

ICARDA in Morocco

A long history of
bettering rural
lives together



ICARDA and its partners deliver resilient, climate-smart food systems, by undertaking innovative, science-based research-for-development. We improve food and nutrition security, and the livelihoods of family-farmers grappling with environmental and man-made challenges, in climate-vulnerable dry regions of Africa, Asia, and the Middle East.

For more than four decades, we have supported communities, donors, partners and governments to:

- Develop crops and livestock adapted to climate and population impacts, pests, and disease.
- Collect, conserve, and research plant genetic resources vital for climate-smart crops.
- Develop innovative soil, water, and agronomy technologies.
- Increase farmer incomes through better agricultural systems and market access.
- Build capacities of farmers, partners, and institutions to research and manage new technologies.
- Improve access to agricultural enterprise and development for women and youth.




Our non-profit solutions based on field-proven science are widely adopted by countries, NGOs, the private sector, and development agencies, improving the livelihoods of millions of farmers across the region. Our unique dryland agricultural expertise combined with extensive networks of research and development partners, including farming communities themselves, makes sure we provide people-centered solutions integrated directly into farming activities and food systems. Our solutions are specifically designed to be scaled-up and adapted to the climate crisis.





 @ICARDA


 <https://icarda.org/research/country/morocco>

 Dr. Michael Baum BCIP & Morocco Platform Director

 Station Exp. INRA-Quich
Rue Hafiane Cherkaoui. Agdal
Rabat - Instituts

 + 212537682909
+ 212537675496

 icarda-rabot-office@cgiar.org

 ICARDA's office:
<https://goo.gl/maps/RkqULcfqpQDkJ5dN6>

 ICARDA's farm:
<https://goo.gl/maps/LtmxZVTYpDiQ4P9R6>



Agriculture contributes about %20 of Morocco's gross domestic product (GDP), varying widely according to rainfall. The country has about 8.5 million ha of good agricultural land, of which nearly %90 is rainfed, while irrigated areas are still expanding. Yet like much of the region climate change, along with impacts from ill-planned land use, is devastating food systems and agriculture, threatening food security and the livelihoods of millions of farmers. ICARDA works with the Kingdom of Morocco within groundbreaking country-led initiatives and needs, to support the United Nations Sustainable Development Goals in improving food security for the whole country, creating sustainable and resilient livelihoods for family farming households, and contributing to natural resources conservation in the face of the climate crisis.

Morocco role in ONE CGIAR



CGIAR is a global research partnership for a food secure future dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resource management. CGIAR incorporates 15 CGIAR centers, more than 3000 scientists and a 1 billion dollar investment allocated to n 32 new global and regional initiatives to create real, lasting, and positive impact.

With a return on investment of 10:1 and a -50 year track record of innovations that have changed the world, funding CGIAR is among the best investments we can make in our common future.

Morocco has been identified as primary target in initiatives that include:



32
Initiatives



\$ 1 billion
Investment



>3,000
Scientists



15
CGIAR Centers



ICARDA in Morocco

ICARDA formalized its partnership with Morocco on the 18th of January 1985 signing a formal agreement with the Government of the Kingdom of Morocco. Morocco welcomed ICARDA when it relocated from Syria due to conflict in 2012, and it has since become a major ICARDA research hub.

In Morocco we manage %30 of the ICARDA global budget (approx. USD 10 million) distributed across 72 projects led by 21 international scientists and over 60 national staff. Over USD 3 million was invested to establish over 400 m² of laboratory facilities and 160 hectares of field research in Rabat. Throughout, the Institut National de la Recherche Agronomique du Maroc (INRA-Morocco) has been ICARDA's key partner among other Moroccan governmental institutions and universities.



21

International Scientists



60

National Staff



500 m²

Laboratory Surface



72

Active Projects



\$ 9.8 Mil/year
Investment



18th Jan 1985
1st Agreement



ICARDA under Generation Green



ICARDA Morocco responds to the royal guideline for Generation Green: “the agriculture sector needs to become a stronger source of employment and a better instrument to improve livelihoods for rural people”. ICARDA is committed to develop and deploy scientific solutions for rural populations to reduce poverty, raise sustainability, create employment, and ensure equitable livelihoods.

Our innovations, especially the deployment of digital tools, help develop youth employment in village enterprises while integrating the role of women cooperatives as generators of rural income. We also research and develop new value chains for healthier foods, advocate for and support major development of green technologies, and we are committed to scaling conservation agriculture to support INRA in achieving a %50 increase in national cereal productivity.



Axe 1.2
Village
Enterprises



Axe 1.3
Women
Cooperatives



Axe 1.4
Digital
Tools



Axe 2.1
Healthier
Foods



Axe 2.3
Green
Tech



Axe 2.4
Conservation
Agriculture



Genebank



The ICARDA Genebank is the fourth largest holding of diversity in the world, accounting for 152,216 accessions that represent nearly 4% of the global diversity. The Moroccan unit holds more than half of the accessions, mostly focusing on landraces and cultivated crop species. Approximately 2/3 of these accessions were safely duplicated in Svalbard for perpetuity. Among the landraces maintained there are 1,443 that were collected across Morocco and shall be maintained in trust for its people. The ICARDA pre-breeding unit generates each year 100 new crosses between modern germplasm and genebank holdings to deliver more diversity and better traits for breeders to use.



4th
Global
Ranking



152,216
accessions
Total Holding



95,625
accessions
In Morocco



69,606
Morocco accessions
Svalbard
Deposited



1,443
landraces
Morocco



100
Crosses
Pre-breeding



Breeding crops



Morocco is the core hub for ICARDA's breeding program of its seven mandate crop species: bread wheat, durum wheat, barley, lentil, chickpea, faba bean, and grass pea.

12 breeders and 35 staff are involved in a process that requires the testing of more than 50,000 new possible varieties each year across 200 hectares of research stations located around Morocco.

Since 2015, 20 varieties have been developed in partnership with national institutions.



7
Crops



12
Breeders



>200 ha
Trials



>50,000
Elites
Tested per year



\$ 5
Mil per year
Investment



20
varieties
Since 2015



Variety impact



ICARDA supports INRA in its commitment to achieve %50 higher national cereal yields via improved varieties by 2030. However, if varieties are not made commercially available to farmers their impact cannot be achieved. A high-level meeting was organized in July 2021 to bring together stakeholders of the Moroccan seed sector. Five high level recommendations were provided: i. INRA varieties are ideal for harsh conditions; ii. base seed production needs to be improved; iii. seed multipliers should be contracted for G2 and G4 productions; iv. catalogue rules need revising; v. a variety portfolio should be defined with stakeholders.



**120 INRA
varieties**
Since 1980



**-50%
yield**
By 2030



>70
Million MAD
R2 subsidies



-30%
INRA shares



18th June 21
Stakeholders
meeting



5
Recommen
dations



Morocco CGIAR Grant Program (MCGP) Genetic Gain



The Morocco CGIAR Grant Program (MCGP) is now in phase IV and has identified genetic gain (better performance) as a critical element to be addressed to improve the lives of Moroccan farmers. The equivalent of USD 200,000 per year are invested by the Ministry of Agriculture of Morocco to support the research and development of improved varieties for 12 high priority product profiles, including the screening of more than 5,500 lines at Sidi el Aydi, the newly established international drought platform, and via the use of Annoceur, a station that was made ready to conduct off-season shuttle. In addition, six demonstration platforms were established to showcase improved varieties to farmers and 16 hectares of pre-base seed productions were successfully harvested.



\$ 1 Mil
Investment



12
Product
profile



5,500
entries
Sidi el Aydi



Annoceur
Off season



6
Demo
platform



16 ha
G1 seed



Picture credit: "Michael Mayor"

Agronomy for a sustainable future



ICARDA supports Morocco's commitment to achieve soil conservation practices (conservation agriculture) on 1 million hectares of land, by 2030. ICARDA's research on the adoption of its conservation agriculture approaches showed a %20 increase in farm productivity and a %13 reduction of production costs, matched by an equivalent reduction in soil erosion and greenhouse gas emissions. Furthermore, crop diversification with relay-intercropping of a spring crop such as chickpea or quinoa, doubled farm income. The inclusion of forage (animal feed crops) in the rotation system increases forage production and has shown by ICARDA to improve the fattening of small ruminants by %10.



+20%
Yield
Conservation
Agriculture



-13%
Costs
Conservation
Agriculture



1 Mill ha
Goal by
2030



+100%
Income
Crop
diversification



+10%
Fattening
Forage
Mixture



Water approaches to maintain natural resources



ICARDA's climate-smart water innovations simplify farming operations while improving water use and land productivity. Integrated innovations include maximizing in-situ storage of water through conservation interventions, fine-tuning when and how to irrigate to produce "more crop per drop," and identifying where and how to source water. Our water-saving technologies in irrigated systems include the deployment of mechanized raised bed planting, deficit irrigation, ultra-low energy solar drip irrigation, and water-harvesting. For rainfed systems ICARDA developed water-conservation techniques and is exploring the safe use of treated wastewater for production of feed, forage, and trees. These innovations have an added value of creating more rural jobs.





Livestock research



At the current growth of %1 per year, Morocco heads of ruminants will reach 35M by 2030, with cereal forage their main food source. As fodder and forage prices rise, ICARDA works with INRA to identify new ways to increase feed production and quality while reducing land competition with food crops. ICARDA's multi-forage inter-cropping projects that aim to increase feed quality, have shown a potential %20 increase in milk production, while its improved dual-purpose (animal and human use) barley varieties produce %20 more forage. In only 6 days, ICARDA's low cost off-the-grid hydroponic systems can produce enough barley green fodder cakes to feed five animals from just 1m².



35 Million
Ruminants
by 2030



+20%
Forage
Dual Purpose



+20%
More milk
Forage mix



6
Days
Fodder cake



365
Days
Forage
availability



Morocco CGIAR Grant Program (MCGP) Yield Gap



Morocco CGIAR Grant Program (MCGP- IV) has identified yield gap research on farm management as a critical element to better the lives of Moroccan farmers. . The equivalent of USD 300,000 per year are invested by the Moroccan Ministry of Agriculture to support the development of resilient agricultural sustainable systems, by scaling out resources use efficient technologies, such as Conservation Agriculture (CA). It uses the innovation platform approach involving all the stakeholders. The project will test and deliver novel knowledge on agronomic practices to improve the sustainability in rainfed agriculture.



\$ 2 Mil
Investment



**+50%
yield**
by 2025



**>2000
Farmers
Engaged**



**50000 ha
trials
Innovation
Platforms**



**1 M ha
CA by 2030**



**100
Factors
Complex
GxExM**



Gender-Transformative Food systems



Women cooperatives hold the potential to become generators of income in rural areas. The conversion of cereal harvests into highly nutritional food generates prices 100-10 times higher than selling the raw grains. However, several social issues exist that prevent women generating and re-distributing this income. Under two PRIMA projects ICARDA and its partners study policies and social issues that hinder and prevent this potentially great economic model from generating income.



100-10 X
Price



75%
Healthier
Foods



+50%
Income



+300%
Employment



4.5\$ Mil
PRIMA
projects



From Morocco to the World



ICARDA is a co-signatory with INRA, the University Mohamed VI Polytechnique and CIMMYT to provide research support for the Moroccan ministerial initiative of Adaptation of African Agriculture (AAA), and ICARDA utilizes the Morocco hub to generate and distribute new innovation and technologies to other African countries. Each year, 16 African countries receive seeds of new varieties developed in Morocco, accounting to more than 15 tons of research seeds shipped and some 38 African young scientists have been trained at ICARDA's Morocco facilities. A total of 10 major innovations developed in Morocco have been adopted by African countries.



16
Countries
Receiving seeds



>15
tons
Seed shipped



38
Africans
Trained



10
Innovation
Up taken



Capacity building



80 percent of ICARDA projects involve a capacity development component. Since 1978, ICARDA has trained over 40,000 people in more than 40 countries through group courses, individual degree and non-degree programs, mentoring program, internships, and study visits. Since 2012, more than 350 students have benefited from co-supervision of ICARDA Scientists, including 144 Moroccan students (85 PhD and 59 MSc). The ICARDA e-learning platform reaches over 2,000 annual users thanks to more than 50 online courses. Morocco has become a major training hub with more than 130 regional and global events organized there, benefiting more than 1,372 participants from more than 30 countries.



>80%
projects
Cap Dev



>40,000
People
Trained



>50
On-line
Course



130
Events
In Morocco



85
PhD
From
Morocco



59
MSc
From
Morocco



Donors thank you

For over four decades ICARDA under the umbrella of CGIAR and alongside its partners, has delivered innovation throughout the region that has transformed food systems to be resilient and sustainable to meet the needs of countries like Morocco. But yesterday's solutions are no longer adequate for today's unprecedented and interconnected challenges. Countless studies show that investment in food systems research results in a high return both for economies, food and nutrition security. But time is short and factors such as climate change are intensifying at an alarming rate. It is essential that the global donor community continues to fund and even increase support for such work before it is too late.

ICARDA's work in Morocco is made possible through the support of:

- **Moroccan donors:** The government of Morocco; The Ministry of Agriculture and Fishery Morocco through the Morocco Collaborative Grant Program; INRA; University Mohamed VI Polytechnique (UM6P);
- **International donors (alphabetical order):** African Development Bank; Arab Fund for Economic and Social Development (AFESD); Bill and Melinda Gates Foundation; CGIAR (better one all together to avoid issue of CRP vs initiatives); European Commission H2020; Food and Agriculture Organization (FAO); German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU); Global Crop Diversity Trust; Grain Research & Development Corporation; International Fund For Agricultural Development (IFAD); NORAD; Norwegian Ministry of Foreign Affairs; OPEC Fund for International Development (OFID); Partnership for Research and Innovation in the Mediterranean Area (PRIMA); Swedish Research Council; Swedish University of Agricultural Sciences; World Bank;





المركز التجريبي للبحوث الزراعي الموحدة
Centre National de Recherches Agronomiques unifiées
محطة التجارب بـ ممرشوش
Domaine Expérimental de Marchouch