

Principles of organic agriculture – vision for a best sustainable practice – standards for a best sustainable practice

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Contents

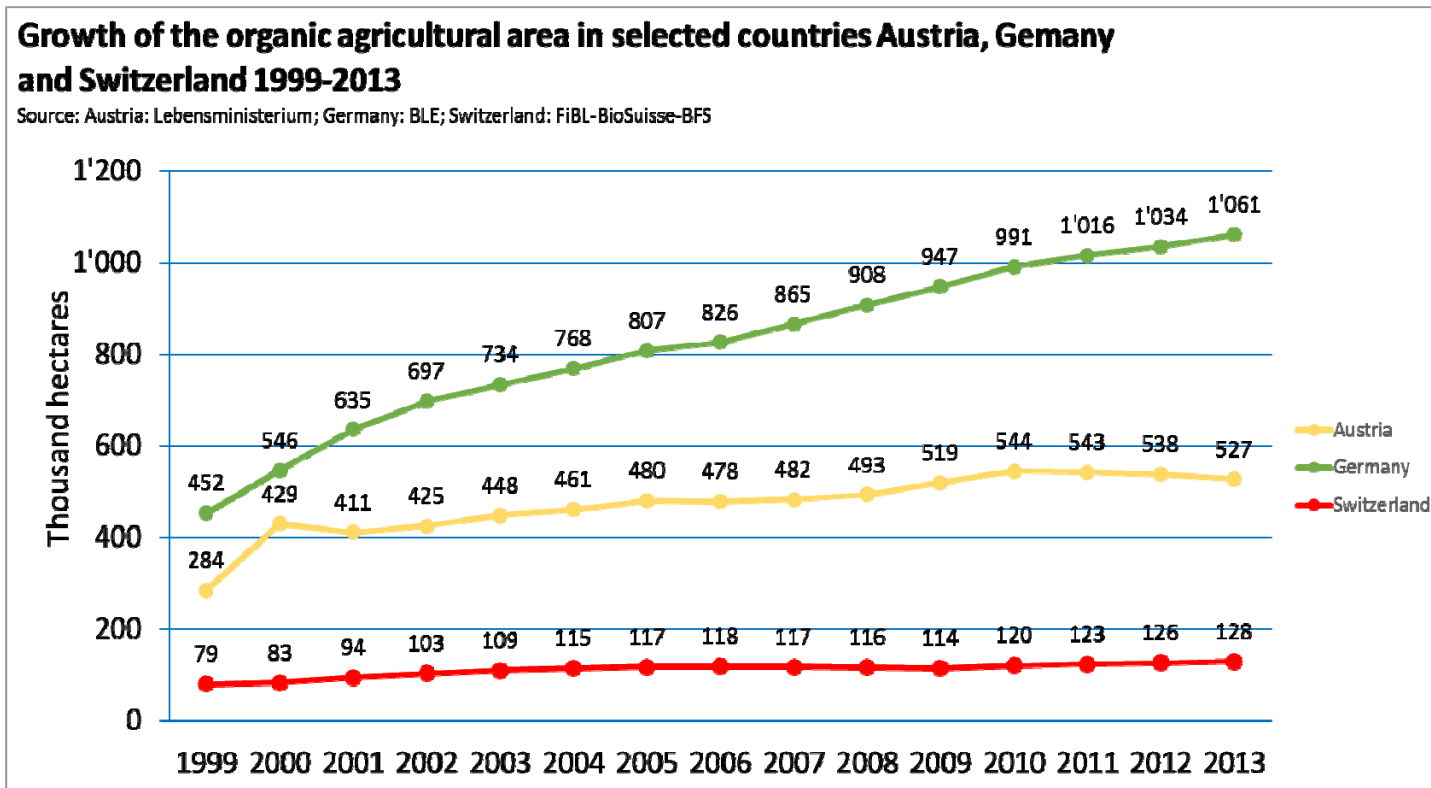
- Drivers of organic 3.0
- 'Features' of organic 3.0
 - Culture of innovation
 - On-going improvement towards best practice
 - Transparent integrity
 - Inclusiveness

Drivers of organic 3.0

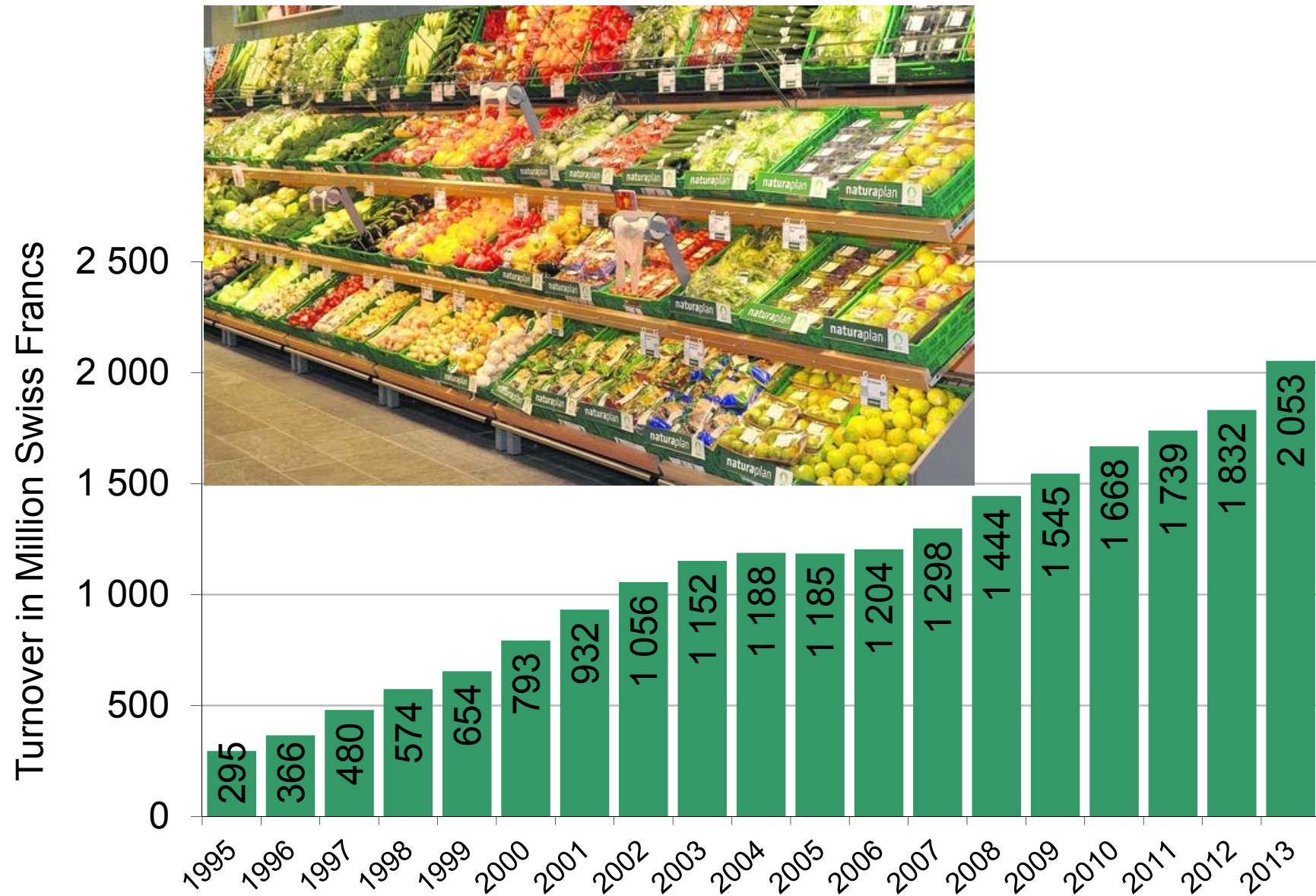
- Weak growth of organic farms and organically managed land.
- Gap between principles and standards in terms of best practice, innovation and claims.
- Albeit of its many advantages in sustainability, organic agriculture is not effective in mainstreaming.
- As a tiny niche, organic agriculture is not 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

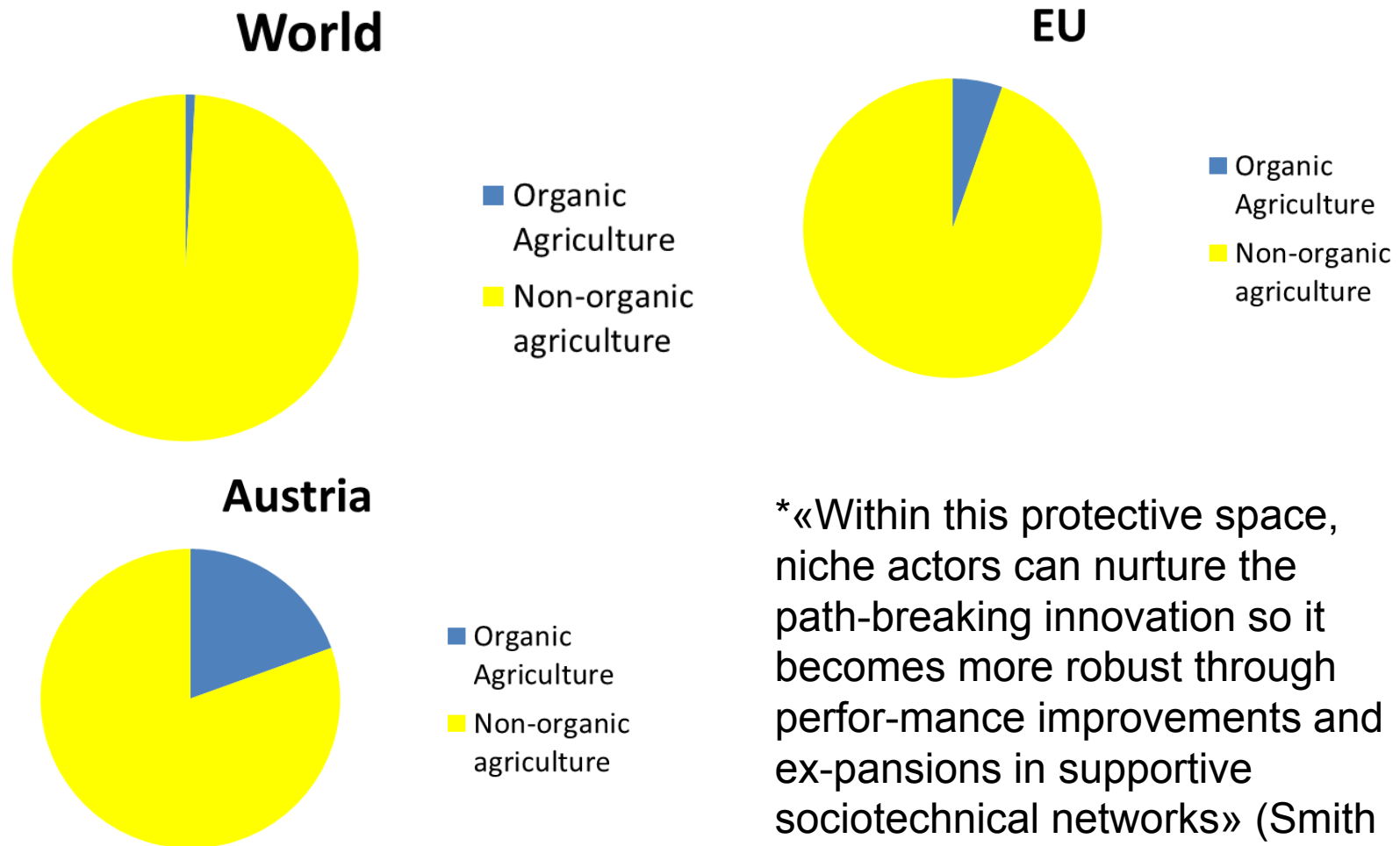
Since 2005, the organic markets have grown by 150 %, while the organic production (area) has grown by 35 % only.



Growth of the Swiss organic market 1995-2013



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!

Policy change needed!

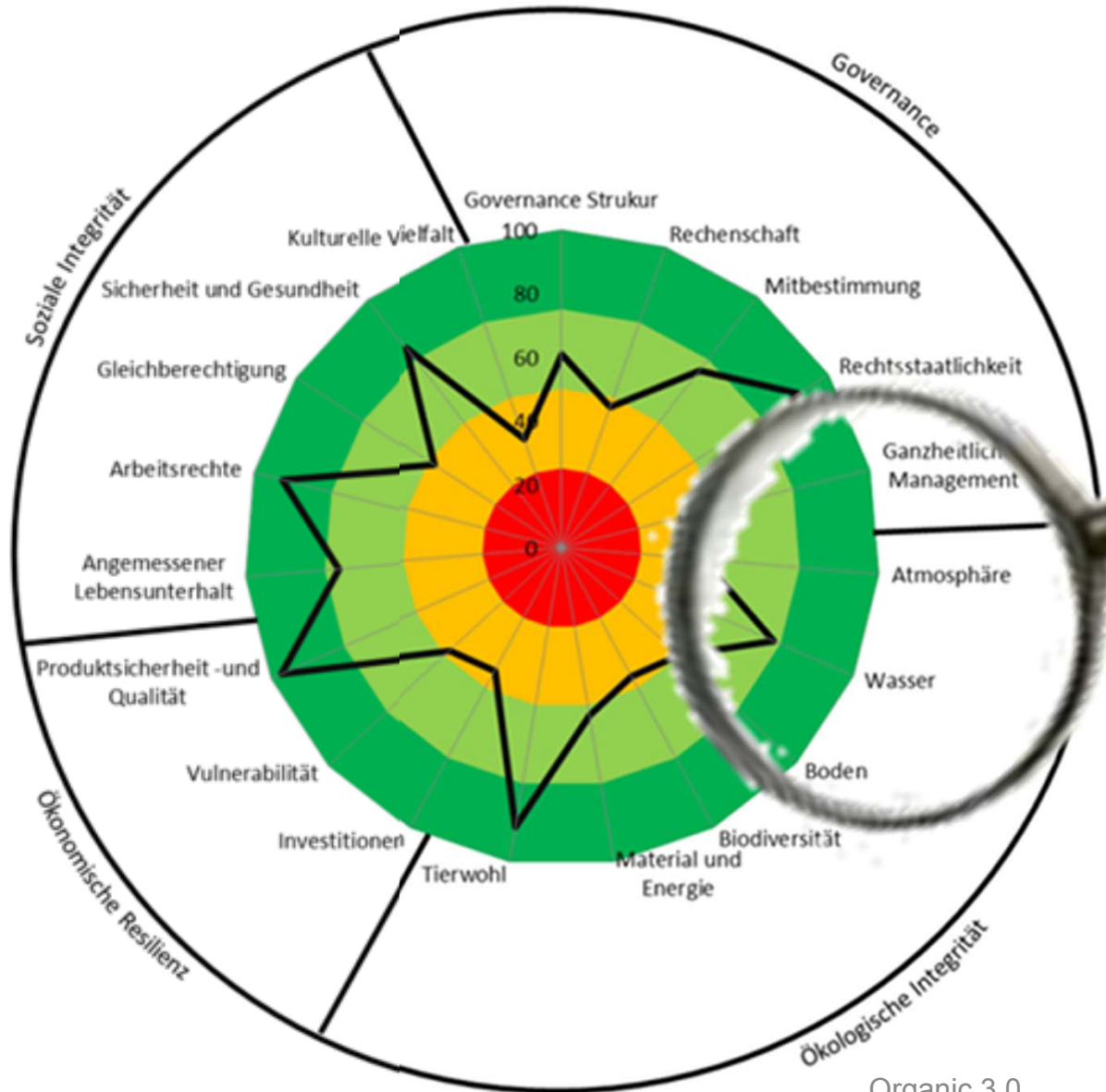
- › Technically immature?
- › Economically not competitive?
- › No true cost accounting?

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



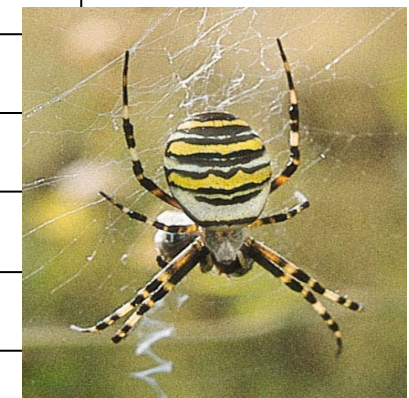
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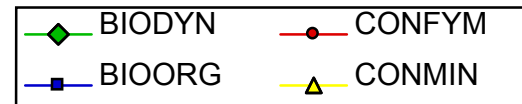
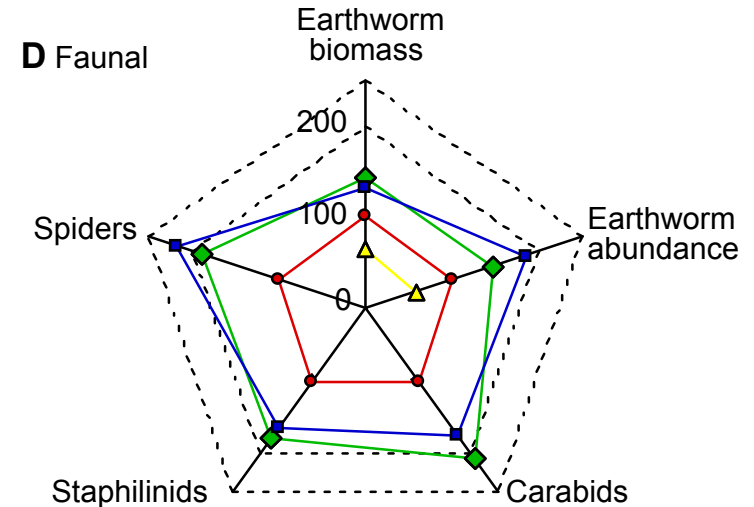
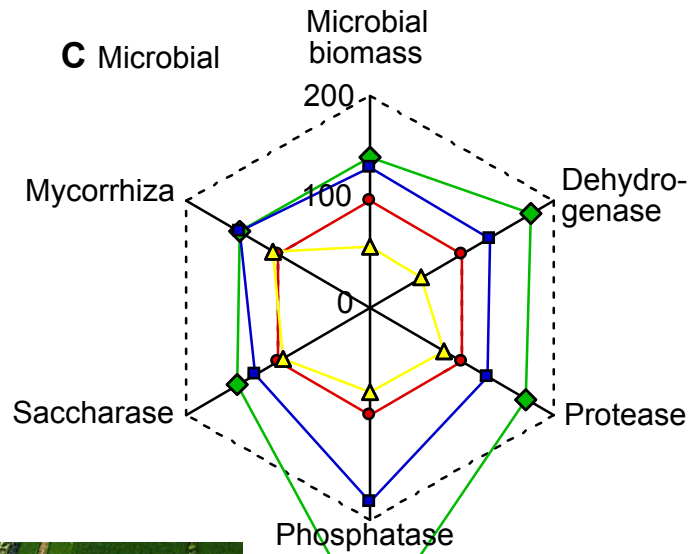
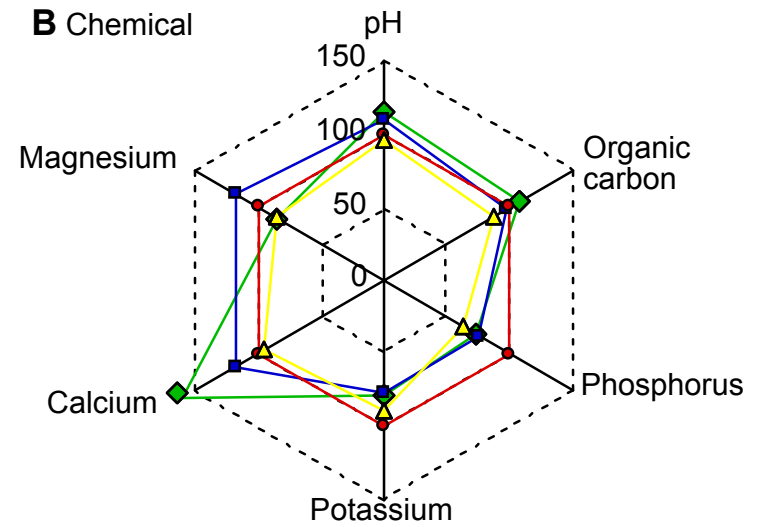
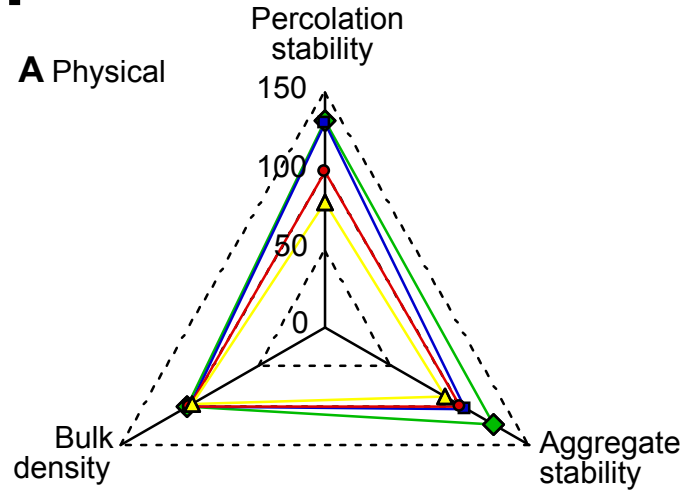
Organic 3.0
SOAAN

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

Taxon	Positive	Negative	No difference
Birds	7		2
Mammals	2		
Butterflies	1		1
Spiders	7		3
Earthworms	7	2	4
Beetles	13	5	3
Other arthropods	7	1	2
Plants	13		2
Soil microbes	9		8
Total	66	8	25



Soil properties in the DOC experiment (year 24)



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

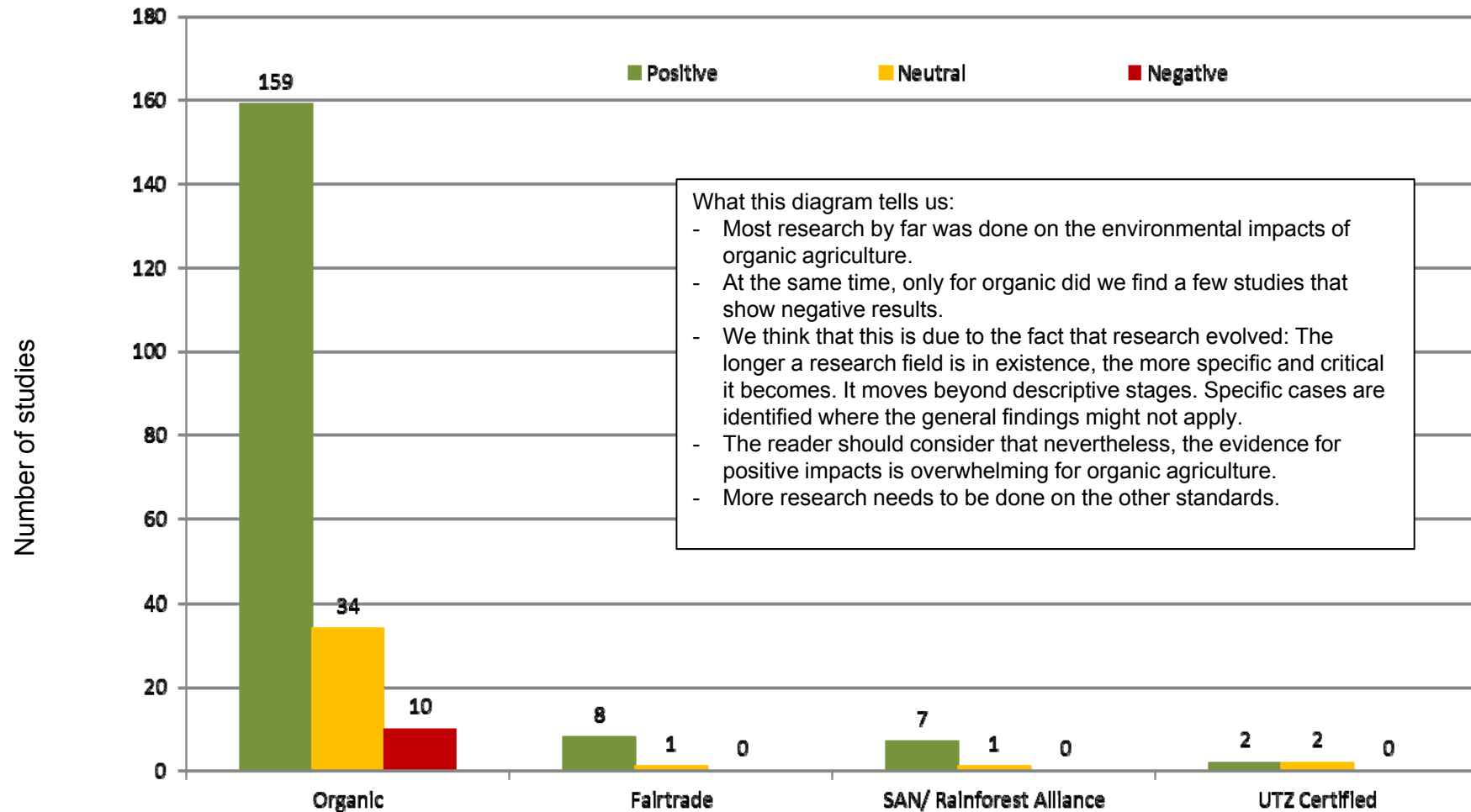
Increasing complexity of measure
➔ **Improving sustainability and resilience**

The competition of sustainability standards



Foods without sustainability labels

Number of studies indicating positive, negative or varying/ inconclusive environmental impacts

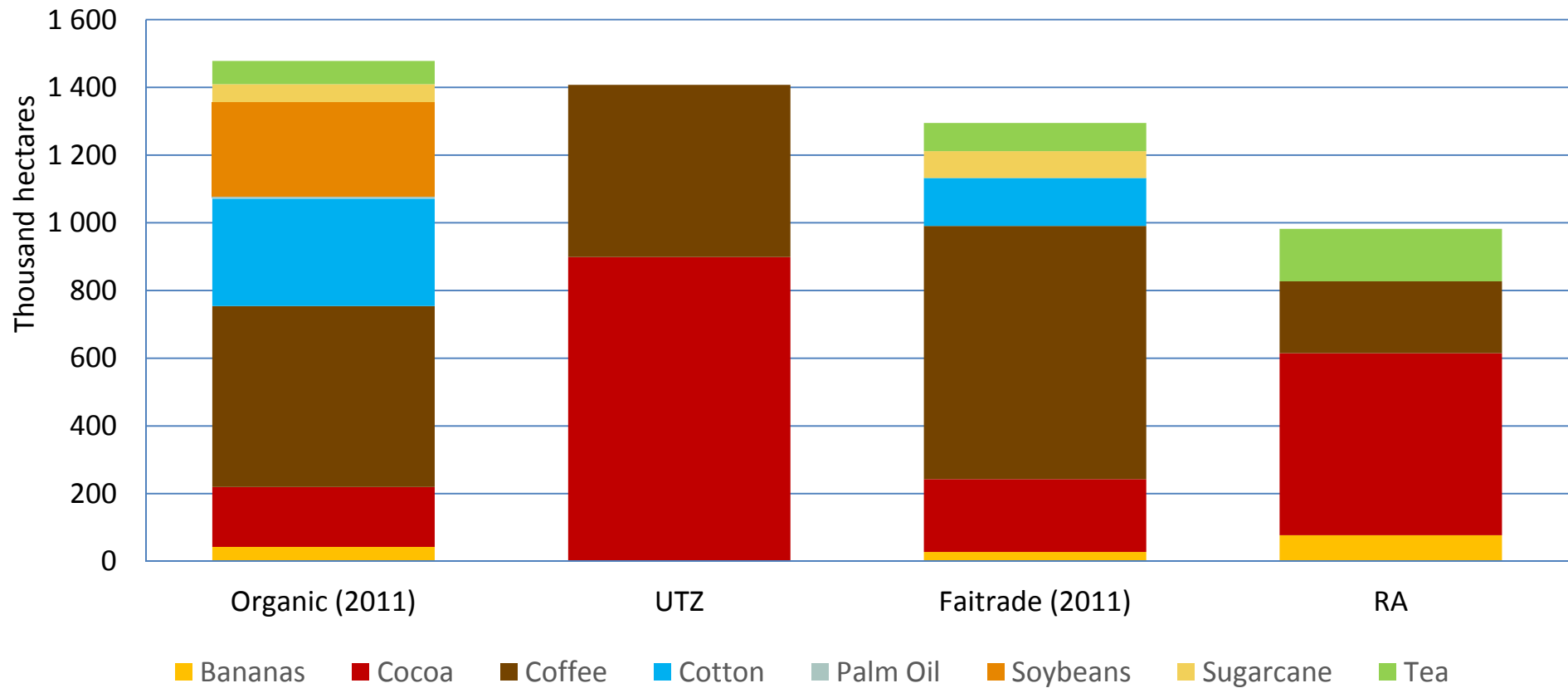


What this diagram tells us:

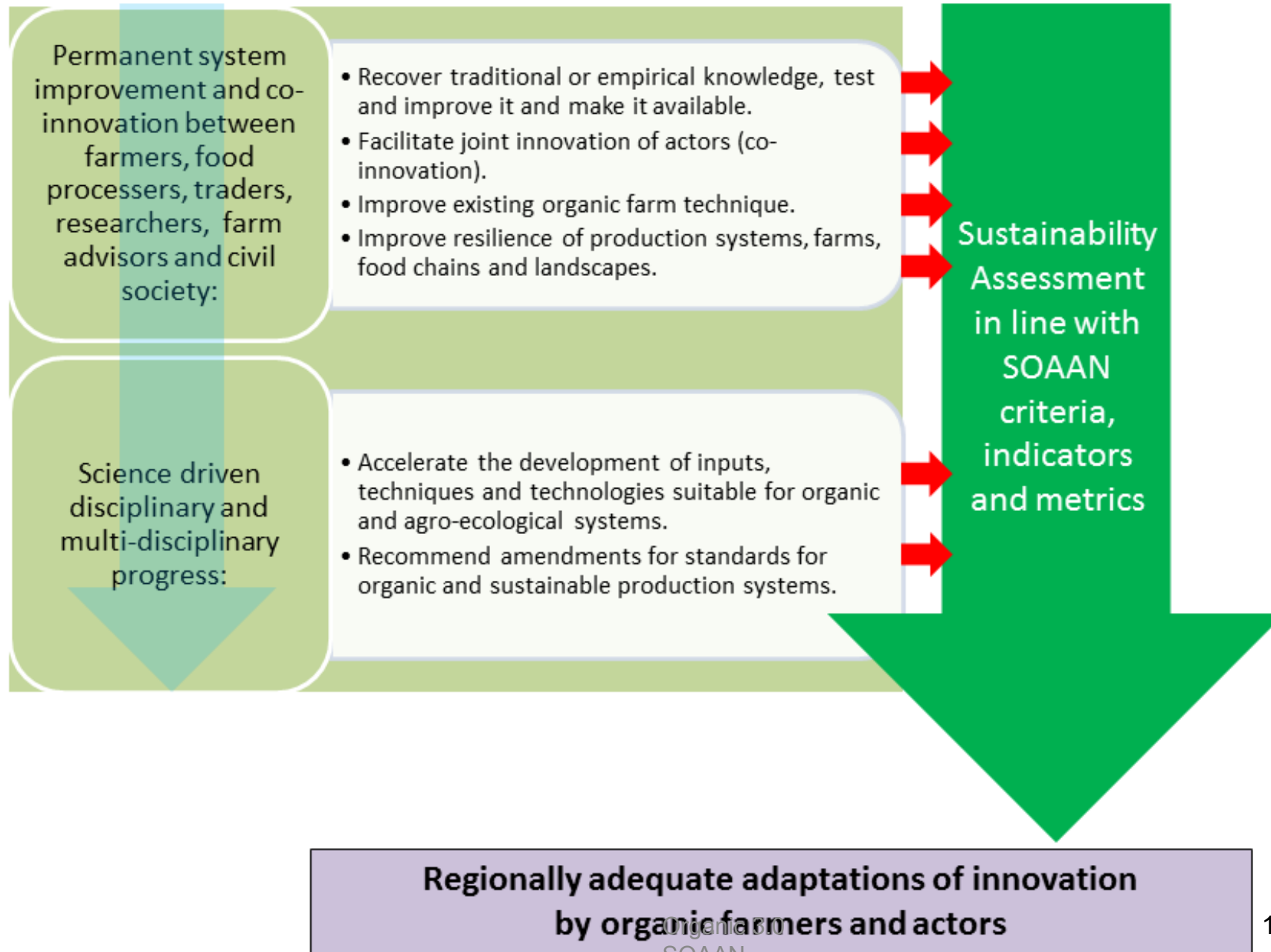
- Most research by far was done on the environmental impacts of organic agriculture.
- At the same time, only for organic did we find a few studies that show negative results.
- We think that this is due to the fact that research evolved: The longer a research field is in existence, the more specific 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 (eg., 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



Organic farming is very heterogeneous



● Subsistence farmers, pastoralists, agrosylvicultural farmers



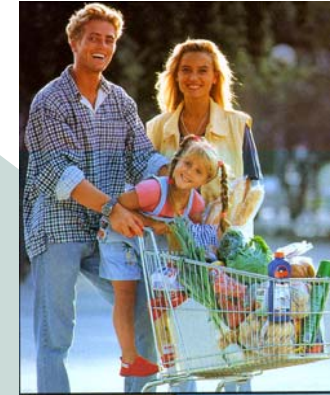
● Intensive small holder farmers with mixed farms

● Family farms with specialisation

● Big farm enterprises



Organic farming is very heterogeneous



Big farm enterprises

Family farms with specialisation

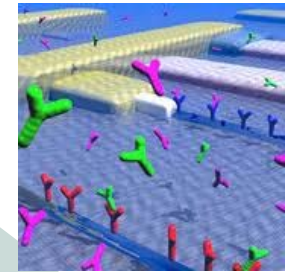
Intensive small holder farmers with mixed farms

Subsistence farmers, pastoralists, agrosylvicultural farmers



Completely different markets and qualities

Organic farming is very heterogeneous



Big farm enterprises

Family farms with specialisation

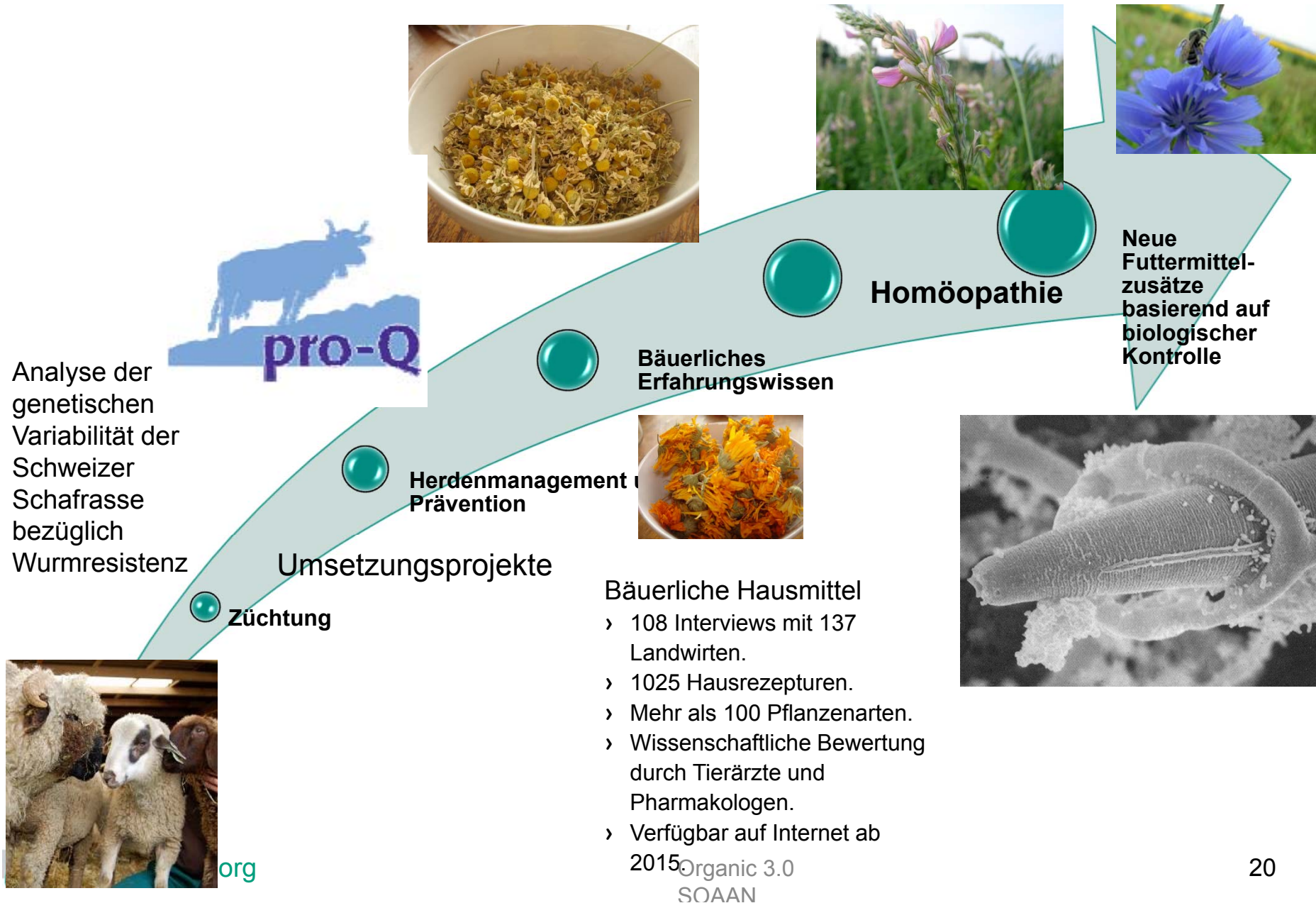
Intensive small holder farmers with mixed farms

Subsistence farmers, pastoralists, agrosylvicultural farmers



Completely different research needs and knowledge creation

Innovations-Pfade: Beispiel Tiergesundheit



Innovation pathways: Phytopathology

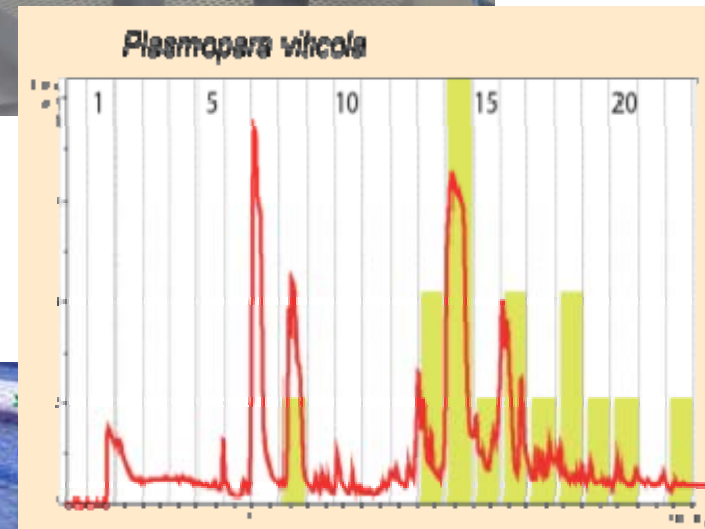
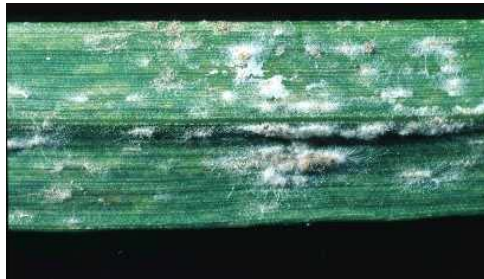
Breeding for resistance



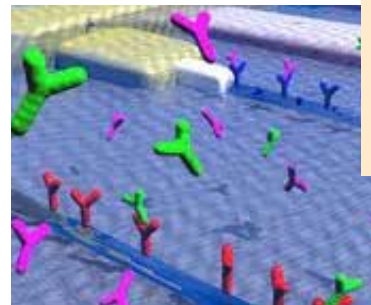
Completely novel plant extracts as bio-fungicides



Mildew of cereals



System approach:
Moniliophthora perniciosa
"Witches' Broom Disease"



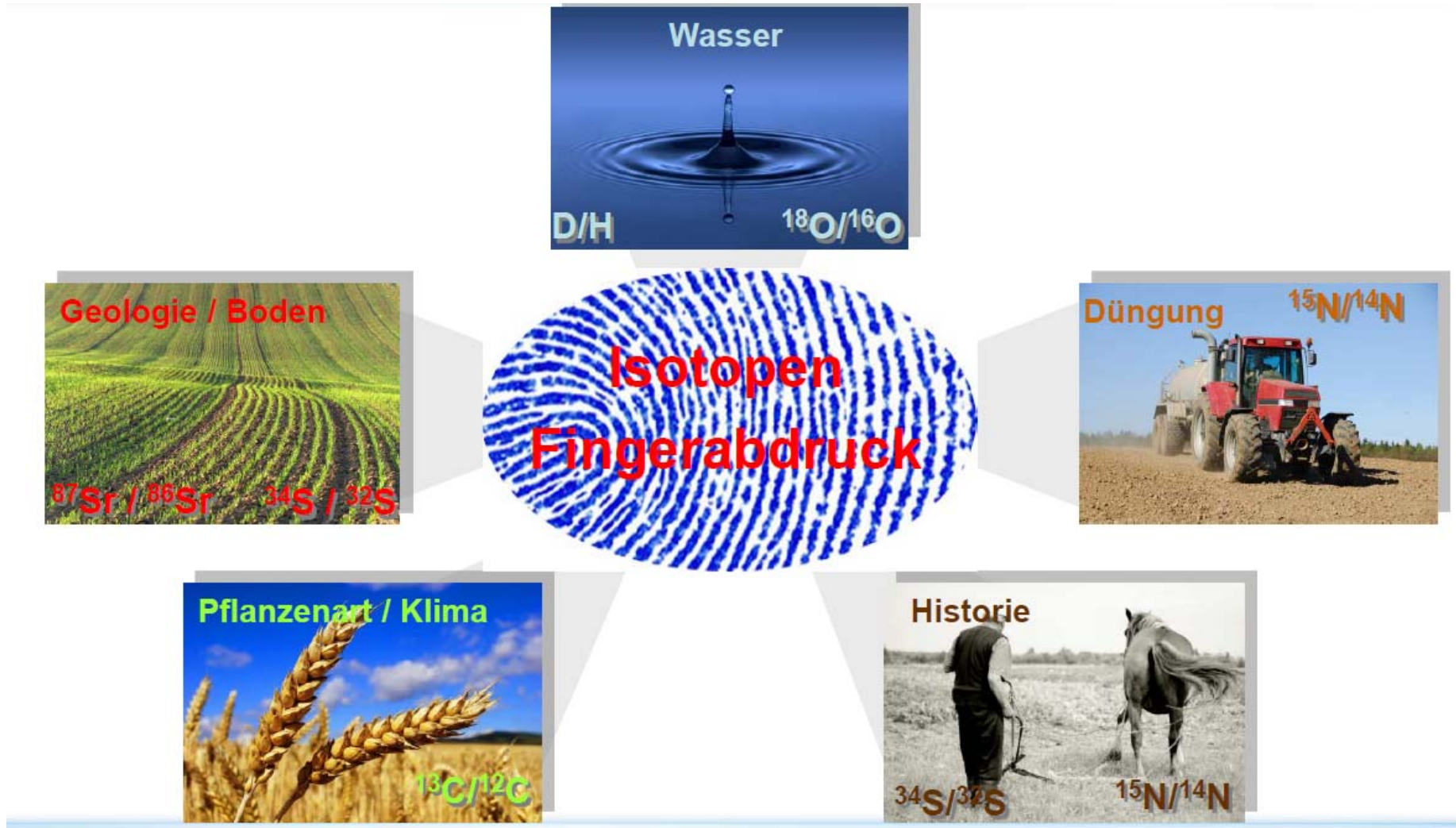
Modern diagnostic:
Nanowire sensors
with protein, DNA and
RNA microchips



Alto Beni, Bolivia

RNA Interferences:
Next generation of
pesticides mimicking
nature (like humane
insulin in medicine)

Fingerprinting with stable isotopes

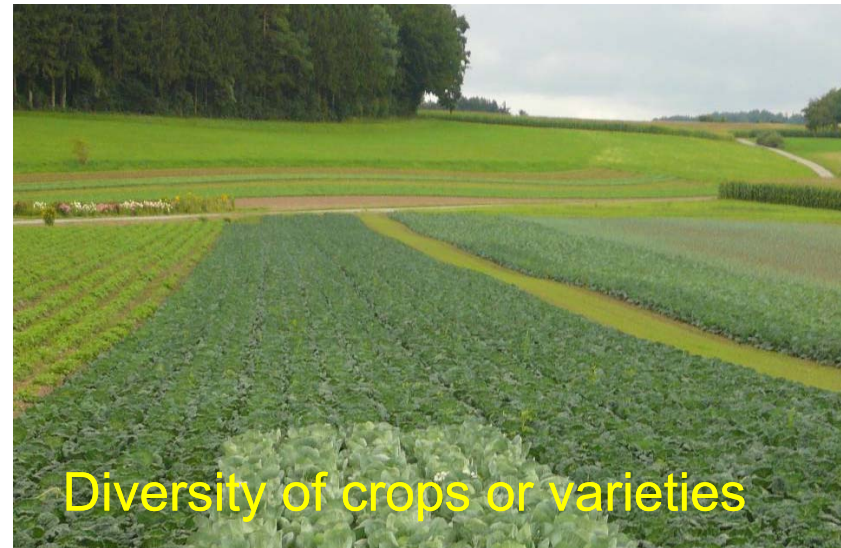


European Space Agency (ESA), Satelliten multi-spectral and hyper-spectral photos or UAV



«80 to 100 % differentiation
Pierre Ott, Ecocert

The system approach as the basis of OF



Chemical compounds used in organic plant protection - system approach, naturalness?

- › Copper
- › Sulphur
- › Phosphonate
- › Sodium hypochloride (NaClO)
- › Mineral Oil
- › Metaldehyde
- › Pyrethroids
- › 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

⇒ Organic Farming and Agroecology are substantially apart