

Knowledge networks for sustainable agriculture in England

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Abstract: *The agricultural knowledge and information system (AKIS) in England has become more fragmented since the late 1980s. Its market orientation came just at the time of an increased need for non-market advice, particularly on the environment. Results from 11 face-to-face interviews and a workshop with a range of industry representatives suggest that this disjuncture and the unregulated nature of the AKIS have been frustrating for many in the agricultural community. These results support the literature in suggesting that sustainable agriculture (SA) has no consensual definition, but there is agreement that it requires a blend of market and non-market actions. Knowledge on SA is developing via retailers and consumers as well as farmers themselves, often through networks and co-learning, stimulated by regulatory requirements and grant information as well as profitability. There is much innovation in learning about SA within the AKIS, but its uptake is likely to be most strongly influenced by policy signals that provide incentives to farmers to farm more sustainably – for example, through the axes of the Rural Development Programme for England (RDPE) and a clearer justification as to why sustainable principles in agriculture make sound business sense for farmers.*

Keywords: *sustainable agriculture; agricultural knowledge systems; networks; co-learning*

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The agricultural knowledge and information system in England

This paper addresses the issue of how best to transmit information and knowledge (I&K) about the principles and practice of sustainable agriculture (SA) to farmers, food producers and the consuming public in England. This is important because it is recognized that SA requires a broader range of I&K to embrace non-market values, such as the environment, landscape, animal welfare, waste management and so on, than the I&K sets that are required for food production alone. I&K for SA also represent a 'new' set of I&K for many in the industry. The paper draws on research from a European Framework VII research project exploring the development of 'learning

networks' for SA across Europe. The structure of the I&K system in England is briefly reviewed in terms of how well suited it is to the needs of SA. The methodology outlines the nature of the literature review, interviews and workshop conducted in the development of the research. The principal issues concerning I&K for SA are then assessed in a results section before a discussion and conclusions are offered regarding the scope for improvement in conveying the SA message.

Until the late 1980s, a centrally funded state agricultural knowledge and information system (AKIS) had the singular purpose of increasing food production. It had various components. New knowledge (from research stations and universities) fed education (universities), training (colleges) and advice (led by the Agricultural

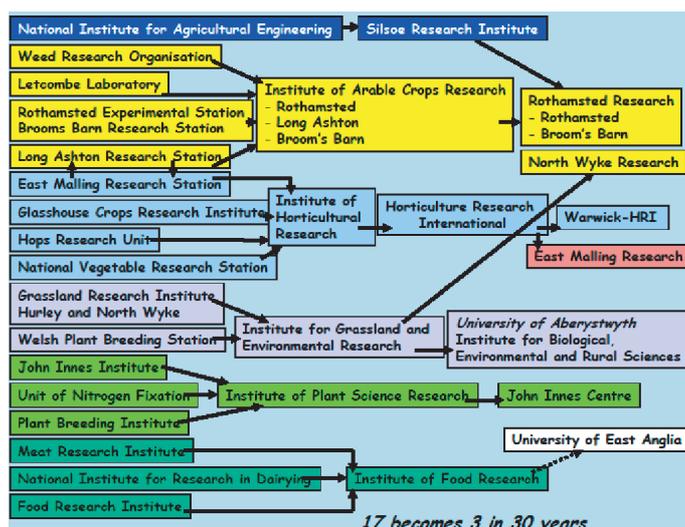


Figure 1. Contraction of research institutes in England from 1979 to 2009.
 Source: Food Research Partnership (2009).

Development Advisory Service, ADAS) within an integrated or ‘closed’ system. The privatization of ADAS in the late 1980s was probably the most prominent event for many in the dismantling of this system as the AKIS became *laissez-faire*. Near-market (rather than non-market) research became dominant, funded by the private sector (often agricultural suppliers) and the levy boards (Government Office for Science, 2010). Seventeen research stations reduced to three (Figure 1), colleges closed (Llewellyn, 2011), university faculties merged (Slee, 2005) and the Agricultural Training Board was disbanded. Trust between farmers and government diminished as a result (MacDonald, 2011) and social networks between farmers and (usually state) advisers were lost (Hall and Pretty, 2008; Pretty, 2009).

But just as the AKIS was becoming a fragmented ‘open’ market phenomenon, the need for new non-market knowledge for an environmental turn in agriculture (triggered by the Agriculture Act 1986 and European policy) was becoming more pressing. The disjuncture between market-based advisory services and the (policy-driven) need for non-market advice was born. The *laissez-faire* nature of advice, too, meant that so many (often unregulated) advisory ‘services’ were appearing that many of those seeking advice turned their backs on it altogether: provision was just too complex to unravel (Dampney *et al*, 2001).

Despite Haskins’s (2003) attempt to rationalize the AKIS and other rural administrations, it still remains complex in 2012. At least 14 different types of actor in the English AKS can be identified from the literature. *Government departments* (for example, Defra) regulate and develop policy, whilst *government agencies* (Natural England, the Environment Agency) also facilitate technology transfer and fund research. At least four *research councils* (for example, the Biotechnology and Biological Sciences Research Council – BBSRC) fund agriculture and food-related research, along with dedicated *research institutes* (such as Rothamsted), which

themselves are distinct from *public sector research establishments* and a range of *private research associations*. *The Levy Boards* (such as DairyCo) also provide research and technology transfer, as do *higher education institutions* (universities and colleges), which also provide education and training.

Consultancy and advice are driven by a range of *food chain actors* such as merchants, processors and manufacturers, and there are increasing numbers of advisory functions offered by *farmers* themselves acting in concert. Distinct from these, land-based *consultancies* offer advice and extension, as do land-based *professional bodies* (such as the National Farmers’ Union – NFU and the Country Land and Business Association – CLA), which also have a lobbying function. *Trade associations* (for example, the National Association of British and Irish Millers – NABIM) offer information exchange, and an increasing range of *charitable trusts* are concerned to get their own messages across, particularly in the context of SA (for example, Linking Environment and Farming – LEAF and the Royal Society for the Protection of Birds – RSPB).

Within this infrastructure, NGOs and charities will offer advice to any farmer on conservation, landscape and natural resources. Farm business advice may come from the government’s Business Link, private agricultural consultants, commercial agronomists (employed by agrochemical firms), farm management companies and levy board extension officers providing a range of advice with different levels of interaction with the farmer (AEA Technology, 2010). Market and non-market advice commonly overlaps when regulation requires non-market action, and the nature of advice ranges from simply selling agrochemicals to providing high-quality whole farm planning (Marshall, 2002; Ingram and Morris, 2006). Tatchell (2005) estimated the BASIS-registered market-based advisory workforce to be in the region of 4,000 in England, with further hundreds offering environmental and other non-market advice.

Since the development of this *laissez-faire* AKIS, agriculture has become more multifunctional, adding to both the range and complexity of advice. Various partnerships, networks and coalitions have grown up in response to this complexity. These have originated broadly from one of two motivations: around a common issue (for example, organic farming, permaculture) connecting people with shared interests; or to achieve economies of scale in advice through enterprise gateways and knowledge hubs (for example, the Rural Enterprise Gateway). Such coalitions have originated from both suppliers and consumers of I&K in different combinations, and commonly make full use of the advantages of the computer age. Importantly, as the AKIS has become more complex, the stakeholder constituency has extended to embrace broader notions of rural development than just agriculture, and wider notions of ‘food’ than just conventional agricultural production.

The line between ‘market’ and ‘non-market’ I&K has also become increasingly blurred. Significant changes in government organization, too, such as the abolition of the Regional Development Agencies and bodies such as the Commission for Rural Communities have changed the

locus of, or left gaps in, recognized conduits of I&K provision.

The provision of non-market advice has been given renewed impetus under EU and international requirements in respect of, for example, water quality, greenhouse gases, cross-compliance and the Rural Development Programme. Frameworks and contracts have been introduced to deliver I&K needs, such as the Farm Advisory Service (overseen by Natural England) in respect of cross-compliance. Whilst information needs are most pressing to ensure regulatory conformity (Garforth *et al*, 2003; House of Commons Environment, Food and Rural Affairs Committee, 2011), a range of voluntary initiatives (such as the Pesticide Voluntary Initiative) have made further calls on advisory services. Defra recognizes the difficulty that farmers face and has tried to streamline and integrate its information and advice by providing web-based platforms such as the newly launched Farm Advisory Service.

Method

A systematic review of the literature was undertaken on the operation of the English Agricultural Knowledge System (AKS) as a whole, covering farm advisory services, privatization, environmental transition, and advice for sustainable agriculture. It embraced policy and professional literature as well as academic work. Little commentary was uncovered about innovative bottom-up approaches to knowledge transfer. A set of issues was synthesized from this review to form the basis of a series of semi-structured discursive interviews about the AKIS.

Some 11 'expert' interviews were conducted to allow 'agenda setting' to take place for a workshop for those involved in various parts of the English AKS. The interviewees cannot be identified individually as anonymity was ensured as part of the interview schedule, but they included senior staff in three farmer representative groups and two other agriculture-related industry bodies; two non-governmental organizations with concerns for food and wildlife respectively; two education and training bodies; and two government department representatives. Whilst this sample was not large enough to be stratified, these representatives were selected to ensure a range of views relating to the AKS. The interviews were transcribed and summaries were then grouped into thematic issues identified as a result of the systematic literature review. Those interviewed then attended a workshop with the research team to discuss the preliminary findings from the interviews and the common themes that emerged. A series of interactive 'post it' boards was developed, which were then categorized, grouped and analysed subsequent to the workshop.

Results: views of the English AKIS

The results of the interviews suggest that the unregulated I&K market can be overcrowded, confusing and overlapping. Its unregulated nature is a cause for concern:

'too many people are trying to sell stuff with their own interests at heart' (Interview 7).

Such comments echo the Curry Report (Defra, 2002), which concluded that services such as Farm Business Advice are, at best, of variable quality. The impermanence of many I&K suppliers (and frequent staff turnover) is frustrating and is seen as part of the infrastructure of 'initiative overload' (Interview 5). The broadening of the information base available has exacerbated this at a time when a farmer's available time for assimilating I&K is considered to be reducing. But here, farmers' needs can be complex. Whilst integration of advice is favoured, information needs are becoming increasingly diverse – and increasingly less likely to come from a single source. Several interviewees conceded the inevitability of a fragmented AKIS because of this.

Changing farm structures (increasing farm sizes and an ageing farm population in particular) are also felt by interviewees to be shifting the demand for both the amount and type of farm advice. Advice is becoming more demand-driven, and the Internet (and other digital communication) is increasingly serving this need. Doubt was expressed, however, about the reliability of such I&K, and its pervasiveness amongst farmers is also seen as a limitation: only 50% of farmers have ready access to the Internet (McElwee and Bosworth, 2010). All of these factors have led to a degree of animosity among I&K consumers, who find it less easy to afford (and less easy to determine its value) when it has to be paid for at the point of use. This limits the purchase of I&K to that which is of clear and immediate commercial value: that which improves production methods.

Results: understandings of sustainable agriculture

Whilst there is, of course, no consensual definition of SA, there is wide recognition that it requires a blend of both market and non-market goals for which the AKIS described above is not best suited. Popular principled definitions, for example, stress SA as a social and environmental, as well as economic process of resilience:

'a system . . . that can indefinitely meet the requirements for food and fibre at socially acceptable, economical and environmental costs' (Crossen, 1992).

'the ability to maintain productivity, whether of a field, farm or nation, in the face of stress or shock (such as increasing salinity, or erosion, or debt, or a new pest, or a rare drought or a sudden massive increase in input prices)' (Conway and Barbier, 1990).

The BBSRC (2002) definition of SA also embraces the social and environmental, as well as the productive:

'socially acceptable systems for the production of crops and farmed animals that are maintained in a stable and productive equilibrium with the broader environment, so that environmental and financial risks are minimised and the choice of future agricultural practices is not compromised'.

Defra's five elements of SA (cited in Environmental Challenges in Farm Management, 2012) also embrace food

quality and animal welfare in the context of a competitive food industry:

- ‘ensuring the continuing availability to the consumer of adequate supplies of, wholesome, varied and reasonably priced food, produced in accordance with generally accepted environmental and social standards;
- maintaining a flexible and competitive industry which contributes to an economically viable rural society;
- ensuring effective protection of the environment and prudent use of natural resources;
- conserving and enhancing the landscape, wildlife, cultural and archaeological value of agricultural land; and
- respecting a high level of animal welfare.’

For some of the interviewees, SA is seen as an ethical obligation, but others, more pragmatically, see it as a possible compromise with rational business behaviour. Some feel that profit or income maximization is the most ‘sustainable’ form of agriculture as it means staying in business. Conversely, others feel that sound business principles have to be founded on embracing the notions of SA.

Some interviewees offered examples of SA practice. Their constructs include practices such as minimum tillage, permaculture, short food chains, biodynamics and organic farming. Whilst some have been critical of these approaches, others have noted a paucity of technical I&K in many of these areas (Ingram, 2010) and lack of ‘establishment’ support, except perhaps in respect of environmental considerations (Ingram and Morris, 2006). In respect of knowledge paucity, ‘bottom-up AKIS’ has tended to grow to fill market gaps: knowledge from good practice within. Paradoxically, some interviewees feel that some of the most innovative of these networks are also the most inward-looking.

Most fundamentally, interviewees felt that the main inhibitor in the uptake of SA was that farmers could not see why they should adopt sustainable principles. This is particularly problematic where low farmer turnover and the ageing farm population tend to inhibit the speedy uptake of new ideas. The policy rhetoric is strong, but the justification is weak. How is climate change mitigation affected in practice, for example? How can the most effective Entry Level Stewardship (ELS) option be determined? There is a lack of evidence about why SA is in the commercial interests of farmers. What are its demonstrable outcomes?

Despite the non-market characteristics embedded in SA, a number of factors have nevertheless served to stimulate SA advice. Interviewees felt that farmers accessed information for one of three reasons: for grants and incentives; regulations and compliance; and business efficiency. As long as advice about SA falls into one of these categories, it will be taken up effectively. Further, food retailers are felt to be influencing farm advice through quality requirements and a need at least to be perceived to be sustainable. The public is also (at least in part) demanding food with a range of (what are perceived to be) sustainable credentials, not least traceability and locality. Here, productive goals are seen as becoming less distinct from environmental and food quality ones, in which what might have been considered a paradox

several years ago – *sustainable intensification* – is being given serious consideration in the context of biotechnologies.

Interviewees also felt that reforms to the Common Agricultural Policy in 2013, and particularly to the Rural Development Programme, would provide both incentives and regulations for low-carbon farming that, for example, would stimulate the demand for sustainability advice and possibly increased state funding for I&K in the non-market domain. A number of interviewees felt that a policy commitment to SA had not hitherto had an impact in England relative to the rest of Europe.

Some aspects of sustainable agriculture were felt by interviewees to be commercially viable, particularly in the domain of renewable energy. All of these factors, it was felt, were leading to a perceptible shift towards more collaboration amongst farmers to increase the capacity for I&K consumption across the sector. A slight increase in ‘hobby’ farming, too, was considered by some to be moving the boundaries between commercial and SA. All of this was increasing the demand for SA advice.

Discussion: innovation in learning for sustainable agriculture

Based on the interviews and workshop, it was felt that although the English AKIS was a *laissez-faire* model, it was what Winter (1997) called an ‘open’ system so that at least access to it was available to all who wanted it. It can be harnessed through the development of networks for learning about new ideas (Garforth *et al*, 2003) and such ideas are quickly made available. In this respect, the interviewees mentioned I&K relating to organic farming, local and community food production and marketing, food assurance, animal welfare, diversified crops such as energy, pharmaceutical crops and on-farm energy production. In these areas, there are new entrants who are generally familiar with information manipulation and networking.

Networks can be useful vehicles for learning in these new areas and, whilst for traditional producers this might suggest a change in approach (Slee, 2005), they are on the increase in areas such as environmental management (Mills *et al*, 2011). Where these have developed from the bottom up, what is termed ‘co-learning’ is felt to be on the increase, with local farmers’ groups learning mutually. Good facilitation is important in these networks, as well as enthusiasm and commitment, of course. In this way, traditional networks (built, for example, around farmers’ clubs and auction markets) are giving way to those triggered by more specialist interests. Commonly, they take place on-farm, focusing on best practice. Two interviewees noted that specific funding for ‘animators’ of such networks was under consideration in the post-2013 Rural Development Programme for England (RDPE). Often small networks of farmers, once they reach a critical threshold, can interact with agencies and receive funding and support. A good example of this is the Pontbren farmer group in Wales (Mills *et al*, 2011).

Many membership organizations also assist in the development of networks. Bodies such as the Permaculture Association, Sustain and the Soil Association offer advice as well as lobbying for policy

change. Food assurance schemes such as the LEAF Marque also support producers by offering accreditation and standard setting. Community-supported agriculture (CSA) initiatives are supported by their members and other actors such as local authorities. Partnership projects such as the Lottery-funded *Making Local Food Work* or the *Brighton & Hove Food Partnership* provide information and can direct people towards funding and networking opportunities. There are natural limitations to such networks, of course, when farmers feel that they are in competition with each other or when the information to be shared is commercially sensitive. A proportion of all new information, too, must come from the 'top' and filter down, generated through national and international research.

In addition to Defra policy rhetoric in respect of environmental quality in farming, the Technology Strategy Board (TSB) has funded Environmental Sustainability Knowledge Transfer Networks to develop innovation through knowledge exchange (Miller, 2011). The government action plan for non-food crops also covers areas such as tackling climate change, funding more scientific research and increasing the use of sustainable products (Defra and DTI, 2004). The Department for Energy and Climate Change also funds the National Centre for Bio-renewable Energy Fuels and Materials. The RDPE, too, provides support for SA beyond environmental measures, in terms of both finance and advice, as does EU convergence funding in Cornwall.

Conclusions: effective support for sustainable agriculture

Whilst farmers are becoming increasingly market-led in terms of both production and advisory services, the research reported here suggests a growth in networks of farmers developing knowledge and innovation from the 'bottom up', through mechanisms of co-learning. Such networks, whether diffuse (through the Internet) or close-knit, are influenced by new rural actors and collaborations which bring insights and different information traditions and cultures to bear on the way in which food is produced. These networks too are serving to redress the 'disconnect' between knowledge providers and knowledge users in agriculture, perceived by a number of our interviewees.

Increasingly, the RDPE is supporting these new innovations, which, in sustainability terms, often have environmental, carbon reduction and ecosystem service principles at their core. Such principles are increasingly permeating mainstream agriculture, with more than 60% of farms currently involved in at least Entry Level Stewardship (ELS). Networks such as LEAF are also now firmly part of the farming establishment.

In tandem with these 'pull' factors, farmers are being 'pushed' into reducing inputs in the face of increasing fertilizer and fuel costs. Consumers too are playing their part in the move towards sustainable practices, with demands in relation to, for example, food standards and animal welfare, leading to developments in the areas of accreditation, assurance schemes and community-supported agriculture. Undoubtedly, progress is being made, but ultimately tensions will endure between the

market signals that a profitable agriculture rightly responds to and the non-market principles that SA implies. The size and strength of state support for sustainability principles will define the extent to which these tensions will be ameliorated.

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