



Enhancing Productivity of Wheat-Legume Cropping System for Smallholder Farmers in West Asia and North Africa

Single approach, multiple benefits

- Higher profits for farmers
- Increased nutrition in rural diets
- More fertile soils and less land degradation
- Greater household resilience to production shocks and climate uncertainties

A multi-country project to promote food security in drylands under changing climate conditions

Algeria, Egypt, Iraq, Jordan, Lebanon, Libya, Morocco, Tunisia, Turkey, Syria, Sudan, Yemen



The Challenge

West Asia and North Africa is one of the most water scarce regions of the world and faces mounting challenges that are undermining the region's ability to feed its growing population. Most countries in the region rely on food imports in varying degrees to meet their demands. From Morocco to Jordan, farmers confront erratic rainfall, frequent drought, increasing salinization, and a limited natural resource base of arable land and water. The increasing mono-cropping of wheat, using only a few wheat varieties, is worsening the food security situation with depleting soil fertility and increasing intensity of diseases and pests. Many of these challenges are expected to amplify from climate change and variability.

The Project

The project tests, validates and disseminates proven and new technologies to assist smallholder farmers in WANA increase their yields and stabilize wheat-legume production system for food security in the face of increasing climate variability. Using participating WANA countries as a platform, the initiative will extend successes to other regions as international public goods.

The project has a three-fold objective:

- Promoting proven technologies for wheat-legume rotation systems by scaling out of improved crop varieties and associated production technologies
- Identifying and testing new technologies in response to new challenges and conditions
- Combining and demonstrating new higher-yield, biotic and abiotic stress tolerant varieties with other interventions, such as integrated pest management and improved crop and soil water management.



Faba bean, the most important food legume crop in Egypt, is reducing the dependence of farmers on nitrogenous fertilizers while providing quality protein for rural families and nutritionally rich residues for animal feed.

The Opportunity in Wheat-Legume Cropping System

Wheat is the major staple food in the WANA countries and pivotal to their food security. Food legumes (faba bean, kabuli chickpea and lentil) are also important as a valuable source of dietary protein, particularly among the poor who cannot afford animal protein. Not only are legumes provide nutritional value, they play a critical role in rotation with cereals in maintaining soil fertility and enabling sustainable cropping systems. Thus strengthening the wheat and food legume production system would deliver on several development goals in the region at once: enhancing food security, poverty reduction, health and nutrition and sustainable environment.

The project is funded by European Union and IFAD and implemented by ICARDA in partnership with national agricultural research and extension agencies in participating countries.

Implementation

ICARDA is applying its proven successes with soil and crop management technologies for dry areas along with conducting adaptive research so continuous innovation can ensure sustainable growth in productivity – a key enabler for food security. Further, the use of simulation modeling will facilitate the **out-scaling of proven interventions to similar environments as international public goods.**

Improved varieties that offer higher yields and greater tolerance to a range of biotic and abiotic stresses

Robust seed systems for timely and reliable access to improved seeds for farmers

Crop management practices for optimal integration of wheat and food legumes into production systems

Integrated pest management for prevalent and emerging pests in the face of changing weather patterns from climate change

Supplemental irrigation on deficit irrigation sites for less soil water stress, better water productivity and stable yields

Conservation agriculture practices for improved soil fertility and water conservation

Gender activities to understand women's role in production system for greater uptake of innovations and equitable benefits

The project team has established a baseline for technology adoption, productivity and household socio-economic status at the start and is monitoring these through farm surveys to **measure research impacts** on indicators of poverty, food security, nutrition and environment.



Farmers learning how to use the no tillage seeder - Lebanon

Adapting cropping strategies to different agro-ecosystems

- **In the lowland coastal areas of WANA**, both durum and bread wheat would be rotated mainly with faba beans and chickpea. The target lead NARS include Egypt, Morocco, Tunisia, Syria and, Sudan.
- **For the continental areas of the region**, the program will focus on developing germplasm and improved crop management practices for wheat-chickpea rotation system. The target NARS include Algeria, Lebanon, Morocco, Syria and Turkey.
- **For the high-altitude areas**, the emphasis will be on developing high-yielding wheat and lentil genotypes for the establishment of wheat-lentil rotations.

Research and development outputs will be extended to other countries in WANA, such as Iraq, Jordan, Libya and Yemen.

Our National Partners in WANA

The initiative is executed through the direct involvement of NARS institutions in eight participating countries:

Algeria – Institut Techniques des Grandes Cultures

Egypt – The Agricultural Research Center and five of the country's governorates

Jordan – National Center for Agricultural Research and Extension

Lebanon – Lebanese Agricultural Research Institute

Morocco – Institut National Recherche Agronomique

Sudan – The Agricultural Research Cooperation

Tunisia – Institution de la Recherche et de l'Enseignement Supérieur Agricoles, Institut National de la Recherche Agronomique de Tunisie

Turkey – GAP Agricultural Research Institute



Participants practicing molecular tools in the breeding of cereals and legumes

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