

In the Name of God

Message from the organisers of the first National Workshop on Participatory Breeding of Cereal Crops¹

4-5 October, 2008

Mahidasht Agricultural Education Centre, Kermanshah, Iran



Participants at the opening ceremony

The first National Workshop on Participatory Breeding of Cereal Crops took place at the Mahidasht Agricultural Education Centre, sponsored by the Jihad-e Agriculture Organisation of the province of Kermanshah. It is a source of pride that Iran was the first country collaborating with ICARDA on a PPB programme to take the initiative of self-organising a national workshop on participatory breeding. With the aim of further strengthening implementation of Participatory Plant Breeding (PPB) in the field in Iran, more than 200 participants from several provinces gathered together, including decision-makers, experts, farmers and other stakeholders from these sectors: research, extension, executive branches, NGOs and ICARDA. The most important output of this workshop was the agreement of all participants on the importance of participatory breeding of cereal crops as an approach which is complimentary to conventional systems of plant breeding.

The results of modern plant breeding are among the most effective and important successes of humankind in the field of science. Yet hundreds of millions of farmers in developing countries do not benefit from the advances of science in agriculture, such as those of the

1- The organisers are: Jihad-e Agriculture Organisation of Kermanshah Province, Dryland Agriculture Research Sub-Institute (Sararood Station) and the Centre for Sustainable Development and Environment (Cenesta).

Green Revolution. Most of these farmers are small landholders and subsistence farmers working on bad land and so have not been able to adopt modern plant varieties which are bred in the standardised conditions of research stations. This problem has long been under discussion by scientists, governments and those involved in agricultural development and finally led to the pioneering of a new research method, called Participatory Plant Breeding in



Ramezan Roointan, Director of Agriculture for Kermanshah province, welcomes the participants

the 1980s. With this method farmers are no longer asked simply to adopt new technologies, but are encouraged to use their traditional knowledge in selection and in discussing the problems of the agricultural sector as partners and colleagues of agricultural scientists.

One of the problems of conventional – or centralised – plant breeding is the focus on breeding for wide adaptation, in other words selecting plants that perform better than average in very large areas and over several years. Unfortunately genotypes that perform well in one area but not in others are quickly eliminated from the research

cycle under this approach. Yet these genotypes may be exactly those that could be useful to small-holder farmers in certain areas. In addition, varieties resulting from conventional breeding methods require more fertilisers and other chemical inputs and many small-holder farmers do not have access to such inputs.

Professional breeders who work without the participation of farmers are often unaware of the needs of farmers which go beyond yield and resistance to pests. For instance they may also look at traits such as harvesting and storage, taste and cooking qualities, and the quality of straw for animal feed. Despite having a wealth of traditional knowledge, farmers' participation in conventional breeding programmes is usually limited to being asked their opinion on a very limited number of lines in the advanced stages of the breeding cycle. Currently in the Iranian system, farmers are not even invited to give their opinion on the handful of genotypes that are used in on-farm trials.

Advanced varieties which are adapted to the standardised conditions of research stations are only planted in the very different, difficult and often non-standard conditions of farmers' fields for only one year without even asking the opinions of farmers about them.

This approach, which is characterised by not involving farmers in research that aims at



Reza Haghparast gives an interview on PPB

solving their problems, will only lead to ineffectiveness of the agricultural research system, in particular plant breeding. The rich indigenous knowledge of farmers is ignored and farmers are not involved in solving their own problems. As a result agricultural research, which is a pillar of knowledge-based agriculture, will be ineffective. Many of the varieties which reach the stage of on-farm trials might have been eliminated from the research process if farmers had been given the chance to evaluate them earlier on in the research process; the reverse is also true: varieties that were eliminated by breeders earlier in the process may have been kept by farmers. It is for this reason that breeding programmes will be less effective both

technically and financially if farmers are not involved.

We would do well to remind ourselves that for thousands of years farmers - and in many cases women farmers – were the main drivers of breeding. They have evaluated numerous varieties in their own fields and selected those that performed best and had good cooking qualities.



Ahmad Taheri presents farmers' experience of PPB

One of the aims of international institutes that work on participatory research is to establish data banks of indigenous knowledge which

would include data and analysis about the needs and desires of farmers. The systematic recording of farmers' knowledge and the use of this knowledge in formal breeding programmes is one of the important outputs of PPB.

Importance of participatory breeding for Iran's rain-fed areas

Given that climatic conditions in Iran's rain-fed areas are impossible to predict and also that they contain a variety of diverse microclimates, one of the important goals of breeding in such areas must be the identification of varieties that are able to resist the possible harsh conditions that they may face in the future while maintaining an acceptable yield. The only method of identifying such varieties is planting and evaluating them in the target environments for which they are bred.

For this reason numerous research stations have been established in several regions of Iran. However, given the wide diversity of climates in Iran's rain-fed areas, the existing research stations cannot accurately reflect all target areas i.e. the fields of farmers. This is why we are witness to some genotypes performing well in research stations but not in farmers' fields. While much investment has been made in these genotypes, they must ultimately be eliminated from the



Scientists of the National Gene Bank discuss indigenous seeds with farmers

research cycle in the final stages of the process. It should be noted that genotypes that are eliminated in the trials in research stations may perform better than checks in farmers' fields. Therefore it is only logical to transfer a part of the research programmes to farmers' fields, i.e. to the target environments.

The best stage for implementing PPB in farmers' fields is during the early stages of research such as the F3 generation and later, but due to the following constraints, this is not yet possible in Iran as opposed to countries which have had more experience with PPB:

- the large number of genotypes involved,
- we are still in the early stages of working with PPB in Iran,
- current facilities/opportunities are not yet at the optimum level,
- lack of necessary coordination between the various departments/organisations that must be involved in the process,
- the existence of laws which have not taken into account the principles of the PPB methodology,
- lack of experience of participation between farmers and researchers in solving problems related to agriculture.



Breeders from the national research institute in heated debate with Salvatore Ceccarelli



Roointan in discussion with Dr. Ghaffari, Director of the Dryland Agriculture Research Institute

But given existing opportunities it is possible to start PPB work in Iran by conducting yield comparison trials of selected genotypes from national uniform yield trials with the involvement of the research, extension, executive and farming sectors. Launching the PPB work in this way will be effective in identifying the problems and possible solutions for the full implementation of PPB.

Given that 75% of the world's poor are small holder farmers in developing countries, complimenting conventional approaches to breeding with PPB will make breeding more effective and will lead to the development of new varieties which respond to farmers' needs and are suited to their target environments i.e.

farmers' fields. This is because in this approach farmers participate in all stages of the breeding programme and select the best varieties based on their own criteria, their indigenous knowledge and their knowledge of their own environments.



Researchers and extension agents in th working group on breeding

In fact in PPB programmes, a major part of the breeding programme is transferred from the research station to farmers' fields and the farmers select the best genotypes based on their own experience and indigenous knowledge. As a result, the selected genotypes are more suited to the target environments and given that the trials have been conducted in farmers' fields from the early stages of the breeding process it is no longer necessary to conduct on-farm trials for promising and advanced lines, thus reducing the duration of the research process while at the same time increasing its effectiveness.

Taking extreme positions on the use of new technologies can often lead to negative consequences; the marginalisation of traditional and indigenous varieties is a case in point. The insufficiently tested and wide-spread use of modern varieties has led to the widespread use of chemical inputs (fertilisers, pesticides, etc.) which have not necessarily helped in improving production, and also seriously threaten the health of humans and the environment.

On the other hand indigenous seeds have shown the greatest resistance to harsh environmental conditions (such as drought, pests, diseases, etc.) as well as of course climate change. Unlike modern varieties which are often based on imported varieties they have been selected naturally in the areas where they have been cultivated over thousands of years during which time they have been exposed to various environmental stresses and have thus been selected by nature. Climate change brings many environmental stresses, in particular drought, so the revival and evaluation of indigenous varieties which often carry genes of resistance to severe climatic stresses is essential for increasing production in a sustainable manner.

Crops are a part of God's creation and humans are meant to take care of God's creation. Therefore protection of the environment and of plant varieties is one of the important responsibilities of all humans.

Here the role of gene banks in conserving and reviving indigenous varieties in areas which may not be suitable for conventionally bred varieties is clearer than ever before. Close cooperation between the National Gene Bank and farmers which involves giving indigenous varieties to farmers will lead to a re-identification of indigenous varieties suitable for target environments and the use of adapted varieties in



Learning about seed laws in the working group on seed registration and certification

breeding programmes. The PPB approach builds on the many important outcomes of the fusion of modern and indigenous knowledge.

In recent years a number of laws and bylaws have been ratified which have recognised indigenous varieties and the use of farm-saved seeds by farmers. It is critical that the legislative and executive branches of government avoid changing these laws or adopting new ones, or seek membership in international organisations that would jeopardise the rights of small-holder and subsistence farmers in Iran. In recent years the industrial-scale seed companies have turned to legal tools to privatise the production of seeds and to make farmers dependent on them for seeds and chemical inputs. Currently some of these laws have been enacted at the international level by organisations such as UPOV. UPOV uses intellectual property rights to take away from farmers their right to save their seeds, protecting this right for large, multinational seed companies. The right of farmers in member countries to produce and exchange their seeds which is an ancient right, is taken away from them and their livelihoods are thus threatened.



Javad Mozafari, Director of the National Gene Bank talks about farmers' rights

The benefits of PPB:

1. Farmers not only participate in testing technologies, but in designing and implementing them.
2. Research becomes applied and PPB is good practise for implementing participatory agronomic research programmes.
3. Researchers become involved in field work and collaborate directly with farmers to solve the problems of the agricultural sector.
4. PPB is an example of demand-driven research: farmers' acceptance of varieties takes place prior to variety release.
5. Better use of the potential of diverse microclimates by planting varieties that are adapted to each of them.

Conclusions and recommendations

- The success of PPB is without a doubt dependent on the coordination and participation of relevant sectors, therefore the cooperation of researchers, farmers, extension and education and the executive branches is more important than ever. Furthermore the need to continue the commendable cooperation between the Seed and Plant Improvement Institute, the Dryland

Agriculture Research Institute and the National Gene Bank, both amongst each other and with farmers is felt more than ever before.

- In addition to activities within the country, exchanges and cooperation with international research institutes plays an important role in advancing the goals and must be supported.
- PPB has so far not had a formal role in the research system. Researchers of the government research institutes recommend that a formal role be envisioned in the plans of the Ministry of Jihad-e Agriculture and that processes are put into place to ensure that PPB varieties are able to be registered and released, and that programmes for their multiplication and preservation of their genetic purity be developed with the participation of the relevant research sectors.

- Support for cooperation between the National Gene Bank and the breeding institutes and farmers with the goal of using, conserving and reviving indigenous varieties as well as using them in breeding programmes and PPB activities in order to improve the adaptability and the sustainability of production.



Roointan and his team discuss the outscaling of PPB in Kermanshah province with Dr. Ceccarelli

- As stated in the National Seed Policy Document, a national committee on farm-saved seeds should be established by the Seed and Plant Certification and Registration Research Institute to support farm-saved seeds, to improve their quality and to give the necessary instructions to be implemented by relevant bodies.
- Membership in international organisations and conventions such as UPOV must be evaluated logically and in a measured way; the relevant information about such membership should be put at the disposal of experts. For this purpose it is essential to organise a national workshop to evaluate the positive and negative consequences of UPOV membership .
- Since ancient times farmers have depended on their indigenous knowledge of cropping and breeding and they have valuable experiences which are unfortunately being forgotten.
- It is critical to have a database of farmers' indigenous knowledge and to revive and document this knowledge so as it to use it in the future by using participatory research methods.

- It is recommended that the province of Kermanshah become a training centre on PPB and courses to teach necessary skills on PPB be taught here for volunteers from throughout the country.
- It is essential to have a representative of the research institutes based in the local Agricultural Services Centres in order to effectively implement PPB programmes and to solve the problems of farmers in the target environments.
- The main responsibility of this representative would be to identify the problems of farmers and cooperate with them and with researchers from the research institutes in implementing research in the field.
- These representatives must learn research methods from experienced researchers in special training courses.



Some of the participants take a farewell shot