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Local and farmers' knowledge matters! How integrating informal and formal knowledge enhances sustainable and resilient agriculture

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ABSTRACT

The widespread transformations in farming practices during recent decades across many parts of Europe – increased capital intensity, scale enlargement, specialization, intensification and mechanization have been accompanied by a quite dramatic shift towards more standardized agricultural information and knowledge. Previous research reveals that transition towards more sustainable agriculture requires a new knowledge base, with new content and forms of knowledge and new processes of learning. In this paper, we explore the relevance of informal farmer knowledge and learning practices in constructing alternative pathways in sustainable agriculture and strengthening agricultural resilience. It is based on 11 case studies carried out within the international RETHINK research programme. The cases reveal the diversity of knowledge sources and learning forms that farmers use and the particular role of farmers' experience-based knowledge. Farmers greatly value local experiential knowledge as they see it as having practical, personal and local relevance. Given the limitations of more standardized information and knowledge, and the urgent need for a transition towards more sustainable and resource-efficient practices, we argue that the potential of local farmer knowledge is not being optimally used and that a better integration of various forms of knowledge is needed. We identify several ways in which different kinds of knowledge can be integrated. For the individual farmer this can be done by synthesising knowledge from different sources. It can also be done through farmer networking – whether or not facilitated by formal agricultural knowledge institutions, through collaboration between farmers and researchers as knowledge co-generators, and through multi-actor knowledge networks that bring together participants from various fields. We conclude that the dynamic contexts, complexity and the local specificity of the current challenges facing agriculture and the many roles it is being asked to fulfil require more inclusive, flexible modes of governing the generation, integration and sharing of knowledge. All stakeholders, including farmers, need to be recognised as equal co-authors of knowledge generation, and all kinds of knowledge, both formal and informal, need to be brought together in innovation processes. Knowledge networking and multi-actor knowledge networks that facilitate knowledge exchanges, joint learning and the generation of new more integrated solutions, are crucial if agriculture is to become sustainable and resilient.

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1. Introduction

During the industrialization of agriculture the role of farmers' knowledge has greatly diminished and much of this knowledge has become lost altogether due to the spread of productivist logic and standardized solutions, and a decline in the size of farming

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communities and their sense of cohesion (Fonte, 2008). However, in the face of the many contemporary challenges facing agriculture: climate change, food security and resource depletion, to name but a few, there is an emerging recognition that farmers' and local knowledge is a valuable resource that can reorient modern agriculture towards more sustainable and resilient paths of development. These challenges should lead us to explore different forms of farming (small-scale, organic, niche agriculture, etc.) and, by extension, farming regions (particularly in developing countries, but also some regions in the Western world) that have maintained their informal knowledge and learning.

In this paper, we explore farmers' knowledge and learning practices with a particular focus on the role of their informal knowledge and learning in constructing sustainable and resilient agriculture. We use the term informal knowledge to describe the diverse forms of knowledge that exist outside the formal agricultural knowledge system, which are generated by practitioners from their experience, without externally-imposed criteria and agendas (Livingston, 1999). We argue that characteristics and the social organisation of informal knowledge and learning processes can enhance agricultural sustainability and resilience.

By sustainable agriculture we do not mean any single form of farming. Specific local conditions, the cognitive predispositions of different stakeholders and their relationships shape the meaning of sustainable agriculture, and the practices involved, generating numerous variations. Instead we stress sustainable agriculture's holistic, diverse and distinctive nature that explicitly interlinks environmental, social and economic dimensions (World Commission on Environment and Development, 1987; Jackson, 1980; Ikerd, 1993; Pretty, 2008), which requires new forms and content of knowledge and new ways of learning (Curry and Kirwan, 2014; Hassanein, 1999; Pretty, 1995; Kloppenburg, 1991). Farmers seeking to follow a more sustainable path rely more on alternative support and learning networks and knowledge sources than on the formal agricultural knowledge and innovation system (AKIS) which is still strongly focused on the production-oriented model of agriculture and does not adequately address the knowledge and learning needs of this type of farmer. Informal knowledge needs more recognition and to be combined with formal scientific knowledge if agriculture is to become more sustainable (IAASTD, 2009a; Pretty, 2008; Morgan and Murdoch, 2000).

In recent years agricultural sustainability has been linked with the concept of resilience, which emphasises dynamics, disequilibrium and unpredictability in agricultural development. Resilience refers to the capacities of an agricultural system to adapt and transform itself so it can persist in the long term (Walker et al., 2004; Darnhofer, 2014). Learning to live with change and uncertainty, and combining different types of knowledge appear critical for building resilience (Folke et al., 2003). Among the diverse knowledge sources and learning forms that farmers use, Darnhofer et al. (2016) have pointed to the particular role of farmers' experiential learning and networking in increasing the resilience of family farms.

Informal farmers' knowledge and learning has been studied in many different contexts and agricultural models, from indigenous farmers in developing countries (Beckford and Barker, 2007; Briggs and Moyo, 2012) to biopharming of transgenic plants (Goven and Morris, 2012). Despite the contextual differences, those studies show, though often without explicitly detailing, the point that informal knowledge has a considerable potential to strengthen agricultural sustainability and resilience. To build on this work we bring together evidence from 11 case studies of farmers' learning practices, the underlying social processes and mechanisms, and how these are connected with more sustainable and resilient pathways. This research shows that informal knowledge, and

specifically local farmers' knowledge, is intrinsic to sustainable and resilient agriculture. We argue that there is clearly a need to improve our understanding and recognition for this knowledge in agricultural policies and knowledge systems in the future.

The remainder of the article is structured as follows. The next section defines the concept of informal knowledge and outlines our theoretical framework for studying knowledge and learning for sustainable and resilient agriculture, which is based on the constructivist paradigm. We then present our multi-case methodological approach. Next, we analyse farmers' knowledge sources and learning practices and how these are related in various networks and we explain why informal knowledge and learning matter for sustainable and resilient agriculture. Finally, we identify several action points to enhance (informal) learning.

2. The theoretical framework: knowledge and learning networks for sustainable and resilient agriculture

2.1. The characteristics of informal knowledge and learning

This article is based on the constructivist paradigm which conceptualises knowledge as being developed by actors in their specific contexts. The research literature provides us with several, sometimes, overlapping concepts and definitions that describe farmers' informal knowledge and learning in their environments. (See Table 1 for examples and Raymond (2010) for a more detailed overview).

We focus on two core and interrelated kinds of knowledge – local and farmers'. Local knowledge encompasses dynamic and complex bodies of know-how, practices and skills, developed and sustained over time on the basis of local people's experiences in their environmental and socio-economic realities (Beckford and Barker, 2007). Farmers' knowledge is a sub-set of local knowledge that enables them to farm in specific local conditions. It is based in their practical experience and often linked to a practical skill. As agriculture is highly dependent on the local environment, local farmers' knowledge is of particular importance as it contains an intimate understanding of the particular set of local cultural and natural resources.

Local knowledge has relevance for agricultural sustainability and resilience as it tends to be holistic, dynamic and adaptive in character. Local knowledge usually considers local systems as a whole, taking into account their social, environmental and economic aspects, empirical and spiritual dimensions (ICSU, 2002). It evolves over time as farmers adapt to dynamic local contexts in order to cope with short and longer-term uncertainties (Pretty, 1995). It is at the core of practices that tend to respect, optimally-use and regenerate local natural and social resources to meet human needs and ensure their livelihoods in the long-term. For example, Briggs and Moyo (2012) studied Malawian farmers who have retained their local knowledge and farming practices. They found that the external 'expert' knowledge provided to farmers is aimed solely at increasing productivity and incomes, whereas the farmers' knowledge integrates the diverse and long-term concerns of the local community – food security, social activities related to food, local economic conditions and sustainable soil management.

This example also shows that local farmers' knowledge is linked to specific ethical, environmental, and social values, which find reflection in farmers' practices in general and specifically in sustainable practices (Eckert and Bell, 2005; Lamarque et al., 2014; Storstad and Bjørkhaug, 2003; Kaltoft, 1999). This issue of values is particularly pertinent when discussing a transition to sustainable agriculture, driven by different values and ways of thinking than conventional agriculture. For example, the International Federation of Organic Agriculture Movements (IFOAM) states that health, care,

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