Knowing the impact of organic cotton production

# System comparison study and on-farm trials on organic cotton in India

Dionys Forster

World Congress on Organic Cotton, Sept. 24, 2009



FiBL

# Background: DOK Long-term trial Therwil (BL)


- 8 treatments
- 5 crops in a 7 years‘ rotation
- 4 replications
- 96 plots à 100m2
- 30 year-trial

www.fibl.org

# Selected results of the DOK trial

| | Organic | | Conventional |
|---|---|---|---|
| Winter wheat yield | 4.7 t/ha | - 15% ← | 5.6 t/ha |
| Fertilisation ($NH_4NO_3$ Equivalent) | 122 kg/ha | - 60% ← | 360 kg/ha |
| Energy (Diesel Equivalent) | 340 l/ha | - 30% ← | 570 l/ha |
| Plant protection (Active Ingredients) | 0-200 g/ha | - 97% ← | 6.0 kg/ha |
| Soil fertility (Microbial Biomass) | 40 t/ha | + 60% ← | 24 t/ha |



FiBL

Mäder et al. (2002), Science 296

# Objectives of the long-term system comparison trial

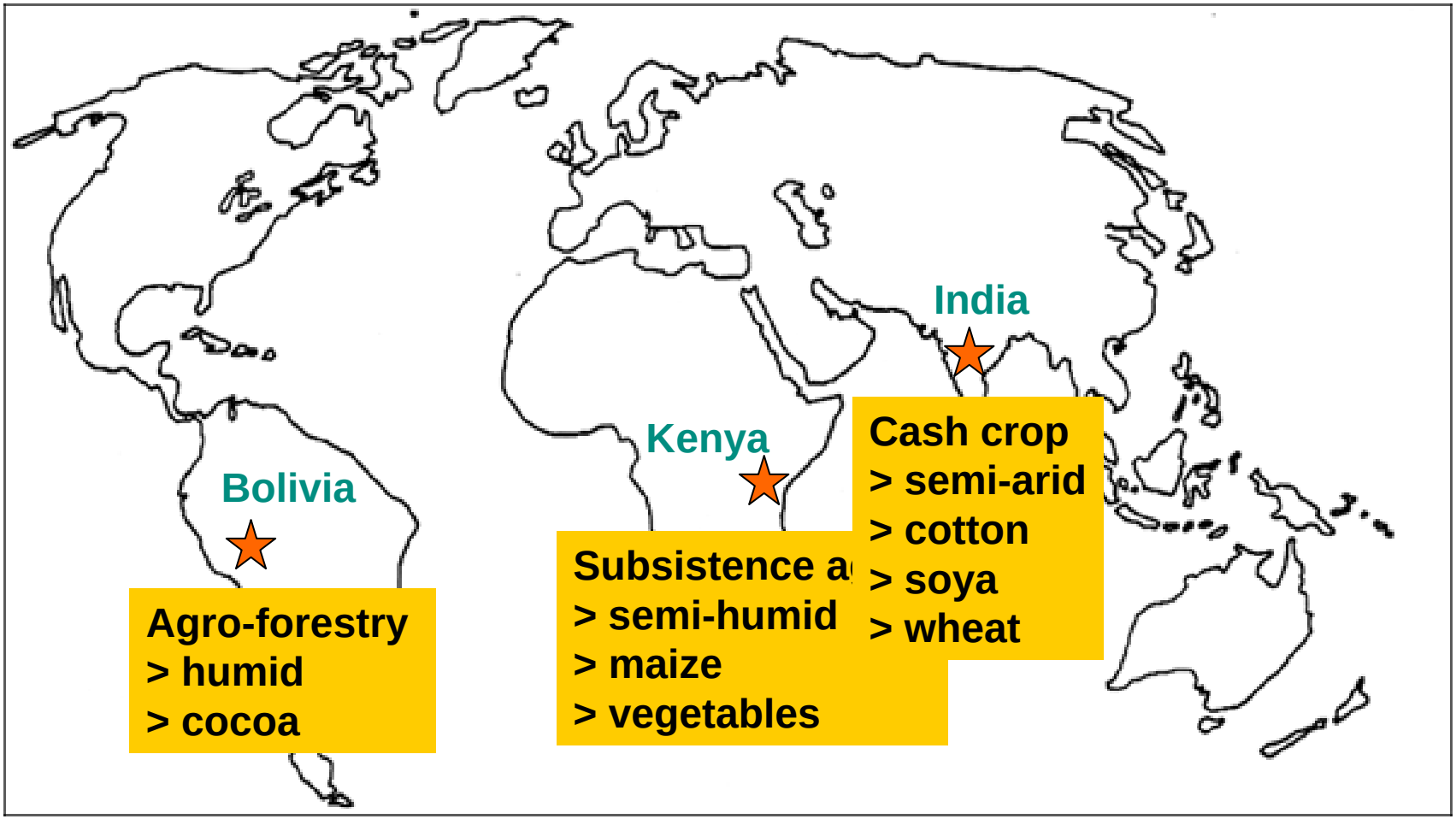
The objective is to quantify:

- How organic agriculture (OA) influences
  - yield and yield stability
  - product quality
  - product storability

- How OA influences the agro-ecological system
  - soil fertility
  - beneficial organisms
  - biodiversity

- How OA influences natural and economic resource effectiveness (output/input relationships)

# FiBL long-term system comparison trial






FiBL

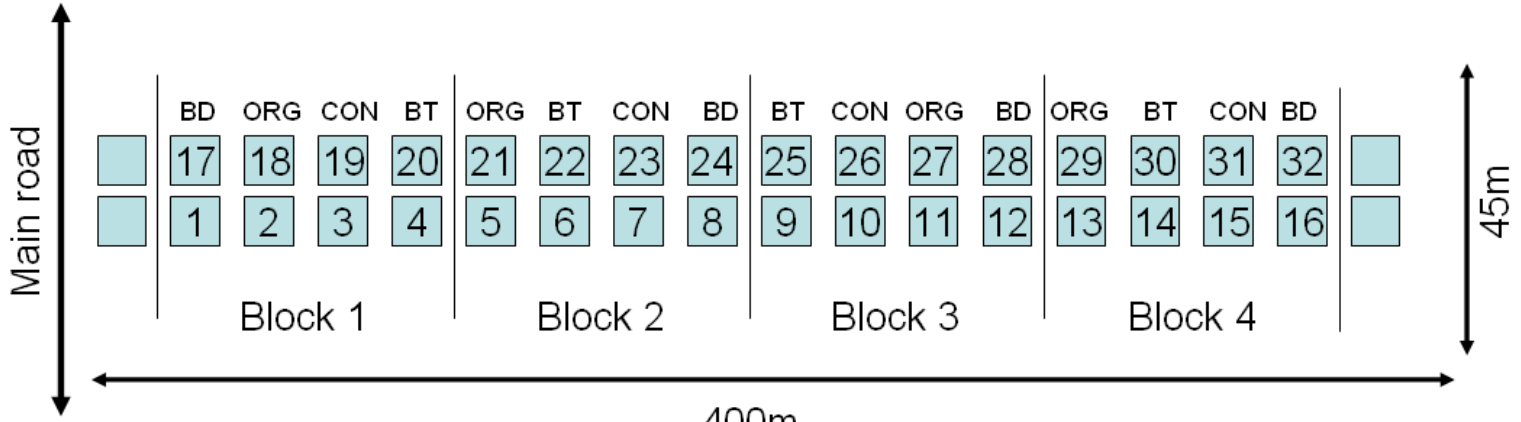
# Location and trial setup

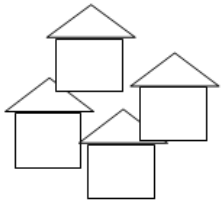
- Location: Central Indian cotton belt (Madhya Pradesh)
- Eco-zone: Semi-arid tropics
- Agricultural system: Annual fibre and food crops (cash crops)
- Crop rotation:

| Year 1 | Year 2 | |
|---|---|---|
| Cotton | Soya | Wheat |


- Treatments: (1) Biodynamic, (2) organic, (3) conventional and (4) GM-cotton
- Trial start: May 2007
- Partners: bioRe India Association

# Trial setup and plot allocation

bioRe Association India
Training Centre



FiBL

# Treatments and fertiliser

- Nutrient input to conventional and GM-cotton treatment:
  - Based on Indian Council of Agricultural Research (ICAR)
  - Adjusted to conventional farmers practice
  - 80% chem. fertiliser and 20% organic fertiliser
  - GM-cotton: + 20% chem. fertiliser compared to conv. cotton

- Nutrient input to biodynamic and organic treatment:
  - N + P supply is about 50% of the conventional practice
  - Corresponds to organic farmer's practice
  - 100% organic fertiliser

- Experience of the last two years
  - Cotton – soya – wheat is an intensive rotation
  - Nitrogen is limiting factor

# On-farm validation trials

Based on first experiences of the long-term systems comparison trial:

- Validate and complement the results of the long-term field trial under on-farm conditions
- Support conventional farmers in the conversion from conv. to organic

# Participatory technology development activities

- On-farm / on-station trials on green manuring (precrop, undersowing)
  - Leguminous crops (gliricidia, sesbania, crotalaria, mung bean)
  - Brassicaceae
- On-farm / on-station trial on phosphate rock solubility on high pH soils
  - Compost and different additives are tested for phosphate rock solubilisation

# Outlook

Issues during the first 4-5 year (conversion period):

- Improve nutrient status through green manures and mulches
- Develop efficient phosphorus sources (e.g. phosphate rock)
- Further adjustment of the trial systems to farmers practices
- First indications on soil fertility are expected after 4-5 years
- Agronomic and economic analysis after first 4-5 years

# Partners and donors:

REMEI AG

bioRe India Association

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

LED LIECHTENSTEIN DEVELOPMENT SERVICE

BIOVISION

coop Sustainability fund

www.fibl.org

FiBL

Thank you for your attention!

Visit FiBL on our website: www.fibl.org or contact: dionys.forster@fibl.org

www.fibl.org

FiBL