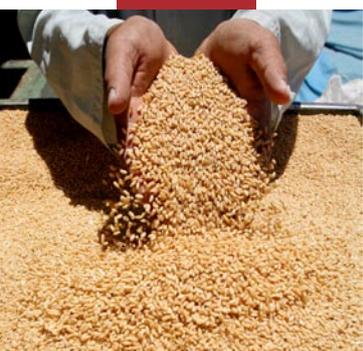


Scientists and farmers team-up to seek diversity in Morocco's fields



The farmers and scientists who scour the fields of Morocco collecting local varieties of durum and bread wheat as part of the Treaty Benefit-sharing Project are doing more than conserving their genetic diversity. They are contributing to the global effort against one of the most dangerous plant pests to emerge in the last century – a fungus that attacks wheat. Known as UG99 because it was first detected in Uganda in 1999, its spores have spread through Africa and the Middle East and continue their move east toward Asia. Ninety percent of the world's wheat has no resistance to UG99 which means plant breeders need genetic materials to build resistance into commercial varieties that are in the spores' paths.

Morocco is the centre of origin of many of the world's food crops, among them wheat (*Triticum spp.*). Over the centuries, many of its local wheat varieties have developed genetic traits that have given them natural resistance to a host of stresses, such as droughts, pests and diseases – including UG99. The project, which is seeking to pinpoint the types of resistance found in local varieties of durum and bread wheat, has undertaken a major re-evaluation of samples already held in the national genebank and combined that with new collecting missions to gather even more varieties from farmers' fields and broaden the genetic base of wheat. However, for a host of reasons such as habitat degradation and farmers' abandoning their local varieties for improved varieties, the farmers and scientists who

The science of selection: farmers and scientists work together

Throughout the project, farmers accompanied the INRA scientists and technicians into the fields where they explained their reasons for selecting or discarding a given variety – such as yield, biomass, height, maturation rate, grain size or color. During the collecting mission, scientists also gathered information from farmers about local names, origins of seeds, any pre-sowing treatments, how long they have been using it, what they like about it in terms of its yield size and color, and any resistance or tolerance they had observed. In addition, scientists and farmers screened the samples independently, made decisions about selecting or discarding, and then compared their results.

teamed up for the field collection found such a scarcity of local varieties growing in the field, they expressed fear that Moroccan wheat diversity is on the verge of extinction. Not only does this bode badly for the critical genetic traits that may be lost, it is especially detrimental to farmers in marginal areas who rely on their local varieties' adaptive attributes for ensuring harvests.

The National Agricultural Research Institute (INRA) of Morocco designed the Treaty Benefit-sharing Project to ensure the participation of local farmers in the collection, selection, evaluation and



adoption of local varieties. Because of the scarcity of varieties in the field, the collection missions also collected samples from local markets, from family grain storage bins and from threshing areas. The project's main objectives are: to conserve traditional wheat cultivars through *ex situ* conservation and encouraging local use and on-farm conservation; to harvest seeds for evaluation and use in breeding programmes; and to increase understanding of the on-the-ground situation concerning the use of the traditional varieties and the magnitude of their genetic erosion.

Wheat seeds already conserved in the INRA genebank were also included in the project. INRA provided information about previous accession missions and samples of seeds, which helped the project determine which regions to target in its new collecting missions, thus seeking new accessions in areas not covered or only slightly covered by previous missions. In addition to collecting, sowing and assessing new accessions, the project also sowed a collection of bread and durum wheat varieties from the INRA genebank.

In just one year...

Project objective I: Support on-farm and *ex situ* conservation of local landraces of durum and bread wheat. The project has:

- ◆ chosen 549 accessions of durum and 449 of bread wheat currently held in the INRA genebank,
- ◆ evaluated 173 of the durum accessions and 144 of the bread wheat accessions, that represented all provinces of Morocco, at the INRA Annoceur experimental station,
- ◆ evaluated 62 accessions of durum and 60 of bread wheat selected by farmers for on-farm testing at Errachidia,
- ◆ identified samples with both good resistance to disease and good agronomic performance, based on testing at Annoceur and Errachidia.

Project objective II: Mine local land races for useful variability for sustainable use in bread and durum wheat improvement. The project has:

- ◆ teamed scientists with farmers from across Morocco to seek new samples of landraces and old cultivars still growing in farmers' fields,
- ◆ collected 16 durum and 10 bread wheat samples (indicating the level of scarcity of wheat varieties in Morocco) which were then sown in farmers' fields, using traditional cultivation methods,
- ◆ evaluated the sown samples for their resistance to stresses.

Still to come...

- ◆ Samples from testing which prove to have resistance as well as good agronomic performance will be used as donors in crossing blocks for further study and recommended for re-adoption to farmers – thus preserved through local use.



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