Biodiversity and livelihoods: From single varieties to “mega-populations”

Maryam Rahmanian, Centre for Sustainable Development and Environment
A livelihood has been defined to be “sustainable” when it can “cope with, and recover from, stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining its ecological base”
Why Participatory Plant Breeding?

- Often the research agenda is decided by scientists without consultation with users.

- Agricultural research seldom uses an integrated approach (complex ecological, social, and economic interactions).

- A large number of technologies generated by agricultural research are not used by farmers.
Participatory Plant Breeding: Trials moved from Research Station to farmers’ fields

Decisions shared between breeders and farmers
“Diversification of production is a way to increase resilience of farming systems to shocks in an environment of increasing uncertainties. Efficient adaptation will require access (both physical and legal through appropriate intellectual property rules) to genetic resources, both of existing crops, livestock and their wild relatives, as well as varieties that may be used in the future.”

*Food Security and Climate Change*, HLPE
Farmers started making mixtures of the single lines from the PPB trials to bring greater stability to their yields over time: this is a mixture of 15 lines of bread wheat from PPB trials in Kermanshah.
Diversity is what makes landraces so popular: this is Sardari wheat, a landrace that has consistently outperformed “improved varieties” in Iran's rainfed regions.
Sardari: susceptible to yellow rust and lodging
In order to breed better varieties, we must build on the diversity of landraces, rather than focusing on pure lines and single varieties.

The mixture of 15 lines of wheat have shown good resistance to rust and lodging.
From mixtures to evolutionary populations

This evolutionary population is a mixture of 1600 barley.
Though we introduced the evolutionary populations for research purposes, some farmers have immediately started cultivating them as their main crop, as in the case of this "mega population" of wheat in Kermanshah.
Area under cultivation of the barley evolutionary population in Iran
Evolutionary populations are created by making mixtures with segregating populations from research stations.
Evolutionary populations will evolve differently under different conditions.

Original Population

- Cold
- Pest and Diseases
- Salt Affected
- Dry and Hot sites
This evolutionary population of barley was cultivated by pastoralists as animal feed under rain-fed conditions in a very dry climate.
This particular genotype really stood out as being better adapted to these conditions and can be multiplied separately.
Farmers select spikes to create “sub-populations”
Evolutionary Plant Breeding

One mega population of barley (1600 F2’s)
What does this all mean for policy and legislation?

“The expansion of IP rights can constitute an obstacle to the adoption of policies that encourage the maintenance of agrobiodiversity and reliance on farmers’ varieties.”

*Seed policies and the right to food: enhancing agrobiodiversity and encouraging innovation,*

Report of the Special Rapporteur on the Right to Food, 2009
Corporate Concentration in the seed sector

- 6 multinational seed companies (Syngenta, Bayer, BASF, Dow, Monsanto and DuPont) control 59.8% of commercial seeds and 76.1% of agrochemicals.

- The same 6 companies account for at least 76% of all private sector R&D in these two sectors.

- Monsanto, the world’s largest seed company and fourth largest pesticide company, now controls more than one-quarter (27%) of the commercial seed market.

ETC Group (March 2013)
Distinct?!
Uniform?!
Stable?!
“In order to circumvent these limitations [IPRs and in particular UPOV 1991], developing countries where the function of traditional, farmers’ seed systems is most important both for the prevention of genetic erosion and for the livelihoods of farming communities should design sui generis forms of protection of plant varieties which allow these systems to flourish, even if this means adopting non-UPOV compliant legislation; and if they do join UPOV, they should use all the flexibilities available to them.”

Seed policies and the right to food: enhancing agrobiodiversity and encouraging innovation,

Report of the Special Rapporteur on the Right to Food, 2009
Article 8

Paragraph 1: Rules related to seed and plant certification in Iran do not include farm-saved seed and plant material, however, necessary support will be given in order to increase the quality of farm-saved seed and plant material.

Article 9

Paragraph 7: Farmers who produce farm-saved seed and plants have the right to store, use, exchange, and distribute their own plant materials.

Paragraph 8: Farmers using farm-saved seed and plants are permitted to use protected varieties.

Available at: http://spcri.org/en/Pages/SeedandPlantPolicy.aspx
Who should decide about policy and legislation for agricultural biodiversity?