

From organic principles to wider application and a resilient agriculture: a reflections paper

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Abstract

Planetary boundaries are exceeded in many ways and major transformations are needed in economic systems and lifestyles - in particular in the industrialized world. Can organic farming principles be applied more widely and help to make agricultural systems more resilient? How relevant are they to the challenges the agricultural sector faces today? If relevant and effective, why are they not more widely applied? In this paper contemporary challenges of agriculture are related to organic farming principles and practices. In the concluding section reference is made to those factors that seem to limit the application of the particular principles and practices. Reference is made to policy and market failure, information deficits and the widespread misconceptions around 'modernization', innovation and efficiency.

Introduction: conventional agriculture in crisis

The declining resources of critical input factors and exceeding of the buffer capacity of natural systems will in particular affect contemporary industrialized, high-input-high-output agriculture. Key references are OECD's (2012) Environmental Outlook 2050, the assessments published by the European Environmental Agency (EEA 2010), IPCC (2007) and the Millennium Ecosystems Assessment (2005). The SCAR (2012) and IAASTD (2009) reports emphasize that there are also massive economic and social problems affecting the agricultural sector. All in all, it is clear that business as usual and improvements in resource use efficiency alone won't be sufficient.

Can organic farming principles be applied more widely and help to make agricultural systems more resilient? How relevant are they to the challenges the agricultural sector faces today? If relevant and effective, why are they not more widely applied? In the related discussions there has always been a tension between longer-term perspectives and continuity on the one hand, and the need to adapt on the other. The balancing of the two leads us directly to the resilience concept which means adaptive capacity, adaptation and continuity at the same time. And of course there always is also a tension between fundamental principles and individual management skills, knowledge, experience and context-dependence that determines place-based practice. Again it is the balancing of the two that matters.

In this paper I will first have a very brief look at the origins and principles of organic farming. This will be followed by a clarification of the terms sustainability and resilience and a brief discussion of contemporary challenges against the background of organic farming principles and practices. In the concluding section reference is made to those factors that seem to limit a wide application of the particular principles and practices. Reference is made to policy and market failure, information deficits and the widespread misconceptions around modernization and efficiency that cause many contemporary problems. The same failures and deficits also affect the further development of organic farming which is why they need to be discussed much more explicitly.

Organic farming: pioneers and principles

Present organic agriculture practice has been evolving over far more than a century. Soil biologists developed first theories on how advancements in science could be used in agriculture as early as the late 1800s. Rudolf Steiner's Lectures on Agriculture were published in 1925, and Sir Albert Howard was the first to apply scientific principles to traditional and more natural methods in the 1940s. At about the same time J. I. Rodale started an organic farm for trials and experimentation in the US while Lady Eve Balfour was experimenting with organic practices in the UK. The overarching goal of organic farming is today defined by IFOAM as "*a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions.*"

It is embodied in the following four principles (based on IFOAM; shortened):

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- (1) **The principle of health:** Agriculture should *"sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible"*. This principle points out that healthy soils produce healthy crops that foster the health of animals and people. Immunity, resilience and regeneration are key characteristics of health. Farming practice is to sustain and enhance the health of ecosystems and organisms. In view of this it should avoid the use of fertilizers, pesticides, animal drugs and food additives that may have adverse health effects.
- (2) **The principle of ecology:** Agriculture should *"be based on living ecological systems and cycles, work with them, emulate them and help sustain them"*. This principle roots agriculture within living ecological systems: nourishment and well-being are achieved through the ecology of the specific production environment. Management must be adapted to local conditions, ecology, culture and scale. Inputs should be reduced by reuse, recycling and efficient management of materials and energy in order to conserve resources. Ecological balance should be attained through the design of farming systems and maintenance of genetic and agricultural diversity. Production, processing, trade and consumption are to benefit landscapes, climate, habitats, biodiversity, air and water.
- (3) **The principle of fairness:** Agriculture should *"build on relationships that ensure fairness with regard to the common environment and life opportunities."* Fairness is characterized by *"equity, respect, justice and stewardship of the shared world, both among people and in their relations to other living beings"*. Agriculture should provide farmers, workers, processors, distributors, traders and consumers with a good quality of life, and contribute to food sovereignty and reduction of poverty. Animals should be provided with the conditions that accord with their well-being. Natural resources should be managed in a way that is socially and ecologically just and should be held in trust for future generations. Systems of production, distribution and trade are to be open and equitable and account for real environmental and social costs.
- (4) **The principle of care:** Agriculture should *"be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment."* The enhancement of efficiency and of productivity should not be at the risk of jeopardizing health and well-being. Given the incomplete understanding of ecosystems, care must be taken. Precaution and responsibility are key concerns in management and technology choices. Scientific knowledge alone is not sufficient. Practical experience, accumulated wisdom and traditional and indigenous knowledge offer valid solutions. Decisions in particular regarding technologies and risks should reflect the values and needs of all who might be affected, through transparent and participatory processes.

All four principles can be seen as equally important. They complement and reinforce each other and they are described by IFOAM (2013) as *"the roots from which organic agriculture grows and develops"*. They *"concern the way people interact with living landscapes, relate to one another and shape the legacy of future generations."*

From principles to wider application and agricultural resilience

The resilience concept emphasizes the capacity of a socio-ecological system to respond to disturbance, resist damage and recover quickly. The importance of resilience as a conceptual framework is rapidly increasing with the more complex challenges and increasing uncertainty, in particular the rapidly changing climatic conditions. Resilience goes beyond sustainability defined by the Brundtland Commission (1987) in terms of the needs of present and future generations. Sustainability is a description of goals that comprise environmental, social equity and economic dimensions, the three pillars of sustainability. Both concepts are complementary but for the discussion in this paper, system resilience is the more meaningful concept.

Table 1 relates the problems faced in contemporary agriculture to the relevant organic farming principles and practices. In the last column it is tried to identify those factors that limit a wider application of the particular principles. The information given in the table is seen as exploratory and a discussion starter, it is not meant to be complete.

Table 1: Problems, relevant practice(s) and factor(s) limiting a wider application

Problems faced in contemporary agriculture	Related practice(s)	Factor(s) limiting a wider application
Pollution (pesticides, nutrients), GHG emissions	<ul style="list-style-type: none"> • soil building, nutrient cycling, nitrogen fixation • locally adapted, resistant plant & animal species • limitation of pesticide, fertilizer & antibiotics use • carbon sequestration through soil building 	Market failure Policy failure Insufficient information
Intense use of non-renewable resources and fossil fuels, unbalanced sharing of global level resources	<ul style="list-style-type: none"> • efficient use of on-site resources • improved soil structure & fertility • efficient use of on-site resources • lower use of non-renewable resources 	Market failure Policy failure Insufficient information
Biodiversity loss, monotone production landscapes	<ul style="list-style-type: none"> • wider crop rotations & genetic diversity • soil biology and maintenance of landscape elements and natural habitats 	Policy failure Insufficient information
Animal welfare and health deficits	<ul style="list-style-type: none"> • husbandry practices that meet the specific behavioural needs of animals & particular livestock species • use of free-range, open-air systems 	Policy failure Insufficient information
Standardized production & low producer prices, path dependency, limited adaptive capacity, indebtedness, dependency on farm input suppliers, pressure & stress among farmers	<ul style="list-style-type: none"> • more diversified farming systems • less capital-intensive, specialized systems • better consumer-producer relations & fairness in food chains • taking advantage of on-site resources, such as livestock manure for farm fertilizer 	Market failure Policy failure Insufficient information Concentration in processing and retail

Conclusions

The table indicates that the core ideas of organic agriculture are extremely relevant to the problems the agricultural sector faces today, and that this relevance goes far beyond environmental issues. It is a mistake not to take the essence of organic farming principles much more into account in addressing the problems faced by contemporary agriculture. A particular strength of organic farming is that it builds on natural systems and ecosystem services, which allows harnessing synergies. Organic agriculture actually tries to "work with nature" instead of trying to achieve full systems control – which makes a lot of sense in times of increasing resource scarcities (Kasperczyk and Knickel 2006). The more recent discussions around ecological or eco-functional intensification might be an indication of a change (and even a paradigm shift).

So far, however, there is very little discussion of the social and ethical goals expressed in the fairness principle. The socio-economic situation of farmers and in the food sector as a whole is far from satisfactory in spite of massive subsidies. To adopt a longer-term, societal and fairness perspective would change policy orientations significantly. Market failure, policy failure and the extreme concentration in processing and retail are key factors aggravated by information deficits and widespread misconceptions around 'modernization'. Many farms considered 'modern' are highly path-dependent – and vulnerable – because of the amounts of money invested in particular lines of production, production systems and technologies, and the resulting narrowing of management options. Adaptive capacity, the efficiency of the use of natural resources and favourable higher level system combinations and links (like between crop and livestock production) appear very much undervalued (Knickel et al. 2013).

References

- IAASTD (2009): Agriculture at a crossroads. International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD). North America and Europe Report.
- Knickel, K., R. Zemeckis, T. Tisenkops (2013): A critical reflection of the meaning of agricultural modernization in a world of increasing demands and finite resources. 6th International Scientific Conference 'Rural Development 2013', 28-29 November 2013, Kaunas, Lithuania

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SCAR (2011): Sustainable food consumption and production in a resource-constrained world. Standing Committee on Agricultural Research, Brussels.

Complete references can be made available upon request.