

ICARDA Country Brief Series

Tunisia



Photo credit: Mounir Louhaichi, 2019 “Vegetation sampling at the agro-silvo-pastoral site in Central Tunisia”

09/03/22

With the analytical support of:



Contents

Introduction.....	4
About ICARDA	4
Agriculture in Tunisia.....	4
ICARDA in Tunisia	4
ICARDA projects in Tunisia	5
ICARDA project value in Tunisia	6
Partnerships.....	8
Project delivery partners	8
Knowledge generation partners	9
Capacity Development.....	10
Research themes	10
Technologies development, testing and scaling	11
Sustainable land management technologies	11
Variety development.....	12
Variety release	12
Innovations.....	14
Opportunities in Tunisia	16

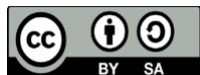
AUTHORS

Enrico Bonaiuti¹; Innocent Bikara^{1,2}, Aymen Frija¹, Laura Becker¹

SUGGESTED CITATION

Enrico Bonaiuti; Innocent Bikara, Aymen Frija, Laura Becker (09/03/22). ICARDA Country Brief Series: Tunisia. ICARDA.

DISCLAIMER



This document is licensed for use under the Creative Commons Attribution 3.0 Unported License. To view this license, visit <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Unless otherwise noted, you are free to copy, duplicate, or reproduce and distribute, display, or transmit any part of this publication or portions thereof without permission, and to make translations, adaptations, or other derivative works under the following conditions:



ATTRIBUTION. The work must be attributed, but not in any way that suggests endorsement by the publisher or the author(s).

¹ The International Center for Agricultural Research in the Dry Areas (ICARDA)

² WorldFish

Introduction

The ICARDA country brief series provides a snapshot of the work ICARDA has done and what is ongoing in the different countries in which ICARDA operates. It highlights the projects implemented, the partnerships that ICARDA has formed for both project delivery and knowledge generation, the key research themes by ICARDA Scientists, and features a summary of the impact ICARDA projects have delivered to the population, especially rural smallholder farmers.

About ICARDA

Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is a non-profit, CGIAR Research Center that focuses on delivering innovative solutions for sustainable agricultural development in the non-tropical dry areas of the developing world.

We provide innovative, science-based solutions to improve the livelihoods and resilience of resource-poor smallholder farmers. We do this through strategic partnerships, linking research to development, and capacity development, and by taking into account gender equality and the role of youth in transforming the non-tropical dry areas.

Agriculture in Tunisia

The agricultural sector employs approximately 16% of the country's workforce, generates up to 6% of the country's exports earnings and contributes around 11-13% to the Tunisia's GDP. Major crops, in terms of cultivated area, are tree crops (especially olives and dates) followed by cereals. While tree crops are strategic for exports (Tunisia is among the top 5 world exporters of olive oil and dates), cereals remain very important for human and livestock domestic consumption. The main cereal crops are wheat and barley. Other important agricultural products include tomatoes, citrus fruit, dates, sugar beets, dairy products, and almonds. Tunisia is self-sufficient in terms of dairy products, vegetables and fruit and is among the world's largest producers and exporters of olive oil and dates. Tunisia is also characterized by low rainfall and limited renewable water resources on most of its territory. It is influenced by the arid and semi-arid climate that covers more than $\frac{3}{4}$ of its area (Lassaad Lachaal et Al., 2005). The agricultural sector is also highly dependent on water resources since it consumes more than 75% of total water use in the country (Frija et Al., 2015; MARH, 2013). Climate variability has major effects on agricultural production in Tunisia which results on highly variable yields along years. As an example of this fluctuation, total cereal production went from 2.9 million tons in 1996 to 0.5 million tons in 2002 and again to 2.9 million tons in 2003 (in 2014). This figure is observed for all cereal crops where the yield of durum wheat varies between 0.5 and 2 tons/ha, soft wheat yield ranges between 0.5 and 2.5 tons/ha and barley yield is between 0.4 and 1.5 tons/ha. Despite their low share in total agricultural land, irrigated areas in Tunisia (450,000 ha) are producing 35% of the agricultural added value and are contributing to up to 20 % of total agricultural exports and 27 % to agricultural employment (Atiri, 2007). Around 48% of these irrigated areas are irrigated from groundwater sources, including both superficial and deep aquifers, allow the irrigation of 48% of the total irrigated area (Frija et al., 2015). Overall water resources in the country are estimated to be only around 4700 million m³ (ITES, 2014) including 650 million m³ of non-renewable resources (13.8 % of the total water resources). Surface water is estimated to 2700 million m³.

In 2016 the government launched a five-year plan, Tunisia 2020 in which it laid down its plans to increase the annual agricultural growth rate to over 4%. To achieve this growth rate, the government and development partners need to tackle challenges such as the increase of droughts due to climate change, land fragmentation, among others.

ICARDA in Tunisia

The presence of ICARDA in Tunisia stretches back to 11 March 1980, which is the date of signature of the cooperation agreement between ICARDA and the Tunisian government. In the first article of this agreement ICARDA and Tunisia have agreed to exchange scientists and technologies; exchange germplasm and breeding materials; exchange scientific literature, information and methodology; and import/export other items relevant to cooperative research. The second article suggests that ICARDA will provide consultancies (provided budget available); scholarship for training national scientists for studies and participation in symposia, workshops, etc; seed materials in quantities necessary for experiments and large-scale adaptive trials; minor research items, literature and supplies not available in Tunisia. ICARDA do also have many significant MoUs signed with key NARS and excellence centers in Tunisia. Currently, ICARDA is hosted at the INRAT (National Agricultural Research Institutes of Tunisia), where it has a Virology Lab, experimental station at Morneq & Greenhouse. ICARDA has about 18 research activities including bilateral projects and CRPs activities with annually renewed funds.

ICARDA projects in Tunisia

Below are summaries of all active projects in Tunisia. For a summary table with exact dates, budget, and project manager, see Annex A.

CGIAR Research Program on Livestock Agri-Food Systems (2017-2021 | \$7.8 million)

Active in Ethiopia, Morocco, and Tunisia, the goal of LIVESTOCK is to create a well-nourished, equitable and environmentally healthy world through livestock research for development.

CGIAR Research Program on Policies, Institutions, and Markets (PIM) - Phase II (2017-2021 | \$0.5 million)

Active in Egypt, Ethiopia, Afghanistan, and Tunisia, PIM's research provides support for policies that help poor farmers improve their lives; produce nutritious and affordable foods; and protect the soil, water, and biodiversity in rural landscapes. In Tunisia, ICARDA's agro-pastoral research focuses on rangeland management and land governance and tenure.

Use of Conservation Agriculture in Crop-Livestock Systems (CLCA) in the Drylands for Enhanced Water Use and Soil Fertility in NEN and LAC Countries (2018-2022 | \$2.5 million | [MEL page](#))

Active in Algeria, Bolivia, Mexico, and Tunisia, CLCA aims to sustainably increase production and enhance climate resilience of small farmers' communities and their crop-livestock production systems in drylands. In Tunisia, the project implements activities in the districts of Siliana, Beja, Zaghouan, Jendouba, Kef, Kasserine, Bizerte and Gafsa. Project activities include best practices for tilling and forage, estimation of erosion sites, and promotion of entrepreneurship and rural businesses, and capacity building of farmers (with a focus on women and youth).

Development of Integrated Web-Based Land Decision Support System Aiming Towards the Implementation of Policies for Agriculture and Environment (LANDSUPPORT) (2018-2021 | \$350,000 | [project page](#))

LANDSUPPORT is a consortium of experts in the field of agriculture, forestry, spatial planning and policy making working in close collaborations with experts in databases, modelling and decision support systems. In Tunisia, ICARDA employs a "living lab approach", involving policy and decision makers and potential users from the very beginning throughout all project phases, ensuring that the delivered decision-support system tools can actually be used. Project activities are implemented in Zaghouan district.

Support for Enhancement of Food Security in the Arab Region (Phase III) (2018-2022 | \$2.4 million | [MEL page](#))

Implemented in Algeria, Egypt, Iraq, Jordan, Morocco, Yemen, Syria, Tunisia, Sudan, and the State of Palestine, the project's aim is to contribute to enhancing food security in Arab countries by improving the productivity of staple food crops, especially wheat, and building the capacity of national agricultural research systems to support and sustain future growth in agricultural production.

Establishing and Operating a Regional Network for Field Measurement of Actual Crop Water Consumption (Evapotranspiration) (2018-2021 | \$700,000 | [FAO page](#))

Active in Egypt, Jordan, Lebanon, Morocco, Tunisia, this is a pilot project to establishing a regional network for field measurement of actual crop water consumption or evapotranspiration (ET). ICARDA is developing standards, protocols, and methods for instrument operation and maintenance for field measurements.

ICT2Scale – Access to E-Learning and Cell Phone-based Services to Strengthen Extension Services for Smallholder Farmers in Tunisia (2019-2021 | \$112,000 | [MEL page](#))

The project goal is to ensure that farmers improve their dryland farming technologies and farm management by making use of ICT enabled agricultural extension services.

Scaling ICT for smart irrigation scheduling and water use efficiency - ICT4Irrigation (2020-2022 | \$220,000)

The objective of this project is to identify best environmental, socioeconomic, and technical contexts suitable for the application and use of ICTs in irrigation scheduling. The project further aims at generating and co-designing and implementing a set of scaling activities, for ICTs use in irrigation, based on consultations with strategic local and regional stakeholders.

CGIAR Research Program: GENDER Platform (2020-2021 | \$100,000 | [Website](#))

GENDER (Generating Evidence and New Directions for Equitable Results) is CGIAR's new platform designed to put gender equality at the forefront of global agricultural research for development.

Modernization Crop Breeding Programs Arab Countries (2020-2022 | \$3.3 million)

Active in Egypt, Lebanon, Morocco, Tunisia, Sudan, the project's goal is to increase the productivity and resilience of agricultural production in the targeted countries in response to the accelerating challenges of the region (climate change, water scarcity, heat stress, emerging new pests and diseases) by developing new crop lines through speed breeding and training NARS scientists. While the selection and breeding of crop lines is occurring in Rabat, Morocco, product profiles were developed in partnership with the Tunisia NARS.

Towards the effective scaling of soil and water conservation technologies under different agroecosystems in North and Central West Tunisia – SWC@Scale - (this project is part of the global GIZ program on Soil Protection and Rehabilitation of Degraded Soil for Food Security) (2020-2023) | \$380,000 | [project webpage](#)

The objective of the overall PROSOL program Approaches to promoting lasting soil protection and rehabilitation are implemented and shared in selected partner countries. In Tunisia the objective of ICARDA SWC@Scale project is to support the [global GIZ-PROSOL program](#) in terms of “research for scaling” by identifying the best pathways for effective and responsible scaling up and out of enhanced soil and water conservation practices at farm level.

Camelina: A Cash Cover Crop Enhancing water and soil conservation in MEDiterranean dry-farming systems (4CE-MED) (2020-2023 | 218,000 | [project webpage](#))

ICARDA is working on potential oil seed crop called Camelina (*Camelina sativa* L.), which can be deployed in crop rotations and conservation agriculture to break existing system of cereal crop after cereal cropping system.

ICARDA project value in Tunisia

The next graph depicts the value of ICARDA projects in Tunisia from 2016-2024, based off of past and current projects. We see that since 2016, there is an annual increase of about \$100,000 in project value in Tunisia. As depicted by the projected project value, if there were no new projects or funds brought into Tunisia, there would be a rapid decline in total project value starting in 2022. Note that the purpose of the graph is to illustrate trends and not to provide precise budget data; several assumptions were made in order to create the graph, noted below the graph.

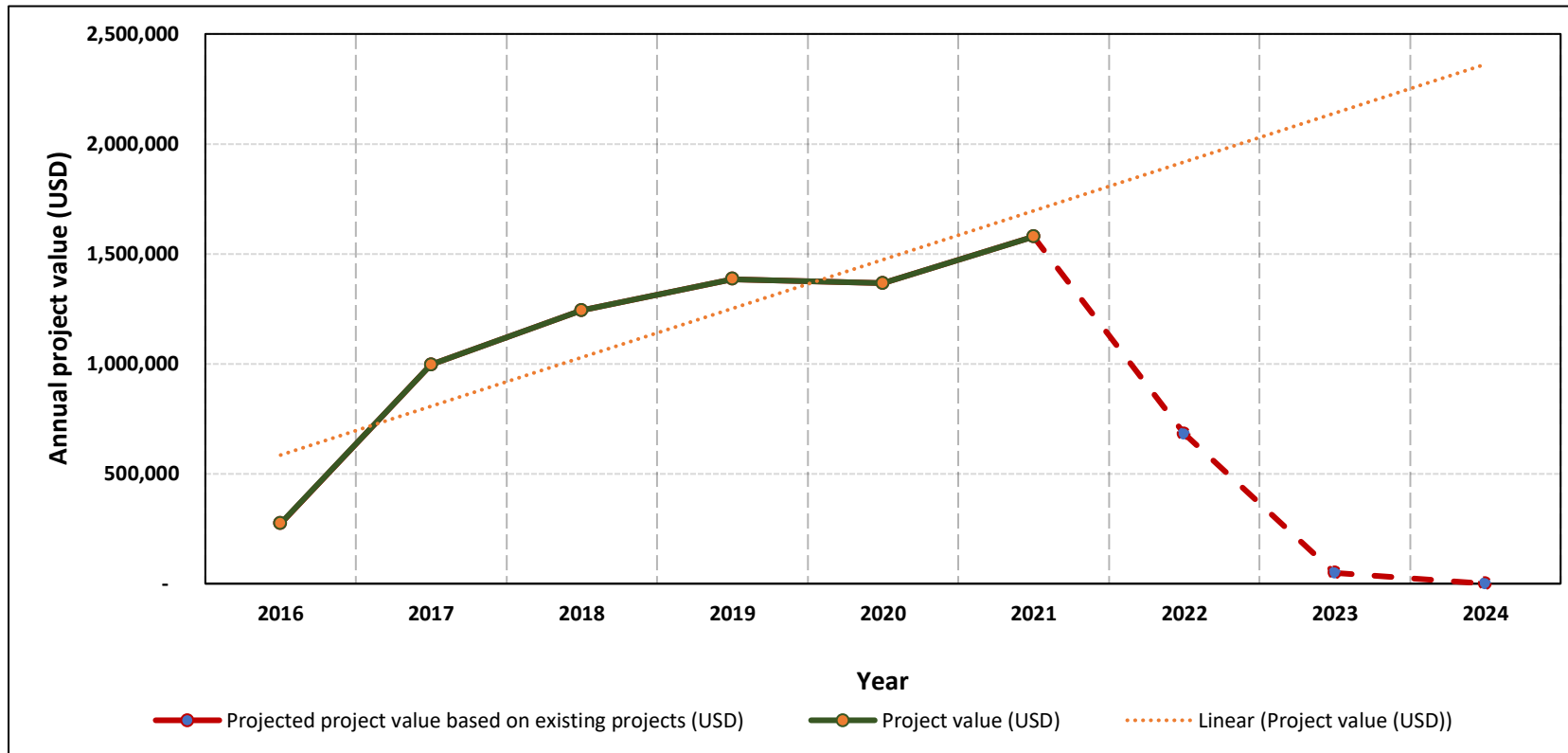


Figure 1: Trajectory of ICARDA project value in Tunisia (Source: MEL, March 2021)³

³Several assumptions were made in order to create this graph. Assumptions include: (1) All budget data in OCS at the time of data pull was up to date. (2) For multi-country projects, funds are distributed equally among countries. (3) Project spending is equally divided across all years.

Partnerships

ICARDA engages a number of local, national, regional and international entities as a means of ensuring effectiveness and efficiency of knowledge generation and project delivery at scale. This section highlights the partners with which ICARDA has worked both in project delivery and knowledge generation and dissemination.

Project delivery partners

Over the years, ICARDA has partnered with over 59 entities in Tunisia that can be stratified into 8 types. The broad base of academic, NARS and Government entities involved provide a solid evidence of the technical and policy related framework ICARDA operates. Future actions may involve more NGOs and CBOs to deliver impact.

Knowledge generation partners

ICARDA partners with a wide range of partners in the generation and dissemination of scientific knowledge, in a bid to increase the uptake of research outputs and influence policy-makers to create an enabling environment for the advancement and adoption of agriculture technologies at scale. Over the past 5 years, ICARDA has partnered with 126 partners to generate 639 knowledge products in Tunisia. Those who have generated 5 or more knowledge products in partnership with ICARDA are listed in Figure 3 below.

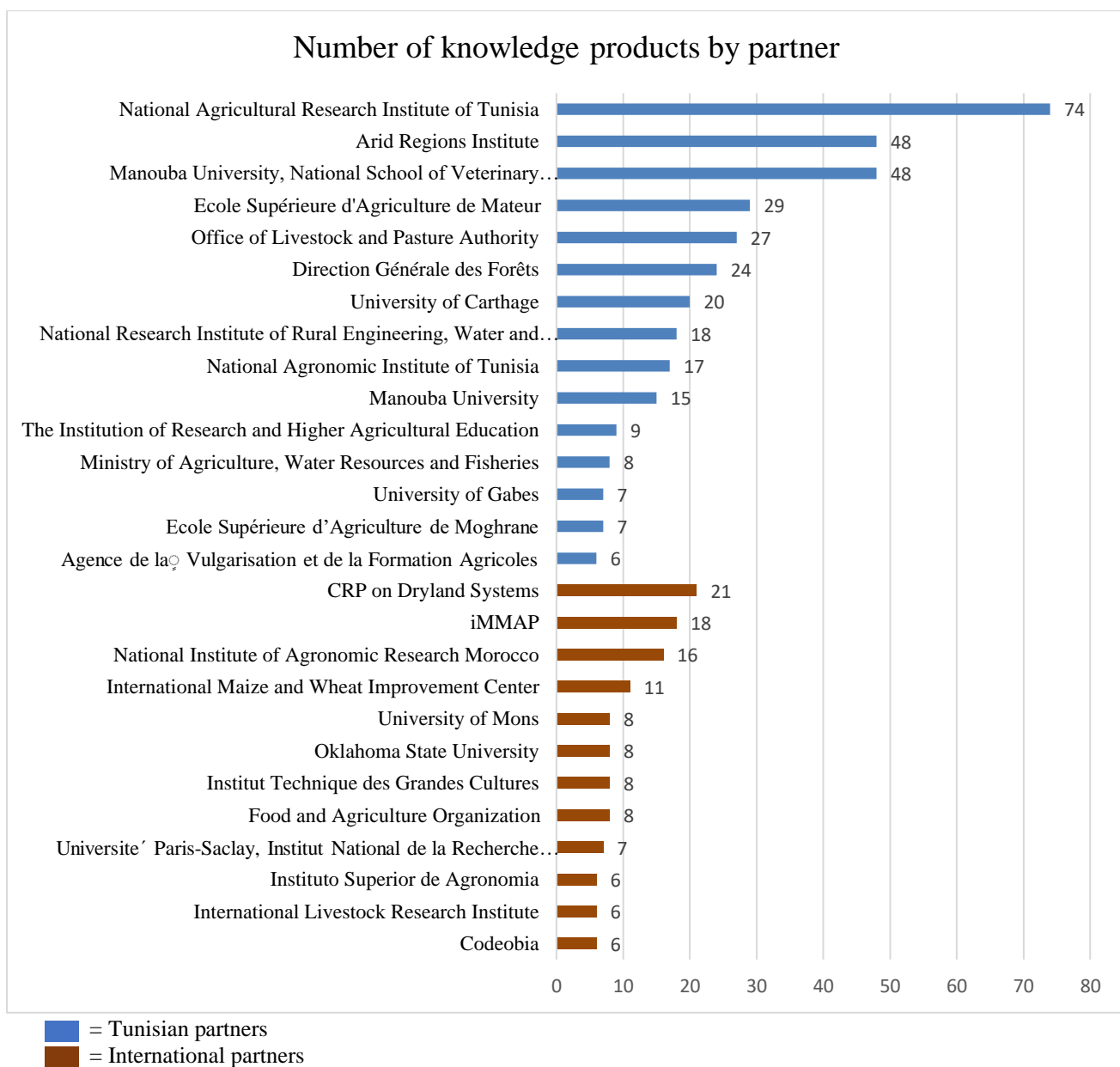


Figure 2: Distribution of knowledge product collaborations amongst institutions (Source: MEL June 2021)

Capacity Development

In Tunisia, ICARDA capacity development work has involved the training of 4,175 men and 3,839 women through group trainings, and 5 men and 14 women for individual advanced degrees, such as PhD or Master's work (Figure 3). The line graphs, depicting group training, show an upward trend over time, while the bar graphs, depicting individual degree work depicts a steadier flow of students, predominantly women. The accuracy of this data depends on the accuracy of reported capacity development activities in MEL.

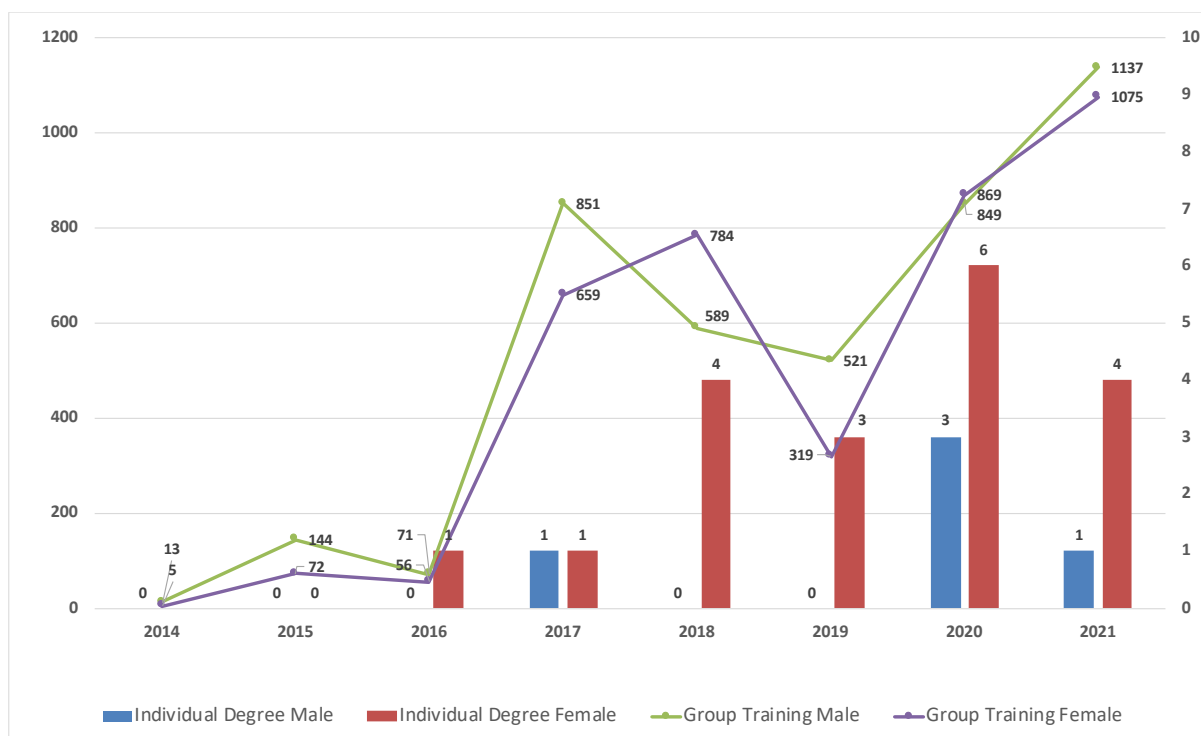


Figure 3: Participants of Individual Degree and Group Training Capacity Development in Tunisia (Source: MEL September 2021)

Research themes

The research themes ICARDA scientists have worked on with respect to Tunisia are key insights on where the largest share of ICARDA work in the country lies, and can be a useful precursor to where the most impact will be created. Figure 5 is a demonstration of the top ICARDA research themes on Tunisia. The top research themes are related to conservation agriculture, no poverty, and livestock.

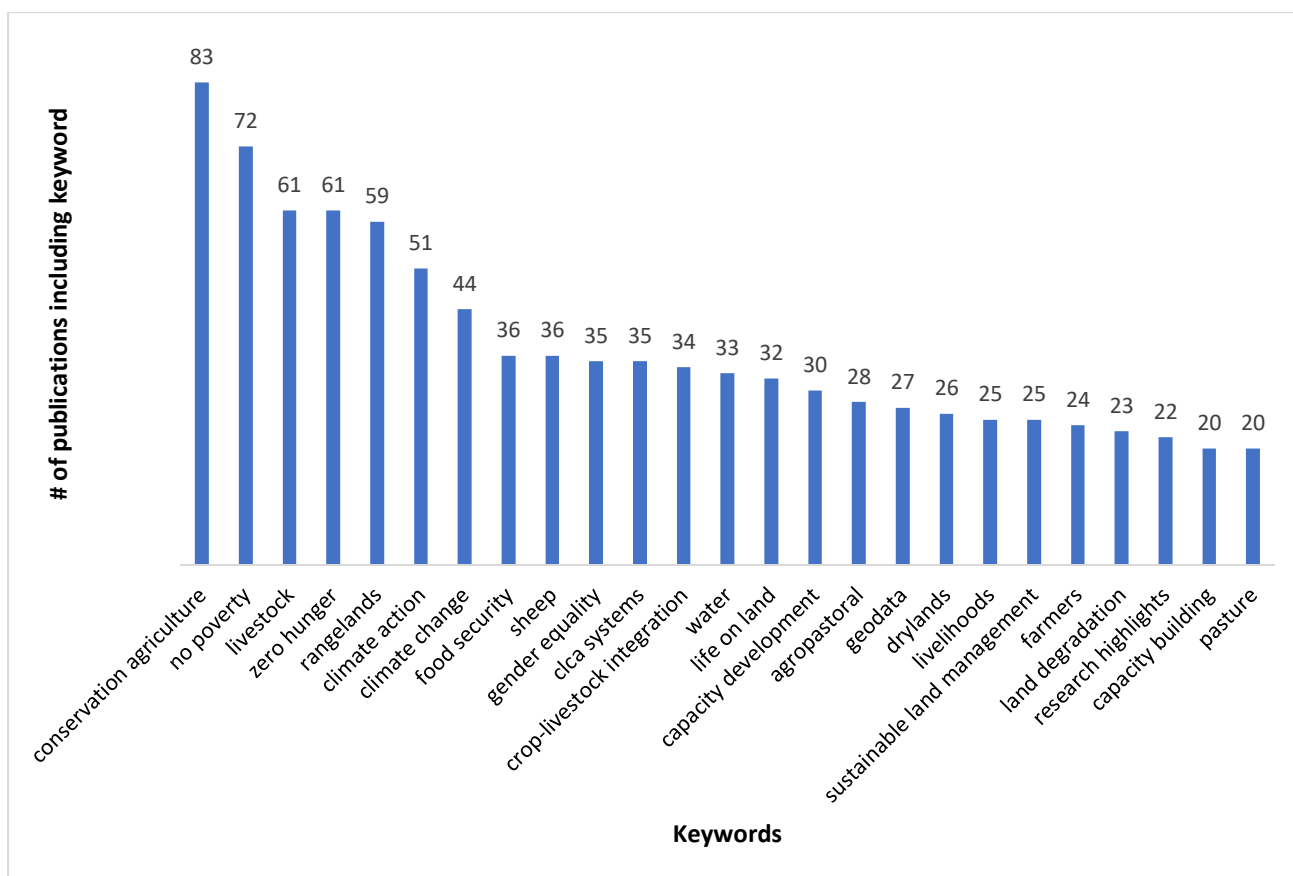


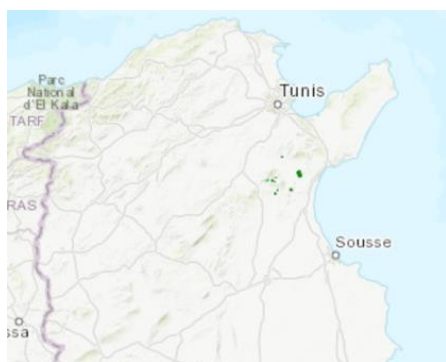
Figure 4: Most common keywords within ICARDA publications on Tunisia from 2011-21 (Source: MEL 2021)

Technologies development, testing and scaling

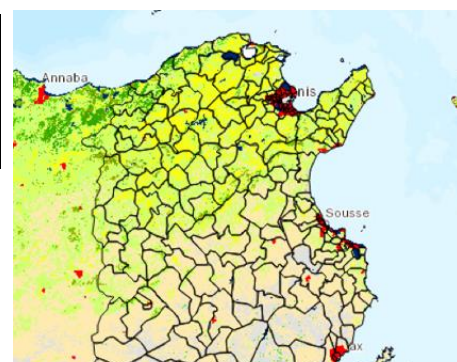
Through strong partnerships with national and international partners, ICARDA excels at developing innovations and generating knowledge aimed at building of resilient and profitable farming systems in the global dry areas. Details on the identification, development and deployment of the resultant technological packages such as sustainable land management technologies, and crop varieties are presented in this section.

Sustainable land management technologies

ICARDA with support from GIZ supported the national institutions (INEGREF, IRA-Medenine) to document scalable sustainable land management solutions using advance geo-informatics. The approach is based on the framework of the World Overview of Conservation Approaches and Technologies (WOCAT) with the addition of Web-GIS functionalities to estimate the scaling success rate. Subsequently, 23 tested sustainable land management technologies were identified for Tunisia. These technologies are presented in Figure 5.



1	Cisterns
2	Floodwater spreading
3	Gully restoration
4	Deficit irrigation





5	Recharge check dam
6	Semi-circular bunds
7	Manual benches
8	Mechanical bench terraces
9	Afforestation
10	Plantation for landscape restoration
11	Hill Dam
12	Buried diffuser
13	Area enclosure
14	Biological fixation of sand dunes

Figure 5: Sustainable land management technologies identified for Tunisia (Source: GEOC 2019, Elaboration: MEL)

Variety development

As part of the varietal nursery development process, ICARDA conducts a number of multi-location trials to ensure that the varieties developed as well adapted and suitable for different agro-ecological zones within its areas of operation. Tunisia has participated and benefitted from this process with a total of 781 trial lines of chick pea, lentil, faba bean, grass pea, barley and wheat since 2009 (Figure 6).

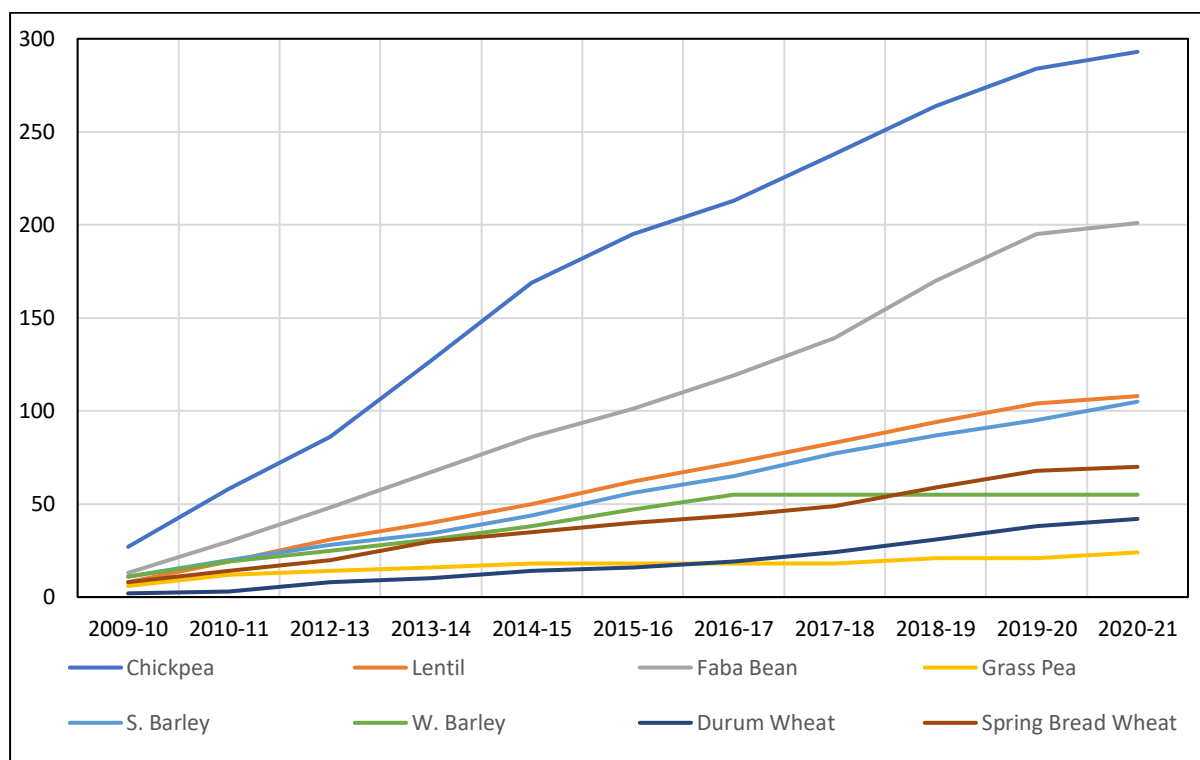


Figure 6: Cumulative ICARDA variety trials lines distributed to Tunisia (Source: INDMS 2021)

Variety release

Variety release is a key pre-requisite for taking crop technologies to scale through wide distribution networks. ICARDA has contributed to the release of 41 varieties of 7 crops by the Tunisian government. The crops include: chickpea, barley, durum, lentil, spring bread wheat, faba bean, and peas (Figure 7). Over the past four decades, the most varieties were released from 1985-89 (Figure 8). The ICARDA-supported varieties released by the Tunisian government were bred for factors such as disease tolerance and resistance, farmer-preferred seed sizes, increased yield, and water-deficit environments.

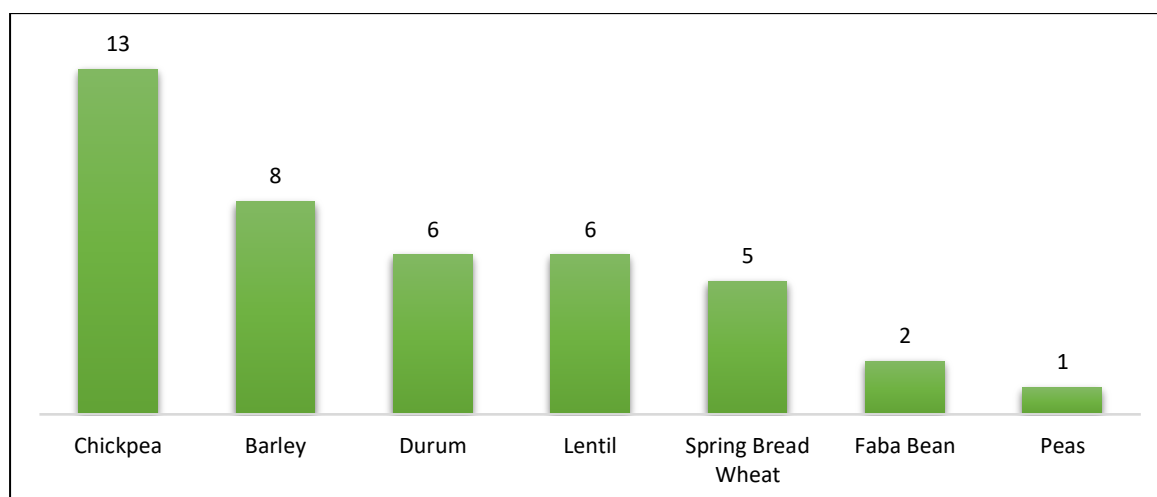


Figure 7: Varietal Releases from ICARDA germplasm by the Tunisian government 1983-2020 (Source: INDMS 2021)

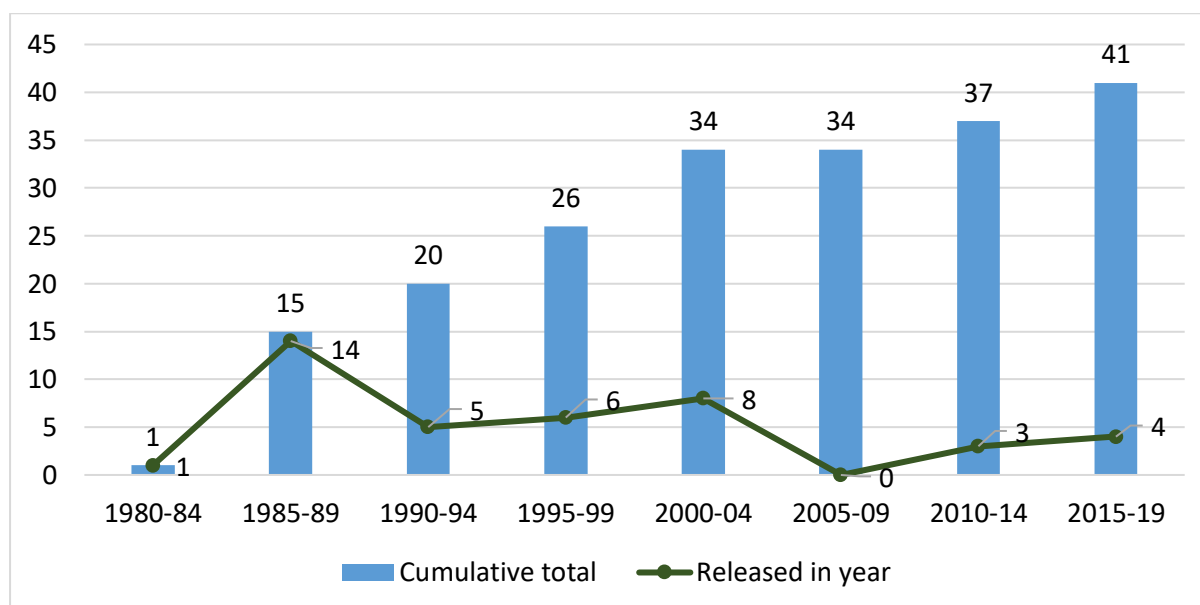



Figure 8: Trend of ICARDA germplasm release by the Tunisian government (Source: INDMS 2021)

Impact assessment of some technologies promoted by ICARDA in Tunisia



This section presents summaries of research conducted on the impact of ICARDA-promoted technologies and practices in Tunisia. The technologies range from irrigation technologies' effect on yield, production cost and soil salinity, adoption of soil and water conservation technologies and irrigation technologies and their associated economic returns. Note that there are no reported outcome impact case reports (OICRs) for ICARDA's work in Tunisia.

Deficit irrigation strategy at key stages improves barley yield, water usage, and soil salinity

Intervention: Different irrigation regimes with saline water (7.6 dS/m)

Impact: Deficit irrigation applied during development and maturity stages led to grain yield of 2.6-3.7 t/ha compared to the national average of 1.07 t/ha. It also reduced water usage without affecting significantly the yields, and reduced the build-up of salinity

Study title & source: Fathia El Mokh, Kamel Nagaz. Impact of deficit irrigation with saline water on yield, soil salinization and water productivity of barley in arid regions of Tunisia. 2013. ([download](#))

Improvements in water-use efficiency for durum wheat production could lead to a 42% reduction in water costs

Study: Assessed water use efficiency in irrigated durum wheat production systems of semi-arid Tunisia.

Finding: By operating at full water economic efficiency, the sampled farms would be able to reduce their costs of wheat production to 42%.

Study title & source: Ali Chebil, Aymen Frija. Impact of improving water-use efficiency on its valuation: The case of irrigated wheat production in Tunisia. 2016. ([download](#))

Investments in water harvesting techniques are beneficial at private and social levels for the local population, resulting in an internal rate of return of 24% in 30 years.

Intervention: Jessour's system-- which is a typical macro-catchment water harvesting technique encountered in the mountains of Matmata in south-east Tunisia. Each unit is made of a small dyke to retain runoff and sediments, a terrace (cropping area) and the impluvium (catchment area).

Impact: long-term cost benefit—internal rate of return of 24% in 30 years.

Study title & source: Mohamed Arbi Abdeladhim et al. Assessing the impacts of soil and conservation techniques in south-east Tunisia. 2015. ([download](#))

Improved technologies in crop and livestock production systems result in higher profits for farmers.

Interventions: Cactus to reduce fallow land; feed blocks for cattle during drought seasons; improved rams; vetch

Impact: Adoption of feed blocks technology potentially saved 90 million Tunisian Dinar per year through the substitution of high-priced feed and cactus reduced fallow land and degraded rangelands by about 50%.

Study title & source: Kamel Shideed, Mohamad El Mourid. Adoption and Impact Assessment of Improved Technologies in Crop and Livestock Production Systems in the WANA Region. 2005. ([download](#))

Innovations

Several ICARDA innovations are reported for Tunisia. The innovations are diverse in nature, including business models, policy recommendations, an implementation package for sustainable agriculture, a new technology, and a modelling tool. Innovations are at stage 3 (available/ready for uptake) or 1 (discovery/proof of concept).

Business Model for Pellet Producing Enterprises in Tunisia (2019)

Innovation: Business model explaining how pellet production using a specified formula and locally produced pellet machine (stationary and mobile) can generate income for an entrepreneur.

Stage of innovation: Stage 1: discovery/proof of concept. Locally manufactured pellet machines do not perform well - they break easily, require molasses (rarely available) to bind the pellets, and pellets are spread on the ground to dry, which is time consuming and unhygienic.

Source:

<https://marlo.cgiar.org/summaries/Livestock/projectInnovationSummary.do?innovationID=1068&phaseID=105>

Enhanced policy recommendations for sustainable rangeland improvement in Tunisia

Innovation: Instead of the current resting technique in Tunisia for farmers by which they cannot access their land for 3 years, ICARDA proposes flexible and ecologically sound alternatives for agro-pastoral communities.

Stage of innovation: Stage 3: available/ ready for uptake- a change in policy is required at the level of the Tunisian Ministry of Agriculture; the majority of stakeholders are in favor of this change, and farm trial findings from 2019 endorsed this policy change recommendation.

Source:

<https://marlo.cgiar.org/summaries/Livestock/projectInnovationSummary.do?innovationID=1091&phaseID=105>

Integrated package for sustainable restoration of silvopasture production systems in Tunisia

Innovation: The package includes cultivating trust among all stakeholders to work together; re-introducing indigenous species familiar to the local community; and facilitating access to inputs (seeds/seedlings) for the local community to cultivate forage crops on their own land.

Stage of innovation: Stage 3: available/ ready for uptake; the Directorate General of Forest in Tunisia has endorsed this innovation by out scaling from the original location in Zaghouan governorate (Central Tunisia) to Jendouba governorate (Northern Tunisia).

Source:

<https://marlo.cgiar.org/summaries/Livestock/projectInnovationSummary.do?innovationID=1078&phaseID=105>

Mobile grinder for chopping livestock feed in Tunisia

Innovation: New model mobile grinder allows feed to be mixed in specific proportions to increase nutritional value and reduces feed loss.

Stage of innovation: Stage 3: available/ ready for uptake. 20 grinders have been distributed and are being utilized; results show it is an effective income generating activity and improves feed for farmers by reducing wastage.

Source:

<https://marlo.cgiar.org/summaries/Livestock/projectInnovationSummary.do?innovationID=1076&phaseID=105>

Use of the Agricultural Production Systems Simulator (APSIM) to assess the long-term impact of conservation agriculture on wheat-based systems in Tunisia

Innovation: Model was used to predict the effect of tillage (conventional tillage [CT] vs. zero-tillage [ZT] and soil residue retention [ZT-RR]) on wheat productivity and soil fertility.

Stage of innovation: Stage 1: discovery/proof of concept; peer-reviewed journal article showing potential value of adopting conservation agriculture practices in Tunisia.

Source:

<https://marlo.cgiar.org/summaries/Wheat/projectInnovationSummary.do?innovationID=1398&phaseID=107>

Policy Contributions

There are no policy contributions documented for Tunisia in the [CGIAR Program Results Dashboard](#).

Opportunities in Tunisia

Innovations

ICARDA has many opportunities to scale up existing innovations and projects, as well as address new and ongoing agricultural challenges in Tunisia. Currently documented as stage 1 innovations, improvements could be made, and pilots could be conducted for the Business Model for Pellet Producing Enterprises and APSIM. Similarly, innovations at stage 3 could undergo focus on adoption by next users to move to stage 4:

- Enhanced policy recommendations for sustainable rangeland improvement in Tunisia
- Integrated package for sustainable restoration of silvopasture production systems in Tunisia
- Mobile grinder for chopping livestock feed in Tunisia
- Enhanced crops rotations through forage mixtures
- Ago-ecological practices adapted to cereal and olive-based systems

Dairy

With rising temperatures and droughts as ongoing concerns, continued innovations are needed for resilient crops and irrigation systems. The dairy sector has noted reductions in quality and quantity of dairy products during heat waves. This is a challenge that ICARDA is not directly working on but could consider for new projects.

Human Diets

The prevalence of anemia among women has been rising since 2010, currently at 32% (FAOSTAT 2018). Projects focusing on production and consumption of iron-rich foods or food fortification could be considered.

Rates of obesity are rising in both adults and children are steadily rising, and projects focusing on nutrient-dense food production and promotion should be considered.

Annex A: Table: Summary of ongoing projects in Tunisia (Source: MEL 2021)

Project name	Total Funds (USD)	Countries	Donor	Date Start	Date End	Project Manager
CGIAR Research Program on Livestock Agri-Food Systems	7,837,918	Global, including Ethiopia, Morocco, Tunisia	CGIAR	2017-01-01	2021-12-31	Barbara Rischkowsky
CGIAR Research Program on Policies, Institutions, and Markets (PIM) - Phase II	489,144	Egypt, Ethiopia, Tunisia, Afghanistan	CGIAR	2017-01-01	2021-12-31	Girma Tesfahu Kassie
Use of Conservation Agriculture in Crop-Livestock Systems (CLCA) in the Drylands for Enhanced Water Use and Soil Fertility in NEN and LAC Countries	2,500,000	Algeria, Bolivia, Mexico, Tunisia	IFAD	2018-04-13	2022-06-30	Mourad Rezik
Development of Integrated Web-Based Land Decision Support System Aiming Towards the Implementation of Policies for Agriculture and Environment (LANDSUPPORT)	356,453	Tunisia	EU-EC	2018-05-01	2021-10-31	Quang Bao Le
Support for Enhancement of Food Security in the Arab Region (Phase III)	2,400,000	Algeria, Egypt, Iraq, Jordan, Morocco, Yemen, Syria, Tunisia, Sudan, State of Palestine	AFESD	2018-10-01	2022-12-31	Habib Halila
Establishing and Operating a Regional Network for Field Measurement of Actual Crop Water Consumption (Evapotranspiration)	716,610	Egypt, Jordan, Lebanon, Morocco, Tunisia	FAO	2018-12-23	2021-11-30	Vinay Nangia
ICT2Scale – Access to E-Learning and Cell Phone-based Services to Strengthen Extension Services for Smallholder Farmers in Tunisia	112,465	Tunisia	GIZ	2019-04-10	2021-09-30	Udo Rudiger
GIZ ICT4Irrigation - Tunisia	222,600	Tunisia	GIZ	2020-01-01	2022-11-30	Aymen Frija
CGIAR Research Program: GENDER Platform	100,000	Egypt, Morocco, Tunisia	CGIAR	2020-01-01	2021-12-31	Dina Najjar
AFESD Grant in Support of ICARDA Capacity Building Activities	1,634,695	Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait,	AFESD	2020-01-05	2021-06-30	Charles Kleinermann



		Lebanon, State of Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Yemen, Sudan, State of Palestine				
Modernization Crop Breeding Programs Arab Countries	3,270,000	Egypt, Lebanon, Morocco, Tunisia, Sudan	AFESD	2020-04-01	2022-12-31	Miguel Sanche Garcia
Camelina: A Cash Cover Crop Enhancing water and soil conservation in MEDiterranean dry-farming systems (4CE-MED)	218,000	Algeria, Greece, Italy, Morocco, Tunisia, Spain, France	EU Belgium	2020-05-01	2023-10-31	Sripada M. Udupa
Soil Protection and Rehabilitation of Degraded Soil for Food Security	376,001	Tunisia	GIZ	2020-12-10	2023-03-31	Aymen Frija



References:

- Al Atiri R, 2007b. Analyse des politiques hydrauliques. Cas de la Tunisie. In: Bachta MS, ed. Les instruments économiques et la modernisation des périmètres irrigués. Kairouan (Tunisie): Cirad. <http://hal.cirad.fr/cirad-00193874>
- Frija, A., Dhehibi, B., Chebil, A., Villholth, K.G., 2015. Performance evaluation of groundwater management instruments: The case of irrigation sector in Tunisia. *Groundw. Sustain. Dev.* 1. doi:10.1016/j.gsd.2015.12.001
- Lassaad Lachaal, Dhehibi Boubaker, Chebil Ali, A.F., 2005. National Policy Report. MedFrol Project.
- MARH. 2013. Rapports des périmètres irrigués en Tunisie. 1998-2013.
- Verner,Dorte; Treguer,David Olivier; Redwood,John; Christensen,Jen; McDonnell,Rachael; Elbert,Christine; Konishi,Yasuo.2018. Climate Variability, Drought, and Drought Management in Tunisia's Agricultural Sector (English). Washington, D.C. : World Bank Group.
<http://documents.worldbank.org/curated/en/318211538415630621/Climate-Variability-Drought-and-Drought-Management-in-Tunisia-Agricultural-Sector>