Hot topic

5

Sharing knowledge between farmers and breeders for creating varietal innovations: lessons from a participatory plant breeding program of sorghum in the Northern region of Nicaragua

Gilles Trouche[1], Silvio Aguirre A.[2], Blanca Castro B. [2], Orlando Gómez[3], Hugo Francisco Guillén[3], Lino Paz[3], Henri Hocdé[1]

[1] Centre de Coopération Internationale en Recherche Agronomique pour le Développement, Montpellier, France

[2] Centro para la Investigación, la Promoción y el Desarrollo Rural y Social, Pueblo Nuevo, Nicaragua

[3] Local farmer's organizations, Madriz department, Nicaragua

Context

❑ Sorghum = first food crop for resource-poor farmers in the dry lands of Nicaragua (and CA)

❑ Two sorghum types grown for food:

➢ Millón: late photoperiod-sensitive cultivars, intercropping with maize or bean in hillsides

➢ Tortillero: early photoperiod-insensitive/white grain modern varieties, semi-intensified cropping systems

❑ Many cropping systems but low genetic diversity: 10 different cropping systems include sorghum in the Northern region (Trouche et al., 2006. Agron. Meso.)

❑ National sorghum program mainly focus on hybrids and varieties for favourable environments

Research back-ground

1. A sorghum improvement project managed between research institutions (Cirad, Ciat & Inta), Cipres and local farmers' organizations

2. A Participatory Varietal Selection phase (2002-2006) mainly focused on three sorghum types for predominant and common cropping systems:

- ✓ Millón for maize-sorghum intercropped systems in hillsides
- ✓ Early tortillero for pure crop plantings
- ✓ Red grain sorghum

Main results: 4 millón and 4 tortillero varieties released, official registration of Blanco Tortillero
http://www.programa-fpma.org.ni

Reference: Giving new sorghum variety options to resource-poor farmers in Nicaragua through participatory varietal selection, 2009. Trouche et al., 2009. Experimental Agriculture)

Creating new original varieties beween farmers and scientists: PPB phase 2004-2008

Intense interactions during the PVS phase between farmers, NGO agronomist and breeder: field observations, knowledge sharing, discussion about the results …

Lead to identify

other sorghum types to be improved and **to define new original ideotypes**

PVS approach showed limitations for providing these specific ideotypes

Favourable institutional and financial context

Implementation of 3 specific decentralized PPB programs

Rapidly designed:

✓ Medium plant height millón for intercropping with maize

✓ Short plant height tortillero for intercropping with bean

Requested more time (5 years):

✓Tortillero for ratooning crop management

An example of a specific PPB program emerged from a long-term interaction process: breeding for varieties adapted to ratooning (rebrote)

✓ A strategy imagined and applied by few farmers in two localities

✓ Existing germplasm tested in this CS do not provide satisfactory results

✓ A small farmer group motivated for creating varieties for this specific CS

✓ With El Niño-La Niña events, this CS showed good resilience to extreme rainfall conditions during the postrera season (both very wet or very dry)

Primera: planting cycle

Postrera: ratooning cycle

Lessons

1. Long-term interactions between farmers leaders, NGO agronomist and breeder **with certain conditions** (sharing knowledge, mutual respect and confidence, formal and informal agreements , individual initiatives), permitted to identify breeding objectives not revealed by standard diagnostic and to co-define original variety ideotypes.

2. This process has generated various products:
   - varietal innovation
   - capacity building for all the participants
   - individual and collective empowerment of farmers

   (also see Hocdé et al. ISDA 2010)

3. For ensuring stability of the actions and impact, this research need to be inserted in existing and dynamic local networks