

Knowledge production and dissemination in sustainable agriculture as a transdisciplinary process – experiences from Switzerland

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Implementation of innovation is traditionally described by the term “knowledge transfer”. It is mainly seen as a linear, one dimensional process and implies that technologies are supposed to be developed by research and transferred by extension services to users. Based on first insights into two research projects related to present experiences in soil conservation and to the evolution of organic agriculture in Switzerland it can be shown that the “linear model of knowledge transfer” is too limiting to address societal knowledge production for sustainable development.

There is evidence that the described classical conceptions of knowledge production do not reflect the communication and innovation processes which have to be understood as a result of an interplay between everyday life and the structures in which it is embedded. Classical models imply a separation between the places, institutions and actors in the process of knowledge production at the one hand and knowledge use at the other. However, in practice the knowledge system of agriculture is much more complex. Farmer-to-farmer interactions and the knowledge backflow from farmers to researchers, extensionists and policy makers should not be neglected. Yet knowledge is exchanged and co-produced rather than transferred between these actors acting at different societal levels.

The processes of knowledge exchange and co-production in agriculture are analysed by means of two research projects relating to the development of organic agriculture and to soil conservation in Switzerland. The projects are associated to the National Centre of Competence in Research North-South (NCCR North-South) and the COST action 634. Both projects aim at identifying enabling and inhibiting factors in cooperation and exchange between the knowledge systems of farmers, scientists and extensionists in view of the principles of sustainable development. Therefore, a transdisciplinary approach is an adequate instrument to analyse the different perspectives of and the interplay between the actor groups.

Organic farming represents a unique field with respect to the importance of practitioners in producing knowledge, since most of common practices have been developed by farmers. A second peculiarity of organic farming is its theoretical basis that includes the concept of organisms which as a whole are more than the sum of its parts, and its mutations and behaviour being influenced by its history and development. This is a contrast to the traditional scientific view which implies that any organism or system can be described as the sum of its parts. The theoretical basis of organic farming is mainly non scientific and relies on the one hand on specific conceptions of bio-organic farming and bio-dynamic farming.

Thus there have been many reasons for a difficult relationship between science and organic farming. Nevertheless, organic farmers used scientific knowledge e.g. from microbiology to solve specific problems. However, the only research institute in Switzerland which addresses exclusively organic agriculture has been co-founded by farmers, policymakers and scientists (Research Institute of Organic Agriculture FiBL, www.fibl.org). Organic farming thus represents a complex picture of knowledge production within a diversity of perceptions of natural systems which involve conflicts between traditional science and research by practitioners. Moreover, extensionists in organic farming traditionally perform a two-way knowledge transfer between farmers and research.

In the case of soil conservation there is a considerable gap between research results on soil degradation processes and soil conservation technologies on the one hand, and limited

implementation of this knowledge in agricultural practice, on the other hand. The learning and communication processes between scientists, representatives from related public administration and farmers, as well as among farmers themselves, are explored by semi-structured interviews, informal talks and group discussions.

First results show that the development of soil conservation is based on diverse interrelations between farmers, experts of public extension services and scientists. This can be illustrated by a historical examination. The first phase in the seventies was characterized by increasing awareness of declining soil fertility due to current discourse in society and experiences from foreign countries (e.g. dust bowl in the United States). Subsequently, different actors searched for solutions based on their background. While natural scientists started research on soil erosion processes, farmers introduced and adapted soil conservation techniques such as direct drilling or zone tillage. These activities occurred independently. However, there was close collaboration between farmers and other scientist (e.g. herbologists). Agricultural sciences and extension services started much later to deal with the mentioned technologies. Thus, the development and dissemination of soil conservation techniques in Switzerland can be characterised as mainly farmer driven supported by science and extentionists in later phases.

The research projects show that the development of organic agriculture as well as the field of soil conservation can be understood as joint problem solving among science, technology and society. It is argued that solutions to complex resource management problems can only be developed on the basis of an integration of farmers', experts' and scientific knowledge. This understanding of co-knowledge production is strongly related to the concept of transdisciplinarity.