

Innovative seed management benefits small farmers in Iran



Farmers in Iran cultivate their crops under harsh climatic circumstances. To help them improve their yield and minimise the risk of crop failure, the method of Evolutionary Plant Breeding was introduced in several provinces, with so far very promising results.

THE CHALLENGE: IMPROVING YIELDS IN POOR RESOURCE SETTINGS

In developing countries, small farmers play a vital role in ensuring food security for rural and urban populations. They constantly try to improve their yield and minimize the risk of crop failure. This has become even more urgent given the severe impacts of climate change on agriculture. Many small farmers are increasingly dependent on large commercial seed companies and plant breeders, which focus on improving and marketing single variety crops. For farmers in poor resource settings, such single varieties have serious downsides, such as the need for expensive and polluting chemical fertiliser and pesticides. A complicating factor in the search for alternative seed management methods that benefit poor farmers is the international legislation on intellectual property rights for plants and seeds.

THE APPROACH: EVOLUTIONARY PLANT BREEDING

Evolutionary Plant Breeding (EPB) goes against the grain of the methods of large commercial plant breeders. EPB is based on the natural selection of plants. Farmers are given a seed population made up of a mixture of many different varieties, which they sow on their fields under different

conditions and stresses. Natural crossing between the seed varieties happens dependent on the specific environment. After harvest, the entire offspring can be sown again to grow and set seed. The benefits of using such genetically diverse populations include:

- Because the seed population continually evolves, mixed populations are more adaptable than single variety crops to changes in (micro-) climates as well as land use and management changes.
- Thanks to the buffering effect of the population structure, mixed populations have more stable yields than uniform varieties.
- The different root characteristics of mixed populations ensure better use of the soil resources, reducing the dependency on chemical fertilisers.
- Mixed populations are more resistant against pests and diseases, which have more difficulty spreading through a multitude of different genotypes.

The EPB method helps farmers, especially in poor resource environments or harsh climates, to build more secure livelihoods. The EPB method is less costly than buying improved seed varieties and less damaging for the environment as it needs less fertiliser, pesticides and fungicides accumulating in the ecosystem. Evolutionary Plant Breeding moreover is a truly participatory method: farmers can distribute the seeds themselves and become much less dependent on large seed companies. EPB is a counterforce against the ever-declining diversity of natural plant varieties worldwide due to commercial breeding that increasingly focuses on uniform crops.

“Most of the single variety populations that were introduced to us in the past were not suitable for more than one or two years. Using the EPB population we can use it year after year.” Abdol-Reza Biglar, a farmer in Garmsar. (From: Salimi, Rahmani, Ceccarelli, Haghparast & Razavi, 2014)



THE RESULT: BETTER YIELDS FOR IRANIAN FARMERS

In 2008, an EPB project was started in Iran. The Centre for Sustainable Development and Environment (CENESTA, see box) provided two farmers in two provinces with mixtures of 1,600 different varieties of barley, supplied by the International Centre for Agricultural Research in the Dry Areas (ICARDA). The barley population, which was sown by pastoralists in a very dry climate under rainfed conditions, performed very well. The barley is mainly used as animal feed. Inspired by this success, the Dryland Agricultural Research Institute (DARSI) established a similar programme for bread wheat, in order to contribute to food security in local communities. This was successful too: after the first harvest, the farmers shared their offspring seeds with more than 150 farmers in 17 provinces using CENESTA's network.

The participating farmers have embraced EPB even more enthusiastically than the involved institutions had anticipated. Instead of sowing just enough to let the population evolve, some farmers after seeing the quality of the plants started to grow it as their main crop. Protein analysis showed that the evolutionary population contains more protein than the local improved variety that the farmers had previously been cultivating. They moreover observed that the mixed populations are more resistant against weeds, thus reducing or eliminating the need for using herbicides and making the crop suitable for organic farming. Based on these successes, CENESTA started another EPB project in Iran in 2014, distributing mixed populations of maize and rice.

THE WAY FORWARD

The successes of the EPB method ask for upscaling to other farming communities in Iran and low resource settings elsewhere in the world. However, international legislation on intellectual property rights forms a serious obstacle to promoting the EPB method. According to the seed law of Iran, EPB is legal since the seed populations are exchanged between farmers and not marketed. However, like many other countries Iran is in the process of developing new seed laws, which will be based on the UPOV Convention. The International Union for the Protection of New Varieties of Plants (UPOV) is the leading international organisation on intellectual property on plants. Its 1991 Act allows farmers to re-use seed on their own farms for certain crops only and obliges them to pay royalties. Exchanging seeds informally is prohibited. Both ENDS, CENESTA and their partners worldwide urge for a broadening of farmer's rights by including seed exchange as well as small, non-commercial seed trade in the UPOV Convention and in national legislation based on this.

Both ENDS and CENESTA

Both ENDS and CENESTA have been working together since 2007 as founding members of Drynet, a global initiative for the future of drylands. It is the first global project that aims to strengthen local organisations in order to get desertification higher on policy agendas. Both ENDS is not directly involved in CENESTA's EPB project, but strongly encourages the promotion of the method.

CENESTA is a non-profit NGO dedicated to promoting sustainable community- and culture-based development. Its main area of work is Southwest Asia. CENESTA is a member of IUCN (the World Conservation Union) and a founding member of the ICCA Consortium, an international organisation dedicated to conservation by indigenous peoples and traditional communities. www.cenesta.org



About twenty farmers have asked me for this seed after they saw it in my field last year. This year I'm only going to grow this mixture and will plant about 40 hectares. I can give seed to about 10 or 15 other farmers this year, and more next year." Faraj Safari. (From: Salimi, Rahmانيam, Ceccarelli, Haghparast & Razavi, 2014)



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