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Participatory Cotton Breeding for Organic and Low Input Farming in Central India

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Abstract

Up to 80% of world's organic cotton is produced in India. However, involved producers are facing increased difficulties to find suitable cultivars. Few hybrids selected for high input farming and genetically-modified (GM) cotton, which is explicitly excluded in organic farming, are presently dominating the Indian seed market. In addition farmers have lost their traditional knowledge on seed production and hybrid seed needs to be purchased each season. Moreover, there is a big risk of contamination with GM cotton and the loss of locally adapted genetic resources. Therefore fast action is needed to re-establish a GM-free seed chain and breeding programs to support organic and low input cotton farmers in India. Participatory plant breeding (PPB) offers a great opportunity for developing locally adapted cultivars as well as for maintaining and increasing genetic diversity. The close collaboration of farmers, extension agents and breeders allows to identify cultivars that suit the circumstances of resource-poor farmers in marginal environments. This study was conducted in collaboration with FiBL, bioRe an organic cotton producer in Central India and the University of Agricultural Sciences (UAS) Dharwad. The main aim of the study was to introduce participatory breeding approaches and to test improved cotton cultivars in smallholders' organic cotton fields and to gain information about the suitability of different types of cotton cultivars for organic and low input farming in Central India. The study combined on-station with on-farm trials and was conducted transdisciplinary involving the joint expertise and knowledge of organic farmers and breeders. On-station seven different cultivars, including different species and plant types were tested under high and low input conditions for genotype \times management interaction. On-farm in farmers fields five commercial cultivars were tested among 20 organic farmers representing different soil fertility levels for genotype \times environment interaction. In addition, 49 cultivars of different species and plant types and five F2 progenies all received from UAS Dharwad were examined on-farm at bioRe for their suitability under organic and low input farming. First year results of this long-term study will be presented.

Keywords: Cotton seed, *Gossypium*, low input farming, organic farming, participatory breeding