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# GREEN COTTON

## Participatory Cotton Breeding for Organic Farming at Chetna Organic in Odisha



Fig. 1: Trail layout on fertile black soil



Fig. 2: Training of farmers in cotton cultivar evaluation in red shallow soil

### Objectives

Chetna Organic is promoting sustainable and profitable livelihoods for small and marginal farmers in rainfed farming systems in Odisha, Andhra Pradesh and Maharashtra. Organic cotton cultivation is limited by the short raining season and by shallow soils. The objective is to identify most suited cotton species and cultivar types that suit the local growing conditions.

### Materials and Methods

In farmer participatory evaluation a total of 120 cotton cultivars provided by Prof. Patil from the UAS Dharwad have been tested in a randomized complete block design with 2 replications under complete rainfed and organic conditions in the season 2013-14. The entries included

- 30 *G. hirsutum* varietal lines
- 30 *G. arboreum* varietal lines
- 7 *G. hirsutum* hybrids
- 19 *G. hirsutum* x *G. barbadense* hybrids
- 14 *G. barbadense* varietal lines.

The trial was carried out at two locations - one representing light red soil conditions in Bandhpari village and the other representing medium soil condition in Kumkhal village. The two sites are separated by 8 km in Lanjigarh block, Bhawanipatna, Kalahandi district, Odisha state in India. The entries were visual scored by the research team, i.e. Prof. S S Patil and Chetna Organic's field team, along with bioRe breeding team and FiBL. Farmers from the Chetna Organic- Textile Exchange – Inditex Seed Guardians program and Chetna's partner cooperatives who have been trained to identify good varieties were also invited for visual scoring.

Farmers evaluate the entries for qualities like ease in

picking and boll size, since these two are factors in workers preference for a variety. The visual scores combined with yield data and fibre quality parameters were considered for selection of the best entries for the next growing season in 2014-15.

This cotton season a total of 23 *G. hirsutum* varietal lines, 15 *G. arboreum* varietal lines, one *G. arboreum* commercial hybrid Ambika-12, 7 *G. hirsutum* hybrids and 5 *G. hirsutum* x *G. barbadense* hybrids including cultivar JK-35 as check will be evaluated in replicated randomized block design under light red and medium black soil conditions. For the development of new cultivars, participatory cotton breeding will be initiated using 10 *G. hirsutum* F2 populations and 10 *G. arboreum* F2 populations derived from specific crosses made at UAS Dharwad with good fibre qualities. Single plant selection will be performed by farmers, field team and researcher considering also the requirement of the textile industry.

### First results

Of the seven *G. hirsutum* varietal lines that were selected for further testing in 2014-15 trial, three entries showed good yield potential and combine fibre qualities which are actually in line with Chetna Organic's marketing requirements. Also certain *G. arboreum* varietal lines look quite promising and need to be further tested under black soil conditions. In contrast, *G. barbadense* varieties have been found to be not suitable for rainfed Odisha conditions, whereas *G. hirsutum* hybrids and interspecific *G. hirsutum* x *G. barbadense* hybrids might be suitable under black soil conditions.

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