
SOAAN Meeting
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Contents

• Drivers of organic 3.0
• ‘Features’ of organic 3.0
  • Culture of innovation
  • On-going improvement towards best practice
  • Transparent integrity
  • Inclusiveness
Drivers of organic 3.0

• Weak growth of organic farms and organically managed land.
• Gap between principles and standards in terms of best practice, innovation and claims.
• Albeit of its many advantages in sustainability, organic agriculture is not effective in mainstreaming.
• As a tiny niche, organic agriculture is not contributing to the global challenges of humanity.
• Organic value chains are prone to fraud.
• The organic movement is more inward-looking than actively pursuing alliances with like-minded movements.
Weak growth of organic farms and land

Since 2005, the organic markets have grown by 150 %, while the organic production (area) has grown by 35 % only.
Growth of the Swiss organic market 1995-2013

Turnover in Million Swiss Francs

Source: Bio Suisse
A protective space* (niche) for innovations or a method to become mainstreamed?

*“Within this protective space, niche actors can nurture the path-breaking innovation so it becomes more robust through performance improvements and expansions in supportive sociotechnical networks” (Smith & Raven, 2012)
Mainstream

• Swiss alps: 63 % of land organically managed.
• State of Salzburg in Austria: 43 %.

Agronomically and socio-economically Adapted?

Niche

Innovation needed!

» Technically immature?
» Economically not competitive?
» No true cost accounting?

Policy change needed!
Are the results formidable or modest?

- 12 percent organic farmers in Switzerland. Stagnating for 10 years.
- 7% of all food sold is organic.
From LCA to sustainability assessment

IFOAM: SOAAN
Biodiversity on organic farms* (global literature review of comparison studies)

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Positive</th>
<th>Negative</th>
<th>No difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds</td>
<td>7</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Mammals</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butterflies</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Spiders</td>
<td>7</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Earthworms</td>
<td>7</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Beetles</td>
<td>13</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Other arthropods</td>
<td>7</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Plants</td>
<td>13</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Soil microbes</td>
<td>9</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>8</td>
<td>25</td>
</tr>
</tbody>
</table>

* Scales: Plots, fields, farms, landscape

Hole et al., 2005. Biological Conservation 122, 113-130
Soil properties in the DOC experiment (year 24)

A Physical
- Percolation stability
- Aggregate stability
- Bulk density

B Chemical
- pH
- Magnesium
- Organic carbon
- Phosphorus
- Potassium

C Microbial
- Microbial biomass
- Mycorrhiza
- Saccharase
- Dehydrogenase
- Protease
- Phosphatase

D Faunal
- Earthworm biomass
- Spiders
- Staphilinids
- Carabids
- Earthworm abundance

Mäder, Fliessbach, Niggli (2002), Science 296
Different approaches to sustainability

- Improved technologies like minimum/no tillage or GMO crops.
- Integrated Production (IP, IPM).
- Low Input Agriculture (LIA) or Precision Farming.
- Low External Input Sustainable Agriculture (LEISA).
- Organic Farming.
- Organic Farming & reduced tillage.
- Organic (successional) agroforestry systems.

Ecological or eco-functional intensification
The competition of sustainability standards

Foods without sustainability labels
Number of studies indicating positive, negative or varying/ inconclusive environmental impacts

What this diagram tells us:
- Most research by far was done on the environmental impacts of organic agriculture.
- At the same time, only for organic did we find a few studies that show negative results.
- We think that this is due to the fact that research evolved: The longer a research field is in existence, the more specific and critical it becomes. It moves beyond descriptive stages. Specific cases are identified where the general findings might not apply.
- The reader should consider that nevertheless, the evidence for positive impacts is overwhelming for organic agriculture.
- More research needs to be done on the other standards.

Note: this diagram is a strong simplification. Most studies address individual indicators (e.g., soil, biodiversity only). Thus, the diagram only shows that some environmental impacts occur. (See slide 50 for limitations).
Areas in production for 8 commodities (2012)

Innovation pathway

Permanent system improvement and co-innovation between farmers, food processors, traders, researchers, farm advisors and civil society:

- Recover traditional or empirical knowledge, test and improve it and make it available.
- Facilitate joint innovation of actors (co-innovation).
- Improve existing organic farm technique.
- Improve resilience of production systems, farms, food chains and landscapes.

Science driven disciplinary and multi-disciplinary progress:

- Accelerate the development of inputs, techniques and technologies suitable for organic and agro-ecological systems.
- Recommend amendments for standards for organic and sustainable production systems.

Sustainability Assessment in line with SOAAN criteria, indicators and metrics

Regionally adequate adaptations of innovation by organic farmers and actors
Organic farming is very heterogeneous

- Subsistence farmers, pastoralists, agrosylvicultural farmers
- Intensive small holder farmers with mixed farms
- Family farms with specialisation
- Big farm enterprises
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Completely different markets and qualities
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Completely different research needs and knowledge creation
Innovations-Pfade: Beispiel Tiergesundheit

- Analyse der genetischen Variabilität der Schweizer Schafrasse bezüglich Wurmresistenz
- Bäuerliches Erfahrungswissen
- Herdenmanagement und Prävention
- Homöopathie
- Neue Futtermittelzusätze basierend auf biologischer Kontrolle
- Bäuerliche Hausmittel
  - 108 Interviews mit 137 Landwirten.
  - 1025 Hausrezepturen.
  - Mehr als 100 Pflanzenarten.
  - Wissenschaftliche Bewertung durch Tierärzte und Pharmakologen.
  - Verfügbar auf Internet ab 2015.
Innovation pathways: Phytopathology

Breeding for resistance

Completely novel plant extracts as bio-fungizides

Mildew of cereals

System approach: *Moniliophtora perniciosa* “Witches’ Broom Disease”

Modern diagnostic:
Nanowire sensors with protein, DNA and RNA microchips

RNA Interferences:
Next generation of pesticides mimicking nature (like humane insulin in medicine)
Fingerprinting with stable isotopes
European Space Agency (ESA), Satellite multi-spectral and hyper-spectral photos or UAV

«80 to 100 % differentiation
Pierre Ott, Ecocert
The system approach as the basis of OF

Diversity of landscapes

Diversity of structures/habitats

Diversity of species

Diversity of crops or varieties
Chemical compounds used in organic plant protection - system approach, naturalness?

› Copper
› Sulphur
› Phosphonate
› Sodium hypochloride (NaClO)
› Mineral Oil
› Metaldehyde
› Phyrethroids
› Iron phosphate
› Potassium permanganate (KMnO₄)
› Di-ammonium phosphate
› Lime sulphur
## Agroecology: Science, farm management and social movement

### Agro-ecological farming

- Many excellent principles and recommendations, vaguely worded.
- No mandatory standards.
- No bans and detailed restrictions.
- Basically open to all technologies.
- No inspection.
- Social learning process.

### Organic farming

- 4 principles of health, ecology, fairness and care, more bindingly worded.
- Mandatory standards.
- Bans and detailed restrictions.
- General technology bans.
- Inspection and certification (3rd party, group certification, PGS).
- Jump in, accept it or forget it.

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Organic Farming and Agroecology are substantially apart