Sound Plant Protection Practices

33 International Cotton Conference Bremen
18 March, 2016
Bremen, Germany

Francesca Mancini

Outline

Sustainable agriculture?
Cotton and sound plant protection
Key success factors

Reducing pesticide risk in cotton
Sustainable agriculture?

Reducing pesticide risk in cotton

International Cotton Conference, Bremen, Germany
16-18 March

Agriculture today land

Cultivated Land: 1.5 Bl Ha

Equivalent to 12% of the world land surface
Agriculture today farmers and farms

570 MI farms

90% family run
80% small scale

Agriculture today water

70% surface water is used in agriculture
20% irrigated land
Agriculture today **fertilizers**

166 MI ton
- 100 MI ton N
- 38 MI ton P
- 28 MI ton K

24 ottobre 2015
Genova
Francesca Mangini
Festival della Scienza

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Agriculture today **pesticides**

35 MI ton active ingredients

Annual growth:
9.8% during 2007-2012

FAOSTAT, 2013
Croplife International, 2015
Intensification and Efficiency

Restablish equilibrium and efficiency in farming systems

Pesticide use on cotton

About 5% of total global use

Insecticide Use on cotton (1990-2013), total tons a.i.

- **Outbreaks:**
  - White fly (Punjab-India and Pakistan)
  - Sucking pests in China
  - Boll weevil in Brazil
  - Mealy bug in Ethiopia

- **Development of resistance of Bt cotton**
  - Pink bolworm in India (Fabrick et al., 2014).
Still a problem?

25% of total insecticide use
1990s

16-18%
2000

Tomorrow

Reducing pesticide risk in cotton

SOUND PLANT PROTECTION
Sound Plant Protection

1. Reduce pesticide use
2. Reduce hazard
3. Reduce exposure

1. Reduce pesticide use

Integrated Pest Management – 70%

<table>
<thead>
<tr>
<th>Country</th>
<th>Methods used</th>
<th>Insecticide use reduction</th>
<th>Source/reference</th>
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<tbody>
<tr>
<td>Mali</td>
<td>IPPM-FFS</td>
<td>92.5%</td>
<td>Settle (2015)</td>
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<td></td>
<td>Use of neem</td>
<td></td>
<td></td>
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<tr>
<td>Benin</td>
<td>Organic cotton farmers</td>
<td>100%</td>
<td>PAN Intl (2015)</td>
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<td></td>
<td>cooperative</td>
<td>805 kg/ha</td>
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<td>Use of food spray to boost yields</td>
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<tr>
<td>India</td>
<td>IPM adoption in Andhra Pradesh – 43 FFS and 52 control farms</td>
<td>75% 1.7 applications</td>
<td>Mancini (2007)</td>
</tr>
<tr>
<td>Nigeria</td>
<td>Organic cotton</td>
<td>100%</td>
<td>Odion et al (2013)</td>
</tr>
<tr>
<td></td>
<td>Use of bush tea for insect control and cowpea</td>
<td>492-693 kg/ha</td>
<td></td>
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</tbody>
</table>
1. Reduce pesticide use

**Systems approach to pest management**

whole agroecosystem: pest and production management
prevent cycles of insecticide overuse, resistance

- natural soil fertility
- biological control
- Pollimation...

2. Reduce hazard

**Highly Hazardous Pesticides**

- Highest acute and chronic toxicity (WHO and GHS* classification)
- Pesticides listed under the international chemical conventions

most HHPs are either not permitted or severely restricted in industrialised countries

...but still used on cotton in developing countries, legally or illegally

*Globally Harmonized System on Classification and Labelling of Chemicals*
3. Reduce exposure

Important but insufficient alone

Photograph courtesy of Hardi International

Photograph by Graham Matthews

KEY SUCCESS FACTORS

Reducing pesticide risk in cotton
Success factor: Agronomic

Ecological factors
- Adoption of IPM on a large scale
- Availability of alternative pest control — location specific
  - Research into alternatives and new control options

Social factors
- Invest on farmers! Build farmer’s knowledge and skills to manage crops
  - Adaptive management in a changing climate - resilience.
  - Food security (intercropping food crops)

Political factors
- Supportive not conflicting policies
  - adequate resources for extension
  - Pesticide subsidies and centralised procurement lead to overuse and accumulation of stocks
- Good governance
Thank you

FRANCESCA.MANCINI@FAO.ORG