



***Submission to the Productivity
Commission review of Australia's rural
Research and Development Corporations***

23 June 2010

Background

The Academy of Technological Science and Engineering (ATSE)¹ welcomes this opportunity to provide a submission to the Productivity Commission review of Australia's rural Research and Development Corporations (RDCs). ATSE is a unique organisation, with the objective of promoting the application of scientific and engineering knowledge to practical purposes for the benefit of the nation's well-being and economic development. ATSE counts among its Fellows a number who work in food, agriculture and other related areas of relevance to RDCs. This submission is supported by the Crawford Fund².

Summary

ATSE considers that the rural RDCs are a critical element of Australia's innovation system. The engagement which they provide between primary producers, government, industry and researchers ensures that the specific R&D needs of our rural sector are met in a way that appropriately shares costs. At a time when Australia's research workforce is ageing, State Governments have cut back their investment, and world food shortages are projected, Australia's rural RDCs can enable Australia to largely feed our own growing population while also contributing the needs of others.

Australia's RDC model is internationally regarded as best practice in undertaking and delivering rural sector R&D. One reason for this is the way it addresses the free rider issue among primary producers. There is plenty of evidence to demonstrate good returns on RDC investment and the spillovers from this investment benefit all Australians. There is, however, a case for extending contribution arrangements to downstream beneficiaries of RDC R&D.

The present cap on Government contributions — 0.5 per cent of Gross Value of Production (GVP) unnecessarily limits rural R&D and should be removed. As a step in that direction, ATSE suggests that the Government provides one dollar for every two levy dollars between 0.5 and 1 per cent of GVP.

ATSE sees strength in the diversity of our RDCs. It is also important that they work together when facing common challenges. There may also be scope for some rationalisation between RDCs. However these matters are for the industry and the RDCs to address. To the extent that the Government believes it needs to influence the behaviour, structure and governance of RDCs it can do so through the provisions of the funding agreements.

ATSE believes that, overall, the RDC model is effective and efficient. Any changes that risk a reduction in Australia's rural R&D effort or result in move away from the industry-government partnership model would be highly undesirable.

¹ The Academy was established in 1976 and is one of Australia's four learned national Academies, which have complementary roles and work together both nationally and internationally. The Academy has about 800 elected Fellows comprising the leadership of applied science and engineering across the country.

² The Crawford Fund Ltd (see <http://www.crawfordfund.org/>), an initiative of ATSE, in supporting this submission notes that Australia's research contribution to international agricultural support depends on the maintenance of a strong rural research capacity in this country.

RDCs have made a major contribution to the success of Australia's agricultural sector and have helped it to achieve high levels of efficiency by world standards. In ATSE's view, the RDCs are a very important component of Australia's innovation system. The present funding arrangements have been an important factor in the rural sector's innovation and productivity growth for more than twenty years. ATSE believes that the links between the RDCs and their stakeholders are one of the notable strengths of the present arrangements and that, overall, the RDC model is effective and efficient.

ATSE notes that the Productivity Commission has commented favourably on the RDCs in some previous reports. The Commission stated in its 2007 report on R&D:³

"The governance design of the rural R&D Corporation model is inherently sound. Levies that are deducted by, and apply to, all beneficiaries of the R&D overcome free-riding and the resultant under-provision of rural research. There are strong grounds for significant funding of RDCs....."

While ATSE agrees with this statement, some improvements in the details of the operation of the model may be needed.

Research and development (R&D) is a major contributor to innovation, which in turn is a key driver of economic growth. It is important to emphasise that much of Australia's *rural* R&D is targeted at addressing issues that are specific to Australia. This is in contrast to R&D in other fields such as new materials or information technology, where the issues and opportunities are not unique to Australia. For example, much rural R&D relates to management of Australia's environment – including soils and water. If we do not undertake this research in Australia, no one else is going to do it for us.

Governments have long recognised the importance of innovation to economic growth and have been addressing the need to improve their innovation performance. However in most sectors of the Australian economy, our innovation performance lags behind many other OECD countries. Even our rural R&D, which is stronger than that in some other sectors, needs to be expanded to bring it up to the levels of some of our competitors^{4 5}.

Innovation is profoundly transforming all aspects of human activity, and should be an integral part of all areas of business, government and education activity in Australia. Innovation needs to be encouraged and supported by government. Just as the social and economic benefits of innovation

³ Productivity Commission 2007, *Public Support for Science and Innovation*, Research Report, Canberra.

⁴ Mullen, J., 2007, *Productivity Growth and the Returns from Public Investment in R&D in Australian Broadacre Agriculture*, Presidential Address to the 51st Annual Conference of AARES, February 2007, Queenstown, NZ.

⁵ Beintema, N. M. and Stads, G.-J., 2010, *Public Agricultural Investments and Capacities in Developing Countries: Recent evidence for 2000 and beyond*, IFPRI note prepared for the Global Conference on Agricultural Research for Development, Montpellier, March 2010.

flow across our economy, there should also be a sharing of the costs and the investments involved. The benefits from rural R&D are shared by consumers, processors, retailers and exporters as well as primary producers. While the primary producers contribute directly to the costs, it is entirely appropriate for the taxpayers to contribute on behalf of the general public. A strong rural sector is of particular importance to regional communities across Australia. The R&D commissioned by the RDCs underpins the viability of these communities.

The rural sector is of particular importance at this time. The world's population is projected to increase by about 50 per cent to more than 9 billion by the year 2050.⁶ Feeding this population is going to be a very big challenge, complicated by factors such as climate change, competing uses of arable land, water shortages, changing diets and increasing use of crops in the production of biofuels. R&D has a very important role to play in increasing production to meet this challenge. The 'Green Revolution' increased food production in the 20th century and some commentators are calling for a new green revolution in the 21st century.⁷ The RDCs are positioned to enable Australia to not only provide sufficient food for our own population, but continue to meet some of the needs of other countries.

The RDCs Chairs Group, CRRDCC, has commissioned several independent economic benefit studies, examining the return on investment in rural R&D Corporations. The outcomes reported in these studies fully supports the value and success of the RDC model to date. These high returns are indicative of substantial under-investment in rural R&D in Australia.

The rural RDC model

The RDC model is probably the best public-private model for funding research, not only in Australia but worldwide. In matching public and producer contributions to R&D it addresses both issues of public good (food quality, safety and environmental sustainability) with the economic and social interests of the industry and its members. This does not occur in the R&D funding arrangements for any other sector. Australia should recognise the value of this sort of approach and use it more widely.

The RDC model is much admired because it addresses a major free rider issue – that of some producers benefiting from R&D paid for by other producers. The levy system ensures that all producers in relevant areas of the sector contribute to the R&D undertaken for that sectoral area. This not only helps spread the costs, but should also ensure a wider uptake of the outcomes. The RDCs provide opportunities for levy-payers to influence investment decisions. Consultations with levy payers, and extension processes to disseminate results give rise to costs in addition to the costs of the R&D, but are an essential part of the RDC model.

⁶ Various United Nations sources

⁷ See for example Evans E., 2009, *The Feeding of the Nine Billion – Global food security for the 21st century*, Chatham House, London.

If individual primary producers were left to fund research, ATSE considers that the vast majority of them would not be able to adequately capture the benefits of that R&D. Individual primary producers are simply not in a position to fund significant research programs. If Australia were to rely on such an arrangement to meet the needs of our rural sector, expenditure on R&D would be massively less than optimal. Over the last several decades, governments have placed increased emphasis on R&D providers (Commonwealth and State Government agencies such as CSIRO, and the universities) earning external income. This has greatly increased the value of cash funding, as those research providers seek income to supplement their in-kind contributions. The RDCs are the major source of cash for rural R&D. Any reduction in that cash will have a multiplier effect, resulting in an even greater reduction in rural R&D. Additionally, the rural CRC's, which often have been among the better performing CRC's, are often initiated and given critical mass by funding from RDC's.

There is a second aspect of the free rider issue – relating to the benefits from RDC R&D which the processors enjoy and to which they make little or, in some cases, no contribution. When the RDCs undertake down-stream R&D that will generate benefits for the processors, cost and benefit sharing arrangements are needed to ensure that the processors make an appropriate contribution. The Commonwealth Government can influence this issue by including in funding agreements requirements to obtain contributions from processors where appropriate.

Managing the outcomes from RDC R&D

In the past the RDCs could rely on the State-based rural extension systems to spread knowledge of R&D outcomes. With the significant winding back of State Government investment in R&D and extension activities, more of the work involved in assisting the sector to take up the outcomes of R&D is now falling on the RDCs, the universities⁸ and the private sector. RDC funding is now the life blood of primary industries' research.

Apart from the grains industry, intellectual property protection is limited in its availability and effectiveness in the rural sector— some innovations cannot be patented and, even if they could be patented, enforcement would be impossible. While new plant varieties can be protected and there are well-known examples of commercial plant varieties where there is a high level of enforcement, other examples show how difficult enforcement can be – such as when overseas growers obtain cultivars of Australian native plants and grow them for foreign markets. Of course, our rural industries are significantly dependent on germplasm from overseas, so we need a realistic approach here. The problems around the protection of some intellectual property arising from RDC R&D provide a further reason for high levels of public support.

While making the results of RDC-funded R&D widely available within Australia, ATSE considers that detailed final reports with experimental data should not be freely available on RDC websites because this allows easy access to overseas competitors. Some RDCs need to take a smarter approach to

⁸ In Tasmania, the State Government has transferred development and extension activities to the University of Tasmania as part of the Tasmanian Institute of Agricultural Research. This is intended to provide a seamless transition from teaching and research through farm practices and technology transfer.

managing this type of intellectual property. One way of addressing this issue would be to make these reports generally available after a period of time – perhaps three years. Further, rather than aiming to register their own plant variety rights (or patents), RDCs should be making more effort to develop intellectual property in partnership with industry (preferably Australian), through cost sharing and licensing arrangements.

Government funding arrangements

The Commission's Issues Paper states that the rural sector has, in the past, been generously funded by government (State and Commonwealth) in comparison with other sectors. Australian rural R&D statistics suggest that the level of government support for the rural sector has been higher than other sectors of the economy. Recent reductions in State Government funding have probably changed this situation, which has not been unique to Australia - some other countries have also shown relatively high levels of public funding for rural R&D. In Australia, the work of Mullen and colleagues⁹ suggests that strong public support for R&D in this sector has resulted in high productivity gains and cost benefit ratios for the sector. These benefits flow broadly through the Australian economy and justify the levels of public support.

There is also evidence of a decline in the growth of investment in food and agriculture R&D worldwide.¹⁰ Mullen reports that in Australia, public investment in agricultural research has been static for two decades and the sector has declined in research intensity. Continued productivity gains are therefore likely to be the result of lags in the dividends from past research investments. Some investment in environmental research may also be making a small contribution to productivity in the agriculture sector. While environmental research undertaken by RDCs contributes to the public good, it makes little or no contribution to improving productivity. Mullen reports that returns on investment in agricultural research are likely to continue to be in the 15 - 40 per cent range. He concludes that the evidence suggests an under-investment in agricultural research in Australia. ATSE believes that, given the looming food shortages discussed above and the challenges posed by climate change, this is no time to be under-investing in agricultural R&D.

ATSE notes that the 2007 Productivity Commission report argued for scaling back Government funding for the RDCs, suggesting an independent assessment of induced spillovers associated with that support. The Government did not accept this proposal. In ATSE's view, these spillovers are impossible to estimate *ex ante* and very difficult to quantify *ex post*. *Ex post* analysis is by definition a picture of what has happened in the past, and may not accurately reflect future spillovers. ATSE considers that any suggestion that such an assessment should be undertaken for all RDC projects would not be useful.

R&D funding provided by the RDCs is playing an important role in supporting the training of the next generation of agricultural scientists and engineers. This is another reason for the sector to receive public funding. To ensure that Australia has the capacity and capabilities needed for agricultural

⁹ Mullen, J., 2007, *op.cit.*

¹⁰ Beintema, N. M. and Stads, G.-J., 2010, *op. cit.*

R&D, our universities and research organisations need to have access to adequate funds. The researcher population is ageing. We need to be sure that vibrant research attracts students and provides quality research training. Continuity of funding is necessary to ensure that skilled research resources are available when they are needed. RDCs need to take capacity building into account when making decisions of R&D funding.

If the Commission finds evidence that the distribution of benefits from primary industries' R&D warrants a greater funding contribution from the private sector (the primary producers), then the question should be how to provide them with an incentive to increase their contribution. Removing or raising the cap on the Government's contribution would be appropriate. Limiting the Government's contribution to 0.5 per cent of Gross Value of Production (GVP) is an unnecessary and arbitrary constraint. While this GVP cap has been justified on the basis that it enables the Commonwealth Government Budget's forward estimates to be determined on maximum Government commitment, ATSE's view is that there are more important considerations.

There has been a tendency for levy-payers to limit their contributions to match this cap. However the resulting funds may not be sufficient to ensure optimal levels of R&D. One way of encouraging levy-payers to increase their contribution would be for the Government to offer additional support for funds raised above 0.5 per cent GVP. ATSE proposes that above this level the government should offer one dollar for every two raised through levies up to a limit of 1 per cent of GVP. An alternative approach would be to set the cap at a level higher than 0.5 per cent of GVP. Any changes in the funding formulae need to be accompanied by stronger requirements in Government funding agreements for processors to contribute more to beyond-the-farm-gate R&D conducted by RDCs. ATSE note that in the forest industries, growers, processors and wood product importers have been paying the levy. There is scope for applying this arrangement in the food sector.

Governance

As the Commission notes in its Issues Paper, some RDCs are established under Commonwealth Government legislation (we refer to these as statutory RDCs) while others are industry owned companies operating under corporations law. Some of the latter undertake activities such as marketing in addition to R&D. ATSE believes that there is strength in this diversity. A one-size-fits-all approach is not appropriate. Those RDCs that also undertake marketing may well have a broader perspective on the needs of consumers and be better placed to identify new ways to meet those needs. However if they focus on marketing at the expense of R&D there is some question as to whether they should be able to continue to be eligible to receive government support. Funding agreements may need to specify a minimum level of spending on R&D in order to qualify for funding.

The experience of ATSE Fellows working with RDCs supports the value of having the links between R&D, marketing, and economic development. It is important that the statutory RDCs should not be unnecessarily restricted by comparison with their industry-owned counterparts. Further, statutory RDCs are subject to the Commonwealth Authorities and Companies Act (the CAC Act), which arguably carries some obligations that go beyond the requirements of Corporations law.

The Meat and Livestock Australia Donor Company is a very good example where there has been an increasing commitment to research beyond the farm gate by primary producers. The initial primary focus of the Donor Company was for innovation investment relating to the meat processing sector. However, over time, primary producers have come on board as partners in whole of supply chain projects.

ATSE strongly disagrees with the Uhrig Report recommendations that led to the departure of ministerially-appointed members of RDCs. If the Government is providing half of the funds, the Commonwealth Minister should have the right to nominate some of the Board members, whether the RDC is a Statutory Body or an industry-owned company. In the case of Statutory RDCs, the Minister appoints the chair and approves candidates from a Board selection process. In the case of the industry-owned company RDCs, the Minister's right to propose some candidates for Board membership should be part of the funding agreement and part of the RDC charter. The funding agreement should state that in proposing such candidates, the Minister will take into account the need for persons with qualifications in R&D, science and technology. They could be expected to take a longer-term view and a greater interest in ensuring public benefits.

Some RDCs are small, and this raises questions about their viability and the efficiency of their operations. Some small RDCs are actually very efficient and effective. Individual groups of primary producers want to ensure that their R&D funds are focussed on matters of importance to them. However the Rural Industries R&D Corporation (RIRDC) appears to address this very successfully, covering nine animal and ten plant industries. If the Commission finds that the smaller RDCs result in higher overhead costs, the Government could put pressure on RDCs through the funding agreements, to limit overhead costs. This would have to be managed on a case-by-case basis. Small RDCs could explore opportunities to amalgamate with larger RDCs, join RIRDC or make other more efficient arrangements. Equally there may be scope for RIRDC to pass some of their current portfolio of industries to other RDCs where the 'fit' is appropriate. However ATSE believes that decisions on structural matters of this sort should be made by the industry.

Project selection and evaluation

Selection processes have been developed by the RDCs to meet their particular circumstances. Levy payers need to be given opportunities to interact with research providers in determining what R&D will be funded. This may add to the RDCs' costs but is important to ensure that the levy payers' priorities are being addressed.

Evaluation of RDC project outcomes has increased significantly in recent years. ATSE applauds this development. However, ATSE would not want to see a requirement that RDCs evaluate every project. The RDC's Chairs Group, CRRDCC, has given significant focus to evaluation and most RDCs have taken this on board.

In relation to project selection processes, some hold the view that primary producers have traditionally been reluctant to invest in R&D beyond the farm gate. We know of no evidence to

support this view, and there are examples of RDC successes in this area. The benefits of such R&D come through enhanced demand for farm products arising from a greater recognition of customer and consumer needs. Without beyond-the-farm-gate investment, we will lock our primary producers into the commodity cycle as price takers. Beyond-the-farm gate R&D investments have increased the demand for Australian wool and diversified the markets for other primary products.

The RDCs play an important role as partners in Cooperative Research Centres (CRCs). The RDCs have had, and exercised, the strength to draw separate but complementary research groups together to bring combined strengths to a given project. In respect to partnering in CRCs, the value added to both a given RDC's research portfolio and the CRC's industry inputs provides immense opportunity and further justifies the new scale of public fund input suggested in this submission. This participation of RDCs greatly increases the intensity of research on a specific strategic objective and expands the RDC's capabilities in multidisciplinary research collaboration that is so necessary in meeting many of the more complex challenges of modern and future-focused agriculture. For RDCs, the capacity building through postgraduate and postdoctoral appointments in CRCs widens the discipline scope and sets high standards for the targeted non-CRC research separately commissioned by RDCs.

ATSE notes that for some RDCs, funding proposals brought forward by research providers is an easy substitute for identifying priority problems and opportunities with the industry and designing research projects to address these. Research providers can often provide useful suggestions for new projects. An interactive process is then required to develop a proposal that meets RDC criteria. The work involved in defining a research project (or program) to meet industry needs, and finding someone to undertake it, requires considerable effort but results in outcomes that are often more relevant to industry needs.

An associated point is the quality of the staff within the RDCs – staff turnover is not high and as a consequence, enrichment from outside the sector is limited. Schemes such as the US National Science Foundation's approach of seconding researchers into the organisation as co-managers of programs would refresh management and also ensure that they are up-to-date with the latest science and innovation.

Some RDCs may undertake R&D in similar areas (e.g. adaptation to climate change). It is important that such research is undertaken by RDCs in cooperation to capture synergies and avoid possible overlap and duplication. The Council of Rural Research and Development Corporation Chairs (CRRDCC) is playing an important role in breaking down barriers to research cooperation and generally facilitating this activity between RDCs.

Support for new and emerging areas

New and emerging rural industries need significant levels of support. Building critical mass in R&D for these areas appears to be primarily a responsibility of RIRDC. The Government should consider providing additional funding through RIRDC to this end. ATSE believes that voluntary contributions

are especially important for new and emerging industries where GVP is low and the need for early innovation is high. The universities may be able to play a key role in R&D for emerging areas (see the example of Tasmania footnoted earlier).

Conclusion

In ATSE's view, the RDC model is for the most part working very well. The RDC model is well renowned internationally as effective and efficient. If the Productivity Commission proposes significant changes to present arrangements, it will need to demonstrate that such changes are evidence-based and will not have undesirable consequences. ATSE would regard any changes that risk a reduction in Australia's rural R&D effort and away from the industry-government partnership model to be highly undesirable.