Bioversity International

Seeds for Needs
Factsheet 1

A participatory approach for landrace evaluation

For more information about the 'Seeds for Needs' initiative, see:

- Factsheet 2
  The crowdsourcing approach
- Factsheet 3
  Strengthening the informal seed system through community seedbanks
- Factsheet 4
  Diversity in durum wheat landraces to tackle drought
- Factsheet 5
  Molecular techniques to map farmer and breeder preferences – an innovative approach towards participatory plant breeding
- Factsheet 6
  Improving Ethiopian durum wheat landraces through breeding

The initiative involved wheat-growing farmers in two areas in Ethiopia to evaluate 400 durum wheat samples (accessions) and identify those that meet their needs and expectations. We also collected agronomic and morphological data[1], and linked this information with feedback from farmers. This allows us to better understand priority traits and inform breeders so that they can take into account farmer preferences and identify priority accessions for immediate distribution to farmers.

In order to identify the traits that are most important to farmers for climate change adaptation, we conducted separate focus group discussions with male and female farmers. They agreed on which traits were the most important to evaluate: earliness (fast-maturing), tiller capacity (capacity to generate extra shoots from one seed), spike morphology and an 'overall' trait that represents a general appreciation of each variety. For each trait, 15 male and 15 female farmers were divided in groups of five, and asked to give a score from one (poor) to five (excellent).

1 We measured the following agronomic and morphological traits: days to booting, days to flowering, days to maturity, plant height (cm), number of fertile tillers, biomass (kg/ha), spike length (cm), number of seeds per spike, moisture content, grain weight (g/plot), grain yield (kg/ha) and the general measurement breeders use for grain size, that is 1000 seeds weight (g)

Photo: Farmers are scoring durum wheat varieties according to their preferred traits in a field trail, Ethiopia. Credit: Bioversity International/C.Fadda

Our progress

- Men and women independently agreed on the top varieties for immediate distribution. In only one site, there were significant differences in the evaluation by men and women with regards to the 'overall' trait.
- In Table 1, we link farmers' qualitative evaluation of the accessions with quantitative agronomic and morphological traits. As the high and significant correlation coefficient shows, farmers' evaluation scores overlap with the quantitative measures of agronomic traits. These results can be extremely helpful for mapping these traits at the genetic level.
- With respect to the overall evaluation (see Table 1), we were able to identify the following agronomic and morphological characters that are important to farmers in both sites: earliness (the faster it matures the better), number of seeds per spike, grain yield and plant height. Biomass was also identified as an important trait in one site (Hagreselam).
- It is worth noting that plant height and biomass were rated as important because they correlate with straw yield, which is the main fodder used by farmers to feed livestock.

Looking ahead

It is key to use an approach that can connect farmers' qualitative evaluation of landraces with quantitative agronomic and morphological data in a scientifically sound way. This helps participatory breeding programmes focus on improving traits that are relevant to farmers. We can also use this information to find the traits identified by farmers in the crop genome.

Cover Photo: Farmers are scoring wheat varieties according to their preferred phenotypical traits in a field trail in the Tigray Region, Northern Ethiopia.
Credit: Bioversity International/ J.V.Gevel

Table 1 - Correlation between farmer ratings and agronomic observations in Hagreselam and Gere Gera villages. The results show significant overlap between farmers' evaluation and agronomic data.

	Hagreselam				Gere Gera			
	Earliness	Tiller capacity	Spike morphology	Overall	Earliness	Tiller capacity	Spike morphology	Overall
Days to maturity	-0.734**			0.176**	-0.771**			-0.247**
Number of fertile tillers		0.268**		-0.054		0.261**		-0.03
Spike length			0.029	-0.112*			-0.05	-0.047
Number of seeds per spike			0.314**	0.331**			0.482**	0.442**
Grain yield				0.417**				0.485**
Plant height				0.359**				0.374**
Biomass yield				0.362**				0.031

*** Correlation is significant at the 0.01 level.* ** Correlation is significant at the 0.05 level.*

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