

Recent innovations in education-extension-research networks of industrialised agricultures

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Key points : In this paper we discuss the contributions that the education and extension systems in developed countries make towards building human capacity for grassland/rangeland farming practice . We approach this by reviewing a recent study on learning networks that involved nine European Union countries and by outlining the development of some new institutional arrangements that have emerged in Australia and in France . We show that farmers and agribusiness are playing a more dominant role in setting the agenda for capacity building in their respective industries , that this in turn depends on the emergence of innovative networking arrangements , and that shared perspectives of learning and change are required to adjust the expectations of multiple stakeholders .

Key words : extension , education , learning , networks

Building the capacity of our grassland/rangeland managers

Managers of grasslands and rangelands in developed countries confront an increasingly complex task to ensure their businesses are profitable and sustainable . This complexity is an outcome of four areas of change impacting on the management process : environment ; markets ; technology ; and the business itself . These areas have long been recognised as being responsible for change in farming practice ; however the way they impact has changed significantly over the past decade .

Environmental challenges include concerns over diminishing water resources and the consequences of global climatic change in terms of more unpredictable conditions at a local level . Competition is increasing for quality water resources and soils for grazing management . The cost of access to these resources is increasing as a consequence of this competition . Managers therefore need to re-evaluate the suitability of their farming systems to account for these changes . Climate change has recently become a popular doomsday topic in the media . While most of this coverage has focused on the long term impacts of climate *change* , such as global warming and rising sea-levels , the more immediate impact on graziers is the impact of climate *variability* . Greater fluctuations in seasonal rainfall events and variability in the length of effective growing seasons have meant that managers cannot rely on recipes or routines from the past to predict the next seasonal event .

Management challenges arising from changes in markets , technologies and business structures are the other factors responsible for the greater complexity in grassland management . Markets for meat and animal products are subject to more stringent quality standards and biosecurity regulations . Technological advances , particularly in information technologies , have placed a greater burden on managers to acquire new skills before they can access the potential of these technologies on farm . New business models are being used to attract new capital into rural regions . Often this new capital also introduces new guiding principles to the practice of grassland/rangeland management . For example , large tracts of Australian grasslands are under the control of superannuation fund schemes that are purchasing properties which were formerly family owned operations . Managers of these schemes are introducing new environmental and trading directives to a workforce of professional managers who now see farm management (cf . farm ownership) as a career option in its own right . In France , the trend in increasing farm size with shared ownership among farmers is inducing new business models . Whilst these changes occur there continues to be a long term trend of an ageing workforce with a corresponding loss of corporate knowledge .

Change is not confined to the business and technical aspects of grazing management systems . The extension and education systems of developed countries are also experiencing change . Some of this change is self determined , as a way to support managers as they adapt to the complexity challenges . We will focus primarily on these self determined changes . We need to outline the types of challenges that are confronting our extension and education systems in developed countries . First , trainees and new entrants to this system are predominantly recent graduates from the secondary or tertiary education system (Generation Y) who have short career planning horizons and high expectations of their employers . Access to and retention of experienced qualified trainers is becoming increasingly difficult for training organisations . Second , many developed countries have introduced user-pay schemes in an attempt to improve the efficiency of extension and education service provision . These schemes tend to be a brainchild of neo-classical economists working on financial policies that have impacts on the extension and education systems . The assumption is that market mechanisms are most efficient at determining the allocation of scarce resources , including skills and knowledge . Other changes , beyond the immediate control of extension and education systems , include advances in new learning technologies , particularly e-learning and interactive distance education . Regardless of these changes any adaptation of extension and education systems usually introduces an added complexity-that of aligning multiple stakeholders , often spanning local , state and federal levels of government . Also all these types of challenges impact on the extension and education organisations . We now give an account of some experiences that mainly address self-determined change .

Lessons from the LEARN group experience

The LEARN Group came together in the mid 1990's to develop processes for collective action at different levels of organisation (local, state and national). Cerf *et al.* (2000) reported on the Group's first round of work in terms of the concepts, facilitation processes and tools that supported participatory and learning approaches to agriculture in developed countries.

A second round of work was undertaken by Group members from nine countries from 2003 to 2005. The aim of this work was to determine how to involve diverse stakeholders in the co-development of a research agenda for a multi-functional European agriculture. Members searched the activities in research, development, extension and education in each of their respective countries to identify what was termed a promising configuration. This referred to a physical or virtual space that had a high potential for a partnership to emerge between the existing work and the LEARN Group. Each member was free to use the most appropriate method to engage and work with participants, including focus groups, workshops, systems mapping exercises and stakeholder analyses. Work at the individual country level was organised in two phases: work was undertaken at a local level to develop a specific promising configuration and thereby start to work collectively on issues that were at stake for those participating in the configuration (watershed management, challenges facing extension, organisational issues for marketing wine or organic products, community development...). The material was then collated and all participants from each local promising configuration were invited at a national level to discuss their way of collectively addressing the issues and interacting with researchers. A third step was to organise an international workshop where all participants from the various countries were invited. Posters allowed each participant to specify the main questions that arose in the national workshops, explaining how these emerged from the collective work, while round table activities allowed cross exchanges amongst the participants. The process generated material that was then analysed by the LEARN Group to develop a common position on a research agenda for learning processes in agriculture.

Hubert (2006) categorised the work areas across the nine countries as focusing on:

1. changing production systems (Belgium, Denmark, France, Greece)
2. changes in rural areas and the role of agriculture (France, The Netherlands, UK, Poland)
3. changes in agricultural advising (Australia, Hungary, France)

He explained that the last category included the topic of higher education and the training of advisors. Regarding this specific topic, the LEARN Group emphasised the need to better define the new skills and competencies required of our advisors in future. More precisely, it pointed to the need to develop methods that enable advisors to play mediation and brokering roles among various stakeholders. New methods were also required to integrate reflexivity and foster creativity in working processes. Such methods have to take into account the multi-cultural nature of the settings in which advisors might be involved and the social dimension that can either impede or foster innovation in such settings.

But some lessons can also be learnt from the bottom-up process that the LEARN Group used to build a research agenda in participatory research and extension. The LEARN Group found that the evolution of networks and organisation of learning partnerships depended on four key elements. First, the way the members initiated contact and invited participation was critical to the evolution of partnerships, even though the role of LEARN Group researchers varied with each local partnership. In some cases the researcher adopted a traditional role of operating external to the process by observing, recording and analysing the methods and processes that were responsible for the co-development of interactive learning. In other cases the researcher analysed the role of objects that mobilised action and built relationships. An object may be technical (eg. the impact of a new irrigation development programme) or social (eg. the impact of a new water allocation policy). Some researchers also facilitated early engagement activities, whereby researchers became active participants in the co-creation of new relationships, typical of participatory action research approaches. The particular role taken depended on the professional background of each researcher, as well as on the room given to researchers by the various stakeholders in a given promising configuration. But, in all situations, learning processes were at stake within the promising configuration and became an issue for researchers and stakeholders. Second, the group observed that it did not try to achieve a representative sample of partners relative to the situation and work area but rather to extrapolate relevant approaches and processes to a wider population. To extrapolate the group used a contrasting analysis during the LEARN Group workshops. Each experience (local, national) was contrasted with all the others in order to identify similarities and differences in learning perspectives, determine what was at stake collectively, and specify the learning and networking issues underlying each situation. Third, the group identified that this contrasting work was facilitated when participants could critically reflect on particular events or outcomes of the activities undertaken within each promising configuration. Therefore, the move from discussion to action in a promising configuration was essential for learning and change: taking joint action on an issue enriched the learning experience. Fourth, and finally, the learning activity itself was a critical element to the success of new partnerships. The Group included the content of learning (what is learnt), the learning process (how learning is practiced) and learning policy (norms of learning) as aspects of a learning activity.

The process resulted in the development of a research agenda for knowing and learning in developed countries; such an agenda being a core aim of the LEARN Group. The Group concluded that learning and knowing was an area requiring further

theoretical development in its own right . A concurrent area to advance was the process of learning-particularly the effectiveness of learning as a way of managing change relative to alternatives (e . g . the use of regulations or market mechanisms to achieve change) . The agenda also suggested that better approaches were required to evaluate and assess processes relevant to learning (eg . empowerment , identity building , sense making) . Other issues included institutional and organisational topics like governance , networks and levels of organisation . Part of the agenda identified the needs of professional practice , such as methodologies to broker reflexive practice among different stakeholders .

What are the implications of the LEARN Group experience to capacity building ? Early participation of key stakeholders during problem definition facilitates co-development and action . The problem context , selection of stakeholders and role of citizens is important but representativeness following classical sampling procedures is usually not appropriate to this type of bottom-up approach . A second level of conceptual analysis (e . g . contrasting experiences) is therefore required that enables a scaling up of findings from the local to the international-in this case spanning nine countries . Creating spaces for reflecting on and contrasting experiences among the researchers as well as among various stakeholders of the different countries was seen as a critical means to build a shared understanding of each experience and enable further development of the research agenda . Therefore , a type of applied social research was important to capture lessons and report progress at a country level : social research oriented towards reflexive practices . The larger objective , to build a research agenda for this emerging discipline , supports capacity building for the research community . Capacity is therefore built at two levels , first for stakeholders through a formal analysis of the development process and second , for LEARN Group researchers by better defining the research agenda that supports the discipline undertaking this analysis .

Developing new extension and education organisations in Australia

In this section we describe structural changes that have recently occurred in the Australian dairy industry to enhance capacity building for farmers . The year 2005 was one of significant structural change in the Australian dairy extension system . A Memorandum of Understanding was formed between Dairy Australia (an organisation that invests levy funds in innovations on behalf of farmers) and the Victoria Department of Primary Industries . This collaboration resulted in the formation of the Dairy Extension Centre (DEC) , a development that provided security of employment to extension staff , a critical mass of capability to the industry and a focal point for the professional development of extension agents . The DEC has an independent Board , chaired by a farmer , and a management team that reports to the Board , based on a three year business plan and an annual operating plan . Approximately half of the total resources of the DEC are allocated to productivity and industry development issues , 35% to natural resource management and the remainder to business development and emergency response .

In June 2005 Australian Dairy Farmers Ltd . (the industry's peak body farmer organisation) made a submission to a Federal Government review of rural skills training and research that ultimately resulted in the formation of a National Centre for Dairy Education (NCDEA) . The Centre was established as a partnership between Dairy Australia and GOTAFE (a tertiary training organisation) with a facility to form cooperative agreements with any other training organisation on an as needs basis . The NCDEA has a management committee that reports to a Board similar to the DEC . By the middle of 2007 the NCDEA had established working groups that were developing 63 training units spanning from Certificate II to Advanced Diploma level training . An electronic framework (StudySmart) was used to house all products that were developed for learners and trainers .

The formation of the DEC and NCDEA , within a year of each other , provided an opportunity to align responsibilities around the provision of extension and education services . Furthermore , it greatly increased the power that farmers could exert over development directions in extension and education . The common denominator between these two new structures was Dairy Australia . Partners to Dairy Australia in each case had very different missions and operating cultures (meaning the values and norms of the organisation) . The DEC is primarily aligned with an R&D culture whereas NCDEA operates in an education culture . A dilemma emerged in early 2006 when it became clear that both organisations were charged with a responsibility to build the human capacity of the industry .

Dairy Australia was uniquely placed to facilitate an alignment of efforts while leaving ultimate decision making to the governing Boards of each organisation . This facilitation took the form of forums hosted by each of the Boards . Independent presentations from academics were provided to open discussions on the respective roles of extension and education . The Informal Learning literature (eg . Cullen *et al* . , 2000) proved useful in the demarcation of roles and responsibilities . Informal learning refers to a workplace learning environment where the curriculum is negotiated and qualifications are not a necessary outcome of the learning experience . This position was adopted to represent a learning continuum that extends from informal to formal learning , indicating the relative roles of extension and education along this continuum (see Figure 1) . Roles overlap in the area of negotiated curriculum . Not surprisingly this is where methods and theories are also shared between the extension and education professions .

At the time of writing the alignment of the DEC and NCDEA is still a work in progress . Experience to date has identified several key lessons for the development of multi-stakeholder approaches to capacity building . Forums for critical debate need to form part of the negotiation process . Debate needs to span from the philosophy of education to the pragmatics of servicing farmers in diverse operating environments . It also needs to identify the competency expectations that each organisation has of

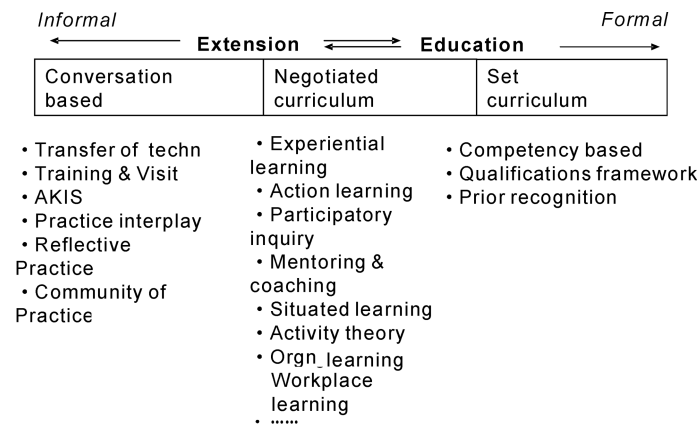


Figure 1 The learning continuum .

training providers and of learners . Questions may arise about intellectual property rights and equality of access , particularly in terms of distance education . In the Australian case the aspiration is to build industry capacity by aligning the learning continuum with the RD&E continuum to maximise contributions from education (eg . establishing core numeracy and literacy skills and applied computer skills) and research (eg . identify new possibilities for productivity and sustainability) .

Researching the linkages between research , extension and education in France

Extension in France is also facing new organisational challenges regarding its relationship to education and research . These challenges are coming to the fore because there is a debate (within the various industries and at the state level) about the economic resources that should be devoted to R&D , to extension , and to education . The questions include who should be charged , should the funds be public , levied on agricultural products or should the services be paid directly by farmers ? Other issues are also challenging the current relationship among extension , education and research , such as the implementation of various policies concerning water resource management , biodiversity management , and sanitary risk management . The recent Grenelle de l environnement is an illustration of the way the French State wishes to promote discussion among the various stakeholders concerning questions such as the development of new environmentally friendly farming systems , or the co-existence of GMO and non GMO within a given area . It is through this process that the State expresses its views about the changes that are seen as desirable changes in farming practices . But the road to follow remains unclear because new farming systems are always evolving and because new scientific knowledge is not always available for the design of such systems . Researchers develop new long term experiments to improve knowledge of such systems (the way to manage them and to assess them through various economic , environmental and social indicators) . Meanwhile , farmers experiment with some new farming practices and their experience can be relevant to others and become a source of inspiration for researchers . As well , some advisors have started to support farmers in changing their farming systems and help them to build new points of reference in order to adopt more environmentally friendly practices . But these various experiences remained unconnected until recently . In fact , since 2006 , a new public fund is dedicated to the promotion of networking activities between research , advisory and education organisations in so far as these activities support the implementation of some key policies and result in the improvement of capacity building among farmers through new curriculum or through new advisory approaches . A network has therefore emerged which opens the opportunity for new learning processes : research experiments are discussed by advisors and farmers involved in new farming experience at farm level . Advisors discuss ways to envision their supportive and learning role . This reflexive analysis of advisory practices , undertaken with the support of social researchers , is then used to design new curriculum to train advisors . Data collected from research experiments and farmers experiences are assessed and ways to support the transition between current and new farming systems are discussed . Thus , knowing and learning about new farming practices and systems are shared among the participants of the network through a joint effort to make each others experiences explicit and by trying to broker between these experiences in order to develop what in the Australian experience is called a negotiated curriculum .

While such a network is largely supported by State RD&E funding , some other networks rely more on local initiatives . For instance , a network has been built among various research units , extension organisations and agricultural colleges in order to design new services for livestock systems in the Massif Central region . The network is an opportunity to undertake studies which could support the networking process and could result in changes in extension practices and organisations . For example , a study was undertaken to identify how advisors describe a difficult or easy advisory experience . Networking also enables collective discussion about the outcomes of research projects among researchers , advisors and farmers . For example , collective discussion about a model of the way farmers build and use information resources , supported by data collected during a specific

research project , helped to identify future strategies that will enable farmers to build more a effective information environment , e .g . enable them to choose relevant information in a given management situation according to their own goals . This also resulted in improvements to the curricula offered at the agricultural college and in providing advisors with a list of criteria that will enable them to better identify how farmers seek support in a given management situation . Such networking processes and their relevance for developing extension services would be hard to achieve without the organisational means and support offered by the agricultural college .

Implications for capacity building projects in developed countries

We have identified four factors that are making the management of grasslands and rangelands more complex . This complexity has increased the importance of capacity building in rural industries . In developed countries it appears that the industries themselves are taking a more active role in setting extension and education development agendas . There is growing interest in developing effective collaborative arrangements between organisations and across different levels of networking , from local to international .

The LEARN Group has treated this area of promising configurations as a topic of research in its own right . They point the way to early stakeholder involvement in the development agenda and to a need to cover multiple scales of networking to achieve impact . They also offer a research agenda for a form of applied social research that is likely to be in greater demand as we search for innovative ways to build capacity .

Networking activities among research , extension and education organisations are now promoted in France as a way to enable those involved to put their respective skills in common , but also to experience new ways of building their respective skills to support farmers who face the complexity of their own work and business . Learning occurs in such networks when each participant recognises that it is meaningful to share experiences about how each of the participants address a given issue (eg . the need to develop environmentally friendly practices , the need for a new supportive role of advisors) through different practices that accepts the challenge to his(her) own practice in a collective approach .

Initiatives to align new extension and education organisations in Australia highlight the importance of creating appropriate forums or neutral grounds for informed , critically reflective debate . Sharing a perspective of learning and change across different organisations will accelerate the negotiation of roles and responsibilities towards a common agenda of capacity building that is greater than any one organisation . Respect for each others cultural and professional heritage , together with an appreciation of what each organisation gains by working with others , will ensure a more cooperative working relationship rather than one that is characterised by each trying to dominate the domain of capacity building .

In any of these experiences , it should be noted that reflective and brokering capacities are needed to not only build new networks that support farmers , but to also support RD&E practitioners in coping with the uncertain and complex situations that agriculture faces today and in the future . The emergence of such networks seems to require at least some institutional initiative to support and drive it , and some involvement of social researchers who can support the development of reflective and brokering practices .

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