

# *Adapting to new challenges: extension theory and practice for the 21st century*

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# **Adapting to new challenges: extension theory and practice for the 21<sup>st</sup> century<sup>1</sup>**

Chris Garforth<sup>2</sup>

## *Abstract*

Twenty first century challenges facing agriculture include climate change, threats to food security for a growing population and downward economic pressures on rural livelihoods. Addressing these challenges will require innovation in extension theory, policy and education, at a time when the dominance of the state in the provision of knowledge and information services to farmers and rural entrepreneurs continues to decline. This paper suggests that extension theory is catching up with and helping us to understand innovative extension practice, and therefore provides a platform for improving rural development policies and strategies. Innovation is now less likely to be spoken of as something to be passed on to farmers, than as a continuing process of creativity and adaptation that can be nurtured and sustained. Innovation systems and innovation platforms are concepts that recognise the multiple factors that lead to farmers' developing, adapting and applying new ideas and the importance of linking all actors in the value chain to ensure producers can access appropriate information and advice for decision making at all stages in the production process. Concepts of social learning, group development and solidarity, social capital, collective action and empowerment all help to explain and therefore to apply more effectively group extension approaches in building confidence and sustaining innovation. A challenge facing educators is to ensure the curricula for aspiring extension professionals in our higher education institutions are regularly reviewed and keep up with current and future developments in theory, policy and practice.

## *Keywords*

agricultural extension, innovation, collective action

## Introduction

I heard some good news last week. A colleague at University of Reading, an agricultural economist from Malawi now working as a research fellow at Reading, gave a seminar paper exploring the hypothesis that productivity on small farms is affected by the security of the farmers' tenure in his or land. His conclusion, based on a survey of 110 farms and some clever econometric modelling, was that security of tenure was not a significant factor in farm productivity. However, two other factors did emerge as significantly associated with productivity. One was group membership: farmers who belong to a group, such as a cooperative, or a farmer field school, or a village association, have higher yields per hectare than those who do not. The other was extension: those in contact with extension officers

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<sup>2</sup> Professor of Agricultural Extension and Rural Development, University of Reading, PO Box 237, Reading RG6 6AR, UK. *email:* c.j.garforth@reading.ac.uk

enjoy significantly higher yields than those who are not. As a professor of agricultural extension, I enjoyed hearing a hard-nosed economist confirming what farmers have always known: access to sound knowledge, information and advice is a critical factor in their being able to manage their resources well.

Also in the last two weeks, we have been welcoming new PhD students to Reading – students from Nigeria, India, Ghana, Malawi, Canada, joining existing PhD students from The Philippines, Ghana, India, Nepal, Mexico, Kenya and elsewhere, all exploring different facets of this search by farmers for information and knowledge to support innovation and adaptation in the face of the changing and challenging environments that confront them. As the level of participation and interest in this conference shows, agricultural extension – as a field of research and of practice – is as relevant now as it has ever been. And at Reading, our postgraduate teaching and research programmes continue to evolve to meet the changing needs of those who have a professional and academic commitment to it – as I am sure it does in the institutions where you work.

#### Farmers' information and knowledge needs

Our understanding of what knowledge, information and advice farmers need has matured from seeing the issue in simple terms as 'transfer of technology' and 'diffusion of innovations' (Rogers 1962; Rogers 2003) towards recognition of six main areas. The first is an understanding of the basic biological and physical systems that sustain agricultural production. While 'modern' science has a lot to contribute here, local knowledge of ecosystems, microclimates, soils, social systems and markets is also invaluable. As the International Assessment of Agricultural Science and Technology for Development (IAASTD) acknowledged (McIntyre, Herren et al. 2009), blending the insights of different knowledge systems offers a sound basis for coping with current and future challenges. Secondly, if producers are to make sound decisions about future production strategies, they need information on current and new technology, and its performance in real farm settings. Often in the past, the promotion of new practices and technologies has been isolated from any analysis of their economic performance from the perspective of the farm and the household, with producers urged to take up new ideas for which there is little economic justification. This leads to the third and fourth areas: business management advice, and information on markets, including an ability to investigate market opportunities. 'Farming as a business' has now become a recurring motif in many national agricultural strategies, for example within Uganda's Plan for Modernization of Agriculture (PMA (Government of Uganda 2001)), Ethiopia's Agriculture Development-Led Industrialisation (Samuel Gebreselassie, Amdissa Teshome et al. 2009) and several national Poverty Reduction Strategies as well as in the EU's rural development policy (European Commission 2008). Information on markets includes knowledge of how producers can link to markets, with associated information on national and (for export commodities) international regulations and consumers' market requirements. Information on domestic policy and regulation, and what farmers can or need to do in order to comply, is the fifth area and has become increasingly important for farmers in developed economies who have seen fundamental shifts in policy with regard to environmental

regulation and the role of food production in sustainable rural development. The sixth is regular and timely information on prices.

These needs range from knowledge that remains relatively stable over time, through information and advice that inform strategic choices, to information for immediate decisions. It is hardly surprising that farmers with multiple requirements seek and use multiple sources of advice and information.

A challenge to those wanting to design a national comprehensive extension system is the diversity of the national agricultural sector within most countries. Many farms are small enterprises, often contributing only a modest proportion of the income or livelihood of the households that operate them. Part-time farming is a well established trend in sub-Saharan Africa (Ellis 2000), which affects the information seeking behaviour and motivation to develop the farm business. In an EU setting, very small farm enterprises with a single operator, are a common feature of the more remote parts of Finland and have become a particular target for programmes to support rural economic and social development, for example through training courses aimed to develop entrepreneurial attitudes and skills (Mäkinen, Lemetyinen et al. 2007).

#### Farmers' access and response to new ideas and technology

Globally, most research on farmers' use of sources of information and advice points to 'other farmers' within the locality as the most proximate source, particularly at the point of decision on whether or not to make a change in their production system. Other sources – mass media, professional advisers, input suppliers, purchasers – are relevant sources of background information. In the UK and other developed economies, supermarkets and those who source their stock have also become significant influences on what farmers do.

However, extension systems that try to build on and accelerate the 'natural' diffusion of new ideas among farmers have not been particularly successful. The World Bank promoted the 'Training and Visit' system for over 20 years in Asia and Africa, before recognising its conceptual flaws and operational inefficiencies in the mid 1990s (Anderson and Feder 2004), mirroring on a large scale the fate of national Pupil Farmer and Master Farmer schemes of earlier colonial and post-independence states in southern Africa. Farmers are now recognised as active seekers of advice, information and opportunities to learn how to improve their production systems and livelihoods rather than a set of traditional producers who need to be persuaded to take on board new ideas in the interests of the wider public.

At the same time, motivation for change varies between farmers: economic factors are important, but not necessarily the dominant drivers particularly in situations of livelihood diversity and competing opportunities. A small but significant number of dairy farmers in New Zealand, for example, has moved to milking their cows once instead of twice a day: motives for this change range from shortages or high prices of feed to a lifestyle choice for the farm family and its hired labour force (Bewsell, Clark et al. 2008). Producers' motivation for moving into or staying in farming varies with their values and objectives and with their family and business circumstances: it cannot be reduced to a simple 'profit maximisation'

construct. This is seen in all kinds of decisions, from responses to policy changes that affect the farm-level economics of food production (Garforth, Rehman et al. 2006) to decisions whether or not to take up new ideas which have been shown to offer an economic benefit (Rehman, McKemey et al. 2007).

There is clear evidence that the way in which information and advice services are provided has an effect on equity of access to and use of services. Women, who in many systems are the main producers of food crops and managers of livestock, are particularly disadvantaged through, for example, the inbuilt bias of services dominated by male professionals and inability to access training events that take place away from their home community because of child care and other responsibilities (McIntyre, Herren et al. 2009). Culture may also make it difficult for them to seek advice from male extension agents. Other sources of inequity include group membership and poverty: where services are provided through existing farmer groups or co-operatives, non-members lose out; while elite capture of available services is well documented, for example in recent research on the National Agricultural Advisory Services in Uganda (Bukonya 2009).

### Current trends in provision

Throughout the second half of the 20th century, it was widely assumed that the state should both fund and deliver extension services. It is now recognised that funding and delivery can be separated. There are two sets of arguments behind this separation. First, since the 1980s and the rise of neoliberal economics in policy making, many have argued that delivery of services by government departments and agencies is inherently inefficient and that bringing in elements of market competition will enhance quality and efficiency. In developing countries, this argument was bolstered by the widespread perception that government extension services were overstuffed and lacked incentives to deliver advice in response to the expressed needs of farmers. Second, others have pointed to fundamental market failures in respect of information and advice (Beynon, Akroyd et al. 1998). Some types of information and delivery have strong public good characteristics limiting the potential of their being funded adequately by the private sector alone. At the same time extension services often deal with advice and information that is in the wider public interest (Röling 1988): farmers' production practices and land management decisions create externalities, both positive (including landscape and biodiversity benefits) and negative (pollution and health hazards). So there is a strong argument that the state should provide some funding for services where knowledge and information markets fail, but to do so by contracting private sector service providers (Garforth, Angell et al. 2003). This, though, should be done with caution because it is also now recognised that public funding can damage emerging commercial provision of knowledge and information services: for example public information centres providing services free of charge to users can undermine commercial internet cafes and other private sector services in developing countries.

These same arguments have led, in the first decade of the 21st century, to renewed enthusiasm for putting public funds into ensuring farmers have access to appropriate advice, information and knowledge services. In the EU, this is driven by concerns over food security,

environmental externalities, rural economic development and social exclusion and most recently the levels of greenhouse gas emissions from food production. Since the privatisation of public advisory services in England and Wales in the late 1990s, increasing amounts of public funding has gone into contracting the private sector to run advisory campaigns around the ‘stewardship’ agenda and subsidising access to business advice for farmers and other rural enterprises. In developing countries, after a sharp decline in international grants and loans to support extension services, donors are helping to finance initiatives that build both demand and supply within pluralistic systems. New policy frameworks have been put in place at national (e.g. India, Raabe 2008) and international levels (Chipeta, Christoplos et al. 2008) to guide future investment.

Increasing pluralism is seen by some as a positive development that meets the diversity of demand from farmers and stimulates quality and efficiency through competition (Garforth, Angell et al. 2003). Others see it as creating new inefficiencies through duplication and confusion in a fragmented market where producers have insufficient information on which to base a choice of supplier and where significant gaps in provision remain (The Curry Report: Policy Commission on the Future of Farming and Food 2002). One particular concern particularly in developing countries is over quality assurance for extension services and the related issue of continuing professional development for service providers who are no longer employees of a government department or agency. This has led to proposals for registers of approved service providers and a professional code of conduct to ensure that farmers can be confident in the quality of services for which they are expected to pay at least part of the cost.

Growing pluralism and the move away from service delivery by the state raises questions over what role, if any, governments should play in relation to information and advisory services. Beyond providing funding to address market failure, the public interest and externalities, to what extent should they seek to ‘manage’ a pluralistic system? Possible roles include setting up a quality assurance and legal framework within which private sector (commercial and not-for-profit) providers offer their services to protect farmers and ensure they can hold service providers to account, and providing seed money to stimulate demand and overcome entry barriers to the service provision market.

### Challenges and opportunities

The IAASTD summarised challenges that face farmers over the coming decades (McIntyre, Herren et al. 2009). These have significant implications for knowledge, information and advisory services, both demand and supply.

Climate change will lead to acceleration of environmental change for many farmers, requiring in turn faster and more fundamental change in technology and adaptation of production systems. In developing countries, those systems facing decline in precipitation and increase in temperatures will need to become even more efficient in water use and switch to more drought tolerant species and varieties. Developed economies are already recognising the need to reduce GHG emissions from agricultural production as part of their commitment to mitigation.

Food security concerns were stimulated by a spike in global food prices in 2007-2008. While prices have subsequently fallen back, it is recognised that current demographic and socio-economic trends will increase demand for food faster than the rise in population and that unless this demand is met by increasing supply, prices will rise and jeopardise access to food for poorer segments of the world's population. Increased production will have to come mainly from yield increases on existing productive land rather than expansion of production into new areas.

Livelihood concerns stem from the fact that food production is still a major source of income and security for many relatively poor and vulnerable households who face increasing competition in local markets from large-scale producers in their own country and from imported products. Larger scale producers are also better placed to take advantage of international trade opportunities because they can match the consistency in quality and quantity demands of purchasers, and cope with regulatory requirements more readily. New technology alone will not enable smaller producers to compete: institutional innovation is needed to facilitate aggregation, quality control and regulatory compliance.

On the other hand, information and communication technologies (ICTs) represent a major opportunity for improving access and efficiency of knowledge and information services for farmers. The most significant trend is the rapid spread of mobile telecommunication networks in rural areas in both developing and developed countries and the associated rise in the numbers of rural mobile phone users. This offers new opportunities for both one-way and interactive communication with and between farmers. There is interesting evidence of both demand and supply led service development here. Farmers are calling agricultural advisers for specific information or to arrange consultation, which represents a big reduction in transaction costs and consequent increase in efficiency. A wide range of organisations is using text messaging (SMS– Short Message Service) to disseminate timely information on market prices. Little research has been done on the impact of these services, but one study in Niger found a significant reduction both in price fluctuations and in price variations between markets following the introduction of market price information services through mobile phones (Aker 2008). Public-private partnership models are being used by provincial governments and telecommunications companies in China to establish telephone information and advisory services for farmers (Fang Yu, Garforth et al. 2009). China Mobile, now the world's largest mobile phone carrier with over 530 million subscribers, has launched its own service for farmers, combining market information and technology advice. Although the rural population lags behind urban areas in phone ownership, a familiar dimension of the digital divide across the globe, 37 percent of China's rural population already have mobile phones and the numbers continue to rise fast.

Internet use is rising less quickly, and usage rates in rural areas lag a long way behind urban areas. In Europe, lack or slow speed of broadband in many rural areas is seen by national and EU policy makers as a serious constraint on economic and social development, while small rural businesses including those in the food production sector are less likely to make use of the internet for accessing and exchanging information and for e-commerce than larger and urban businesses. In developing countries, lack of infrastructure, high cost of connections and

the lack of locally relevant content restrict growth. However convergence of technologies within new generations of mobile phones will make internet services increasingly accessible and we can expect demand to stimulate supply of internet products targeted at farmers.

Use of still and moving images in extension has a long history (Oakley and Garforth 1985). New generations of ICTs are increasing the scale and interactivity with which these can be used, from pest and disease diagnosis and surveillance through mobile phone images (Miller, Beed et al. 2009), to scaling up within and between regions the use of videos documenting local innovation processes (van Mele, Wanvoeke et al. 2010).

### Learning and innovation

Information, education, knowledge and advice are essential ingredients for successful innovation among farmers, but they cannot do the job alone. Local success stories of innovation and new entrepreneurial activity have identified training in business skills, support to marketing, and strong partnerships between farmers' organisations and sources of new technology as key factors alongside information in farmers' building of successful agricultural enterprises (MATF 2007).

Extension theory is catching up with practice. Innovation is now less likely to be spoken of as something to be passed on to farmers, than as a process that can be nurtured and sustained (Leeuwis and van den Ban 2004). Innovation systems and innovation platforms are concepts that recognise the multiple factors that lead to farmers' developing, adapting and applying new ideas and the importance of linking all actors in the value chain to ensure producers can access appropriate information and advice for decision making at all stages in the production process. They are central to new extension policies and strategies that are emerging across the world.

Similarly, while "group approaches to extension" have been widely applied for many years, through the application of theories drawn from social psychology and other disciplines there is now a better understanding of why these can be so effective. Concepts of social learning, group development and solidarity, social capital, collective action and empowerment all help to explain and therefore to apply more effectively group approaches in the support of innovation among farmers. "Discussion groups" have now become one of the main channels through which public sector advisers in Ireland interact with and support their farmer clients, building on the New Zealand experience with Monitor Farms (Teagasc 2008). Two well-established applications of group approaches are Landcare and Farmer Field Schools.

Landcare began in Australia in the 1980s as an autonomous development of farmer groups concerned about local land degradation and now comprises over 4000 groups which undertake local research, analysis and action co-funded by government, business and group members. A study by Sobels, Curtis and Lockie (2001) demonstrated that key to the success of Landcare groups are elements of social capital, including 'trust, norms, expectations of reciprocity, and linkages' (ibid: 265).

Farmer Field Schools originated in efforts to reduce rice farmers' dependence on chemicals to control insect and other pests in Indonesia, again in the 1980s. Supported by FAO and taken up by other international agencies and national organisations, FFS has become an international movement across all continents and a range of disciplines and enterprises. Although some have expressed scepticism about the cost-effectiveness of the FFS model (e.g. Feder, Murgai et al. 2003), a review by van den Berg and Jiggins of available evaluations (2007) demonstrated that there are both immediate and longer term benefits of farmers' participation in FFS, ranging from a reduction in pesticide use (representing savings for the farmers as well as an environmental benefit for the wider population) to increased capacity to make sound production decisions in the future. A key element of the FFS model is a process of local research and analysis by group members, supported by a trained facilitator, on the basis of which they decide on a course of action and then review the outcomes.

The FFS experience and other group approaches to supporting innovation highlight the need for appropriate knowledge and skills among those who facilitate these processes. Staff who were brought up in the 'technology transfer' tradition may need re-orientating towards a more participatory, interactive approach so that they can engage confidently in the co-production of knowledge with farmers and focus on the process of problem solving, learning and innovation.

### Conclusion

It is clear that current and anticipated challenges facing food production systems will create new demands for education, training and advisory services, and linking these services to applied research will help to ensure that providers have access to up to date knowledge. However 20th century models dominated by public sector funding and delivery are no longer appropriate. Creating space for civil society and the private sector, with regulation and targeted public investment to overcome market failures, should be the main focus of state activity in the 21st century. We have sufficient experience from the past 100 years to design systems that will support the supply of these services, while taking full advantage of rapid developments in ICT technology and infrastructure. The vitality of pioneering work in the non-government not-for profit sector continues to provide lessons and inspiration for the development of producer-focused support for innovation.

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