Managing water scarcity in rainfed agriculture in West Asia and North Africa: ICARDA’s experience

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What is ICARDA?

- ICARDA: International Center for Agricultural Research in the Dry Areas.
- ICARDA is one of 15 CGIAR Centers worldwide, working to reduce hunger and poverty as well as protecting the natural resource base through agricultural research for development, and capacity building.
ICARDA’s mission:

“To alleviate poverty and increase food security by achieving better, more sustainable livelihoods for the resource poor in the non-tropical dry areas of developing countries through increased agricultural productivity and development, including adding value to primary products, while fostering the equitable and more optimal management and the conservation of the natural resources (water, soils, biodiversity etc.) and human capital.”
ICARDA’s vision is a future where farm communities throughout the world’s dryland areas enjoy secure food supplies, stable incomes, and sustainable livelihoods.
ICARDA 4 major programs to implement the new agenda...

- P1: Water and land management
- P2: Biodiversity and integrated gene management
- P3: Diversification and sustainable intensification of production systems in dry areas
- P4: Socioeconomic and policy program.

ICARDA’s sub-regional programs will be expanded. Specifically, the highlands research network and the Latin American program will be strengthened, and a new Asian network established.
Importance of dry areas

- about 4 billion ha (25% of the total global land area)
- more than 1,850 million people (28% of the global population).
- About 74% of this area and 90% of its inhabitants are in the developing world.
- A large proportion of these inhabitants are not only economically disadvantaged but also chronically resource poor.
Challenges to meet

- Low adoption of new technologies at large scale in the rainfed agriculture
- Global Climate Change and Droughts;
- Environmental Degradation;
- Water Scarcity.
**Water poverty**

**Water scarcity standard (500 m³/year)**

**Fig. 2.1.** Actual Renewable Water Resources (ARWR) per capita (1000 m³/yr) by region.
Map Areas of physical and economic water scarcity
The most limiting factor is and will be Water availability in the future
Water not land is the limiting resource

\[ y = -0.4278x^2 + 4.7328x - 0.543 \]

\[ R^2 = 0.7611 \]

Zhang and Oweis 1999
What are some achievements of ICARDA in terms of water scarcity management?
Species and Varieties improvement

- Tolerance to drought
  - Growing cycle
  - Morphological and physiological traits
- Pest and disease resistance
- Adapted species to different environments
Crop and soil management

- Sound cultural practices
  - Crop rotations
  - Fertilization
  - Alternative cropping

- Conservation agriculture
  - No-till system
  - Large experience in Morocco and Tunisia
Water Benchmarks of CWANA
ICARDA's response to water scarcity for better livelihoods

Community-Based Optimization of the Management of Scarce Water Resources in Agriculture in West Asia and North Africa

Project Workplan and Budget
DRAFT

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Potential water productivity

- Supplemental irrigation water
- Full irrigation water
- Rain water

Water productivity (kg/m³)

SI water

Fl water

Rain water
Indigenous Water-Harvesting Systems in West Asia and North Africa

Editors
Theib Oweis
Ahmed Hachum
Adriana Bruggeman

International Center for Agricultural Research in the Dry Areas
Technical options

Soil and water conservation technologies
Technical options

Water harvesting associated with rangeland improvement
Improved rainwater productivity

- No intervention
- Micro WH
- Macro WH

% of rainfall

Evaporation
Transpiration

Graph showing improved rainwater productivity with different interventions.
Introduction of new species adapted to water scarcity
Improving co-learning by linking sources of local and scientific knowledge in the drylands

Differing perceptions of priorities for dryland Syria

- Researchers’ views:
  - Lamb fattening: 23
  - Micro-credit: 22
  - Water harvesting: 8
  - Home garden: 8
  - Jabban institution: 3

- Policy makers’ views:
  - Water harvesting: 8
  - Micro-Credit: 7
  - Modern irrigation techniques: 4
  - Lamb fattening: 3
  - Barley varieties: 1

Farmer-researcher dialogue
Regional Implications

- National, regional and international awareness and commitment
- Sharing knowledge
- Networking: Research, Policy, Institutions, NGOs and Communities
- Investment in science and technology by NARS, IRC, Developed countries
Thank you