Sustainability assessment and complementarity

or

How do we know if organics is good?

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Seminar at CSAFE, University of Otago, 25. Feb. 2016

How do we know if organics is good?

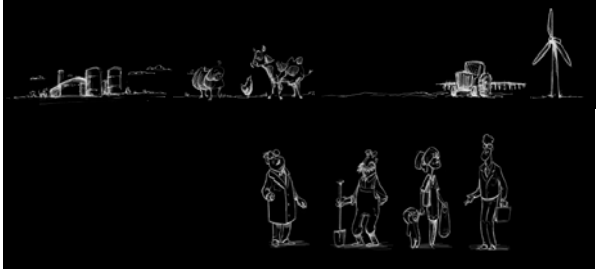
Drawings by Vīgis Robiņš
and Peter Smith, Tumblehead

MultiTrust

TUMBLEHEAD

What is organics?

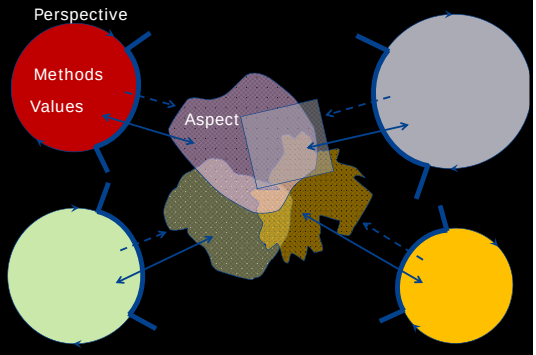
- Organic history: organics as protest against conventional
- Organic certification: organics as sector and market
- Organic principles: organics as movement and agroecology



How do we know if organics is good?

What does science say?

There are many perspectives on organics

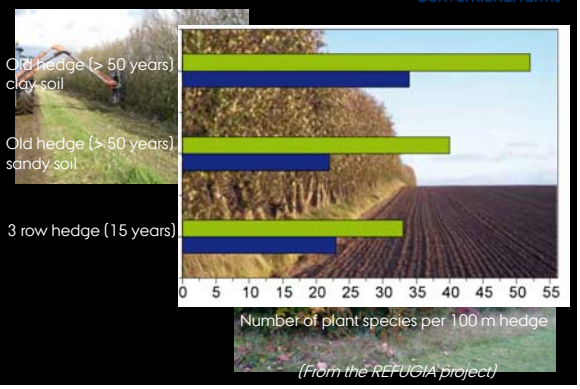


What does science say?

There is much debate on whether organic is better than conventional or not.

A few examples:

Nature quality: biodiversity



(From the REFUGIA project)

Nature quality: dedicated nature areas

25 % larger area needed for organic food production

Is "feed the world" a question of production?

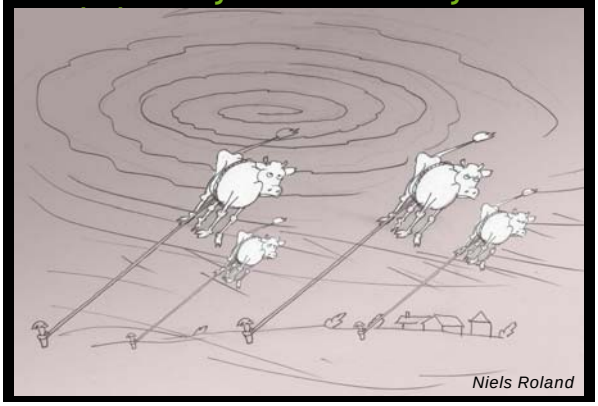
Technology is the solution

Organic is luxury

or distributive justice?

- or food sovereignty and self-sufficiency
- or what is meant by "conventional"
- or the question of rapidly changing diets

Climate change is also a challenge



Climate from a product perspective (LCA)

Conv.: 1.20 kg CO_2 eq. per litre

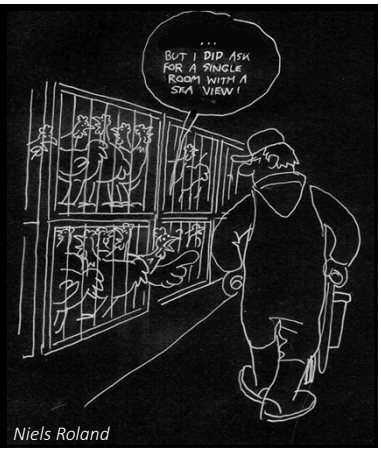
Org.: 1.27 kg CO_2 eq. per litre

Climate from a farm perspective

Conv.:
App. 10 ton
CO_2 eq.
per hectare

Organic:
App. 6 ton
CO_2 eq.
per hectare

Animal welfare: options for natural behaviour

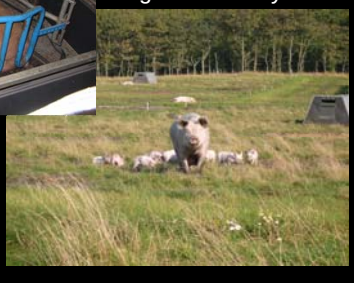


Animal welfare: human care and control

Animal welfare: human care and control

Conv.: mortality 24 %

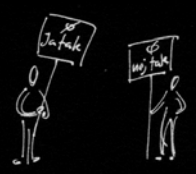
Org.: mortality 33 %



Summing up the debates on whether organic is good

Debating values without knowledge is empty!

Debating knowledge without values is blind!



Sustainability assessment and complementarity

- These debates turn on value-laden and contested concepts

  and these contested values are at the basis of sustainability assessments

Typical sustainability assessment

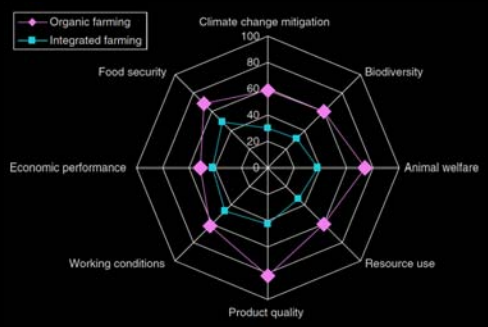


Figure: Sustainability assessment of Swiss organic agriculture, in: Schader et al. (2012) Environmental performance of organic farming

Sustainability assessment and complementarity

Paper coming out in Ecology and Society

- These debates turn on value-laden and contested concepts
- These contested values are at the basis of sustainability assessments
- Some values seem contradictory,

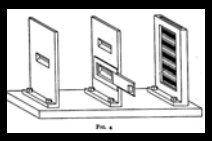
  and maybe complementary?

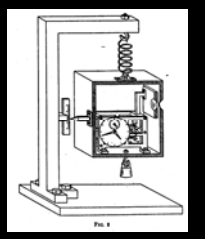
Niels Bohr's complementarity

$$\Delta x \cdot \Delta p \geq \frac{\hbar}{2}$$

Quantum physics: position | momentum

(Drawings by Bohr 1949)





The phenomenon includes the whole experimental apparatus

Generalisation of complementarity

Quantum physical complementarity is based on the quantum of action:

$$\Delta x \cdot \Delta p \geq \frac{\hbar}{2}$$

But Bohr considered complementarity to be a general epistemological lesson that applies to other fields:

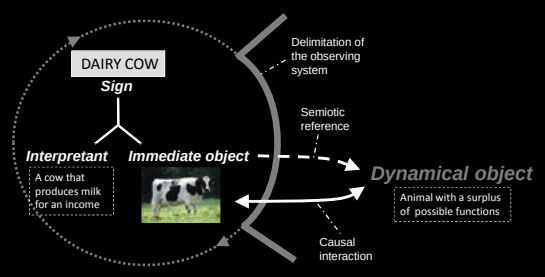
Biology
Psychology
Ethics
...

A *phenomenon* always belongs to a perspective that determines what can be observed and what cannot be observed.

Complementary observations are observations of the same object

- that exclude each other due to the conditions for observation,
- but which both/all contribute to the representation of that object.

The semiotic basis of observation



Based on the semiotics of Charles S. Peirce (1839-1914).
See the papers by Alrøe & Noe 2011, 2014 on hugo.alroe.dk

Forms of observation complementarity

$$\Delta x \cdot \Delta p \geq \frac{\hbar}{2}$$

Quantum physics: e.g. position | momentum

Observer stance: from without | from within

Rubin's vase: figure | ground

http://bizgurus04.wordpress.com/2012/11/13/2008/

Different forms of complementarity that are relevant to sustainability assessment

detached | involved — Observer stance complementarity

Value complementarity

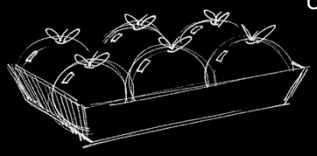
Different forms of complementarity that are relevant to sustainability assessment

detached | involved — Observer stance complementarity

justice | mercy — Value complementarity

Value complementarity in product quality

Uniform standard



Diversity of experiences

Value complementarity in animal welfare

Care

Naturalness

Value complementarity in nature quality

human
nature

Authentic, untouched

human
nature

Rich, human-made

Complementarity and sustainability

Three perspectives on growth and sustainable development:

Growth without limits	Growth within limits	Growth and injustice
Environmental economics	Ecological economics	Political ecology
substitutability	ecological limits	ecological justice

Byrne & Glover 2002, Byrne et al. 2006

Planetary boundaries

Rockström et al. 2009, here from Nature's feature on planetary boundaries, 24. Sep. 2009.

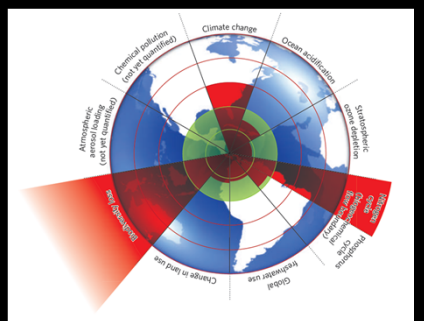


Figure 1 | Beyond the boundary. The inner green shading represents the proposed safe operating space for nine planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), have already been exceeded.

Growth and ecological injustice

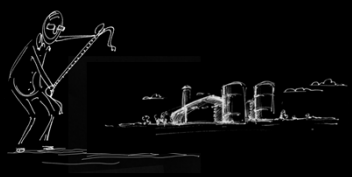
Kerala, India, 2004

Observer stance complementarity

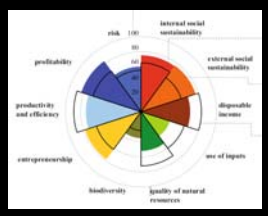
Two forms of farm research in Denmark in the 1990's

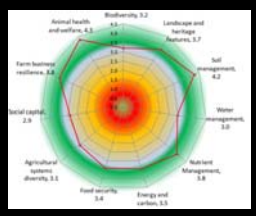
Involved development

Detached monitoring



Full *versus* rapid sustainability assessment

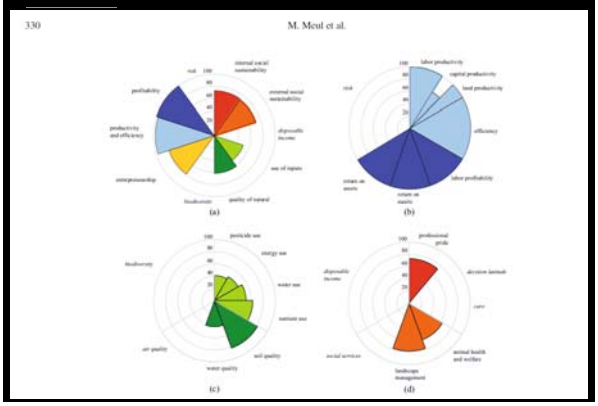




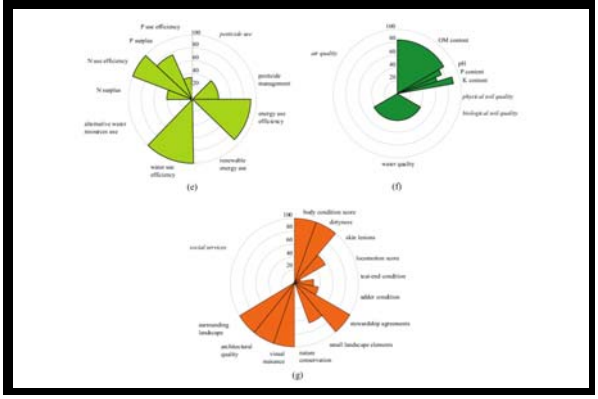
Full assessment tools	Rapid assessment tools
Description and monitoring	Learning and development
Accurate, general	Enabling action, site-specific

Marchand et al. 2014, Triste et al. 2014

A full assessment tool



A full assessment tool



Full *versus* rapid sustainability assessment

detached | involved

Full assessment tools	Rapid assessment tools
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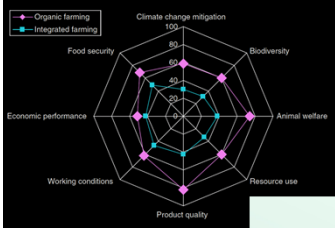
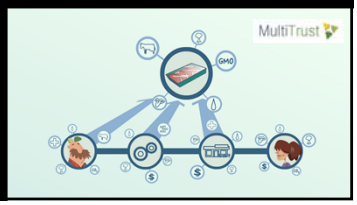
Marchand et al. 2014, Triste et al. 2014

Assessment from without or within



- Research driven
- Effects (performance)
- Entity (farm, sector)
- General aspects

- User driven
- Criteria (values)
- Chain / system
- Concrete initiatives



Use of knowledge: risk versus precaution

- Science-based assessment
- But the scientific knowledge is limited

Risk assessment

Principle of precaution

- In front of possible irreversible damage
- Precautionary action without a conclusive scientific understanding

The Bichel assessment (1999): A 100 % conversion of Danish agriculture to organic production

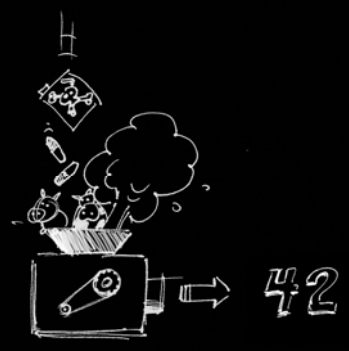
Implications for sustainability assessment

Two main problems of sustainability assessment

The problem of integration: The surplus of possibilities for integration

The problem of implementation: Getting from sustainability *assessment* to sustainability *transformation*

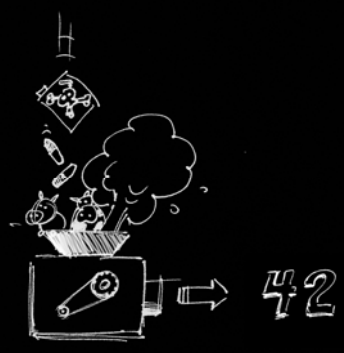
Indexes are integration machines ...



indexes hide information

Including:

- Differences in values and concerns
- Possible issues of complementarity



Even typical sustainability assessments ...

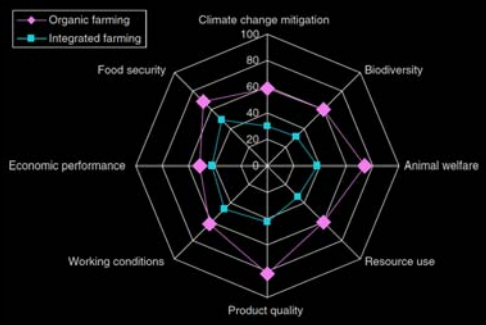
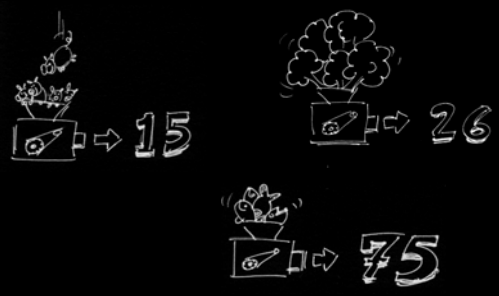


Figure: Sustainability assessment of Swiss organic agriculture, in: Schader et al. (2012) Environmental performance of organic farming

are based on indexes



Complementarity and participation

detached | involved

Observer stance complementarity

- Participation in itself is not enough – stakeholders can be involved without their perspectives being involved
- The complementarity between monitoring and development is important
- Involved means influence on the values behind – and this means the values must be exposed

Complementarity between sustainability assessment and sustainability transformation

- Science tends to take a detached stance to produce a valid sustainability *assessment*
- But taking a detached stance excludes taking an involved stance to help bring about sustainability *transformation*

detached

—

involved

A better understanding of complementarity

- Can help see why complementarity cannot be overcome – only handled in better or worse ways.
- And focus attention on how to handle issues of complementarity better.

- Can help distinguish between issues of complementarity and other problematic issues – and thereby between problems that may be resolved and those that may not.
- And focus attention on how to better recognize issues of complementarity.