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# GREEN COTTON

## Participatory Cotton Breeding for Organic Farming and Securing of Genetic Diversity of non-GM Cotton in India

### Background

Up to 80% of the global organic cotton was produced in India. Today the organic cotton production is severely threatened by the lack of suitable seeds as the production of non-GM cotton seed has been stopped by private seed companies. Bt cotton hybrids of *Gossypium hirsutum* cover more than 90% of the cotton growing area, while endemic Desi cotton like *G. arboreum* are almost extinct and many *G. hirsutum* cultivars are genetically contaminated by Bt. In the last two growing seasons the area under organic cotton production decreased by about 20 % in India. Therefore a Cotton Cultivar Evaluation project was started at bioRe association in 2011 which is complemented and extended by the Green Cotton participatory breeding project.

### Objectives

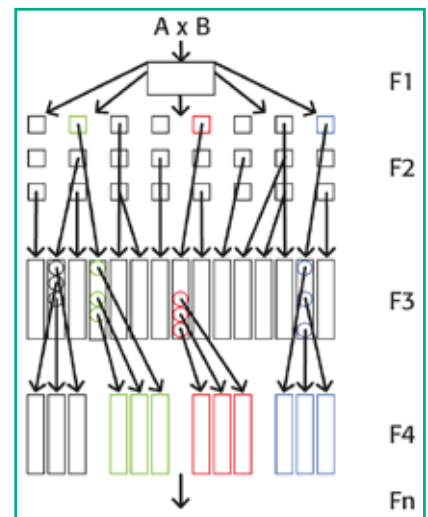
The short term aim of the project is to provide organic cotton farmers with high quality seeds. In the midterm new cultivars need to be developed that fit the needs of organic cotton farmers and the textile industry. Seed sovereignty and autarky of smallholder cotton farmers shall be improved by capacity building and establishing decentralized participatory breeding initiatives. Farmers' experience and breeders' knowledge is combined to develop cotton cultivars adapted to local conditions of organic cotton farmers. To achieve this goal following objectives were defined: (i) Networking with all stakeholders in the organic cotton value chain to achieve coordinated cooperation, (ii) Collection and conservation of genetic resources, (iii) Testing of existing cultivars under organic conditions, (iv) Training farmers in seed multiplication, crossing and selection, (v) Establishing participatory cotton breeding programs, and (vi) Re-establishing the non-GM seed chain.



Workshop on Breeding and Supply of non-GM cotton seed March 2013.

### Methodology

- Regular Workshops, field demonstrations and visits to establish network and mutual trust among organic growers organisations, breeders, researchers, seed company, cotton institutes and textile industry in India but also on international level (Round Table of Organic Cotton of Textile Exchange).
- Capacity building in decentralized cotton breeding by collaboration, exchange and training
- Utilization of farmers knowledge to define most important traits and ideal cotton genotype under different growing conditions.
- Establishment of replicated on-station trials of non-GM cultivars provided by the UAS Dharwad under organic growing conditions in high fertility irrigated and rainfed low fertility soil in MadhyaPradesh (bioRe association) and in Bhawanipatna, Odisha (Chetna Organic) comparing 30 *G. hirsutum*, 30 *G. arboreum* (desi cotton), 30 *G. barbadense* species, as well as hybrids vs. varietal lines.
- Regular workshops with farmers on cultivar testing, crossing techniques, selection of segregating material and cultivars and seed production (farmer breeder curriculum).
- Farmer managed on farm cultivar trials in different soil types with and without irrigation.
- Developing new crosses to combine the robustness of desi cotton with the high fiber quality of modern varieties.
- Socioeconomic evaluation of different models for the establishment of a seed supply chain for non-GM cotton in India.



Pedigree selection scheme.

### Acknowledgement

