculture, through the more efficient use of the natural resources of the Arabian Peninsula, in particular water, energy and indigenous plant species.

The proposed Program has five components with the following specific objectives:

- (1) **Agroecological Characterization:** Improved targeting of research and technology transfer, land use planning, and environmental management based on the characterization of the specific potentials and constraints of the diverse agroecologies and associated land use systems of the Arabian Peninsula.
- (2) **Management and Utilization of Different Sources of Irrigation Water:** Improved water use efficiency and optimal utilization of available water resources in open field irrigated production systems.
- (3) **Rangeland / Forage / Livestock Systems:** Development of integrated range, forage and livestock production systems and management practices for rangeland rehabilitation.
- (4) **Protected Agriculture:** Development of a protected agriculture industry for the region that meets the national demand for more efficient and sustainable production systems and techniques.
- (5) **Capacity Building and Institutional Strengthening:** Strengthened national institutional and human resource capacity and enhanced technology transfer.

The overall program, objectives and associated expected outputs are summarized in Table 1.

7. PROGRAM MANAGEMENT AND COORDINATION

ICARDA will continue to be responsible for managing and coordinating the Program, including responsibility for financial management and donor reporting. Activities in the Arabian Peninsula are managed and coordinated by the ICARDA Regional Coordinator in the Dubai office. The Regional Coordinator is responsible for all logistical and administrative organization, and liaison with national programs and the ICARDA Director of International Cooperation.

The Regional Steering Committee comprises the National Coordinators, ICARDA's Regional Coordinator, ICARDA's Director of International Cooperation, and the two donor representatives from AFESD and IFAD constitute the members of the Regional Steering Committee. A Regional Steering Committee Meeting (RSCM) will be held once a year to review, amend and approve annual workplans and budgets. In addition a Regional Technical Coordination Meeting (RTCM) is held annually in one of the seven Arabian Peninsula countries, in which the scientists from the participating national institutions, ICARDA and other collaborating institutions, review the results of the past year and finalize plans for the coming growing season, for submission to the RSCM.

PROGRAM SUMMARY: OBJECTIVES AND EXPECTED OUTPUTS

OBJECTIVE 1: Improved targeting of research and technology transfer, land use planning, and environmental management based on the characterization of the specific potentials and constraints of the diverse agroecologies and associated land use systems of the Arabian Peninsula.

Outputs:

- 1.1 Regional assessment of abiotic stresses and crop water requirements through agroclimatic mapping
- 1.2 Agroecological zoning for biodiversity conservation, rangeland management and rehabilitation, and targeting of technology transfer.

OBJECTIVE 2: Improved water use efficiency and optimal utilization of available water resources in open field irrigated production systems.

Outputs:

- 2.1 Recommendations for appropriate irrigation, soil and crop management that promote efficient use of water, economic net benefits to water users, and yield security and stability.
- 2.2 Evaluation of the water use efficiency of different crops
- 2.3 Evaluation of methods to use alternative water sources such as brackish water and treated wastewater.
- 2.4 Evaluation of traditional systems based on renewable water resources.
- 2.5 Demonstration of recommended packages of practices for improving the efficiency of water use in field level irrigation under different cropping systems and sources of water.

OBJECTIVE 3: Development of integrated range/forage/livestock production systems and management practices for rangeland rehabilitation

Outputs:

- 3.1 Germplasm of indigenous and exotic forage and rangeland species with identified attributes and potential for utilization (a) in rangeland restoration or rehabilitation, and (b) as alternative forage crops.
- 3.2 Technical options for forage crop production in different agroecological zones and under different production systems.
- 3.3 Technical options for the restoration and rehabilitation of degraded rangelands in different agroecologies.

3.4 Technical options for management of livestock under rangeland systems in different agroecological zones.

3.5 Rangeland management practices transferred and demonstrated in target areas and pilot sites.

OBJECTIVE 4: Development of protected agriculture industry for the region that meets the national demand for more efficient and sustainable production systems and techniques.

Outputs:

4.1 Simple greenhouse structures and covering materials suitable for the region's climate, with more efficient ventilation and cooling system.

4.2 Improved irrigation systems for increased water use efficiency, and adapted soil-less cultivation systems and techniques

4.3 Improved integrated production and protection (IPP) management practices that ensure strong healthy plants with adequate protection from pests and diseases, using safe control practices with minimal use of chemicals.

4.4 A regional networking mechanism that maximizes the collaboration among researchers, scientists and extension staff in various countries and exchange of knowledge, information and expertise regionally and internationally.

4.5 Enhanced capabilities of national scientists, researcher and extension personnel.

OBJECTIVE 5: Strengthened national institutional and human resource capacity and enhanced technology transfer

Outputs:

5.1 Enhanced capabilities of national scientists and exchange of information and experiences on problems of common interest through regional networking.

5.2 Sustainable research management, technology transfer and delivery systems.

5.3 Information dissemination to the end-users

8. BUDGET

8.1 DONOR CONTRIBUTION

APRP is supported financially by the Arab Fund for Economic and Social Development (AFESD) and the International Fund for

Agricultural Development (IFAD) and more recently the OPEC Fund for International Development. Funding is sought to support:

- (i) Four Regional Specialists recruited by ICARDA, who will be responsible for leading and coordinating the specific regional research activities in water management, rangeland management, abiotic stresses (stress physiology) and protected agriculture. The specialist in stress physiology will also act as the Regional Coordinator
- (ii) Short term consultants, to assist the specialists, where required.
- (iii) Operational costs for national research activities, including: research materials and supplies, casual labor, field costs of technical research, costs of data collection, analysis, etc.
- (iv) Capital equipment, for strengthening of gene bank and GIS facilities, research equipment for use in the field and office, additional field and computer equipment, and e-mail and internet facilities in all seven countries.
- (v) International and local travel for national and ICARDA scientists.
- (vi) Travel for technical and steering committee meetings.
- (vii) Short- and long-term training programs for the NARS program staff and exchange visits between national scientists in different countries.
- (viii) Workshops, conferences, and seminars.
- (ix) Reporting and publications, including annual reports, workshop proceedings, consultants' reports, regional reviews, and the program's network newsletter.
- (x) Regional coordination and management of the program.

8.2 NARS' CONTRIBUTION

The National Programs of the seven participating countries contribute to the program through the in-kind provision of their research and management staff..

8.3 ICARDA'S CONTRIBUTION

The budget provides for support for ICARDA's coordination and management of the program and for logistic and administrative support from ICARDA Headquarters. ICARDA supports the program through the in-kind contribution of its scientific staff's time in research support and technical backstopping, and in the provision of germplasm and other research materials where required.