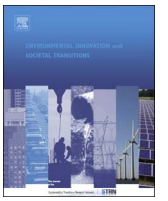
Environmental Innovation and Societal Transitions xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Environmental Innovation and Societal Transitions

journal homepage: www.elsevier.com/locate/eist



Original research paper

Agricultural transition: Niche and regime knowledge systems' boundary dynamics

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ARTICLE INFO

Keywords:
Permaculture
Knowledge systems
Niche
Regime
Boundaries
Innovation

ABSTRACT

This paper examines how knowledge systems within alternative agricultural niche develop and interact with the regime's Agricultural Knowledge Systems (AKS). It frames the analysis around transition, knowledge systems and boundaries literatures. Specifically it explores the extent to which niche knowledge systems confront and, or enhance the regime's AKS. The paper draws on empirical data from a study of the Permaculture community in England. The analysis describes the boundary between the knowledge systems of the Permaculture niche and the mainstream agricultural regime. Rather than a simple notion of PKS confronting or enhancing the AKS there are multiple knowledge processes operating which both maintain and permeate boundaries between the two knowledge systems.

1. Introduction

Scholars agree that a transition towards sustainable agriculture is needed if we are to meet the future challenges in the agri-food system (Hargreaves et al., 2013; Hinrichs, 2014). This entails a shift from a system characterised as having the goal of increasing productivity, to one built around the wider principles of sustainable production and rural development and resilience (Brunori et al., 2013); social justice and food security (Goodman, 2004; Marsden, 2004). Innovative forms of agriculture are emerging which can potentially contribute to such a transition, often associated with groups and networks of actors advocating alternatives to mainstream agri-food systems (Wiskerke and Van Der Ploeg, 2004). Transition theory considers such innovative forms of production and organisation as niches (a space where new ideas and practices can develop)[1] and conceptualises transition as the outcome of interactions between these niches and socio-technical regimes (the incumbent system of dominant technologies, practices and institutions) (Kemp et al., 1998), particularly in terms of the niches' potential to influence the wider system (Elzen et al., 2012). The aim of this paper is to examine such an interaction from the perspective of knowledge by means of a Permaculture case study.

Niches defend radical innovations such as alternative agricultural production methods or particular ideologies and operate outside established structures, cultures and practices. They are important sources of ideas and practices which can seed a transformation in the socio-technical regime, if processes at niche, regime and landscape[2] levels of the system are supportive (Kemp et al., 1998; Schot and Geels, 2008). However, regimes are resilient and resist change. In the agricultural context the dominant agri-food regime exhibits technological, organisational and institutional lock-in that ensures its persistence (Seyfang and Smith, 2007) and results in only incremental improvements in sustainability performance (Seyfang et al., 2014 p14). Influences in the broad political

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[1] Niches are variously defined in the transition literature, for example as protected spaces where new socio- technical practices can develop, or the outcome of a process of consolidation of paradigms different from those prevailing in the dominant socio-technical systems; and as places or communities such as grassroots innovation movements where novelties are developed.

[2] This refers to the three levels niche, regimes and landscape, heuristic analytical concepts within the multi-level perspective, used to conceptualise transition.

http://dx.doi.org/10.1016/j.eist.2017.05.001
Received 29 November 2016; Received in revised form 22 April 2017; Accepted 16 May 2017

and economic, socio-cultural 'landscapes' (Elzen et al., 2004) operate to different extents, for example, changing consumer culture, but, as yet, have not radically changed institutional structures and conventions within the agri-food system.

As such niches advocating more radical innovations such as sustainable agriculture alternatives often struggle to find and maintain a viable space within the regime due to limited funding and support, and experience difficulty in making effective links and diffusing oppositional ideas (Seyfang and Smith, 2007; Smith, 2006b). Consequently they are often consigned to operating on the fringes of conventional agricultural contexts. This is demonstrated in numerous examples of sustainable solutions and grassroots innovation movements that deviate from mainstream agricultural practices that encounter difficulties in achieving widespread transformative change (Hermans et al., 2015). Scholars, for example, note that the current agricultural science and technology agricultural landscape does not sufficiently support holistic and agroecological approaches, while other more technical agricultural innovations, are able to flourish (Duru and Therond, 2015; Vanloqueren and Baret, 2009; Lamine, 2011). This interplay between the entrenched regime and innovative niche has been examined and conceptualised within different strands of the transitions literature (Diaz et al., 2013; Smith, 2007; Bui et al., 2016), and widely explored with respect to the agri-food system and innovation (Knickel et al., 2009; Van Der Ploeg et al., 2004; Ingram, 2015). However the role knowledge plays in this interaction has yet to be fully explored.

Knowledge has been described as one of the most relevant resources circulating in niches (Ingram et al., 2014; Morgan, 2011; Smith, 2007). Actors in niches typically share common goals and interests; they learn together to experiment and create new ideas and innovative practices (Knickel et al., 2009). In doing this they develop their own distinctive knowledge systems, often with limited support from the formal Agricultural Knowledge System (AKS). Arguably niche knowledge systems potentially confront and destabilise the regime's AKS, which is charged with fostering innovation but is locked into old approaches or trajectories of the incumbent regime (Brunori et al., 2013). Equally, however, this learning and experimentation in niches may enhance the regime's AKS, contributing to its diversity and adaptive capacity, and creating opportunities for mutual learning and boundary work which are critical to transition (Cash et al., 2003; Tisenkopfs et al., 2015).

Understanding this dynamic across the boundaries between the knowledge systems of niches and the established mainstream AKS is therefore important particularly with respect to the role of knowledge in the overall system innovation that transitions require (Grin et al., 2010). Despite the centrality of knowledge to innovation and transition, there is little understanding of the interplay between knowledge systems of emerging innovative niches and the incumbent regime. This paper addresses this gap. It frames the analysis around transition, knowledge systems and boundaries literatures and draws on empirical data from a study of the Permaculture community in England, a niche advocating agricultural transition through community development and food production based on agroecological principles. It examines how the Permaculture community links with, and influences, the conventional agri-food regime through the lens of knowledge and learning, specifically examining the potential of the Permaculture niche's knowledge system to confront or enhance the AKS of the mainstream regime. Specifically the paper aims to make theoretical and empirical contributions to understanding the role of knowledge and knowledge processes in niche-regime dynamics.

Understanding these processes can contribute to the body of work which seeks to explain why some niches and indeed the agricultural sector as a whole have made limited progress on sustainability transition pathways (Diaz et al., 2013; Vanloqueren and Baret, 2009). Using Permaculture as a case study allows analysis of a niche radically different from the incumbent regime with clear ambitions to transform the agri-food system, a community and membership organisation with identifiable knowledge structures and mechanisms in place. Increasingly, analysts and policy makers are seeing the need for steering radical system innovations in more sustainable directions in the agricultural domain (Seyfang and Smith, 2007), insights from this study can contribute towards this endeavour.

2. Niche and regime knowledge systems' boundary dynamics

2.1. Knowledge systems

In agriculture the notion of the Agricultural Knowledge System (AKS) describes the formal set of institutes and actors (researchers, advisory services, supply chain industries, education and engaged farmers) charged with fostering innovation. The AKS framework captures the stable actor networks which support agricultural innovation and learning (Roling and Engel, 1991). Beyond these formal entities Roling and Jiggins (1998) argue that knowledge systems can also be coherent set of cognitions, cosmologies and practices; while other scholars equate knowledge systems to social systems (Van et al., 2005). According to Roling and Jiggins (1998) knowledge systems are made up of the key elements which can occur in unique, internally coherent combinations and can be characterised and distinguished on the basis of the following elements: an epistemology: a belief about the way people interact with their environment; a set of practices for managing agro-ecosystems; ways of learning about agroecosystems; ways of facilitating and supporting such learning; supportive institutional frameworks and actor networks; conducive policy context.

2.2. The regime Agricultural Knowledge System (AKS)

The incumbent socio-technical agri-food regime built around industrialised agriculture exhibits the mutually entrenching cognitive, material, economic and social phenomena that characterise a regime (Smith, 2006a). In western agriculture this is manifested through regulation, prescribed farming practices, a specific trajectory for research and development and established supply chains; and in institutions, such as the AKS, that are locked-into generating incremental innovations and segmented knowledge (Knickel et al., 2009). The AKS encompasses powerful actor networks (comprising agricultural scientists, extension officials, and agro-