Influence of the Fast Spread of Bt Cotton on Organic Cotton Production
Examples from India and Burkina Faso

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Cotton

- Worldwide > 20 mio. cotton producers
- > 70 countries, 2.5 % of arable land, 35.77 mio ha
- Mostly small scale producers (< 2ha)
- appr. 86 % of cotton is genetically modified
- top Bt cotton producers
  USA 93 %, China 68 %, Australia 95%, India 90 % of Cotton production was Bt Cotton in 2011

Textile Exchange, 2011a; USDA, 2012
Organic Cotton

In 2009-10 organic cotton growing took place in 23 countries. Countries have been categorised into six Regions as displayed in the map below.

<table>
<thead>
<tr>
<th>Country</th>
<th>Metric Tonnes (percentage breakdown)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> India</td>
<td>195,412 (80.85%)</td>
</tr>
<tr>
<td><strong>2.</strong> Syria</td>
<td>20,000 (8.27%)</td>
</tr>
<tr>
<td><strong>3.</strong> Turkey</td>
<td>11,599 (4.80%)</td>
</tr>
<tr>
<td><strong>4.</strong> China</td>
<td>4,300 (1.78%)</td>
</tr>
<tr>
<td><strong>5.</strong> USA</td>
<td>2,808 (1.16%)</td>
</tr>
<tr>
<td><strong>6.</strong> Tanzania</td>
<td>2,635 (1.09%)</td>
</tr>
<tr>
<td><strong>7.</strong> Uganda</td>
<td>1,550 (0.64%)</td>
</tr>
<tr>
<td><strong>8.</strong> Peru</td>
<td>831 (0.34%)</td>
</tr>
<tr>
<td><strong>9.</strong> Egypt</td>
<td>666 (0.28%)</td>
</tr>
<tr>
<td><strong>10.</strong> Mali</td>
<td>541 (0.22%)</td>
</tr>
<tr>
<td><strong>11.</strong> Pakistan</td>
<td>345 (0.14%)</td>
</tr>
<tr>
<td><strong>12.</strong> Burkina Faso</td>
<td>298 (0.12%)</td>
</tr>
<tr>
<td><strong>13.</strong> Israel</td>
<td>150 (0.06%)</td>
</tr>
<tr>
<td><strong>14.</strong> Benin</td>
<td>150 (0.06%)</td>
</tr>
<tr>
<td><strong>15.</strong> Paraguay</td>
<td>109 (0.05%)</td>
</tr>
<tr>
<td><strong>16.</strong> Greece</td>
<td>100 (0.04%)</td>
</tr>
<tr>
<td><strong>17.</strong> Kyrgyzstan</td>
<td>83 (0.03%)</td>
</tr>
<tr>
<td><strong>18.</strong> Tajikistan</td>
<td>55 (0.02%)</td>
</tr>
<tr>
<td><strong>19.</strong> Senegal</td>
<td>27 (0.01%)</td>
</tr>
<tr>
<td><strong>20.</strong> Nicaragua</td>
<td>17 (0.007%)</td>
</tr>
<tr>
<td><strong>21.</strong> South Africa</td>
<td>15 (0.006%)</td>
</tr>
<tr>
<td><strong>22.</strong> Brazil</td>
<td>5 (0.002%)</td>
</tr>
<tr>
<td><strong>23.</strong> Zambia</td>
<td>2 (0.001%)</td>
</tr>
</tbody>
</table>

TOTAL            | 241,697*                             |

Textile Exchange, 2011d
Organic Cotton - success story

- 2005 only 0.1 % of global cotton production, 2010 it was already 1.1 %. Neither Recession nor unstable economies put damper on growth.
- Organic textiles industry grew +20% to estimated $5.16 billion in 2010.

Textile Exchange 2011b

- In 2009, global recession, -7 % in global apparel and textiles market, + 35% organic products sales
- “Several brands and retailers more than doubled their usage of organic cotton alone and plan to do so in 2012 as well”.

Textile Exchange 2011a

Organic Cotton – big business

• Global organic cotton market + 20 % in 2011
• estimated $6.2 bio. market in 2011 and $7.4 bio. market in 2012.”
  
  Textile Exchange 2011a,

• The world market for organic cotton is projected to exceed $19.8 billion by the year 2015.
  
  Global Industry Analysts, Inc., 2012

• “Paradigm shift in the textile sector”
  
  John Mowbray, Ecotextile
Organic Cotton – production decline

- Organic cotton production -35% 2011 to 2012
- Organic Cotton from 1.1% to 0.7% of Total Cotton Production 2011
- Reports about GM contaminated organic cotton, fraud
- Non-GM seed availability increasingly difficult
- Large scale Bt Cotton adaption poses risk to organic cotton production
- Increasing competition for land (GM <> organic),
- Coexistence very difficult if not impossible

Textile Exchange 2011d
Forster et al., 2011
Traidcraft, 2011
www.ecouterre.com
Menon, 2003
Contamination

- No GM organisms allowed in Organic
- Contamination
  - Genetic contamination 5-15%
  - Physical mixture 5-30%
- Complex supply chains and small holdings, often poor, risks of cross contamination are likely to increase
- Buffer zones often not feasible (ubiquitous GMO, small scale structures)
India

- Largest Cotton producer after China, 21% of world production
- 6 mio small scale farmers <15 acres, cotton holdings 3-4 acres
- 2010 cotton export accounts ~ 1/3 of foreign exchange earnings of India
- India was the only country to grow and market the 4 types of cotton species in the world.
  - G. hirsutum (AD)
  - G. barbadense (AD)
  - G. arboreum (A)
  - G. herbaceum (A)
India – GM Cotton Introduction

- The production and supply of seeds is done by the public and private sector
- Traditionally cultivation of adapted Desi varieties (1950 around 97%)
- 70ies, first hirsutum hybrids introduced
  -> Desi varieties disappear, 2010 only 10%, probably less
- 1995 GM seeds for research purpose, also illegal testings
- 2000 signing Carthagena Protocol on Biosafety
- 2002 Commercial release of 3 Bt hybrids
- 2003/4 Monsanto sublicensed Bollgard gene to other companies
India – GM Cotton Introduction

- **2005 3rd Amendment to Patent Act**
  - patents for GM seeds
  - Dominant private sector

- **2006**
  - shift from case-by-case to event based approvals.
  - Gov’t sets maximum retail price for GM cotton set by

- **2002: 3 approved varieties**
- **2010: already 780 Bt Cotton hybrids from 34 seed companies**
India – Fast spread of GM Cotton

- By 2011, 7 million farmers had adopted Bt on 26 mio acres (~10.52 mio ha), around 90% of total Indian cotton area

Source: Compiled by ISAAA, 2010
Choudhary, B & Gaur, K., 2010a.
Kathage and Qaim, 2012
India - Fast spread of GM Cotton

- GM promotion by Government,
- 2002-2012: 90% Bt Cotton
- Privatization of seed sector, concentration
- R&D goes to Bt hybrid production, no interest in non-GM
- Gradual replacement of open pollinating varieties to hybrids
- Smaller local seed companies who could provide organic seed marginalized and disappeared
- Non-GM seed production disappearing → prices rise
- Illegal spread of Bt Cotton, proliferation of seed market
- Many varietal genotypes are heavily contaminated
- Environment of seed insecurity
- TRACENET is a burden esp. for small scale organic producers

Textile Exchange, 2011c
Mbaye and Barry, 2011
Forster et al., 2011
Blake 2010
Ramaswami et al., 2009
Murugkar et al., 2007
Burkina Faso - Cotton

- 35% of GDP from the cotton sector, 18% of the people live from cotton growing (1/6 of all farm households)
- In West Africa Burkina Faso, Nigeria, Mali and Ghana have functioning legislation allowing field trials with GM
- since 2006 opted for Bt Cotton
- SOFITEX being formerly gov’tal is gatekeeper and dominates the sector, only Bt seed provider
- Largest Bt-Cotton producer in Africa
- signed Carthagenas protocol, illegal liberation of Bt before
- strong role of NGOs to implement political framework for GMOs

www.cotton-made-in-africa.com
Delpeuch, 2011
Textile Exchange 2011c
Mbaye and Barry, 2011, p.69

01.10.2012
http://upload.wikimedia.org/wikipedia/commons/e/ea/LocationBurkinaFaso.png
Burkina Faso Bt Cotton adoption

- 2000: joint collaboration between Burkina Faso’s national cotton companies and Monsanto
- 2006 Gene transfer in the local varieties (back cross)
- 2007: field experiment with 20 farmers (20 ha under controlled conditions with farmers participation)
- 2008: 8’500 ha (2%)
- 2009: 125’000 ha Bt Cotton (Monsanto’s Bollgard II) in local varieties (29%)
- 2010: 260’000 ha (65%)
- 2011: 247’000 ha Bt Cotton (58% of total cotton area)
Burkina Faso Bt Cotton

- 60% profit to the seed farmers, 28% to Monsanto and 12% to research.
- Monsanto owns events, Burkina Faso varieties
- Opposition in different communities, price struggles, even riots
- 275% price increase for untreated non-GM Cotton
- Increasing output prices
- GM free zones for seed production required → no policy to create alternative zones
- 100 m (?) distance to GM field challenging in smallholder context
- Farmers switching back to non GM? Published and disclaimed

Burkina Faso Implications for organic cotton

- Organic cotton was found to be polluted with Bt Cotton → no premium
- Criminalizing traditional seed exchange between farmers
- Before GM introduction conventional seed could be used
- Negative campaigns against organic projects from seed companies
- Outcrossing in wild or local species possible
- Additional cost for organics for testing, non-GM certification, setup and maintain traceability systems
- Number of organic farmers decreased rapidly
- Example organic cotton project:
  After steep increase, drop from 7’000 farmers to 2’400, production 2’200 t in 2008 to 700 t of lint in 2010
- Organic seed production insufficient, inferior quality has to be used
Summary

• India: 90% GM Cotton in 10 years, BF fast spread as well
• Concentration in seed market, dominance of private sector
• Seed chain is GM seed chain
• Promotion of GM crops by governments, role of NGOs
• Coexistence with GM impossible
• Outcrossing
• Contamination of varieties with GM genes
• Many varieties already polluted
• Non-GM seed availability is crucial for farmers
• Non-GM seed scarcity → thread to production, to breeding
• Organic has burden taking care for traceability and non-GM purity, no „costs-by-cause principle“
Outlook: The Dharwad Declaration

- National Workshop June 21\textsuperscript{st} 2011
  "Disappearing non-GM cotton - ways forward to maintain diversity, increase availability and ensure quality of non-GM cotton seed"
- Jointly organized by bioRe India Ltd., FiBL Switzerland, University of Agricultural Sciences Dharwad and others
- To combine forces for immediate action and support of:
  - Collaboration and Exchange
  - Desired Policy Changes
  - Evaluation and multiplication of existing cotton varieties under organic and low-input conditions
  - Establishing and optimizing the non-GM seed chain
  - Continuous improvement of non-GM Varieties
To achieve these goals we join forces and partner in non-GM cotton seed issues to secure non-GM seed availability and genetic diversity over long-term.

Dharwad, 21 June 2011

Signed by: Dr. L. Savariraj, Sawed Trust; Dr. M. Abdaheer, Sawed Trust; A. Ambatipudi, Chetna Organic; D. P. Arya, Pratibha Syntex; Dr. A. Barik, DOCM Mumbai; R. Baruah, bioRe; V. Carriappa, Savayaya Krishikar Sangha, HD Kote; M. Chinnaswami, Appachi Cotton; G. R. Dharmendar, Chetna Organic; Dr. D. Forster, FiBL; O. Gadade, Cotton Connect; P. V. Gaonkar, UAS Dharwad; A. Katyal, Sunstar Overseas Ltd; H. G. Kencharaddi, UAS Dharwad; M. Kunz, Remei AG; S. Makari, SOFA; Dr. M. Messmer, FiBL; P. Nagarajan, Textile Exchange; H. Patel, Agrocel; Dr. B. C. Patil, UAS Dharwad; Dr. S. S. Patil UAS Dharwad; K. Prasad, Sahaja Samrudha; G. Rajashekar, Centre of Sustainable Agriculture; M. Ramakrishnan, Arvind Limited; H. M. Ranganatha, UAS Dharwad; D. N. Reddy, Chetna Soceity; S. P. Reddy, UAS Dharwad; A. Roy, Ram Krishna Ashram Krishi Vigyan Kendra; K. Sainathan, Agrocel; M. S. Sunstar Overseas Ltd; R.T. Singh, Centre of Sustainable Agriculture; Dr. M. V. Venugopalan, CICR.
Outlook: FiBL- bioRe research partnership

The GREEN COTTON project

- Introduction of participatory breeding approaches, facilitating and training of farmers to get into breeding again
- Inquire suitability of different types of cotton cultivars for organic and low input farming conditions in Central India, on farm trials representing farmers’ growing conditions
- Participatory cultivar testing
- Drought resistance
- *G. hirsutum* + *G. arboreum*
- Alternative seed chain development

Messmer et al. (2011); Roner (2012); Roner et al. (2012)
Outlook: The Green Cotton Project
It takes 15 years to breed a new variety.

Thank you for your attention.
Abhiyan & Abhiyan, A Decade of Bt Cotton in Madhya Pradesh:
Blake, F., 2010: Guidance Document for Co-existence between Organic and GMO Cotton in India


Delpuech, C. 2011: African Cotton market as crossroads: will the price spike turn into a new Kickstart ?, Policy research working paper, The World Bank


Kathage and Qaim (2012): Economic impacts and impact dynamics of Bt ( Bacillus thuringiensis ) cotton in India , http://www.pnas.org/content/109/29/11652.full.pdf+html


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• Textile Exchange 2011c: Textile Exchange Cotton Briefings 2011
• Traidcraft (2011), Cottonseed Supply for Planting in Africa: A study into the functioning of current structures for research, breeding, multiplication and distribution and their impacts on cotton farmers
• www.grain.org/article/entries/415-bt-cotton-on-mali-s-doorstep, 3.9.2012