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Expertise in rural development: A conceptual and empirical analysis

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ABSTRACT

Understandings of socially distributed *expertise* as being key to living, interpreting and intervening in the world, are increasingly used in development narratives, referring usually to knowledge sharing across multi-stakeholder partnerships. This movement towards the democratisation of expertise challenges the ideological claim of science to be the exclusive source of objective information, evidence and discovery on which informed decisions and technological developments should be based. But if we reject that claim, what are the implications for the way stakeholders learn, organise and transmit knowledge and skills, and resolve problems? And how do science and expertise come together in development narratives and practices? We address these questions through an examination of the changing relationship between scientific, professional and non-professional expertise in rural development. Firstly, we examine the evolution of models of rural development and knowledge generation over past decades and introduce the concept of *vernacular expertise* – the expertise that people have and develop that is place-based but crucially nourished by outside sources and agents and which underpins neo-endogenous development models. Secondly, by drawing empirically on qualitative research with rural advisory professionals who support farmer decision making we unpack the composition of vernacular expertise as a fusion of field/place generated and field/place focused knowledge, and consider how it may be better recognised and enhanced in development processes and policy agendas.

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1. Introduction

We are experiencing an enormous growth in knowledge and in access to knowledge that challenges prevailing models of how knowledge is produced, circulated and used. However, not all forms of knowledge are necessarily recognised or legitimised through policy and decision making platforms. What are the implications of an apparent democratization of expertise for individuals and for society in the context of development narratives and practices? Whose knowledge counts and what notions of expertise might emerge in support of development debates?

This paper addresses these questions in the context of rural development, by examining the role and future of expertise and its potential to provide an alternative rhetoric that challenges the exclusivity of science. In particular we draw attention to the neo-endogenous (local and extra-local) nature of expertise that is sometimes dismissed as ‘local knowledge’ (Ray, 2001). Our aim is to consider the universal characteristics of the vernacular as a discourse (rather than its local and sometimes parochial

constructions) and to conceptualise a hybrid notion of expertise, discussed here as ‘vernacular expertise’. In particular, we examine the interaction between scientific, professional and non-professional expertise in the field of rural development. We find rural development an insightful case to conceptualize expertise because of its well documented, shifting – and at times experimental – governance and knowledge exchange models (Gkartzios & Lowe, 2019).

The paper is structured as follows. Firstly, we discuss the notion of expertise and its role in providing an encompassing frame for considering the democratisation of knowledge and skills. Secondly, we contribute to the analysis of knowledge dynamics in rural development by examining the evolution of models of rural development and knowledge generation over past decades. We consider how science and rural expertise have come together in the past, and been framed, within prevailing models of rural development in developed world contexts, thereby exposing the underlying epistemology beneath development models. We then go on to examine empirically what constitutes the expertise of rural advisory professionals as a case example to illustrate the concept of ‘vernacular expertise’ – the vital expertise that people have that is place-based but crucially nourished by outside sources and

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agents and which underpins networked models of development – and ask how it may be better recognised and enhanced.

2. The democratisation of expertise

Science has grown exponentially over the past two centuries (Weingart, 2003). In the West over recent decades higher education has become a basic feature of mass society, underpinning a great expansion of the professional classes. The vast expansion of knowledge and of access to it are redistributing and mixing up the functions of knowledge production and knowledge consumption (Nowotny, Scott, & Gibbons, 2001; Nowotny, 2003). For example the World Wide Web has hugely expanded our potential as producers and consumers of information. This breaks down traditional hierarchies which were founded on a scarcity of knowledge and which reinforced a sharp divide between knowledge producers and users and importantly, is involving a democratisation of knowledge.

Traditionally the democratisation of knowledge has been cast in terms of the role of science in society and preoccupied with challenging or defending the boundaries, special status, authority and exclusivity claims of science, and the implications for the democratic pluralism of public decision making (Turner, 2001; Collins & Evans, 2002; Liberatore & Funtowicz, 2003; Wynne, 2003; Ellis & Waterton, 2005; Eden, Donaldson, & Walker, 2006; Evetts, Mieg, & Felt, 2006). However *expertise* – the skilful development and deployment of knowledge and other technical capabilities – presents a more encompassing frame for considering the democratisation of knowledge and skills than arguments over the ‘democratisation of science’ (Feyerabend, 1982; Fischer, 2000; Wynne, 2001; Jasanoff, 2003a; Liberatore & Funtowicz, 2003; Carolan, 2006b).

Expertise is widely distributed across humankind. It embraces the full and rich diversity of types of human knowledge, experience and skills, whether tacit or codified, informal or certified, individualised or collective (Amin & Cohendet, 2004). Indeed, certain types of expertise are ubiquitous, such as communication and social skills learnt in growing up in a society or mastery of one’s native language. One can argue that everybody has some sort of expertise, perhaps from their occupational training and lived experience; or learnt through their role as, say, parent, teacher, student, patient, manager, home maker, road user, consumer, client, activist or business woman; or acquired in pursuing a hobby, sport, profession, craft, vocation or career. In so far as one’s expertise is drawn from experience and embodied in skills, it is hard to be dispossessed of it. It can, however, potentially be shared. Indeed this is how expertise may be enhanced. Its quality of inalienability (i.e. that people cannot be dispossessed of their expertise) makes it a sound basis for asserting democratic rights. The concept of expertise recognises that everyone who is interested in a problem and has relevant expertise should be engaged in its resolution (Carolan, 2006a; Whatmore, 2009).

In this regard we recognise different pathways of expertise formation. Expertise for example arises from people’s embodied skills and capacities as well as their position within social networks, whether these be formal institutions that set standards, train and accredit experts in particular fields, or informal peer networks that recognise their greater expertise in certain areas. It is enlarged and enhanced interactively, realised through application, built through experience, and tested and further developed through experimentation (Ericsson et al., 2006; Mieg, 2006). Expertise must therefore be demonstrated in relation to something as well as recognised by someone (Jasanoff, 2003b). This may be a function of an individual’s formal certificated or institutionalised identity or their use of particular substantive bodies of knowledge (Evetts et al.,

2006). Or it is contingent and negotiated, with the authority of experts socially constructed, shaped and contested within particular social contexts and relations (Jasanoff, 2003c; Rip, 2003; Mieg, 2006). In other words, expertise is acquired, valorised and conferred by wider social groupings and institutions. It is manifest through the different ways that individuals perform their roles and work practices with respect to peers and non-expert audiences, and how they adapt their specific knowledges within particular contexts (Chi, 2006; Clancey, 2006; Mieg, 2006).

Expertise is thus formed and assessed through judgment of the performance and results of its application, but crucially whose judgment? The primary form of assessment of expertise is the judgment of fellow experts. In considering who else’s judgment counts, an important distinction is between professionals whose social function is primarily one of service or one of instruction. Conventionally, expertise as *instruction* involves a set of vertical relationships (between expert and novice, teacher and pupil, professor and student, parent and child, or master and apprentice), through which expertise is passed down from acknowledged experts in a particular discipline or vocation to those who are in training. The hierarchical basis of this classic form of expertise (‘learning at someone else’s feet’) can sometimes be overturned, for example through efforts to invoke child oriented learning strategies. Moreover, all instructional experts must work with the agency of their novices or apprentices. Even so, these relationships are intrinsically vertical.

In contrast, where expertise is provided *in service*, this may additionally embody inflected and horizontal relationships, even inverted (bottom-up) ones. So in addition to peers, a range of potentially complementary relationships (between provider and user, expert and client, expert and customer, or expert and patient) may be involved in the judgment of service expertise. Most of the literature on the potential complementarity of service expertise between service providers and users focuses on the expert-patient relationship in medical treatment and health care (Ledger & Slade, 2015). In some circumstances patients have shown a capacity to become experts in understanding and intervening in the progress and treatment of their own illness. The complementarity between expert and user in this instance can be seen to lead to the co-production of expertise, with the medical professional learning from the patient and vice versa. They do not produce the same body of expertise, but through their interaction they each develop their own expertise on the illness and its management (Prior, 2003).

An emphasis on expertise therefore counters the ideological assumption that science – seen as the preserve of professional scientists – is the only sure source of reliable information, evidence and discovery on which sound policy making and related decisions should be based (Collins & Evans, 2007; Wynne, 1996). This claim to exclusivity is what has given science, particularly in its mono-disciplinary forms, its mystique, its hegemonic power which debases all other knowledge and creates an absolute hierarchy between scientists and others (Murdoch & Clark, 1994; Bruckmeier & Tovey, 2008). The very terminology that is used to characterise these others – non-scientists, lay people, amateurs, citizen scientists – casts into the shadows those types of knowledge and skills that have not been thoroughly subjected to scientific authority. Thus science has become the standard paradigm against which all other forms of knowledge have come to be assessed (Murdoch & Clark, 1994). We see this problem manifest in development narratives and notions of ‘evidence-based policy’, whereby policy-making results are valorised from authoritative (scientific) knowledge in various forms (see Shortall, 2012). On a global scale, more recently, the United Nations General Assembly (2015) recognised ‘the global partnership for sustainable development’ through multi-stakeholder partnerships across the public,

private and civil society that ‘mobilize and share knowledge, expertise, technology and financial resources’. Expert group meetings are invariably organised at global institutions to position scientific knowledge in a dialogue with policy makers (i.e. the Expert Group Meeting on Science and Sustainable Development Goals). These developments suggest that there are overlapping categories of expertise, with scientists being pre-eminently experts, although expertise is not the exclusive preserve of scientists (Lowe & Phillipson, 2006; Shortall, 2012).

3. Models of rural development and knowledge generation

In exploring how science and expertise come together and have been framed, we now consider the example of rural development and how this has evolved over past decades. A hierarchical approach to knowledge transfer informed agricultural extension after World War II as part of a top-down, science-led approach to the development of rural areas (Cochrane, 1979; Chambers, Pacey, & Thrupp, 1989; Buttel, Larson, & Gillespie, 1990; Lowe, 2010). Knowledge was developed externally by scientists (Dancey, 1993; Swanson, Bentz, & Sofranko, 1997; Rivera & Sulaiman, 2009). Potential knowledge users (farmers) might be technically skilled in what they did, but as non-scientists they were construed as inexperienced, with little worthwhile to contribute to the research process itself. The consequent gulf between researchers and users of research had to be transcended at the end of the research. The science outcomes were diffused to farmers by extension agents in the form of technical advice, inputs and equipment. Those farmers who responded with enthusiasm were classified as ‘progressive’, and those who did not as ‘traditionalists’. In many contexts, this technological treadmill served to squeeze out those farmers who ‘lagged’ behind (Cochrane, 1979; Lowe, 2010).

This process of organising the application of science to practical agriculture through farm extension represents the oldest tradition of self-consciously organised knowledge transfer between research institutions and socio-economic communities. The philosophy of knowledge transfer presumed that it took place as the end stage of a sequential and unidirectional process, from the conduct of research in the laboratory, leading to scientific discoveries and technological breakthroughs which would then be disseminated to potential users (Shove & Rip, 2000). This model of knowledge production and application relates to the way the main academic disciplines tended to portray themselves in the 20th century, distinguishing between pure science (producing concepts and interpretations, proposing models, clarifying causal relations and organising experiments) and the application of the resultant knowledge which was portrayed as merely engineering or social engineering. Application was largely deemed to be derivative not creative – the putting into practice of scientific breakthroughs through the formulation and broadcasting of techniques, technologies and procedures.

In this top-down model of rural development (sometimes referred to as exogenous development), the main forces of progress were therefore conceived as being outside rural areas (Fig. 1). Productivist concerns framed policy narratives and scientific inquiries of rural communities. Rural areas were considered ‘backward’ and they were thought to lack dynamism of their own. Their modernisation was to be pursued by external planning, settlement rationalisation, infrastructural connections and the transfer of social and technical innovations from dynamic urban centres (Lowe, Ray, Ward, Wood, & Woodward, 1998; Ward et al., 2005). Industrialisation and technological innovation were seen as vital drivers of rural development but these were fixes derived from external research rather than solutions generated in or for specific localities. Scientific knowledge was thus conceived of as an exogenous force, with

the role of rural development being to smooth the way for, and stimulate the uptake of, new scientifically-driven technologies (Buttel et al., 1990).

This simplistic approach to rural development, with its “imposition of ‘alien’ scientific techniques” (Murdoch & Clark, 1994: p.124), was eventually criticised for fostering dependency, for delegitimising local knowledge, and for its negative social and environmental impacts (Norgaard, 1992). In the late 1980s and 1990s – in keeping with the move away from Keynesian economic planning as part of the shift from a welfare oriented to a competition oriented state – the top-down model of rural development was overtaken by a bottom-up philosophy (sometimes referred to as endogenous development) (van der Ploeg & Long, 1994; Lowe et al., 1998; Ward et al., 2005; Gkartziros & Lowe, 2019), based on the co-evolution of local social and ecological systems (Norgaard, 1992). Its premise was that the development of rural areas should seek to realise the indigenous potential of its particular natural and human assets, including local knowledge and skills. However, this came to seem equally simplistic, with its assumption that rural areas can be self-sufficient, their development isolated from external forces and left to rely on local knowledge and resources. It was also built on the assumption that the knowledge of local actors was confined to the locality.

In 2006 the OECD published a major report on new approaches to rural development (OECD, 2006). The study argued that ‘rural’ is no longer synonymous with decline, at least not universally. It found that easier commuting over longer distances is greatly enlarging the influence of large urban areas across surrounding countryside. This not only undermined notions of rural areas as separate realms of economy and society but also meant that many such areas were gaining population and experiencing significant growth. This seemed to have little to do with the relative prosperity of farming. Overall, less than 10 percent of the rural workforce in OECD countries was employed in agriculture, and agricultural support was found rarely to be effective in stimulating wider rural development. Instead, the report identified a new model for rural development, driven by an increased focus on local amenities, pressures for reform of agricultural policy, and decentralising trends within national governance systems. It suggested the new model involved multi-sectoral approaches to development aimed at identifying and exploiting the varied place-based potentials of rural localities.

The new approach is referred to as networked (or neo-endogenous) development (Gkartziros & Scott, 2014; Lowe et al., 1995; Shucksmith, 2000; Ray, 2001; Ward et al., 2005; Marini & Mooney, 2006). This approach recognises how rural areas are shaped by both internal and external forces. It therefore seeks to promote local and extra-local connections that will strengthen the terms on which local people deal with the outside world. Networked development provides a framework for understanding that rural development requires different kinds of actors who perform different roles in rural society and economy. While the resourcefulness and resilience of local businesses, households, community groups and voluntary organisations are important, other actors with stronger national and global connections also have a vital role to play in linking localities into broader interwoven circuits of capital, power and expertise, such as rural professionals, regional agencies, NGOs, companies, universities and research institutes (Esparcia, 2014).

Networked development therefore situates questions of science and expertise at the core of rural development theory and practice, encouraging us to reflect on the role of scientists and non-scientists in the production of ‘ideal models’ of rural development. Critically, neo-endogenous development is not simply a prescriptive model devised by scientists on how development *should* work in practice. It is a perspective on the governance of rural development, a way of

	Top down (or exogenous) development	Bottom up (or endogenous) development	Networked (or neo-endogenous) development
Key principle	Economies of scale & concentration	Harnessing local (natural, human & cultural) resources for sustainable development	Identifying and exploiting the place-based potential of localities; Socio-spatial justice
Dynamic forces	Urban growth poles	Local initiative & enterprise	Local-global networks and urban-rural flows; External interconnections through multi-scalar and multi-sectoral governance
Functions of rural areas	Production of food & primary products for expanding urban economies	Diverse service economies	A mosaic of consumerist and (re-)emerging productivist functions
Major rural development problems	Low productivity & peripherality	Limited capacity of areas/groups to participate in economic activity	Unequal relations between localities and external forces and institutions; Climate change and economic crises.
Focus of rural development	Agricultural modernisation; encourage labour & capital mobility	Capacity-building (skills, institutions, infrastructure); overcoming exclusion	Building local capacity to mobilise internal resources and respond to external pressures and opportunities
Focus of rural development research	Agricultural economics; Keynesian economic models and positivism	Rural sociology and rural geography; interpretive approaches and case study research	Action and activist research <i>with</i> communities; Inter/transdisciplinary
Sources of knowledge	Scientific research and external experts	Local community	Place based ‘vernacular expertise’

Fig. 1. Models of Rural Development.

thinking about how things work, recognising the networked nature of knowledge production (Gkartziou & Lowe, 2019). With respect to its underlying epistemology, the networked model of rural development therefore values locally-generated knowledge and skills, but seeks to enrich them through interaction with external ones. It thus promotes local and external exchange to strengthen *expertise in place*, what we term ‘vernacular expertise’ i.e. the expertise that people have about the places in which they live and work, how these places function and how they relate to the wider world.

Vernacular expertise is expertise that is place-based but is also crucially nourished by outside sources and agents. This is the expertise variously acquired and possessed by local residents, farmers, rural enterprises, workers, community organisations, naturalists and rural professionals. Anything that is vernacular focuses on local needs, resources, skills, materials, conditions etc., but is not bound by, indeed challenges, normative perceptions of what is locally customary or traditional, by being open to learning from external expertise. As introduced in rural development discourses by Dove and Kammen (2001: p.621) the concept of the vernacular implies a co-construction of realities in development practices:

“The concept of a vernacular model of development provides a way to make sense of the informal, norm-driven, diverse and even conflicting practices that dominate the real versus imagined landscape of development. [...] It encompasses a description of how official and vernacular realities articulate with one

another, how the boundaries between the two are defined, maintained and negotiated.”

In a similar vein, drawing on critical regionalism, Donovan and Gkartziou (2014) discussed vernacular thinking in rural development discourses by focusing on practices that prioritise local needs but are also extrovert, globally ambitious and reflexive. In the context of housing development in rural areas this is demonstrated through affordable, architect-led, ‘self-build’ housing construction that meets the needs of rural communities, whilst equally positioning them at the forefront of global architecture.

In using the term vernacular expertise here, we deliberately avoid other terms that, consciously or not, pigeon-hole the expertise of local agents as being confined to the locality, or implicitly subordinate¹ it to an external authority. Terms such as ‘local knowledge’ (Kloppenburger, 1991; Ray, 2001), ‘lay knowledge’ (Petts & Brooks, 2006; Morris, 2018), ‘traditional knowledge’ (Tahoun, 2003) or ‘endogenous knowledge’ (Rist et al., 2011) can imply parochialism, when what is needed, and what local agents often pos-

¹ The subordination of local knowledge by scientific knowledge has been examined by many authors, for example Wynne (1996), Agrawal (1995), Briggs (2005), Mackinson and Noltstedt (1998), Briggs and Sharp (2004), and Reed et al (2013). It has been shown how externally derived knowledge typically requires adaptation to situate into local contexts. In turn, as the very same contexts adjust to accommodate new techniques or innovations, this process can involve the marginalisation of local knowledge (Murdoch and Clark, 1994).

sess, is extrovert (i.e. externally networked) local knowledge. We recognise that the term vernacular is contested with different meanings and interpretations across disciplines (Donovan & Gkartzios, 2014). As a term it is also used in relation to knowledge, language and cultural debates (see for example Nercissians & Fremerey, 2008) and sometimes in derogative ways – particularly when used in developing or underdeveloped countries – demonstrating colonial tendencies and naivety (see also Gupta, 1999). We don't use the term vernacular as synonymous to local here or to refer to indigenous cultures. Our point in using the vernacular is to highlight its universal, hybrid local-global qualities rather than its essentially local (and sometimes parochial) understandings. For us the term vernacular implies a re-awakened interest in neglected forms of culture and existence that are associated with, but not derived entirely within, particular territories, and indeed, not necessarily rural (i.e. Upton, 1983). We are thus in agreement with previous uses of the term vernacular in rural development narratives (e.g. Dove & Kammen, 2001; Donovan & Gkartzios, 2014), although what we want to highlight here is the externally networked (local and extra-local), and thus hybrid, formation of *expertise*.

Vernacular expertise therefore, to us, displays the heterogeneous constitution of 'sustainable knowledge' outlined by Murdoch and Clark (1994), with its inextricable mixture of the local and the universal, the natural and the social, as well as the blending of scientific, political-managerial and local knowledge forms identified by Bruckmeier and Tovey (2008) within participatory resource management. There is also a resonance with Long's (1992: p. 27) description of the "fusion of horizons", in which local and scientific knowledges are mixed together within people's knowledge repertoires, including the process through which external scientific knowledge becomes situated and is given meaning within local bodies of knowledge (Arce & Long, 1992). Gorz (1993) specifically refers to 'vernacular know-how', within his concept of the 'culture of the everyday' in relation to "the habits, norms and modes of conduct that enable individuals to interpret, to understand, to assume responsibility for the way they inhabit the world that surrounds them" (p.57).

The shift from a top-down to a networked model of rural development therefore changes the way we think about how expertise is generated and transmitted, as well as the rationale for knowledge generation. The aspiration is not just for more science or expertise, but towards what purpose: for better informed and skilled citizens, communities, businesses, workers and professionals; so that through their expertise they can tackle their own problems and can learn more efficiently from elsewhere. That entails a shift away from *knowledge transfer* as the model of the relationship between knowledge production and interested stakeholders, towards a model of *expertise exchange* (Phillipson, Lowe, Proctor, & Ruto, 2012; Fazey et al., 2012). From this perspective the generation and diffusion of knowledge and techniques involve an iterative and networked process, built on the transfer and exchange of expertise to and from multiple sources. In the case of rural development this implies acknowledging the value and validity of non-scientific and non-professional sources of expertise and building on and building up the vernacular expertise of local actors.

4. Vernacular expertise: empirical insights

4.1. Research design

To consider empirically what constitutes vernacular expertise we draw on a research project in the north of England looking at the knowledge sources of farmers, who deploy vernacular expertise in their work, and the professional experts who advise them

and thereby earn a living through developing, testing and disseminating vernacular expertise. We acknowledge that farm advice represents a specific focus within a much broader discourse of rural development. However, we see it as providing a valuable empirical context through which to examine practices and notions of expertise. Our purpose in the current paper is not to provide a full investigation of farm advisers and their role as knowledge intermediaries in informing and drawing upon farm level knowledge (for such a study see Proctor, Donaldson, Phillipson, & Lowe, 2012; Phillipson et al., 2016), but to use farm advice as an illustrative case to explore vernacular expertise as the basis of neo-endogenous rural development.

The UK does not have a well developed system of public sector farm extension services, but rather a mixed economy of farm advice (Klerck & Proctor, 2013). Professional experts in the research refer to three groups who were covered in the project: land agents, farm veterinarians and applied ecologists. Of all our professional rural advisers, it is land agents that are atypical internationally. Land agents (also known as rural surveyors or valuers in Britain) advise farms and estates on the value of rural property and assets and the legal, tax and management aspects of their use, sale or acquisition. They operate as sole independent consultants or in multi-person private land agency practices. Some are employed directly to manage private farms and estates or by public and third sector organisations that hold rural land. Farm veterinarians provide advice and services in the care and treatment of animals, the promotion of animal welfare and optimisation of animal production. They are employed within private practices which may specialise exclusively in farm animals, but more often serve a mixture of farm and companion animals. Vets are also employed by official agencies and government to regulate animal health and welfare. Finally, applied ecologists conduct wildlife surveys and advise on the conservation of habitats and species. They work in the private sector as independent consultants or occasionally within multi-professional practices, or for public and third sector organisations carrying out conservation management and wildlife protection.

It is the case that rural advisory professionals play a key role in enabling decision making and enhancing the skills of farming and land based businesses facing increasing pressures to deliver a range of goods and services, involving complex requirements. Commercial objectives to produce quality primary products competitively have to mesh with broader demands of food security, ecosystem services, sustainable resource use, the management of animal and plant health, and adaptation to environmental change. Professional advisers contribute expertise on many of these aspects, assisting farmers' operational and strategic decision making.

The project involved 60 in-depth interviews with advisers, farmers and representatives of professional associations and participant observation of advisers in the north of England. The interviewees were identified with the help of a project advisory team of representatives from the professions to provide a spread of advisers according to profession, levels of specialism and experience (see Table 1). Farmers were selected for interview through contacts made during 5 days of work shadowing with advisers: they had livestock or mixed farms. Additionally, a discussion seminar was held with university-based veterinary scientists to explore their perceptions of the expertise of practising rural vets. All interviews were recorded and transcribed. All data was organised using NVivo software, and analysed manually through rounds of thematic analysis and coding by the research and advisory team (with data analysed for each profession and thematically across professions) (see also Proctor et al., 2012).

Table 1
Interviews.

	Veterinarians	Land agents	Ecologists	Other
Interviews with professional representatives	6	6	7	4
Interviews with advisers	8	8	15	0
Work shadowing of advisers	2	1	2	0
Interviews with farmers	–	–	–	6

4.2. The vernacular expertise of rural advisory professionals

4.2.1. Field oriented knowledge

When we asked the advisers about their specific knowledge sources, a complicated picture emerged of externally and locally sourced knowledge. Regarding the former, they referred to scientific and technical knowledge, as well as formal professional knowledge relating to codes of conduct and standards, and regulatory knowledge relating to new laws and policies. Undoubtedly, to an extent both professional and regulatory knowledge are informed and shaped by scientific knowledge.

However, advisers do not simply act as conduits for the flow of knowledge from external sources to farmers:

“I think that’s what I enjoy about the job, it’s trying to take technical knowledge and science that I don’t understand necessarily and translate that down to something meaningful, practical and relevant to my clients, but also that they can then understand and buy into and can affect change, and that’s extremely interesting and challenging. All the technical knowledge and journal reading in the world is worthless without the practical context and experience . . .” (Farm Vet 1)

“Each farmer is totally different, and the more you can appreciate the type of character, the way they work, the better you are when you go and meet somebody else. . . . For any one problem, six or seven farmers will approach it differently, and you need to know the setup on that farm and how he works. Individuals’ backgrounds are different.” (Land Agent 1)

“It’s tailoring your advice, not just to the site and the issues on the site, but also to the client’s background and the client’s interest and the client’s level of knowledge, and trying to do it in a way that’s encouraging and supportive.” (Applied Ecologist 1)

Thus advisers select, synthesise, target and digest knowledge from scientific, professional and other sources to tailor it to the geographical context, farming situation and specific capacities of their clients and make it accessible to them. This is field-focused knowledge which may be externally or locally sourced.

Rural advisers also emphasised the importance of the knowledge they themselves generate locally. This is knowledge that they derive, in their words, “from practice”, “on the job”, “in the field”. It comprises two main elements.

Experiential knowledge arises from advisers learning through seeing what works and what doesn’t work in practice. It is often gained quite intuitively, as well as through consciously transferring lessons from one farm or locality to another, learning from mistakes and sharing best practice. It is expertise derived from observation and application and refined through replication and adaptation:

“Most of it probably comes from field experience, and from current field experience of colleagues, and learning from colleagues and sharing best practice, yes, and actually being out there doing the job.” (Applied Ecologist 2)

“There’s no doubt that the practical experiences you get are absolutely vital to temper your advice, and as much as anything to know what harm you can do with advice and it’s very possible to

improve one thing and make another thing a lot worse, and it’s that kind of whole farm context and experience of things going wrong probably that is the most important thing.” (Farm Vet 1)

“I suppose I would describe [my expertise and knowledge] as experience-based . . . How do you deal with a situation? You look at the last time you dealt with it, you look at the last time you dealt with something that had the same elements.” (Land Agent 2)

Experimental knowledge is where advisers conduct their own experimental interventions as part of their problem solving, deliberately and systematically trying out and comparing different approaches to an issue. We found the vets had the most experimental outlook (Proctor, Lowe, Phillipson, & Donaldson, 2011). They talked about trying out different drugs and doses, altering feeding regimes and modifying techniques in surgery. Such experimentation is seen as valuable in extending knowledge, testing skills and finding novel solutions:

“A lot of things are a little bit experiment-wise in terms of, you know, a batch of sick lambs or something and I’ll go, ‘Right, I’ll give those five that kind of antibiotic, those five that kind, and those five that kind,’ and see which ones live, see how they do.” (Farm Vet 2)

“That’s something we do on a, I suppose on an anecdotal level, definitely. Different drugs and we then discuss that within the practice, ‘What have you used for this, what’s worked and what hasn’t’. We certainly do some auditing. A particular example that we’ve been doing recently is auditing some of our surgery that we do on the cattle side – caesareans and displaced stomach operations, auditing the success of those. Obviously we then look at that and make decisions as to whether there are changes that we should make in technique or approach or sterilisation or whatever.” (Farm Vet 3)

“We’ve been involved in proper clinical trial work as a side line at our practice, with the pharmaceutical companies and the like, so we know what that’s all about. We do in-house research which is things like, they’re not ground breaking, but everything is like for example this year we’ve been involved in a foot bathing trial for a sheep foot bath, which wasn’t high science that was just in-practice style research.” (Farm Vet 1)

Rural advisers see field generated knowledge – whether experiential or experimental – as complementary to the formal professional, scientific and regulatory knowledge learnt from their basic training and requisite Continuing Professional Development programmes. Indeed, they see it as what they distinctively bring to the table – one of two essential characteristics that make them field-oriented experts. The other characteristic is that they strive to contextualise, tailor and translate relevant knowledge from any source for their clients. It is this fusion of field-generated and field-focused knowledge that constitutes the vernacular expertise of rural advisory professionals. Crucially, they must also be able to convey this knowledge meaningfully to farmers.

Farmers recognise and express their appreciation of the field-oriented expertise of their rural advisers. As one farmer remarked:

“They need to know what is happening on the farm . . . The more they know the farm, the better they’re able to make decisions and tell you what you should be doing.” (Farmer 1)

In contrast, the vernacular expertise of rural professionals is casually dismissed or barely acknowledged by the scientific community. We see this illustrated here in an exchange between university veterinary scientists that took place at a seminar held to discuss our research project:

"We're collecting data from veterinarians in the field to analyse, to give us the indications of that disease prevalence etc. The issue coming back over and over again... is that this isn't going to be very valid data, because it has been collected by veterinarians in the field and therefore... it will have been collected by non-experts." (Veterinary Scientist 1)

"I know that every single thing you do in practice is based on research because without that it would be hearsay, it would be hocus pocus." (Veterinary Scientist 2)

Such views sit beside an apparent lack of curiosity in UK university veterinary schools towards veterinary practice and reinforce a professional demarcation between researchers and practitioners reflecting the classical vertical relationship of expertise in instruction. Many veterinary researchers and academics, often with a background in biological sciences, have had little or no exposure to veterinary practice which receives limited coverage in veterinary training. Students' main exposure to everyday veterinary work comes from extramural studies and work placements. This demarcation between formal research and practice underpins the notion that innovation comes only through the incorporation of new research into practice via top-down knowledge transfer which discounts the possibility of innovation occurring in daily practice (Proctor et al., 2011).

However, the rural advisers from the professions involved in the project did not themselves see scientific research as the sole source of their expertise and admitted finding it difficult and not always fruitful trying to keep in touch with scientific advances. When asked about specific sources of scientific knowledge most referred back to what they had learnt in their basic training and complained that they did not have sufficient time to refresh their scientific knowledge. Many considered that most contemporary research was not relevant or applicable to what they did. Some referred to the inaccessibility of much published science. And most advisers looked to their professional bodies to filter and synthesise the latest research findings through professional publications and Continuing Professional Development programmes.

4.3. Rural professionals learning from their farmer clients

The field generated knowledge of rural professionals is not entirely their own self-generated knowledge. They also learn from other agents in the field, including other rural advisers (Phillipson et al., 2016) as well as farmers. Rural advisory professionals test out and develop their field-acquired knowledge through their interactions with their clients. The rural advisers themselves freely acknowledge that they draw extensively on the knowledge and experience of those they advise. They appreciate that farmers too possess expertise to do with farm management and knowledge of the local environment and wildlife, as well as formal technical knowledge, practical skills to do with handling animals and equipment, and commercial acumen. The vernacular expertise of the farmer, like that of the rural adviser, is locally-generated and enriched through external sources. This is expertise rural professionals need to draw on, if their knowledge is to be effectively applied and they are to be capable experts in this context.

Thus it is the farmers who provide rural professionals with much of the detailed understanding of the agricultural context in which their advice is to be applied. Here they draw extensively on the experiential knowledge of farmers:

"I have learnt an awful lot from farmers on that wider context, and on the realities of things and on understanding their businesses and the industry and their unique skills when it comes to livestock, that's where I've learnt a huge amount." (Farm Vet 1)

"But they know a lot about their area of farming and their area of land. They then extrapolate that to the rest of the world and that's fair enough, that's their knowledge. But you can't ignore the fact that they do know a lot about how things work on their moor, on their farm, and if you don't take that into consideration then you're not going to get the full story of what's going on." (Applied Ecologist 3)

"Although they might not be academically educated, they're very intelligent people and they can offer quite a lot of information to us that we don't know." (Land Agent 3)

Rural advisory professionals likewise recognise and draw upon the skills and knowledge of their farmer-clients in the management of animals, land, farms and estates:

"It's a two way discussion because they've got loads of knowledge that you can learn from." (Farm Vet 3)

"I think it's that sort of being prepared to use their expertise because they've all got their expertise, they all know what they're talking about; it's no good me going to talk about livestock management because they know much more than I do about it." (Applied Ecologist 4)

"Well we don't want to experiment on a client's estate, at a client's expense. So what one has to do is one has to find, effectively, someone who has done it before." (Land Agent 4)

Rural advisory professionals also recognise the potential for farmers to come up with novel solutions to the problems they face and see themselves as learning generalisable lessons from these farmer-generated innovations:

"I mean, you see how farmers and landlords look after their property and do things. And you sort of pick up from one client and transfer the information to another. You don't, necessarily, say who's done it, 'But I have seen such and such done, have you thought about doing it this way?' – And this sort of thing. You pool knowledge." (Land Agent 5)

"What I'd like to think we do is – and, you know, not being exclusive, other good advisers can do the same – not just translate that, not just take one piece of information or one idea from one farm and give it to everybody else, but actually evaluate it, see if it's really working and why it's working for them, and then on which other farms it might work, but which farms it wouldn't be suited to." (Farm Vet 4)

"They're the people that are out there every day and they're the ones that have seen it change over time as well. That's not to say that they know everything and you don't know anything because you've got that, you do have some knowledge that they don't as well. They've maybe only seen their area and seen how they've managed it, whereas you've seen other areas and all of that. It is very much an important part of listening to what people say and also getting their ideas because they might come up with something as well, something that you can use." (Applied Ecologist 5)

Rural advisory professionals thus need to be open to learning from farmers about what works and what does not:

"Obviously when I started, I was young, green in the tooth, and I may have made a few mistakes, but farmers being farmers, they soon tell you when you've made a mistake, so you learn quickly on the job, really." (Land Agent 1)

"They know a lot about the mechanics of farming or the housing or how things work, and some know a lot about ventilation, some don't, some know a lot about feeding systems, etc. And then a lot

of farmers, stockmen, owners, whatever, will have innovative ideas every now and again, or they'll have heard something from either a meeting that we haven't been to or from a friend of theirs or they've read or whatever, and we will evaluate that." (Farm Vet 4)
 "The stretch really is about making judgements about land management and not having the experience of land management;... you don't know what the grazing regime has been, you just know what it looks like then. And those kinds of things which a farmer might be able to tell you." (Applied Ecologist 6)

As one farmer remarked:

"With my advisers I'm mainly learning off them, but they're also wanting feedback off me on the results to see whether it has worked, or it hasn't worked." (Farmer 1)

Much useful information and insights are gleaned by rural advisory professionals from informal conversations with their farmer clients:

"You ask them questions like, 'Why do you do that?' [laughter]. That's interesting how did you do that?' So, they aren't consciously feeding you information, without realising it, almost as part of normal conversation because you're, actually showing, from their point of view, you're showing an interest in what they're doing. You know, this bloke's interested in what I'm doing, this is good, but at the same time you're getting information out of him." (Land Agent 5)

"And it is that, just definitely going in, sitting down and having a cup of tea, and just chatting through things, and just talking a lot of nonsense, but just having a chat. It's amazing how much you learn in that respect. Again, you're broadening your knowledge of the industry talking to clients. You can go through the price of grain, the price of fat cattle, the price of store lambs in that sort of 40 minutes of having a cup of tea." (Farm Vet 2)

"If I go to talk to a known farmer about conservation, I know that I'm not going to be going in without any knowledge about what they do and how they do it. I may not be an expert, but at least I can have a chat about the sheep numbers and types and all the processes that they go through with a little bit more understanding about how it all functions and fits together." (Applied Ecologist 4)

When the expert learns from the farmer the arrow of influence is reversed. The non-expert becomes the expert, and vice versa. As one farmer commented wryly: "I think I'm the best expert that

there is here". It is this very reversibility that is at the heart of expertise exchange, with each deferring in turn to the expertise of the other. As another farmer put it:

"They take on board what we say and we take on board what they have to say as well." (Farmer 2)

Being a competent professional expert thus involves learning how and when to be an effective non-expert (as well as an effective expert) and not just in dealings with farmers (Phillipson et al., 2016). In negotiating solutions to problems and dispensing advice to clients, advisers often also come into contact with other professional experts, for example a vet having to deal with a nutritionist or a land agent with an ecologist (Proctor et al., 2012; Klerkx & Proctor, 2013). The farmers interviewed drew on a host of advisers (Table 2). Experienced advisers recognise the limitations of the expertise of others, but also of their own. Being an effective expert thus entails managing multiple expert/expert and expert/non-expert interfaces, in a context in which the distinction between expert and non-expert is fluid and the boundary between them is permeable (Phillipson et al., 2016). A key element of this is interactional expertise. Collins and Evans (2002, 2007) characterise this as mastery of the language and jargon of a substantive field of expertise such that one can engage in meaningful discussion with its experts but without having their practical competence or skill.

Carolan (2006b: p.427) describes farm advisers and agricultural scientists acquiring a working knowledge of the 'local lexicon' or 'farmer talk' as providing the basis for information exchange. One farmer we interviewed explained how they sought advisers "at-tuned to our way of thinking". Interviewees emphasised also the importance of 'farmer talk' and its role in expediting expertise exchange. Far more than simply a means of 'breaking the ice' or easing communications between adviser and farmer, 'farmer talk' provides a common medium for exchange, through which technical expertise of many different kinds is translated and adapted to the farmer's own perspective and farm context. It is through 'farmer talk' that advisers are obliged to adopt the problem definition and perspective of the farmer, thereby reinforcing the farmer's central position and agency:

"The way I look at it, you pick everybody's brains and it's up to you to make the decision yourselves. But I always think if they were good enough, they would be doing it themselves ... it's my judgment I rely on, not theirs. I'll question their advice many a time." (Farmer 3)

Table 2
Advisers used by farmer interviewees.

	Farmer 1	Farmer 2	Farmer 3	Farmer 4	Farmer 5	Farmer 6
Vet	X	X	X	X	X	X
Land agent	X	X	X	X	X	X
Animal nutritionist	X	X			X	
Ecologist	X		X	X		X
Organic farming consultant	X	X			X	
Solicitor	X		X			X
Agronomist/crop sprayer		X	X			
Soil scientist	X					X
Accountant	X		X			
Feed merchant	X					X
Heritage consultant		X				
Hedgerow consultant		X				
Banker	X					
Arable adviser		X				
Farm records adviser				X		
Foot trimmer						X
Planning specialist						X
Business adviser						X

5. Conclusions

In this paper we have considered a shift in emphasis in development policy and practice from science to expertise, and the role of expertise in supporting a democratisation of knowledge. We provide an account of the changing way that knowledge and technical skills are developed and extended, moving away from the notion of one-way knowledge transfer to a more extensive and equal collaboration between scientific, professional and non-professional sources of expertise. Our analysis of the evolution of rural development approaches and their underlying framings of knowledge generation over past decades reveals that this shift is in keeping with the move from a top-down to a networked model of development. We argue that at the core of networked development are epistemological questions about the role of science and expertise framed here as vernacular expertise: the expertise people have about the places in which they live and work that is place-based but crucially nourished by outside sources and agents.

Through the paper's empirical example, an analysis of the knowledge sources of farmers and rural professionals, vernacular expertise is in essence hybrid, found to be constituted by a fusion of local and extra-local experience, skills and knowledges, including a combination of field generated and field focused knowledge. By extending this framing beyond the case example to wider knowledge dynamics of rural development, attention is therefore drawn to the essential role of place generated and place focused knowledge. On the one hand, expertise that is derived within the locale, through place generated experience and experimentation. On the other hand, expertise which is drawn from extra-local scientific, professional and regulatory knowledge that must be adapted to specific contexts.

As professionals whose social function is distinguished primarily as one of providing expertise in service rather than instruction, rural professionals' vernacular expertise is also co-produced through their horizontal relationships with, and learning from, their farmer clients, as well as professional peers. Willingly recognising and drawing upon farmers' own vernacular expertise, and developing the necessary language and interactional skills for mutual learning to take place, was found to be vital for rural professionals to effectively apply and adapt their knowledge to local contexts. Interactional expertise thus extends beyond simply speaking the language of other experts. It is a skilful and creative process whereby expertise is adapted, contextualised and negotiated, and meanings shared. It involves the set of embodied and linguistic practices, performances and strategies that comprise expert-expert interactions.

So, to conclude, what are the implications of the recognition of vernacular expertise for both organised science and development? Our conceptual discussion and empirical findings suggest that the response demands to work with, and help mobilise, vernacular expertise. Such a response will require the identification of new ways to draw upon, recognise and help strengthen expertise in place (i.e. vernacular expertise). In the case of research, development and evaluation approaches this implies building on and building up the expertise of local actors through the joint-production of knowledge, the creation of networks for expertise exchange, and helping equip local actors with methods and tools they can use to develop and apply their own expertise.

For us all to become effective experts, we must learn to deal with other experts. This involves becoming deft at managing and mutually constructing our dual roles as both experts and non-experts. We need to understand the management of the expert/non-expert interface as a process of exchange. The key point is that, to work, the expert/non-expert interface must be mutually constructed – demand must be informed by trust;

authority underpinned by service. Knowledge and information must flow in both directions. Thus, as a democratising force, expertise introduces the prospect of an equivalence around which there can be mutual exchange and learning.

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Conflicts of interest

All authors of this paper have no conflict of interests, including any financial, personal or other relationships with other people or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, this work.

References

- Amin, A., & Cohendet, P. (2004). *Architectures of knowledge*. Oxford: Oxford University Press.
- Arce, A., & Long, N. (1992). The dynamics of knowledge: Interfaces between bureaucrats and peasants. In N. Long & A. Long (Eds.), *Battlefields of knowledge: The interlocking of theory and practice in social research and development* (pp. 211–246). London: Routledge.
- Agrawal, A. (1995). Indigenous and scientific knowledge: Some critical comments. *IK Monitor*, 3(3).
- Briggs, J. (2005). The use of indigenous knowledge in development: Problems and challenges. *Progress in Development Studies*, 5(2), 99–114.
- Briggs, J., & Sharp, J. (2004). Indigenous knowledges and development: A postcolonial caution. *Third World Quarterly*, 25(4), 661–676.
- Bruckmeier, K., & Tovey, H. (2008). Knowledge in sustainable rural development: From forms of knowledge to knowledge processes. *Sociologia Ruralis*, 48(3), 313–329.
- Buttel, F. H., Larson, O. F., & Gillespie, G. W. (1990). *The sociology of agriculture*. New York: Greenwood Press.
- Carolan, M. S. (2006a). Science, expertise and the democratisation of decision-making. *Society and Natural Resources*, 19, 661–668.
- Carolan, M. S. (2006b). Sustainable agriculture, science and the co-production of 'expert' knowledge: The value of interactional expertise. *Local Environment: the International Journal of Justice and Sustainability*, 11(4), 421–431.
- Chambers, R., Pacey, A., & Thrupp, L. A. (1989). *Farmer first*. London: Intermediate Technology.
- Chi, M. T. H. (2006). Two approaches to the study of experts' characteristics. In A. K. Ericsson (Ed.), *The Cambridge handbook of expertise and expert performance* (pp. 21–38). Cambridge: Cambridge University Press.
- Clancey, W. J. (2006). Observation of work practices in natural settings. In A. K. Ericsson (Ed.), *The Cambridge handbook of expertise and expert performance* (pp. 127–145). Cambridge: Cambridge University Press.
- Cochrane, W. W. (1979). *The development of American agriculture*. Minneapolis: University of Minnesota Press.
- Collins, H. M., & Evans, R. (2002). The third wave of science studies: Studies of expertise and experience. *Social Studies of Science*, 32, 235–296.
- Collins, H. M., & Evans, R. (2007). *Rethinking expertise*. Chicago and London: The University of Chicago Press.
- Dancey, R. J. (1993). The evolution of agricultural extension in England and Wales. *Journal of Agricultural Economics*, 44(3), 375–393.
- Donovan, K., & Gkartzios, M. (2014). Architecture and rural planning: 'Claiming the vernacular'. *Land Use Policy*, 41, 334–343.
- Dove, M. R., & Kammen, D. M. (2001). Vernacular models of development: An analysis of Indonesia under the 'New Order'. *World Development*, 29(4), 619–639.
- Eden, S., Donaldson, A., & Walker, G. (2006). Green groups and grey areas: Scientific boundary-work, nongovernmental organisations, and environmental knowledge. *Environment and Planning A*, 38, 1061–1076.
- Ellis, R., & Waterton, C. (2005). Caught between the cartographic and the ethnographic imagination: The whereabouts of amateurs, professionals and nature in knowing biodiversity. *Environment and Planning D: Society and Space*, 23, 673–693.
- Ericsson, A. K. (2006). An introduction to Cambridge handbook of expertise and expert performance: Its development, organization and content. In A. K.

- Ericsson (Ed.), *The Cambridge handbook of expertise and expert performance* (pp. 3–19). Cambridge: Cambridge University Press.
- Esparcia, J. (2014). Innovation and networks in rural areas. *Journal of Rural Studies*, 34, 1–14.
- Evetts, J., Mieg, H. A., & Felt, U. (2006). Professionalization, scientific expertise and elitism: A sociological perspective. In A. K. Ericsson (Ed.), *The Cambridge handbook of expertise and expert performance* (pp. 105–123). Cambridge: Cambridge University Press.
- Fazey, I., Evelyn, A. C., Reed, M. S., Stringer, L. C., Kruijssen, J., White, P. C. L., et al. (2012). Knowledge exchange: A review and research agenda for environmental management. *Environmental Conservation*, 40(1), 19–36.
- Feyerabend, P. K. (1982). *Science in a free society*. London: New Left Books.
- Fischer, F. (2000). *Citizens, experts and the environment*. Durham, NC: Duke University Press.
- Gkartziou, M., & Lowe, P. (2019). Revisiting neo-endogenous rural development. In M. Scott, N. Gallent, & M. Gkartziou (Eds.), *The Routledge companion to rural planning* (pp. 159–169). London: Routledge.
- Gkartziou, M., & Scott, M. (2014). Placing housing in rural development: Exogenous, endogenous and neo-endogenous approaches. *Sociologia Ruralis*, 54(3), 241–265.
- Gorz, A. (1993). Political ecology: Expertocracy versus self-limitation. *New Left Review*, 202, 55–67.
- Gupta, A. K. (1999). Science, sustainability and social purpose: Barriers to effective articulation, dialogue and utilization of formal and informal science in public policy. *International Journal of Sustainable Development*, 2(3), 368–371.
- Jasanoff, S. (2003a). Technologies of humility. *Minerva*, 41, 223–244.
- Jasanoff, S. (2003b). (No?) Accounting for expertise. *Science and Public Policy*, 30(3), 157–162.
- Jasanoff, S. (2003c). Breaking the waves in science studies: Comment on H.M. Collins and Robert Evans, 'The Third Wave of Science Studies'. *Social Studies of Science*, 33(3), 389–400.
- Klerkx, L., & Proctor, A. (2013). Beyond fragmentation and disconnect: Networks for knowledge in the English land management advisory system. *Land Use Policy*, 30, 13–24.
- Kloppenborg, J. (1991). Social theory and the de/reconstruction of agricultural science: Local knowledge for an alternative agriculture. *Rural Sociology*, 56(4), 519–548.
- Liberatore, A., & Funtowicz, S. (2003). 'Democratising expertise', expertising democracy: What does this mean, and why bother? *Science and Public Policy*, 30(3), 146–150.
- Ledger, A., & Slade, B. (2015). Coproduction without experts: A study of people involved in community health and well-being service delivery. *Studies in Continuing Education*, 37(2), 157–169.
- Long, N. (1992). From paradigm lost to paradigm regained? The case for an actor-oriented sociology of development. In N. Long & A. Long (Eds.), *Battlefields of knowledge: The interlocking of theory and practice in social research and development* (pp. 16–46). London: Routledge.
- Lowe, P. (2010). Enacting rural sociology: Or what are the creativity claims of the engaged sciences? *Sociologia Ruralis*, 50(3), 311–330.
- Lowe, P., & Phillipson, J. (2006). Reflexive interdisciplinary research: The making of a research programme on the Rural Economy and Land Use. *Journal of Agricultural Economics*, 57(2), 165–184.
- Lowe, P., Murdoch, J., & Ward, N. (1995). Beyond endogenous and exogenous models: Networks in rural development. In J. D. Van der Ploeg & G. Van Dijk (Eds.), *Beyond modernisation: The impact of endogenous rural development* (pp. 87–105). Assen, Netherlands: van Gorcum.
- Lowe, P., Ray, C., Ward, N., Wood, D., & Woodward, R. (1998). Participation in rural development: A review of European experience. *Centre for rural economy research report*. Newcastle University.
- Mackinson, S., & Nøttestad, L. (1998). Combining local and scientific knowledge. *Reviews in Fish Biology and Fisheries*, 8(4), 481–490.
- Marini, M., & Mooney, P. H. (2006). Rural economies. In P. Cloke, T. Marsden, & P. H. Mooney (Eds.), *Handbook of rural studies* (pp. 91–103). London: Sage.
- Mieg, H. A. (2006). Social and sociological factors in the development of expertise. In A. K. Ericsson (Ed.), *The Cambridge handbook of expertise and expert performance* (pp. 743–760). Cambridge: Cambridge University Press.
- Morris, C. (2018). Expert and lay environmental knowledges. In N. Castree, M. Hulme, & J. D. Proctor (Eds.), *Companion to environmental studies* (pp. 767–771). London: Routledge.
- Murdoch, J., & Clark, J. (1994). Sustainable knowledge. *Geoforum*, 25(2), 115–132.
- Nercissians, E., & Fremery, M. (2008). Vernacular languages and cultures in rural development: Theoretical discourse and some examples. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, 109(1), 65–84.
- Norgaard, R. (1992). Coevolution of economy, society and environment. In P. Ekins & M. Max-Neef (Eds.), *Real-life economics: Understanding wealth creation* (pp. 76–88). London: Routledge.
- Nowotny, H. (2003). Democratizing expertise and socially robust knowledge. *Science and Public Policy*, 30(3), 151–156.
- Nowotny, H., Scott, S., & Gibbons, M. (2001). *Re-thinking science: Knowledge and the public in an age of uncertainty*. Cambridge: Polity.
- OECD (2006). *The new rural paradigm: Policies and governance*. Paris: OECD.
- Petts, J., & Brooks, C. (2006). Expert conceptualisations of the role of lay knowledge in environmental decisionmaking: Challenges for deliberative democracy. *Environment and Planning A: Economy and Space*, 38(6), 1045–1059.
- Phillipson, J., Lowe, P., Proctor, A., & Ruto, E. (2012). Stakeholder engagement and knowledge exchange in environmental research. *Journal of Environmental Management*, 95(1), 56–65.
- Phillipson, J., Proctor, A., Emery, S., & Lowe, P. (2016). Performing inter-professional expertise in rural advisory networks. *Land Use Policy*, 54, 321–330.
- Prior, L. (2003). Belief, knowledge and expertise: The emergence of the lay expert in medical sociology. *Sociology of Health & Illness*, 25, 41–57.
- Proctor, A., Lowe, P., Phillipson, J., & Donaldson, A. (2011). Veterinary field expertise: Using knowledge gained on the job. *Veterinary Record*, 169(16), 408–410.
- Proctor, A., Donaldson, A., Phillipson, J., & Lowe, P. (2012). Field expertise in rural land management. *Environment and Planning A*, 44(7), 1696–1711.
- Ray, C. (2001). *Culture economies*. Newcastle: CRE Press.
- Reed, M. S., Fazey, I., Stringer, L. C., Raymond, C. M., Akhtar-Schuster, M., Begni, G., et al. (2013). Knowledge management for land degradation monitoring and assessment: An analysis of contemporary thinking. *Land Degradation & Development*, 24(4), 307–322.
- Rip, A. (2003). Constructing expertise: In a third wave of science studies? *Social Studies of Science*, 33(3), 419–434.
- Rist, S., Boillat, S., Gerritsen, P. R. W., Schneider, F., Mathez-Stiefel, S. L., & Tapia, N. (2011). Endogenous knowledge: Implications for sustainable development. In U. Wiesmann & H. Hurni (Eds.), *Research for sustainable development foundations, experiences, and perspectives* (pp. 119–146). Switzerland: NCCR University of Bern.
- Rivera, W. M., & Sulaiman, V. R. (2009). Extension: Object of reform, engine for innovation. *Outlook on Agriculture*, 38(3), 267–273.
- Shove, E., & Rip, A. (2000). Users and unicorns: A discussion of mythical beasts in interactive science. *Science and Public Policy*, 27(3), 175–182.
- Shortall, S. (2012). The role of subjectivity and knowledge power struggles in the formation of public policy. *Sociology*, 47(6), 1088–1103.
- Shucksmith, M. (2000). Endogenous development, social capital and social inclusion: Perspectives from LEADER in the UK. *Sociologia Ruralis*, 40(2), 208–218.
- Swanson, B. E., Bentz, R. P., & Sofranko, A. J. (1997). *Improving agricultural extension: A reference manual*. Rome: FAO.
- Tahoun, S. A. (2003). Traditional knowledge in the context of the UN Convention to combat desertification. In: Z. Adeel (Ed.) *Sustainable management of marginal drylands*. UNU Desertification Series no. 5, UNU: Tokyo.
- Turner, S. (2001). What is the problem with experts? *Social Studies of Science*, 31(1), 123–149.
- United Nations General Assembly (2015) Multi-stakeholder partnerships. Sustainable development knowledge platform website (accessed 1st November 2018). <https://sustainabledevelopment.un.org/sdinaction.html>.
- van der Ploeg, J. D., & Long, A. (1994). *Born from within: Practice and perspectives of endogenous rural development*. Assen, Netherlands: Van Gorcum.
- Upton, D. (1983). The power of things: Recent studies in American vernacular architecture. *American Quarterly*, 35(3), 262–279.
- Ward, N., Atterton, J., Kim, T.-Y., Lowe, P., Phillipson, J. & Thompson, N. (2005) Universities, the knowledge economy and 'neo-endogenous rural development'. Centre for Rural Economy Discussion Paper 1.
- Weingart, P. (2003). Growth, differentiation, expansion and change of identity – The future of science. In B. Jorges & H. Nowotny (Eds.), *Social studies of science and technology: Looking back ahead, Sociology of Sciences Yearbook* (pp. 183–200). Dordrecht: Kluwer Academic Publishers.
- Whatmore, S. (2009). Mapping knowledge controversies: Environmental science, democracy and the redistribution of expertise. *Progress in Human Geography*, 33 (5), 587–599.
- Wynne, B. (1996). May the sheep safely graze? A reflexive view of the expert-lay knowledge divide. In S. Lash, B. Szerszynski, & B. Wynne (Eds.), *Risk, environment and modernity: Towards a new ecology* (pp. 44–83). London: Sage.
- Wynne, B. (2001). Creating public alienation. *Science as Culture*, 10, 445–481.
- Wynne, B. (2003). Seasick on the third wave? Subverting the hegemony of propositionalism: Response to Collins and Evans. *Social Studies of Science*, 33 (3), 401–417.