

# *les dossiers* **d'AGROPOLIS** INTERNATIONAL

*Expertise of the scientific community*

Special Partnership Issue



## **Agroecological transformation for sustainable food systems**

Insight on France-CGIAR research

Number 26  
September 2021



# When farmers and scientists collaborate

## *Climate smart varieties for low-input cropping systems in Africa and Central America*

Improving sorghum and rice varieties to secure food for the rural and urban poor, while delivering revenue opportunities in regions vulnerable to climate change, requires joint efforts. For 20 years now, CIRAD has been collaborating with farmers' organizations, research institutes and NGOs to identify and develop new sorghum varieties adapted to low-input agroecological cropping systems in West Africa and Central America, as well as new upland rice varieties for the highlands of Madagascar—some of the regions most affected by climate change in the world. Impact analyses on these decentralized participatory breeding programs have revealed **a large adoption and dissemination of the developed varieties because of their adaptation to**

**the prevailing soil and climate constraints, intensification objectives and local food preferences<sup>(1,2)</sup>**. Farmers appreciate the higher and more stable yields achieved in their cropping systems, not to mention the quality of the harvested grain for family consumption, as well as its high market value and enhanced fodder quality, especially for sorghum<sup>(1,3)</sup>. In Burkina Faso, collaboration between stakeholders on these varieties has prompted the set-up of new seed-production networks by farmers' organizations, generating both revenue and employment<sup>(1)</sup>. A similar breeding approach is being pursued in southern Madagascar.

The outcomes are hence of a dual nature: firstly, the development of varieties that are superior

to farmers' traditional cultivars for progressive intensification and adaptation to climate change<sup>(4)</sup>; secondly, the organization of a new framework that allows farmers, extension agencies and scientists to work together toward disseminating future new varieties while developing better cropping systems. **Today, farmers demand to be involved in all stages of experiments conducted in their fields, from deciding which varieties and cultural practices are best, to accessing and exchanging the future seed.** In so doing, farmers and researchers are shifting from a researcher-led 'participatory' relationship to a partnership model whereby the researcher is subsequently just one among several key stakeholders.

### Contacts

Gilles Trouche (AGAP, CIRAD, France),  
gilles.trouche@cirad.fr

Kirsten vom Brocke (AGAP, CIRAD, France),  
kirsten.vom\_brocke@cirad.fr

### For further information

(1) Vom Brocke K., Kondombo C.P., Guillet M., Kaboré R., Sidibé A., Temple L., Trouche G., 2020. Impact of participatory sorghum breeding in Burkina Faso. *Agricultural System*, 180.

(2) Breumier P., Ramarosandratana A., Ramanantoanirina A., Vom Brocke K., Marquié C., Dabat M.-H., Raboin L.-M., 2018. Évaluation participative des impacts de la recherche sur le riz pluvial d'altitude à Madagascar de 1980 à 2015. *Cahiers Agricultures*, 27(1): 15004.  
<https://doi.org/10.1051/cagri/2017065>

(3) Trouche G., vom Brocke K., Aguirre S., Chow Z., 2009. Giving new sorghum variety options to resource-poor farmers in Nicaragua through participatory varietal selection. *Exp. Agric.*, 45: 451-467.

(4) Vom Brocke K., Trouche G., Weltzien E., Kondombo-Barro C.P., Sidibé A., Zougmore R.B., Goz E., 2014. Helping farmers adapt to climate and cropping system change through increased access to sorghum genetic resources adapted to prevalent sorghum cropping systems in Burkina Faso. *Experimental Agriculture*, 50(2): 284-305.  
<http://dx.doi.org/10.1017/S0014479713000616>



▲ Final evaluation of a set of dual-purpose sorghum varieties developed through a decentralized participatory breeding program in Nicaragua. © G. Trouche

# From gene banks to farmers' fields

## *The Seeds for Needs approach (durum wheat)*

Smallholder farmers' needs cannot be addressed by one-size-fits-all approach in areas where the agroecological conditions are varied and farmers have different crop trait preferences. The conventional plant breeding strategy of using a narrow array of genetic stock ignores the high potential offered by genetic resources available in various gene banks. Moreover, this strategy increases the vulnerability of agriculture in the current climate change setting. The Seeds for Needs (S4N) approach, which combines genomics, conventional breeding, and farmers choices through crowdsourcing, aims at testing many varieties in farmers' fields to select best performing superior varieties for specific climatic and edaphic growing conditions. By bringing seeds to farmers' fields, women and men farmers have an opportunity to select varieties that can fulfil their needs and that are more tailored to their specific farms, with traditional knowledge taking a front seat in the management process.

...cont'd 

▼ Woman farmer carrying her durum wheat harvest. © Y.G. Kidane

