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Committee Secretary
House of Representatives Standing Committee on Agriculture and Industry
PO Box 6021
Parliament House
Canberra ACT 2600

RE: Standing Committee on Agriculture and Industry – Agricultural Innovation

Dear Sir/Madam,

Thank you for the opportunity to provide a submission around this important subject in Australian agriculture. As the peak professional body for rural extension in Australia we feel we are well positioned to make an informed comment around Australia's agricultural innovation system and assert a number of recommendations that would assist in setting it on a more assured course in the 21st Century.

In Australia, the agricultural innovation effort involving research, development and extension, in accompaniment with associated engineering developments; and demand pull from other sectors, has since the 19th Century freed up the relative proportion of the Australian population directly engaged in agriculture. This has allowed that workforce to be used to develop other areas of the economy. RD&E can also be demonstrated to have reduced operational costs within farm enterprises and lifted overall national agricultural productivity, adding to the national terms of trade, reducing food costs, and providing many flow-on benefits in technologies and scientific advances to many developed and developing nations globally.

It is now also being appreciated in Australia that agricultural RD&E investments are critical drivers for achieving productivity gains essential for agricultural industry viability and the ongoing production of safe and affordable food both domestically and internationally. Maintaining consistent positive productivity gains is critical for Australian agriculture. We have a high cost agri-economy, and one of the only advantages we have is historically strong productivity gains consequent of adoption of advancements in technologies and practices by farmers and graziers.

The value proposition associated with justifying the investment of funds in agricultural RD&E remains a challenge – it is not a convenient and closed experiment. It remains a complex environment where the combined impact of research and development inputs, and the lag times in adoption of different technological or systems innovations are not always immediately understood.

The issue of lag times in the realisation of the benefit of RD&E investment is important. The dividends from agricultural RD&E are not always obvious in the short-term but have a delayed impact and an often extended legacy in an economy. Lag times can be as long as 15–35 years before the full dividend of technical or systems innovation is achieved. Conversely, the results from divestment in RD&E will have sustained negative consequences decades onwards. This emphasises the need for ongoing effort to enhance agricultural productivity gains given future global challenges around increasing world population, increased food demand from a rising middle class in Asia, pressures on natural resources (especially access to

affordable water and vital crop nutrients such as nitrogen and phosphorus); and the yet to be fully understood effects of climate change.

The impact of the combined public and private agricultural RD&E investment from 1918–2003 has been calculated at a benefit to cost ratio of 12.2:1, an internal rate of return of 16%, and sustained productivity growth of 2%. However the hollowing out of research intensity and divestment in extension services has seen the rates of return decline since the early 2000s.

It is heartening that the Australian Federal Government is now recognising the issue of reduced rates of productivity gains in certain sectors of Australian agriculture, and that productivity gains are critical if Australian rural industries are to remain competitive in often distorted global markets. Productivity gains are therefore being seen as essential for the survival and progression of rural industries and their communities, for providing affordable and safe food domestically; and as a consequence of Australia being a significant exporter of various agricultural commodities, also having an influence on the price of food in the global market place. Affordable food in global markets translates into alleviating suffering in developing nations and promoting international stability and security.

Policy changes since the 1980s saw rural industries and the Commonwealth take a greater role in agricultural RD&E. Consequently the State Governments saw an opportunity to divest from these services and began to withdraw as traditional providers of production-orientated RD&E services to agriculture. Recent estimates indicate that public investment in agricultural RD&E in Australia has been static for around two decades, and declines in the rate of gain in agricultural productivity in certain industries are beginning to be observed as a result.

With State Government investments in sustained decline, the rural sector has seen the appearance of multiple actors in the agricultural RD&E landscape. It has led to opportunities for private enterprise with some former state departmental officers and others establishing their own advisory services, especially in more populated farming regions. However, an assumption held by policy makers that the private sector would sufficiently fill the gap left by the public sector exit across Australia's farming regions has proven to be over-optimistic, with evidence of failures in service provision of RD&E. Governments in some jurisdictions still provide production orientated expertise in RD&E, but these are largely diminished in terms of capacity across almost all industries compared to previous decades.

APEN wishes to provide a set of recommendations to the Australian Government in the agricultural innovation/RD&E space. They all relate back to the central theme of increasing productivity gains in our rural sector through the building of capacity in our farmers, institutions, and service agents, for the benefit and prosperity of their regional communities and Australia as a whole.

Yours sincerely,

Jeanette Long
APEN President

Recommendations

1. Recommendations around reorganisation of the Australian agricultural innovation system

The case exists for discussing alternative structures for organising and delivering agricultural RD&E, and new systems to fund investment to prevent existing Australian export industries from becoming uncompetitive against other nations who are investing more heavily in agricultural innovation. Australia is not developing significant tracts of new arable lands for food production; in fact numerous valuable agricultural zones have already been subsumed by urban expansion. Therefore, increases in productivity must be made using the existing land and water resources. This requires increasing investment in agricultural RD&E.

1.1 *Develop industry-owned RD&E institutions*

With a retreating level of State and Territory Government investment, industry-owned RD&E institutions offer the best prospect for building and retaining long-term human capital in the agricultural research and extension sciences for industries. It is critical to move beyond the existing Research and Development Corporation (RDC) framework that simply brokers projects on a competitive basis, to develop agencies that possess research and extension staff and preserve RD&E capacity on behalf of their industries. The new institutions would understand the importance of capacity building. They would not fund at the margins but contribute to the whole RD&E effort of the industry, i.e., investing in core activities that underpin industry success. Such institutions could ensure succession of knowledge and skills over time. This is vital for ongoing industry development. Institutions can also build and better sustain social capital between themselves and their client base by having staff that are in periodic contact with them. Where there are multiple agencies involved in particular industries' RD&E efforts, rationalisation of those assets under single corporate entities for the purposes of efficiency must occur.

1.2 *Further expand producer, processor and government co-investment in RD&E and agri-food industries*

This will require negotiated statutory investment levies which may surpass the existing level of contributions under the current RDC scheme. If the Australian Government is attesting to the value of R&D investment, grower and processor funds should continue to be matched by the Commonwealth. An expanded role for extension must be embedded in these new agencies to ensure that new knowledge, systems and technological innovations proceed more efficiently. Processors of agricultural products have long benefited from advances of agricultural RD&E but in the case of many industries, they have contributed limited amounts to the investment and advancement of RD&E. This was argued strongly by several high-profile submissions to a national review of the RDCs in 2011; however it did not receive the support of the Commissioners. Producer, processor and government co-investment arrangements have been demonstrated in the Australian sugar industry for many decades and remain the central plank for its ongoing RD&E capacity. This position is defensible in industries where field-based factors have a significant impact on factory performance, and importantly factory throughput, which drives the processor's profitability – a clear case of mutual dependence that is often forgotten.

1.3 *Avoid total deregulation of RD&E*

Findings from a review of New Zealand's Crown Research Institutes in 2010 indicated that a completely deregulated RD&E competitive framework should be avoided. Formed in 1992, CRIs were effectively given a charge to become financially viable and to operate on commercial lines. According to the Crown Research Institutes Taskforce, a past policy imperative of government for the CRIs to be economically sustainable has had some negative impacts upon the nature of the science generated and affected the net benefits to client industries. It stated that there were inconsistencies between creation of value for the organisation as opposed to the greater good for New Zealand. These commercial drivers also led to the pursuit of competitive contracts that were short-term, relative to the time frame in which science can be expected to produce results. This has had a detrimental impact of CRIs ability to operate strategically. Furthermore, the existing funding and governance arrangements for CRIs inhibited collaboration with universities and the

private sector and effectively made them competitors in what should have been a collegiate function of government in enabling industrial advancement.

The CRIs have also had little in the way of extension capacity. New Zealand discharged its public sector involvement in extension in 1987, and consequently R&D generated by the organisations relies on industry service providers or private consultants to undertake many active extension works. The function of extension, or as articulated in the review ‘technology transfer’, also came under scrutiny. This role was seen to have been undervalued by the agricultural CRIs and was highlighted as a core responsibility with an emphasis to develop, invest in and manage intellectual property or innovation with the intent of expediting its passage into outcomes for stakeholders. On these observations a completely deregulated agricultural RD&E system is unlikely to deliver the outcomes Australia needs.

1.4 Integrate research and extension capacity within institutions

Extension services must not be considered as add-ons, they must be fully integrated into the process and delivery of research, and be active in providing feedback from industry stakeholders to research elements, as well as in identifying farmer innovation which can be tested through science. Extension agents should function as credible technical experts in their specific roles, and be present in the field. An absence from the field results in a decline in support for extension services. Appropriate planning, provisioning, and skilling of extension in adult education skills and process should be used to complement and not be a substitute for technical competency.

1.5 Reduce bureaucracy

Any new institutional arrangements (either quasi-government, industry-based or private), must eliminate excessive management hierarchies common to the former public sector ‘Departmental’ models. Less complex management structures allow for more flexibility, increased responsiveness to resolve issues, and reduced cost structures.

1.6 Create a new focus for State Government Departments of Agriculture

Should industries and Commonwealth take full responsibility for main stream agricultural industry RD&E, State and Territory Government Departments of Agriculture will be able to be realigned to become development support agencies for new and emerging agricultural industries. Presently many State Governments are focussed on working with the larger established industries as they can more easily obtain matched Commonwealth funds through which the States and Territories can then supplement their Departments. The larger and established industries should be encouraged towards greater independence. Subsequent to these changes, State and Territory Government RD&E entities could focus on longer term strategies for increased industry diversity and greater value-adding to enhance gross state agricultural product. Because of collective public benefit outcomes, State and Territory governments must maintain ongoing commitments to biosecurity, product integrity and policy functions.

1.7 Embed a consumer focus within RD&E effort

RD&E effort should be considered in reference to its contribution not just to the producer, but how the investment translates to benefiting consumers. RD&E institutions will require systems that ensure organisational awareness of the needs and wants of consumers so as to facilitate better targeting of RD&E efforts. This will reduce the risk of divisions along interest lines of professionals within agencies, or with industry stakeholders involved in decision making that might have separate and even selfish agendas. It is essential that a balance be maintained in effort dedicated to the various resource management, production, and value-adding streams along the value chain, else there will be a risk to industry capacity to resolve different bio-physical or market orientated eventualities.

1.8 Positive externalities outcomes must be considered

Planners and implementers of RD&E efforts must consider issues in the context of economic, environmental and social responsibilities and outcomes. Rural industries operate within communities, and their impacts and benefits cannot be evaluated in isolation of these component parts. This is where the public investment component can be further justified in terms of collective Public-good benefits.

1.9 Ensure that rural industries partner more closely with universities

The possibilities of universities partnering with industries, and functioning as learning and service hubs for agriculture should be further explored. This concept could be focussed around universities strategically positioned to service rural industries in formalised service partnerships. This could translate into situations where industries invest in university faculties in order to guarantee both RD&E services, as well as ongoing skilled technical professionals.

1.10 Ensure strategic use of private sector actors

There will be ongoing expansion and utilisation of private sector capacity where industry-owned institutions require additional expertise or geographic positioning of RD&E capacity. Private sector actors will continue to act as instruments of institutions to undertake certain research or extension functions particularly in areas where an institution's service delivery is absent.

1.11 Further develop international collaborative arrangements

Further international and agency agreements between sister industries in other nations, and increased sharing of personnel and interchange of skills and innovations will further enable potential maximisation of innovation. As an example the Australian Centre for International Agricultural Research (ACIAR) plays an import role in our national RD&E space which benefits the counterpart countries, provides a source of students to Australian universities, but also enhances international collaboration and learning by the Australian partner institutions. The insights into solving problems in developing countries often forces a rethink of how we conduct our own RD&E.

1.12 Maintain professional diversity in governance of institutions

An increased commitment to ensuring a level of professional diversity in the governance and management of industry-owned RD&E institutions is critical to avoid conflicts of interest, and any potential aversion to innovation amongst industry decision makers. The Productivity Commission in 2011 encouraged the movement of industry RDCs towards skills-based as opposed to representative selection of board members.

1.13 Focus on industry and national outcomes

Strengthening of performance monitoring and enforcement, both at the micro-level with specific projects conducted by the institutions, as well as at the macro-level over individual organisations, is essential to ensure sustained confidence in the institutions by contributors of funds.

1.14 Ensure proper oversight over the use of public funds

A reformed agricultural innovation system requires system oversight by an independent umpire (e.g., an ombudsman or commissioner). This is to oversee the collective institutions framework and ensure probity with the use of public funds. This will provide additional rigour to the Australian agricultural RD&E process. Prior to when many RDCs became corporatised, Government Directors were appointed to RDC boards, and a Parliamentary Secretary oversaw the different bodies and acted as a conduit between the RDCs and the Minister of Agriculture. This structural arrangement has since been abandoned by most corporatised RDCs, and has been blamed for the emergence of some contentious governance issues within them.

1.15 *Local action in a global context*

Agriculture now functions in a global context. There is an omnipresent risk in that sometimes the forces of globalisation can result in negative impacts on a nation's agricultural interests in terms of market power and processing. The proposal to raise and invest in national industry-owned RD&E institutions offers an assurance that future innovations in Australian agriculture are not gradually accumulated and centralised in an oligopoly of globalised agribusiness and food corporations. Externally-based stakeholders will not necessarily always have the Australian national good as their first priority. Should there be gradual centralisation of Australian agricultural innovation in the hands of trans-national corporate agribusiness, situations could emerge where, either inadvertently or deliberately, Australian trade or national food security interests could be compromised. The approach to establish industry-owned RD&E institutions with government co-investment provides an anchor for ongoing development and innovation to remain in the hands of Australian industry. It is a paradigm of capacity and resilience building as opposed to cost shifting.

2. **Recommendations around information technologies hardware and infrastructure**

Information technologies offer a real advantage to enhance innovation and add to productivity gains through either direct application in farming systems, or through the value they can add via allowing increased access to capacity building opportunities – especially for those more remote and regional centres where professional services are difficult to secure.

2.1 *Information technologies hardware and infrastructure*

Expansion of real-time telemetry for farming regions allows for remote regional access for farm machinery diagnostics, servicing and advice with repairs direct from the manufacturer e.g., John Deere or Caterpillar technical support services access from the United States.

IT infrastructure and increased telemetry band width is essential in order to support adoption of precision farming techniques which can aid and assist adoption farming practices that have both net productivity and environmental advantages e.g., precision tillage and fertiliser practices.

Adequate real-time telemetry capability is essential for modern harvesting and logistics coordination. In industries where farmers supply large centralised processing units e.g., the likes of a sugar mill, cotton gin or milk processing plant; real-time IT allows for efficient allocation of transport assets and onsite preparation for receipt of incoming produce. As the remote regions of northern Australia are further developed to large-scale agricultural regions e.g., the Ord, the southern Gulf of Carpentaria, and the Fitzroy and Pilbara regions, the IT infrastructure required to support this expansion will become increasingly essential.

Consequently, the extension of geospatial coverage of IT capacity to service regional and remote areas is becoming a significant issue in the northern development narrative. The current Telstra investment doctrine is not strategically focussed when it comes to the development of the north. Its strategy is based on meeting the service needs of the 'existing' populations (not future). This is because the principal incentive is to realise a swift return to shareholders. APEN recommends that a rethink of the Telstra business investment model to be more strategic be undertaken, especially when it comes to further developing the agribusiness potential of rural and remote Australia.

2.2 *Capacity building function*

Increasing IT access and bandwidth in remote and regional Australia for interactive remote learning technologies can facilitate knowledge exchange and thereby aid capacity building that would otherwise be unavailable to farmers or rural service agents. Failures to address these issues will also act as a barrier to adoption and adaptation of either current or future best practices.

3. Expand knowledge networks through farmer-to-farmer knowledge exchange using farmer groups

One way to create knowledge networks and bolster innovation is to support farmer-to-farmer knowledge exchange via farmer groups. There is a growing trend in Australia for farmers to join formal grower groups that, along with private expert advice conduct their own on-farm research programs. In addition to the research value, it appears that a key reason for this trend is that these groups provide the 'like-minded' people that farmers identify as helping to maintain motivation, provide access to other innovative farmers, and function as an effective network for information exchange and moral support. Group extension networks are proven as effective mediums for innovation adoption and review, and provide solid social capital to farmer/grazier members. Many built their social capital as a result of the investments in the Landcare movement, an example of the long-term benefits of such investments. Extension strategies that utilise group techniques are not antiquated – they are being re-applied in many districts and sectors in rural Australia. The role of extensionists in the innovation process remains, as they can assist people to 'develop broadened perspectives and reasoned judgements' on critical issues. Farmers and graziers like to see extension agents functioning as catalysts, i.e., not just being the ones who hand out the information and prescribe the process, but rather the ones who facilitate people to obtain information and define the process.

Considerable applied RD&E has been funded through farmer groups in some industries e.g. grains, which has encouraged collaboration between farmers, departmental research and extension, CSIRO, universities, and private sector researchers, sales representatives, advisory personnel and consultants. The problems addressed by these groups then provide an indication of relevant problems requiring pure research needed to support applied research and in turn the pure research has drawn on the benefits of blue sky research. This processes also serve to shorten the adoption lag times because of the increased relevance of the research.

Not all producers are prepared to commit to group processes or may not have the farm information details that are needed to successfully apply such a process. However, those that do engage can drive regional innovation and industry development.

There is evidence that learning gaps have occurred in certain cohorts and sectors since the widespread withdrawal of public-sector extension in Australia. This is despite the presence of private extension providers. Where industry-funded interventions have been made to fill those gaps it has been found that there was a hunger for information and learning – simply because it wasn't being provided through other mechanisms. This in itself is not an argument for returning to the free, ad-hoc provision of government advisory services. It does, however, make a case for targeted industry-funded programmes to address identified information and learning gaps critical for farm viability and sustainability. There is a place for proactive knowledge management apart from (only) allowing market forces to operate.

It must be remembered that the rural industry client base in any sector is neither homogenous nor static. There is a mix of learning styles and propensity for engagement that requires an application of different learning methodologies and techniques. One size does not suit all. Additionally, the clients groups are not static. There is a continuous state of succession as former operators leave industries, and new ones (whether they be kin or otherwise) enter. Each of these business management units leave or enter with a set of skills and capacities. Sometimes skills are lost, other times gained. The maintenance of agricultural competitiveness can be helped by these adults having access to adult educational streams such as those provided by targeted rural extension programs as part of a complete innovation system.

4. Build knowledge networks via participatory processes

Participatory research can be a good basis for new partnerships. Participatory research refers to a process of interaction between local and external actors to co-create innovations. Participatory approaches are not new. Unfortunately, farmers' knowledge remains undervalued and the traditional bias towards academic pathways of research dissemination remain. Having effective grower liaison capacity via extension agents

enables the feedback mechanisms to function and provide continual improvement in the innovation process. Systems must be re-established in Australian agriculture to reconnect the researcher discipline areas and end users in a way that provides effective service delivery, as well as meaningful feedback on programs and needs.

5. Further building on human capital in agriculture by attracting new entrants

Attracting new farmers to agriculture is another important step in building human capital. It is crucial in safeguarding the transfer of knowledge and expertise to future generations and to reinvigorate the sector with new talent, ideas and enthusiasm. This is needed because the number of young owner-operator farmers has declined since the 1970s. Since 1976, the number of farmers under the age of 35 has fallen by more than 75%. The Commonwealth Extension Services Grant of the 60s and 70s had a large role in revolutionising extension and research processes in Australia, the benefits of which are still being felt today.

6. Enhance the practice of extension

Good extension practice is critical for the adoption of emerging technologies and the efficient and effective performance of the innovation system. Two possible ways to enhance extension practice in Australia are recommended.

6.1 Training in Extension Methodologies

Extension training must be introduced into the undergraduate courses in agriculture and natural resource management at Australian universities. This training should include the practical experience in extension provided by the public and private sector.

6.2 Establishment of an Innovation System Centre of Excellence

It is important that extension practice continues to evolve – this requires commitment to the funding of research into extension and the innovation system. We propose that an “Innovation Centre of Excellence” be established to undertake research activities and the ongoing training of those involved in the innovation system for agriculture. This should not be a “bricks and mortar” institution but rather a Co-operative Research Centre style collaboration of universities, government, private consultancy, agribusiness, RDCs and end-user participants with the aims of continual improvement in the innovation system operating in Australian agriculture. They will be responsible for:

- Undertaking research in extension and the innovation system through post-graduate studies
- Providing evidence based advice for future policy direction in agricultural and natural resource management extension
- Foster the continuous improvement in extension practice amongst practitioners in the agricultural innovation system