



Organic Cotton Breeding Opportunities and Challenges

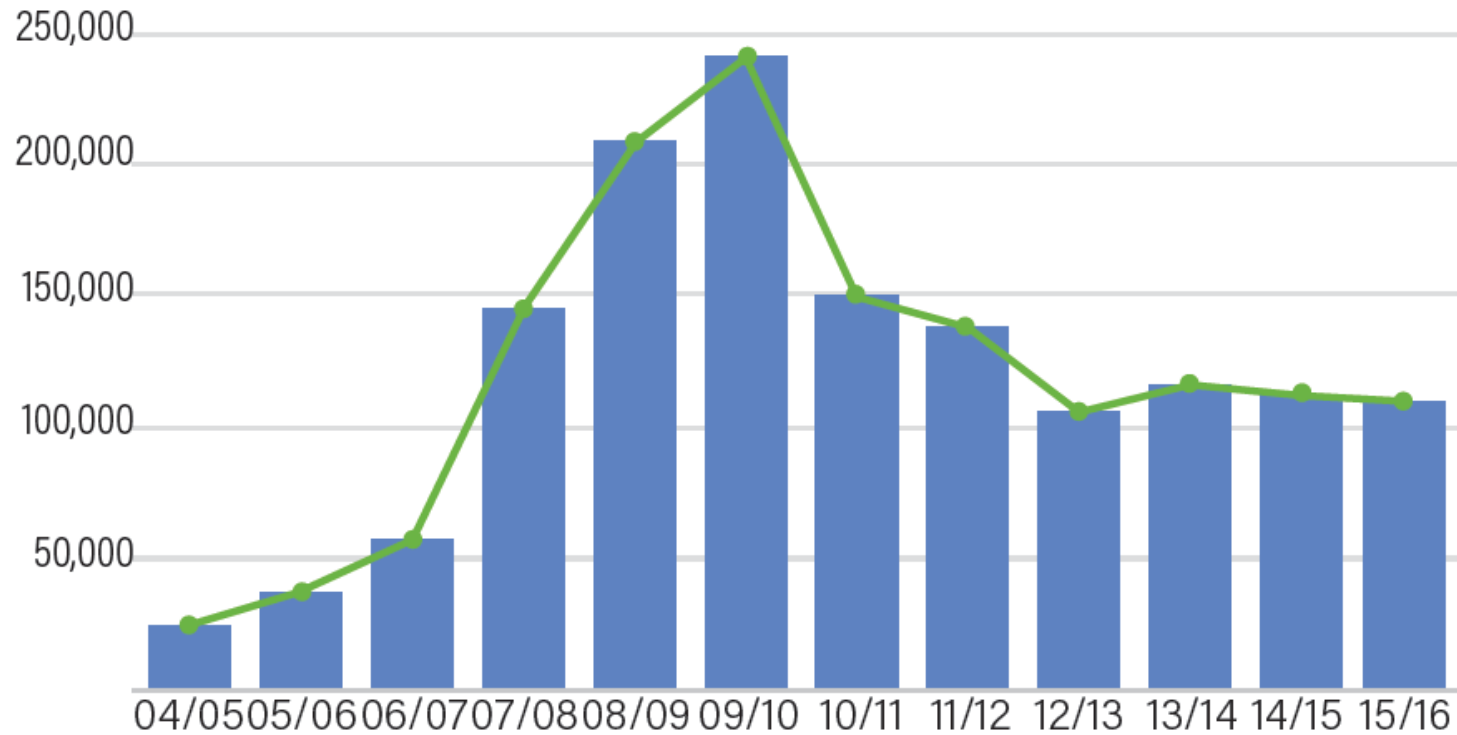
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IFOAM SEED PLATFORM & ECO-PB Pre-Conference on Organic Seed and Plant Breeding
Delhi, India, 8th November 2017

Organic Cotton Production on global level

Global Fiber Production Trend (MT)



Textile Exchange: Organic Cotton Market Report 2017

Challenges organic cotton in India

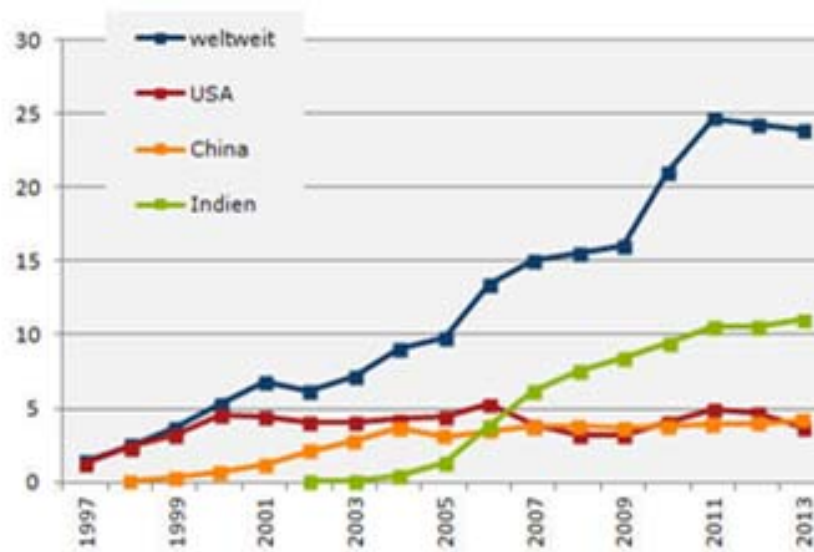
- India has been the largest organic cotton producer, 10 years ago India supplied 80% but dropped now to 56%, with a decrease of 20% from 2014/15 to 2015/16!!!
- Organic cotton in India is less than 2%, while genetically modified Bt cotton reached 95% in less than 10 years
- Public breeding and seed multiplication were neglected
- Local non-GM seed supply were eroded
- Commercial seed companies have limited interest in non GM cotton (higher production risks, risk of Bt contamination, small demand)
- High dependency on global seed company holding Bt licence resulting in high seed price and concentration on high input agriculture (high level of fertilizer, pesticide, irrigation)
- Breeder's seed is already contaminated with Bt, causing Bt contamination throughout the cotton value chain

Challenges of Organic Cotton in India

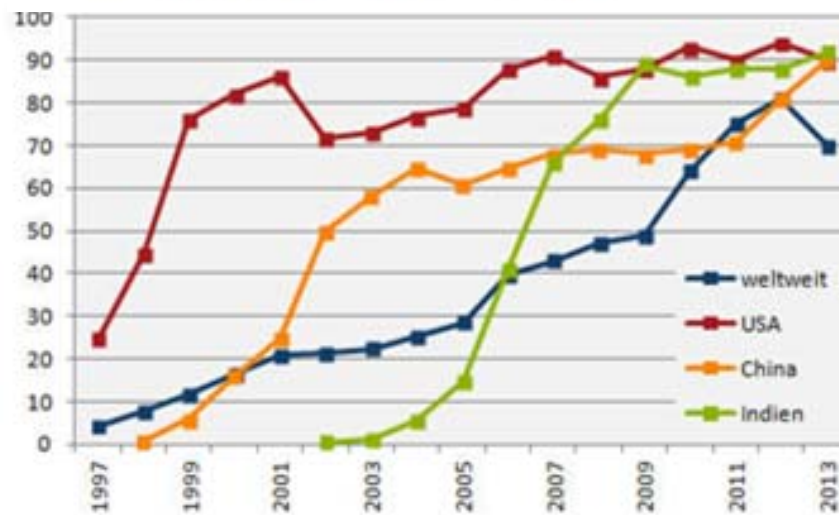
Reduced interest of farmers to grow organic cotton:

- Reduced yield & longer picking periods compared to Bt cotton
 - Improvement of organic cotton cultivation (composting, irrigation, systemic plant protection, resilient cultivars)
 - Market development for other crops in cotton rotation
- Other labels like BCI are more attractive, easier to achieve
- Other crops become more attractive (market price, time till sale, risk of contamination, availability of seed in time)

Area under GMO cotton of main producing countries



Anbauflächen gv-Baumwolle in Millionen Hektar



Anteil gv-Baumwolle an der Anbaufläche eines Landes in Prozent

Competition with other labels like BCI (Better Cotton Initiative) introduced in 2010

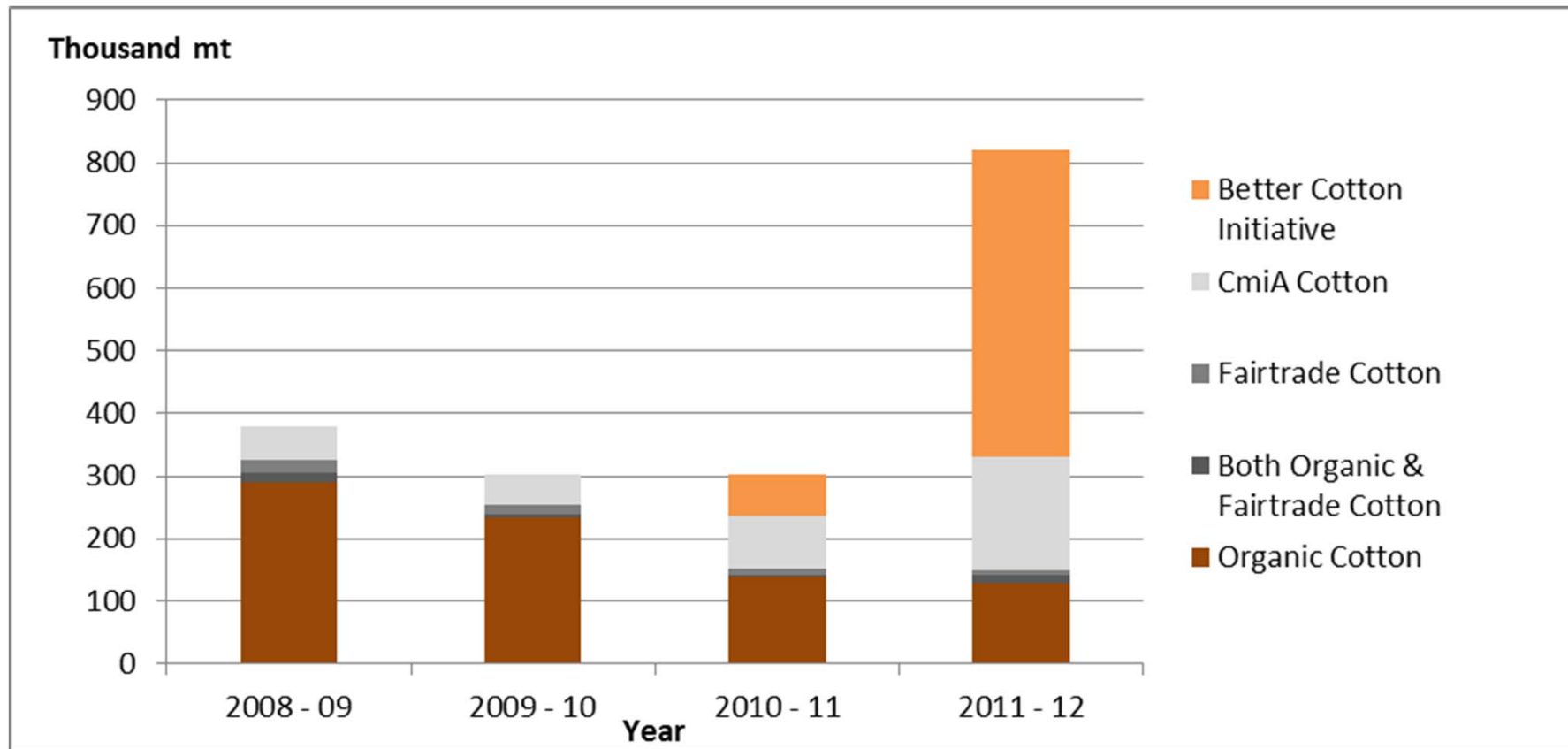


Figure 1: Sales of different sustainable cotton labels, source Warrik (2013)

Cultivated cotton species in India

***Gossypium
hirsutum***

Upland cotton
tetraploid



***Gossypium
barbadense***

Pima /
Egyptian cotton
tetraploid



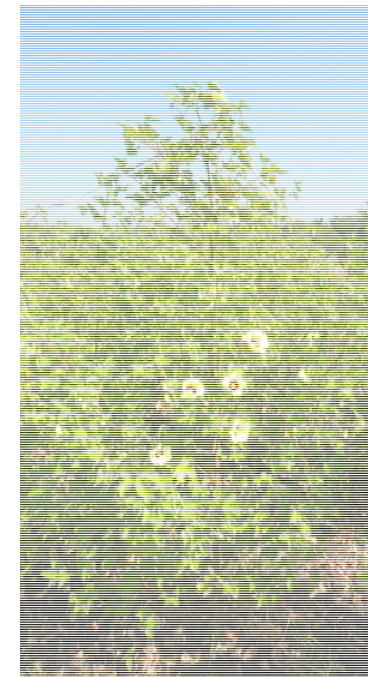
***Gossypium
arboreum***

Desi cotton
diploid

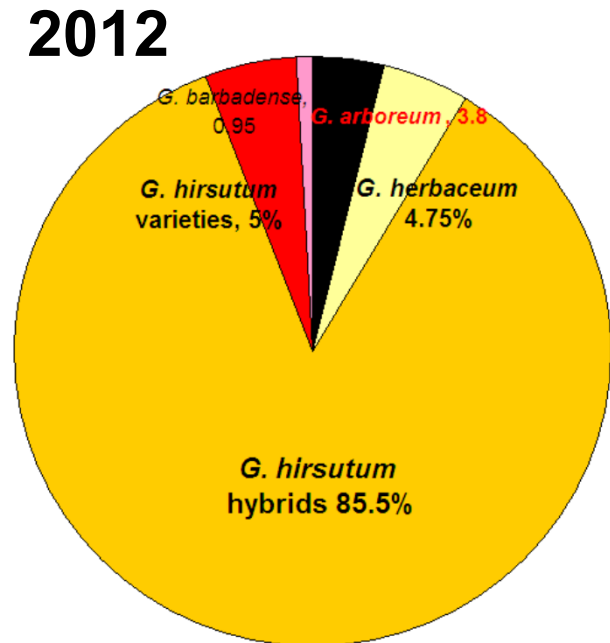
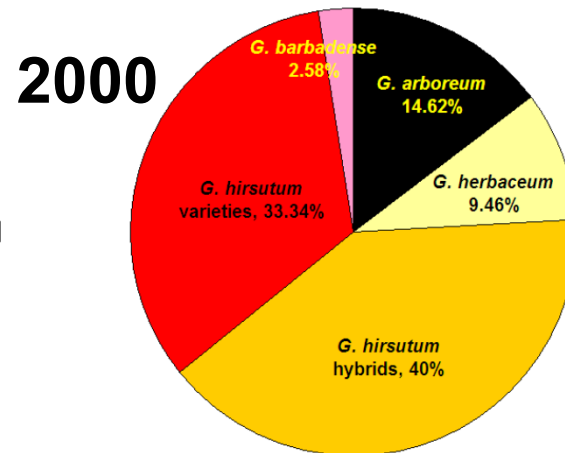
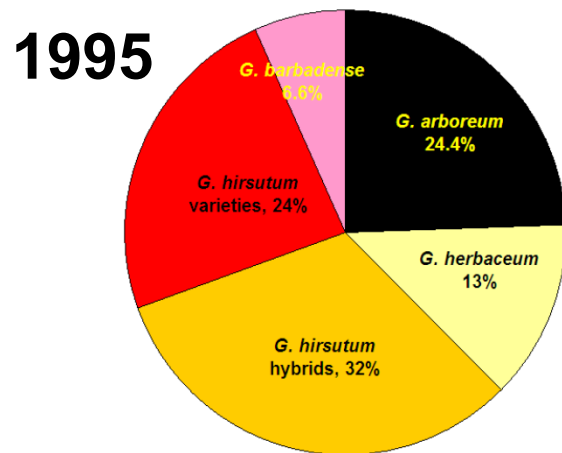
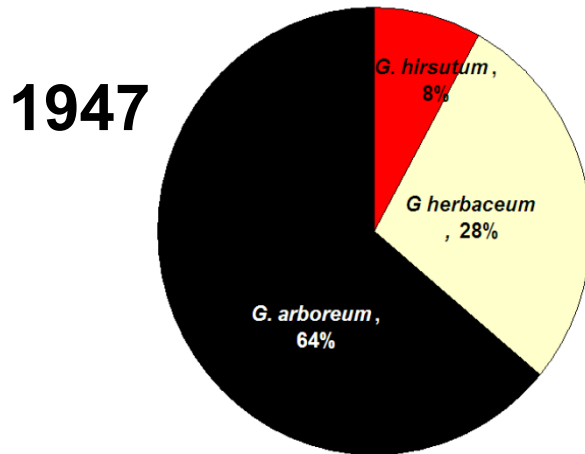
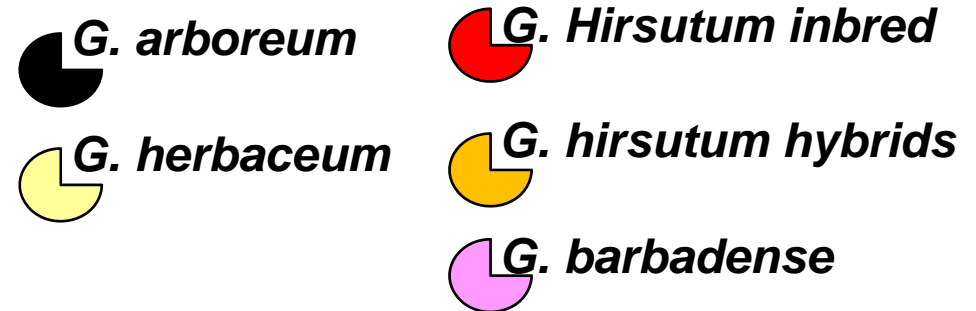


***Gossypium
herbaceum***

Desi cotton
diploid



Change of cultivation area in different cotton species in the last decades in India



Prof. Dr. R. W. Bharud, Mahatma Phuke Agricultural University Rahuri, MA
All Indian Cotton Improvement Project

First Steps: The Dharwad Declaration

National Workshop June 21st 2011: «Disappearing non-GM cotton - ways forward to maintain diversity, increase availability and ensure quality of non-GM cotton seed» Dharwad Declaration

Jointly organized by bioRe India Ltd., FiBL Switzerland, University of Agricultural Sciences Dharwad including main stakeholders

To combine forces for immediate action and support of:

- Collaboration & Exchange, e.g. private public partnership
- Desired Policy Changes, e.g. establishing GM-free zones
- Evaluation and multiplication of existing cotton cultivars under organic and low-input conditions
- Establishing and optimizing the non-GM seed chain
- Continuous improvement of non-GM cultivars



How can organic cotton be safeguarded in India?

Shortterm action: Secure seed supply

- Establish Networks with public and private cotton stakeholders that share the same interests (Dharwad declaration)
- Training & Capacity building of organic cotton growers in on farm cultivar testing and seed multiplication
- On-Station and On-Farm Cultivar Testing together with Farmers for suitability of cultivars under diverse local smallholders' organic growing conditions

Mid- and longterm action: Improve cotton cultivars adapted to organic farming

- Collection and utilization of the full Diversity of the cotton germplasm, especially the more robust endemic Desi cotton (*G. arboreum*) and adapted *G. hirsutum* inbred varieties & public hybrids
- Establishing decentralized participatory cotton breeding programs focusing on the growing conditions of organic cotton producers

→ Regain Seed Sovereignty of high quality cotton germplasm



GREEN COTTON

Decentralized Participatory Cotton Breeding for Organic and Marginal Growing Conditions in India

In collaboration with Partner Organisations:

- bioRe Association
- Chetna Organic
- University of Agricultural Science Dharwad

Timeframe: 2013 – 2016 (option for prolongation)

Supported by Mercator Foundation Switzerland



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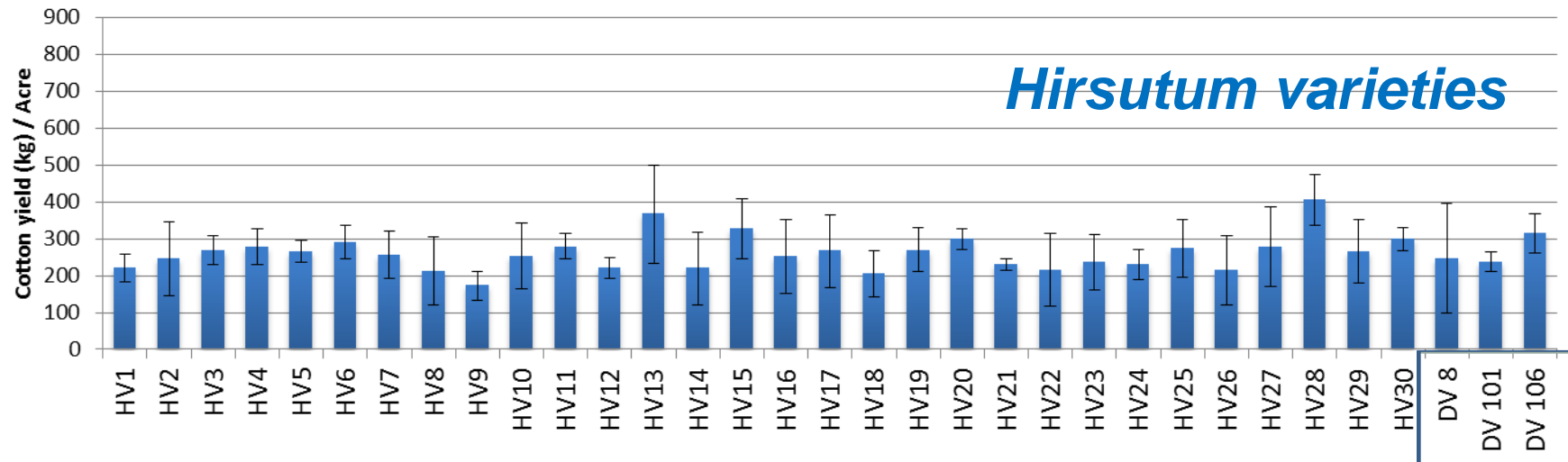
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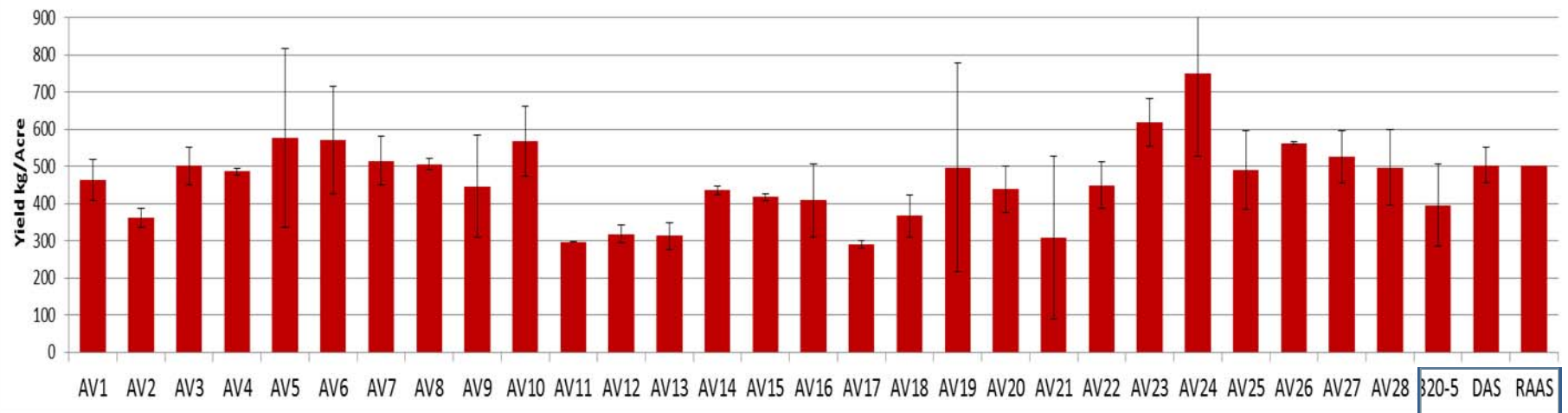
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Madhya Pradesh Light Soil Trial rainfed 2013/14

GCP LST Hirsutum 2013/14 (Rep. I&II) Cotton yield (kg) / Acre

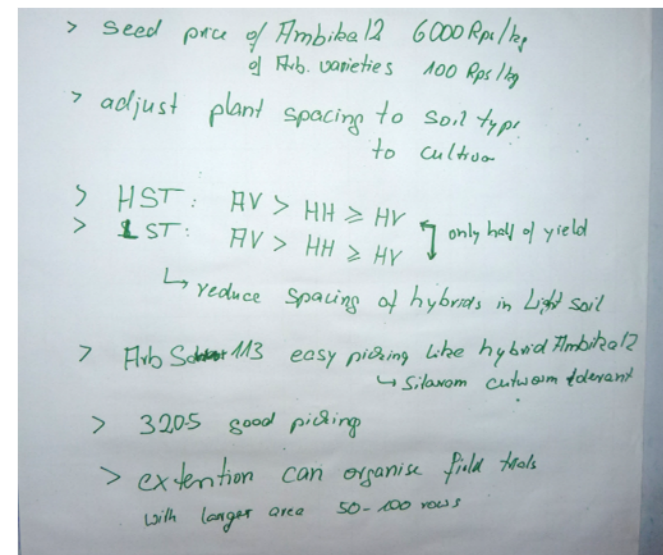


GCP LST (R-I&II) Cotton yield (kg) / Acre *Arboreum varieties*



Arboreum Cotton

- Later and longer fruiting
- Tall and branching plants, hanging capsules, opening often not sufficient, more difficult picking
- Only 3-4 compartments per capsule, hirsutum has 4-5
- Seed weight is less, and therefore less attractive for farmers as they are paid per kg seed cotton (more profitable for ginners due to higher ginning out turn)
- In general less capsules can be collected per hour, therefore workers prefer hirsutum cotton to pick (higher salary per day)



Seeding the Green Future

Local partners

Organic cotton growers organisations:

- **Chetna Organic**: involved in Green Cotton participatory breeding since 2013
- **Pratibha Synthex**: started with on station breeding
- **Cotton Connect**: link to many organic growers associations
- **ASA**: hosting the Organic and Fair Cotton Secretariat focused on MP

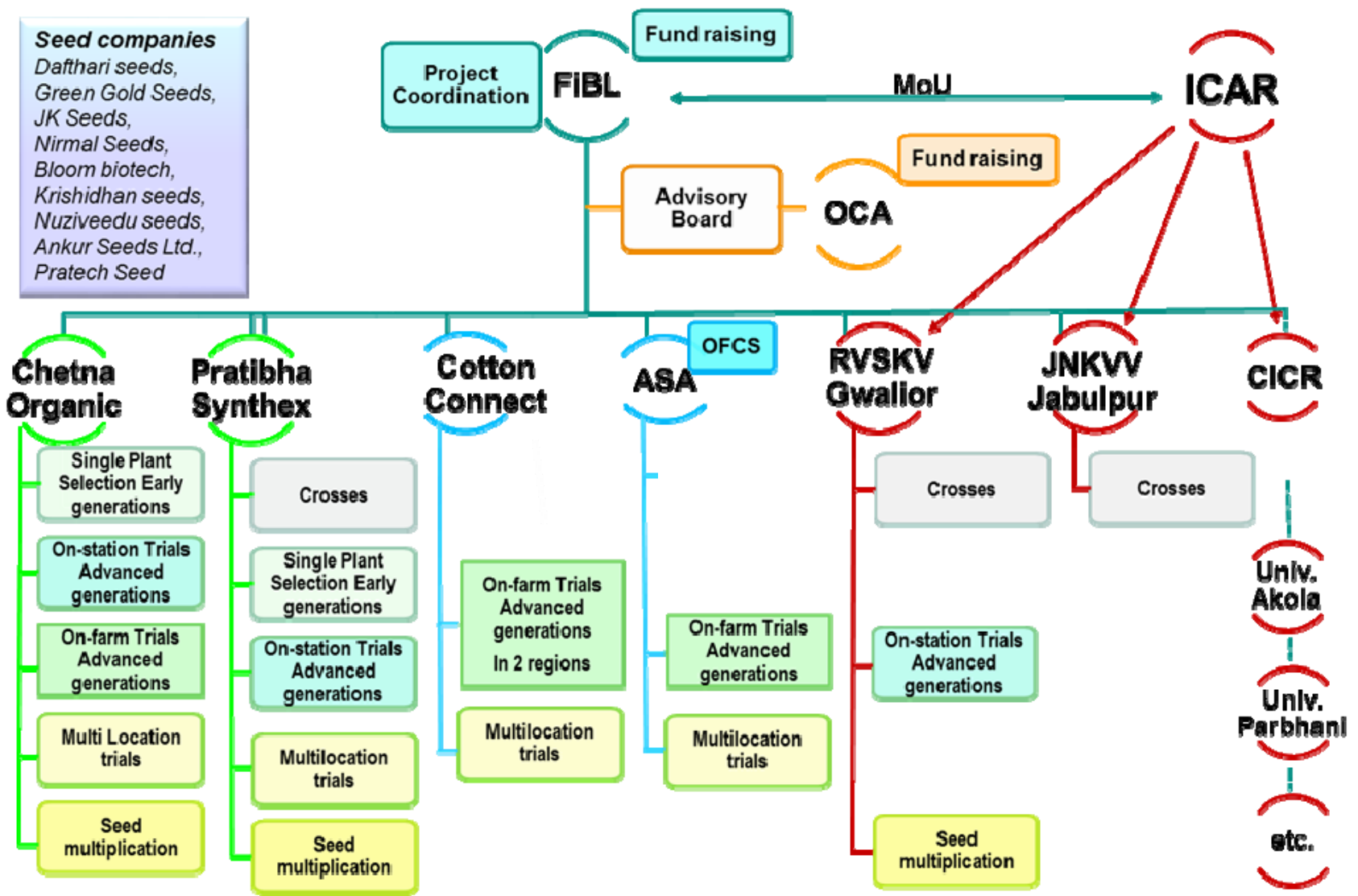
Public institutions and universities:

- **RVSKV Gwalior university – Khandwa College**: testing for truthfully labeled seed under organic conditions, seed multiplication, crosses

Commercial seed companies providing non GM seed on contract basis: Dafthari seeds, Green Gold Seeds, JK Seeds, Nirmal Seeds, Bloom biotech, Krishidhan seeds, Nuziveedu seeds, Ankur Seeds Ltd, etc.

Seeding the Green Future

Project Governance



Importance of International Cooperation

Textile Exchange:

- annual Organic Cotton Market Report
- established 2012 Organic Cotton Round Table
- with annual meetings the task force Seed & Soils



Organic Cotton Accelerator:

Pooling resources of international textile brands to support

- cotton breeding projects in India
- develop business models and sourcing practices that secure the integrity of organic cotton supply chain





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Institut de recherche de l'agriculture biologique
Research Institute of Organic Agriculture

EXCELLENCE FOR SUSTAINABILITY

Research Institute of Organic Agriculture
Forschungsinstitut für biologischen Landbau



«Seeding the Green Future»

Participatory breeding for Securing Organic Cotton and Genetic Diversity

Phase I: January 2017 till March 2018

Amritbir Riar & Monika Messmer

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1.4.2017 Kick-off Meeting Bhopal



Jointly organized by Textile Exchange OCRT Seed & Soils Task Force
&

FiBL as integral part of the breeding project

With the kind support of

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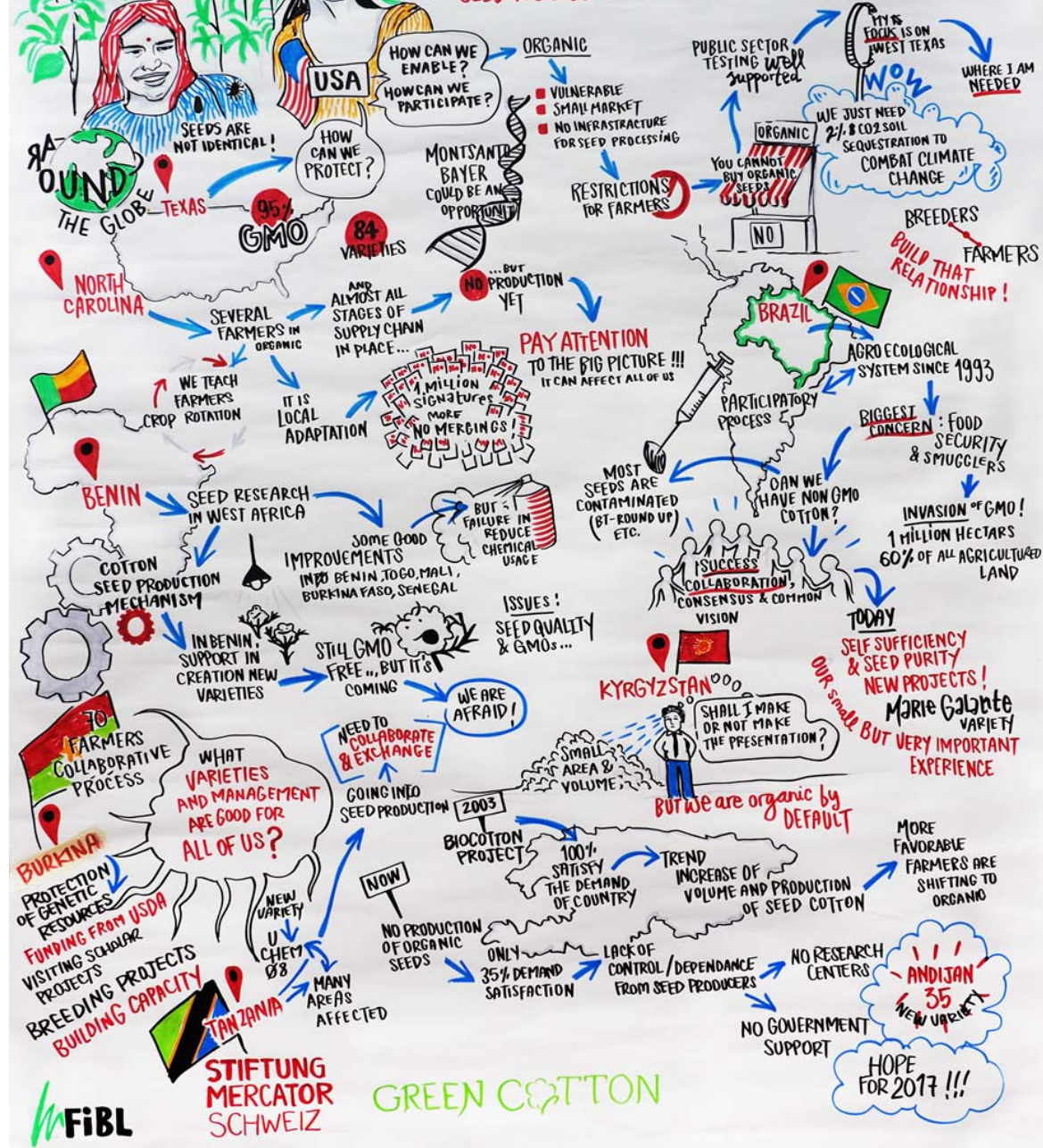
Monika.Messmer@fibl.org

Hamburg 7th October 2016

seed summit

OCTOBER 7TH 2016
HAMBURG

SEEDING & BREEDING THE FUTURE OF ORGANIC COTTON



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GREEN COTTON

Linking Seed & Breeding Initiatives on global scale

- Capacity building to empower organic farmer organisations
- Sharing of information, knowledge, practices, testing protocols
- common R&D projects
- Status quo analysis of available species and cultivars
- Focus on biodiversity and adaptation to climate change
- Exchange of seeds: among partners, between countries? Open source seeds, farmer owned seeds
- Maintenance breeding with quality system to avoid GMO contamination
- Scholarship, Training, institutional exchange
- Political lobbying for organic cultivar testing
- Linking stakeholders, partner recruitment
- Develop business plan for breeding and seed production
- Common fundraising to approach different brands, Crowd funding

MOTION M61 (2017) Organic Textiles: Fibre Production and Processing to be Covered by Appropriate Standards

Textiles advertised/labelled 'organic' and made with organic fibres produced according to recognized standards (e.g. IFOAM Family of Standards), should also be processed to a standard (endorsed by IFOAM - Organics International) that prohibits hazardous and residual inputs according to a clear procedure.

IFOAM acknowledges that such standards should cover the whole supply chain (as is the case with food). Stating the organic fibre content ("contains X% organic cotton"), e.g. through the Organic Content Standard by Textile Exchange, is a relevant step.

IFOAM will communicate this to stakeholders and engage with them for the widespread adoption of a whole-chain-approach (chain of custody) to labelling organic textile products



**Thanks a lot to your attention and
to all who have supported
the cotton seed projects so far**



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