

Submission to the Australian Government's Productivity Commission Inquiry into Rural Research and Development

The potential of agricultural extension for capacity and resilience building; and new institutional structures for its' future delivery

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Executive Summary

This paper addresses the wider value proposition relating to agricultural extension. It argues that extension services contribute to building capacity and resilience in rural Australia. Capacity and resilience are discourses that are becoming of increasing interest to public policy makers and politicians as they struggle to confront economic, ecological and social challenges across regional and rural Australia. The concepts of capacity and resilience have also come to the attention of the various rural research and development corporations (RDCs) as they attempt to determine if their investment efforts have resulted in a sustained benefit to their stakeholders. The paper also argues that there is an existential need for reinvestment in agricultural research, development and extension (RD&E). It does not advocate a return to past RD&E models or paradigms. New institutional arrangements should be considered for the future carriage of Australian rural industry RD&E. It will propose that universities have both an obligation, as well as a unique capacity to spread knowledge, promote learning and build institutional, human and social capital in rural industries and their communities. It discusses how universities have the potential to fill agricultural RD&E service provision gaps where there is either private or public sector failure, and proposes a number of institutional agricultural RD&E models that could be considered in future policy directions.

A need to reinvest

Mullen (2007) stated that agricultural RD&E in Australia had yielded productivity improvements of approximately 2% annually. In the period from 1918 to 2003, public and private RD&E in agriculture realised an internal rate of return of around 15% with a greater than 8:1 benefit-cost ratio. However, he outlines how public investment in agricultural RD&E in Australia has been static for nearly 30 years (Mullen 2007, 2010b). Agricultural research intensity as a percentage of GDP has also declined markedly since the mid 1980s (Mullen 2007, 2010, and 2010b). There is evidence of declining broad-acre agricultural productivity of around - 1.4% annually in the last decade, and reducing terms of trade (Mullen 2010b).

“There has been little growth in real research expenditure in the last 30 years, and relative to the size of the agricultural sector, public investment has fallen, particularly in Commonwealth and State research institutions. Australia shares these downward trends in agricultural productivity and in public investment in research with other developed countries. These are worrying trends because in coming decades

agriculture needs to adapt to climate change while world population is projected to grow by up to another three billion. Investment in research has many of the features of investment in long-lived infrastructure. It takes several years before any benefits flow from the investment, but they may persist for 50 years. The impact of the reduced investment in research in past decades may be only just becoming apparent as one cause of lower productivity.” (Mullen 2010, p1)

There has been a steady retreat from the use of public funds for Australian agricultural RD&E, especially by State governments (Marsh and Pannell 1999, Mullen 2010b). Arguably, private sector investment has not expanded at a rate that would compensate for public sector withdrawals (Fulton *et al.* 2002, Hunt and Coutts 2009). Mullen (2010b) states that in 2007 private sector RD&E investment in Australian agriculture accounted for around 20% of total investment in the field. This contrasts with other developed countries where around 50% of RD&E investment is derived from the private sector (Pardey *et al.* 2006). This indicates market failure. The previous assumption that the private sector would fill the void of agricultural RD&E service provision following the public sector’s withdrawal has been proven to be over ambitious.

Defining capacity, resilience and extension

The discipline and activity of extension requires definition from an Australian perspective. The State Extension Leaders Network (SELN 2006, p.3) described extension as follows:

“Extension is the process of enabling change in individuals, communities and industries involved with primary industries and natural resource management (NRM). Extension is concerned with building capacity for change through improved communication and information flow between industry, agency and community stakeholders. Extension seeks outcomes of capacity building and resilience in individuals and communities. Extension contributes to protecting, maintaining and enhancing the landscapes, livelihoods and lifestyles of all Australians.

Macadam *et al.* (2004, p.17) explain capacity in a rural Australian context as: “Externally or internally initiated processes designed to help individuals and groups associated with rural Australia to appreciate and manage their changing circumstances, with the objective of improving the stock of human, social, financial, physical and natural capital in an ethically defensible way”. Coutts *et al.* (2005, p.4) defined capacity building more simply as “increasing the abilities or resources of individuals, organisations and communities to manage change”.

Finally for this discussion resilience has been defined as the capacity of an individual or community to cope with stress, overcome adversity, or adapt positively to change (Rolfe 1999, Luthar *et al.* 2000, Kaplan 1999, Varghese *et al.* 2006).

Agricultural extension’s role in capacity building

After two decades of neglect, agricultural extension is back on the agenda at the international level, and there is an urgency to reinvest in the delivery components of agricultural research and development because it builds capacity and leads to economic and social development (World Bank 2008, Ellis 2000). Marsh *et al.* (2007, p.1) described the particular value of extension within the RD&E system in Australia by suggesting that the “economic benefits from extension include accelerated benefits from earlier research and faster rates of adoption of improved new practices; reduced risk because of accelerated learning about new practices; and better informed non-adoption decisions”. Macadam *et al.* (2004) further supported the value of extension arguing that farms require good information flows for effective management, operation and innovation. Paine *et al.* (2007) believe that extension supports resilience through bolstering adaptive capacity of rural producers, primarily through the use of learning relationships with farmers. They cite strong links between resilient farming systems and extension, claiming that learning from the past, people factors, technology evaluation, integrated designs, participation by farmers, and information systems, are integral to adaptive capacity and building resilience.

In the past, the farming sector in Australia had access to an abundance of government sponsored information via extension services that assisted with production and farm management knowledge and skills development. However, government investment in agricultural RD&E in Australia has declined since the early 1990s (Vanclay 1994, 2003, Mullen 2007), with a shift in preference towards funding environmental extension priorities (Marsh and Pannell 1999). The assumption was that the private sector would fully compensate for these withdrawals, but that hasn't been the case (Fulton *et al.* 2002, Marsh *et al.* 2007, Hunt *et al.* 2008, Hunt and Coutts 2009,). Additionally, as corporate suppliers or resellers of agricultural consumables move into roles traditionally occupied by institutional extension services, some producers have perceived that there is a risk to the reliability and independence of advice being provided by commercial agents (Coutts 2007, Hunt and Coutts 2009). Macadam *et al.* (2004) also foreshadowed a risk of an information drought in parts of the agricultural sector, and resulting disadvantage where there is an absence of widely available extension services. In a Tasmanian study, Hunt *et al.* (2008) identified evidence that knowledge and skills gaps in certain production and natural resource management areas were present amongst farmers and graziers.

The decline in extension presence and capability has caused a disconnect in the research, development and extension feedback loop in some parts of agriculture (Black 2000, Botha *et al.* 2007). Furthermore, there is a predominance of short-term contract arrangements for extension professionals which does not provide an effective succession strategy for retaining expertise, maintaining relationships or building additional knowledge and human capital in rural industries (Coutts *et al.* 2001, Kerin 2010). To assume industries and their communities can have short-term engagement with change agents and then develop autonomous and self-sustaining capacity is over optimistic, as ongoing knowledge reinforcement and skills development is essential for effective extension (Lockie *et al.*, 1995, Pratt and Bowman 2008,). Hunt *et al.* (2008) argued for long-lived knowledge bases to ensure the retention of important skills and knowledge for ongoing rural industry competitiveness and sustainability. They also discussed how any given rural industry client base in any sector is neither homogenous nor static. This is consistent with observations on changes in human capital made by Moser (1998). Capacity can be lost if knowledge and skills are not revisited or reinforced and capacity building will not be sustainable if the appropriate institutional arrangements do not exist (Macadam *et al.* 2004). A study into rural towns in Queensland conducted by Plowman *et al.* (2003, p.1) demonstrated that those towns possessing the greatest resilience shared "adequacy of availability of a variety of experts to provide the breadth of services that residents expect, as well as access to up-to-date professionals and experts who are constantly upgrading knowledge and skills". In regional and rural Australia extension personnel form part of this combined human and institutional capital set.

The objective of this paper is to demonstrate in a very practical manner that the value of extension needs to be considered beyond the narrow parameters of just achieving changes in on-farm practices. Extension personnel bring to regional communities skill sets that are highly adaptive, and that can add value to the overall development of capacity and resilience, especially in times of adversity.

Extension contribution to resilience

In addition to sustaining and enhancing on-farm and industry productivity, extension services also provide critical institutional and human capital in times of crisis or adversity. The multi-functional benefits of extension capacity are showcased in the following examples:

- Ongoing work in the Tasmanian sheep industries indicates that extension is a vital piece of strategic human and institutional capital for assisting rural industries and their communities negotiate troubled times (Hunt *et al.* 2008, Hunt and Coutts 2009). Extension played an important role in building capacity in farmer and grazier on-farm skills (especially in drought management), aided in developing accessible psycho-social support services for rural communities, and filled a policy innovation void between the extensive grazing industries and government.
- Paine *et al.* (2007) described the actions of the sole regional dairy extension agent in the recovery response to Severe Tropical Cyclone Larry on the Atherton Tablelands dairy industry in North Queensland in 2006. This was complemented by the testimony of the local extension agent, Howard Smith, who was interviewed by us on 17 November 2009. Both Howard Smith and Paine *et al.* (2007) confirmed how extension services played a vital role in the initial response in terms of damage assessment, coordinating mobilisation and resources, and facilitating industry-wide farm recovery efforts. In this situation, the local extension agent was given a leading position in the disaster command structure. He had the organisational skills, coupled with local geographic knowledge, dairy business understanding, and relationship knowledge, to be effective in this role. Importantly, he was available and ready for immediate deployment.
- Hunt *et al.* (2003, 2004) provide additional examples. In the 1999-2002 period the Australian sugar industry was subject to record pest outbreaks from rodents and canegrubs that caused in excess of 1.5 million tonnes of lost sugarcane production, equating to over \$45 million in lost revenue. The Australian sugar industry, unlike many other rural industries in Australia, owns its RD&E capacity (the Bureau of Sugar Experiment Stations Limited), which is funded through joint industry and matching Sugar Research and Development Corporation (SRDC) funds, and external resources. The sugar industry's retention of core RD&E capacity allowed it to have the necessary resources at hand to react to these pest outbreaks. The responses activated were rapid, well-targeted and highly efficacious; with damage reductions of nearly 60 percent affected with rodents in 18 months, and 80 percent with canegrubs in 12 months (Hunt & Samson 2002, Allsopp 2010). Allsopp (2010) suggests that a significant part of the sustained successful suppression of canegrub damage over the last decade can be linked to extension efforts that enhanced the pest management skills of canefarmers.
- Other examples around the value of extension capacity can be found in bushfire response efforts. Victorian Department of Primary Industries (DPI) extension staff have provided available response capacity in the aftermath of both the 2003 and 2009 Victorian bushfires (DPI 2009). The retention of extension services have provided the Victorian Government with the capacity to respond to the needs of both commercial and non-commercial rural landholders (Gippsland's Bushfire Recovery Program 2009).
- The 2005 bushfires on South Australia's Eyre Peninsula are another case example. Rural Solutions, a corporate RD&E agency of the South Australian Government, played an important role in disaster response activities. Their efforts succeeded in the participation of 70 percent of affected farmers developing business plans for recovery, and accessing AUD \$2.53 million dollars in Commonwealth and State Government support (Lamont 2008). Extension's contribution to the recovery process involved synthesising technical information into a form that was easily understood by individuals; facilitating early decision-making with clients; providing local advice to best suit local conditions; linking individuals with other expertise, and providing independent, objective advice to farmers.

The presence of extension services can provide local facilitative leadership that can serve as a catalyst in the resolution of industry problems (Coutts 2008). Natural disasters, droughts, pest outbreaks, commodity price collapses and other unforeseen perturbations test the physical, economic and social fabric of farming families and their regional communities. The reported examples show the benefit of having pre-positioned and readily available capacity for deployment when skilled professionals were required. Extension services are key components in enabling rural industries and communities to be resilient and recover from shocks. Technical competencies are important for extensionists, however, facilitative leadership that can enable stakeholders to mobilise into action requires due recognition by policy makers and program developers. Also important are effective analytical skills for problem identification and solving. It is this suite of skills that needs to be further developed in extensionists if they are to become more effective in capacity and resilience building within their sphere of operations.

Looking to alternate RD&E institutional models for Australian agriculture

This paper is not advocating a return to past RD&E models and paradigms that previously existed in the public sector. It does however argue that there is a case for an expanded role for universities to develop innovative institutional structures for sustaining future agricultural RD&E. Kilpatrick *et al.* (2006) suggest that regional universities can add to local sustainability via bringing an RD&E capacity to their home locations that might be rarely available through other mechanisms. Through locally initiated projects, researchers in regional universities are able to connect their region to national and global RD&E contexts. To be able to do this, university RD&E leaders must be able to establish and maintain effective relationships with regional stakeholders, i.e. bodies that fund research, research participants and/or research partners. Universities logically could become key agents in regionally-based learning communities. They can build on sharing the available expertise from within the community as well as collaborating with people and groups external to the region. Through this they can introduce new ideas, raise awareness of new practices and expose members to new norms and value sets (Kilpatrick *et al.* 2006).

There are a number of non-government institutional models that are involved with the delivery of integrated RD&E programs into rural and regional communities. The governance arrangements and types of funding resources differ for each of these, but they are worthy of mention in the discussion of future institutional models.

Australia – The McKinnon Project:

Based at the University of Melbourne's Veterinary School at Werribee on the outskirts of Melbourne, the McKinnon Project is a recognised leader in sheep and beef consultancy both in Australia and internationally. The McKinnon Project was established in 1982 with the specific aim of improving the productivity and profitability of sheep flocks and beef herds. The McKinnon Project's core functions include education, research, and whole farm consultancy for the extensive livestock industries. McKinnon has been involved with investigations into the live sheep export business, as well as various productivity programs funded by the animal industry RDCs. The project also offers consultancy services to agribusiness. It has been instrumental in establishing new scientific findings related to livestock production, and cementing in place new production doctrines via their extension-consultancy efforts. Larsen *et al.* (2002) in their work with Australian wool growers felt that McKinnon has been able to successfully develop participatory models of research that identified important problems and research priorities. They have been able to establish strong linkages between researchers, program consultants and innovative farmers. As a consequence they were able to deliver properly designed and relevant research and extension packages that improved the profitability of participants. McKinnon has

proven to be a sustainable program that has been for the most part revenue positive. McKinnon's presence has ensured the retention and availability of high-level intellectual property to the Southern Australian animal industries by maintaining a small highly-skilled multidisciplinary team. It has played a vital role in keeping production system knowledge alive and up to date (Counsell pers. comm. 2008).

United States of America – Cooperative State Research, Education and Extension Service:

In the United States, university engagement in RD&E activities in rural and regional communities is the norm as opposed to the exception. The United States Department of Agriculture has over 100 colleges and universities involved in its Cooperative State Research, Education and Extension Service (also known as the Land Grant system). Despite the sharp decline in the size and economic importance of rural America since the inception of the scheme in 1914, the National Cooperative Extension System remains an important player in American life. It has adapted to changing times and landscapes, and it continues to address a wide range of agricultural industry and community needs in rural and regional areas.

The institutions carry out RD&E works in six major areas:

- Youth Development — cultivating important life skills in youth and equipping youth to make appropriate life and career choices.
- Agriculture — research and educational programs to advance rural industry productivity and diversification.
- Leadership Development — training extension professionals and volunteers to deliver programs in agricultural industry and community settings.
- Natural Resources — extending awareness and understanding to landowners and home owners about natural resource stewardship.
- Family and Consumer Sciences — helping families become resilient and healthy by teaching nutrition, food preparation skills, positive child care, family communication, financial management, and health care strategies, and;
- Community and Economic Development — helping local governments investigate and create viable options for economic and community development (USDA 2008).

Röling (1988) observed that the US Cooperative Extension System integrates the functions of teaching, training, extension and research. Since its origins the scheme was not only seen as a means of delivering new applied knowledge to farmers but also for transmitting their interests to the university research community – thus retaining an action-research learning model within their RD&E system. The extension agents were not just educators or disseminators of research, they performed many other tasks such as facilitators, motivators, capacity builders, skills teachers, counsellors, and public relations. The US system has been highly successful contributing strongly to the rate of technical change in agriculture.

Australia - Tasmanian Institute of Agricultural Research (TIAR):

In line with most other states, public policy decisions have led to the Tasmanian Government's steady withdrawal from the direct provision of RD&E services to Tasmanian rural industries over the last 15 years. What has been developed in place of publicly provided extension is a joint venture arrangement between government and the University of Tasmania to sustain a level of RD&E capacity for agriculture in the state. TIAR has RD&E interests in the dairy, extensive agriculture (sheep, grains, beef), vegetable and perennial horticulture sectors. It, along with the McKinnon Project, resembles aspects of the US Cooperative model. It is funded through federal and state revenue streams as well through competitive program funds from respective RDCs.

BSES Limited – Australian sugar industry

BSES is a non-university institution that deserves mention. Formerly known as the Bureau of Sugar Experiment Stations it has been in existence for nearly 110 years, and is the principal RD&E agency for the Australian sugar industry. It is funded directly by both farmer and producer levies, and royalties from sugarcane varieties it produces. Producer and miller stakeholders also fund the Sugar Research and Development Corporation (SRDC) which BSES then competes for relevant program funds. The Queensland state government also makes a modest investment in the industry. BSES has R&D capacity in plant breeding, plant pathology, pest management and biotechnology, as well as a network of regional extension officers across the entire Australian industry. It serves as an excellent example of a self-sustaining agricultural RD&E agency in Australia that operates largely outside of the public sector and is a model that could possibly be emulated by networks of regional universities in delivering rural industry RD&E needs.

Concluding remarks

The role of extension, and the re-institution of extension services in Australia, needs to evolve to a new paradigm that facilitates the development of resilience of rural industries and their communities, and sustainable career streams for rural industry professionals who constitute valuable rural industry capital. To do this will require a change in perspective regarding the value of rural industries and their communities in the national dialogue, and a departure from economic rationalist paradigms that drive down institutional and human capital resources, and consequently the capacity of industries and communities to adjust to change. Withdrawal from rural industry and community extension leaves governments with reduced capacity to implement policy or public good initiatives in regional Australia. It also leaves rural industries at a strategic disadvantage in terms of skills maintenance and future productivity gains. Federal, State and Local Governments may need to consider new innovative partnership relationships with rural industry research and development corporations and regional universities to make further progress towards the aspiration of resilient rural industries and communities. Universities are centres of excellence that could also be harnessed to deliver specific socially orientated programs for net “public good” benefits in the regions in which they function. The alternative to further investigating institutional innovation in agricultural RD&E is that we continue to live on our past intellectual capital investments and risk becoming less competitive internationally, and potentially become less secure in our own food resources. We suggest therefore that there is a strong case for innovation in agricultural RD&E structures towards models that are more closely linked and supported by rural industries (both producers and processors), and that are tied to regional centres of learning excellence.

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