Knowledge systems, innovations and social learning in organic farming – An overview

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Introduction

Organic farming is a land use system with high potential as it can contribute to addressing several challenges our society faces, such as poverty, loss of biodiversity, water pollution or climate change. These contributions are rooted in an innovative knowledge system that links a diversity of actors along the food chain across regions, borders, sectors, professions and disciplines. The organic farming knowledge system is not a set of general technical practices to be implemented everywhere. Organic farming is an ongoing and complex context-specific adaptation of its practices by local actors. It is tightly linked to a process of trial-and-error by organic farmers and consumers, and it is the outcome of their inventions and innovations. The organic farming knowledge system with its institutions and organizations is therefore a result of a vivid social learning process.

In this workshop, we want to explore key processes within organic farming knowledge systems, like social learning, farmers' experiments and innovations. We want to better understand the relevance of these aspects for the design of resilient farming systems. In the face of global change, market fluctuations and policy changes, it is imperative that organic farmers build resilient farming systems – strengthening the agro-ecosystem as well as the integrity of the socioeconomic system. We hypothesize that social learning, farmers' experiments, knowledge transmission, and innovation are vital processes for building farm resilience. However, the links between resilience and knowledge systems, innovations and social learning have not been studied in detail at the farm level. In the workshop, we address this research gap based on a systems perspective for agricultural knowledge, information and learning processes.

Agricultural Knowledge and Information System (AKIS)

Building on system concepts, different models have been introduced to explain and analyze agricultural knowledge and information services (classically known as extension services). These are known under different names, such as Agricultural Information System (AIS), Agricultural Knowledge System (AKS) and Agricultural Knowledge and Information System (AKIS) (Garforth and Usher, 1997). Earlier system concepts mainly focused on research supply and transfer of information and knowledge (World Bank, 2006). Over the years it has been increasingly realized that knowledge cannot be transferred from one 'reservoir' to another in a complex agricultural development theatre (Engel, 1997). The purpose of a knowledge system is not assumed to be naturally or scientifically determined; instead, it is understood as an emergent property, and interactively shared and developed by the stakeholders themselves (Leeuwis and Van den Ban, 2004). AKIS builds on multiple stakeholders, diverse worldviews, intense social interaction and social problem solving; this is never static or closed, but always open and on the move (Engel and Salomon, 2002).

AKIS marks changing roles of research and extension services that support innovation in agricultural development, understanding knowledge processes as socially constructed, and considering communication as a form of social interaction (Engel, 1995: 38). AKIS accentuates innovation as a social phenomenon that takes place in the complex interaction of diverse social actors. This is in contrast to the former view on innovations as pure technological innovations that take place in the isolated and controlled environment of researchers' facilities. Innovation is a process to trigger change by making knowledge, technology and information available and putting these into socially and economically productive use (Sulaiman et al., 2006). AKIS recognizes that scientific knowledge coming from research organizations and other sources is an important, but not the only input for innovation to happen and that there are multiple sources of innovation (Biggs, 1990) including the innovative capacity of farmers (World Bank, 2006). One source for inputs is extension services.

From the perspective of AKIS, the extension services for organic farming development have to be seen as elements of the organic farmers' ecological knowledge system (c.f. Röling and Wagenmakers, 1998). It is increasingly recognized that organic farming is no longer a unitary movement with a clear and uncontested identity. Its goals and preferences have been appropriated and redefined by various actors, each emphasising different aspects (cf. Darnhofer et al., 2008). In practical terms, actors such as researchers, extensionists, farmers, NGOs, traders and consumers are constructing a system which encompasses all the know-how and facilities necessary for production, processing and consumption of products. The system thinking enhances social actors 'co-operation' that serve to solve a problem better compared to their individual efforts (Röling, 1992; Leeuwis and Van den Ban, 2004). A specific challenge for the knowledge system is the conversion from conventional to organic farming. Conversion to organic farming requires merging scientific knowledge with local knowledge, stimulating learning and triggering agricultural innovations in rural communities (Röling and Wagenmakers, 1998).

In order to stretch the impact of the organic agricultural movement we need institutional (social) innovations (Santamaría Guerra, 2003). Such innovations require organization and institutionalization of agricultural knowledge infrastructure and more particularly on the interface between the users and the producers of knowledge using different facilitation techniques at different levels of the system (Deugd M., 1998; Smits, 2002; Leeuwis and Van den Ban, 2004).

Social innovation in organic farming

Organic agriculture systems are highly dynamic socio-ecological systems. They are subject to constant change, particularly in light of the prevailing global megatrends such as climate change, natural resource degradation, population growth, and urbanisation. Social adaptation and innovation that harness knowledge and learning are key competences of organic farmers to build resilient farming systems. The transition to organic agriculture itself is a complex system change that shifts social processes and structures (Padel, 2001). Social innovation, however, does not take place independently from technical innovation. Rather, social innovation can be precondition, concomitant, or consequence of technical innovation (Gillwald, 2000). We assume that the dynamic spheres in which organic stakeholders operate on the one hand require innovation capacities to cope with prevailing challenges, and on the other hand open up new opportunities for social innovation.

Social innovation is an area of rapidly growing interest that has so far hardly entered the stage of agricultural research. While some scholars argue that social innovation is a ‚buzz word', too vague to be applied to research (Pol and Ville, 2009), others argue that social innovation is a critical type of innovation that has so far been undervalued (e.g. Phills et al., 2008; Pol and Ville, 2009). Although no agreed definition of social innovation exists (Pol and Ville, 2009), social innovation refers to "new concepts and measures that are embraced by concerned groups of society and used to meet social challenges" (ZSI, 2008). Most definitions revolve around four characteristics of social innovation: (1) relative novelty implies that the innovation is new to the user, context, or application, but the innovation does not necessarily need to be original; (2) social innovation comes into broader use through diffusion, (3) social innovation is not a 'temporary fashion' but implies a certain constancy; and (4) social innovation has a clear impact on society (Gillwald, 2000).

We argue that social innovation is a central feature that deserves more attention in organic agriculture and related research. Understanding the complex ways in which social innovation is triggered, managed and sustained provides new perspectives of how to create an enabling environment for community-based innovation in organic agriculture. Based on this understanding, mechanisms can be fostered in order to leverage, promote and scale out innovation that will ultimately benefit not only certain stakeholder groups, but the organic agriculture system as a whole. Inherent driving forces of social innovations are experiments, tests, trials and errors of organic farmers.

Experimentation of organic farmers

In the context of knowledge systems and innovation processes, the topic of farmers´ experimenttation is of particular interest, as by experimentation farmers build up local knowledge and test or develop innovations. Historically, farmers´ experiments shaped agricultural development and lead to the implementation of the worldwide agricultural systems, and they are common elements in the daily life of farmers (Scheuermeier, 1997; Sumberg and Okali, 1997; Bentley, 2006). Farmers´ experiments can be defined as the activity of introducing something totally or partially new at the farm and to assess the feasibility of this introduction (Quiroz, 1999), or as the process of comparing something already known to something unknown (Stolzenbach, 1999). Experiments can be provoked by external change and emerging problems, they can be stimulated by personal interest and curiosity, or they can be deliberate trials to effect desired future changes (Rhoades and Bebbington, 1991; Sumberg and Okali, 1997). There are two major reasons why farmers´ experiments are particularly important in the context of organic farming: First, while conventional farmers can use external inputs such as synthetic pesticides and synthetic fertilisers to buffer adverse dynamics in their agro-ecosystem, organic farmers need to develop knowledge about the agro-ecosystem to a larger extent to be able to manage their farms successfully without these inputs. Second, organic farming was developed by farmer grassroots organisations, where farmers themselves were responsible for advances and innovations. The lack of advice and formal research in the pioneer phase of organic farming (Gerber et al., 1996) brings forth the assumption that organic farmers have developed a culture of experimentation.

Until today farmers’ experiments build up local knowledge – a prerequisite to cope with unforeseen changes and to enhance the adaptive capacity of the farming system. Experimentation is one of the fundamental strategies involved in farmers’ attempt to learn about and control their environment (Rhoades and Bebbington, 1991). The process of learning and testing knowledge is vital for building social-ecological resilience towards sustainability (Berkes and Turner, 2006). An important aspect is whether or not local knowledge helps monitor, interpret, and respond to dynamic changes in the context in which farmers live (Berkes et al., 2000). In this context, learning is a key component, which is enhanced by careful experimentation (Walker et al., 2006).

Processes of experimentation build up practical, local knowledge and therefore constitute knowledge generating capacity that is needed for the achievement of sustainability and development goals (IAASTD, 2009). The ability to cope with change and implement desired improvements on the farm by own experimentation is also vital for the autonomy of farmers. If outcomes of farmers´ experimentation, like local innovations and enhanced local knowledge are shared and spread within a region, they can contribute to rural development. Farmers´ own experimentation constitutes a creative potential for the further development of (organic) agriculture and for rural areas in general. To make better use of this potential, institutional conditions like agricultural policies and regulations, as well as systems of agricultural information and advisory services should not inhibit, but motivate and support practical experiments. Farmers´ experimentation is particularly important for the further development of organic agriculture. Organic agriculture has the potential to provide future strategies for up to date challenges (like climate change, soil erosion, loss of biodiversity, food insecurity). Making use of countless practical local experimentation processes and combining farmers´ local knowledge systems with scientific knowledge systems raise the possibilities to find appropriate solutions for these challenges, especially in the design of resilient farming systems.

Relevance of knowledge and innovations for resilience in organic farming

Organic farming was partly developed as a reaction to the development of mainstream agriculture into industrial, large scale units where ecosystems, animals and health issues are not treated with the kind of respect that some farmers, advisors and consumers thought appropriate (Conford, 2001). Thus, a major issue in organic farming has always been to produce food and fibres with the notion that humans depend on the capacity of ecosystems to provide ecological goods and services (cf. Daily, 1997; Millennium Ecosystem Assessment, 2005). However, agriculture is not only dependent on supporting ecosystems, agriculture can also be considered a linked social-ecological system since people manage natural resources to produce food and fibres and in turn, respond to feedback from the ecosystem (cf. Darnhofer et al., forthcoming). Humans need to understand the dynamics of agro-ecosystems in order to be able to secure food production. This notion is central in resilience thinking (cf. Walker and Salt, 2006), which presents a useful lens through which to look when discussing knowledge systems and innovations in organic farming.

Resilience is the capacity of a system to absorb disturbance: to undergo change and still retain essentially the same function and structure (e.g. Walker et al., 2004). Carpenter et al. (2001) suggest that social-ecological resilience has three defining characteristics: buffer capacity (the amount of change a system can undergo while maintaining its functions and structures), self-organisation (as opposed to lack of organisation or organisation imposed by external factors), and the ability to build the capacity for learning and adaptation. Partly depending on the adaptive capacity of the actors in a farming system, resilience can be built or eroded. Adaptive capacity is the ability of actors to cope with change and dynamics (Gunderson and Holling, 2002). Thus, adaptive capacity of farmers and other actors is a prerequisite for their resilience building capacity (Walker et al., 2004; Fazey et al., 2007). Analogically, learning is an important precondition for building resilience (Berkes et al., 2003, Armitage et al., 2008). Learning may enable actors to respond accurately to social-ecological feedback (Folke et al. 2003; Berkes and Turner, 2006; Armitage et al., 2008).

A further attempt to define what a resilient social-ecological system may be was made by Folke et al (2003). Based on a number of case studies exploring different social-ecological systems they proposed that a resilient social-ecological system learns to live with change and uncertainty; that it nurtures diversity for reorganisation and renewal; that it combines different types of knowledge for learning; and that it creates opportunity for self-organisation toward social-ecological sustainability. As can be seen from the above, learning and the use of different knowledge systems are central concepts when building social-ecological resilience.

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