

# MIND THE GAP: BRINGING CLIMATE-SMART SOLUTIONS TO THE FIELD IN TUNISIA

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Scientists and farmers meet in the field to learn about the new barley variety

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Technological innovation in the small farm sector of developing countries is one of the key mechanisms for poverty reduction and food security. Unfortunately, many agricultural technologies developed in the past were not widely adopted. This is due to institutional constraints, including weak agricultural extension systems that hardly reach smallholder farmers. As a result, productivity among smallholders remains low, and subsistence orientation high, along with household vulnerability to poverty and malnutrition.

The need for better technologies for smallholder farmers have since long been recognized by the international community. Significant investments have been made over time to develop new technologies. However, less effort has been dedicated to how to bring these new technologies successfully and cost-effectively to smallholder farmers, so that they can contribute to actual poverty reduction and sustainable agricultural development. Knowledge is not pursued or available to shape appropriate designs and models of technology transfer under various conditions.

“Mind the Gap” is a project implemented by ICARDA in Central Tunisia with the financial support of the Federal Ministry for Economic Cooperation and Development in Germany. This project includes activities in the Governorates of Zaghouan and Kairouan, where a production system based on barley and livestock is predominant.

By using Randomized Control Trials, the project tries to find out which agricultural extension design most favors the adoption of the new barley variety Kounouz within smallholder farmers. The trials involved 560 smallholder farmers, divided in four treatment groups of 140. A control group of 140 farmers did not benefit from any extension sessions related to the new barley variety.

# CHARACTERISTICS OF KOUNOUZ

Kounouz is a spring barley six-rowed variety, developed by the National Agricultural Research Institute of Tunisia (INRAT). It was officially registered in 2010 in the Tunisian catalog of plant varieties for commercial use by farmers. The new Kounouz variety was selected by INRAT in collaboration with ICARDA in line with the decentralization strategy for germplasm development for the region. It was initially selected from the segregating populations for North Africa grown in Béja and subsequently evaluated in a series of on-station and on-farm trials over the years at different locations before the variety was released for general cultivation across drylands and semi-arid regions of Tunisia.

Kounouz is semi-compact with bent ears at maturity, yellowish-white kernels and greyish albumen, hollow straw, medium-early variety (103 days) with medium height (95 cm) adapted to semi-dry location and lodging resistant. Compared to the Manel variety, Kounouz is moderately resistant to net blotch and powdery mildew that are common diseases to barley. It is resistant to scald under natural inoculation compared to Rihane, a commonly grown barley variety in Tunisia.

During three consecutive crop seasons between 2004 and 2007 in semi-arid Kef, Kounouz gave an average grain yield of approximately 52 qx/ha (a quintal is equal to 100 kg), compared to Rihane and Manel, 48 qx/ha and 52 qx/ha, respectively. At the trial site in sub-humid Beja Governorate, Kounouz gave an average grain yield of about 41 qx/ha during six consecutive crop seasons between 2001 and 2007, compared to Rihane and Manel, which yielded about 38 qx/ha and 42 qx/ha, respectively.

Based on these characteristics and outcomes of the trials, it is advisable to grow Kounouz in semi-arid areas (250-350 mm of rain annually).

## EXTENSION ACTIVITIES

To prepare sufficient amount of the new Kounouz barley seeds for potentially interested farmers of the project, the national agricultural research system partners -- Office d'Elevages et des Paturages (OEP) and Institut National de Recherche Agronomique de Tunisie (INRAT) -- multiplied the seeds on their respective field stations and produced 73 tons of treated seeds.

Every smallholder household taking part in the trial areas of the research project could buy 100 kg of seeds of the new variety at a subsidized price of 40 Tunisian Dinars (USD16.4), which was enough to cover the production costs. As the quantity of available seeds was sufficient to serve each potentially interested farmer (100 kg), it further enabled INRAT to store 21 tons of seeds for next season.

## INVITING FARMERS TO DEMONSTRATION PLOTS

In November 2016, INRAT installed 20 ha demonstration plots at its farm in Oueslatia in Kairouan Governorate. Half a year later, in April 2017, all 560 farming households were invited to visit the barley fields at the demonstration plots. The field days were frequented by farmers in groups of 25 - 30 and moderated by researchers from INRAT and technical staff from the livestock extension service. Discussions focused on production techniques and characteristics of Kounouz.

A year later, in 2017, the farming households were invited to visit Kounouz plots cultivated by local farmers who had purchased and sown the new Kounouz barley variety for the first time in the governorates of Zaghuan and Kairouan. They are part of the overall group of farmers acting as "farmer to farmer" extension mechanism in order to bridge the gap between the official platforms and farmer test sites.

Despite the unfavorable agricultural season with average rainfall of below 200 mm in both regions, some farmers managed to produce significant amount of biomass.

In May 2018, the same farming households were invited to visit the INRAT field station in Mornag community. Climatic conditions at Mornag were more favorable, allowing seed production under rainfed conditions. At the field station in Mornag, trials were set up to compare the new Kounouz barley variety with Rihane under different cropping methods (different doses of Ammonium Nitrate), as well as a 10-ha field for Kounouz seed production.

## INFORMATION VIA SMS

The baseline study had the contacts of almost all 700 households. This information was used to send relevant information concerning Kounouz production to 560 households. The same messages were sent from five National Tunisian Agricultural Extension and Training Service (NARES) agents who were trained by the project, using Tunisie SMS, mobile service provider, as an extension tool.

Farmers also received text messages (subsidized by the project) about when and where to collect and pay for the Kounouz seeds. One message, for example, stated: "Dear fellow farmer, you can contact your next CTV office until August 15 and express your interest in purchasing 100 kg Kounouz seeds at a subsidized price of 40 Tunisian Dinar."

To make sure that all 560 farmers knew about the offer, agents also made personal contact, in particular to those who had not provided their numbers or who had no phones.

## MANAGEMENT TRAINING

Half of the 560 farmers received invitations to three days of management training. The 280 farmers were trained by the NARES agents. Topics included: a) the use of a simple production and cost calculation sheet, helping to identify major expenses in Kounouz production, b) advantages of collective action (purchase of inputs and marketing) and steps to set up a cooperative.

## GENDER APPROACH

Almost all 560 households sent male family members to technical trainings organized by the project. Therefore, a specific female training module was offered to 280 women. This training was given twice, over a three-day period and focused on female entrepreneurship. Participants were shown how to develop business around barley (e.g. processing, collective action as a female cooperative).

## PROMISING RESULTS

While the first barley cultivation season with the new climate-smart variety is still ongoing and the results still have to be analyzed, the interest in the new barley variety within the participating farmers was very high. Three out of four farmers participated in the field days and technical trainings, and an even larger number of the farmers who received additional management and gender training decided to purchase and cultivate the new barley variety.

The extension services - trainings, field visits, SMS and subsidized seed - contributed to significant results with 22.3 tons of Kounouz barley seeds purchased in Kairouan, and 10.5 tons in Zaghuan by half of all the 700 farmers targeted by the "Mind the Gap" project.

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