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RDC Inquiry
Productivity Commission
LB2 Collins Street East
Melbourne VIC 8003

*By email:* rural-research@pc.gov.au

To Whom It May Concern,

The University of Sydney is pleased to make a submission to the Productivity Commission's review of Rural Research and Development Corporations (RDCs).

The University has a long and productive history of engagement and partnership with rural RDCs and Industry Owned Companies (IOCs). We view the RDC model as a vital and world-leading approach to agricultural research broadly defined. It is a model that has served Australia well over the last 20 years and beyond – delivering substantial productivity and other returns for the people of Australia.

As the Productivity Commission's own research has found, much of the productivity growth achieved by Australia's agricultural sector over the last forty years has resulted from its ability to generate and apply new knowledge and technologies. In our view, the RDC model has been a critical to this success. It has complemented other policy and market drivers, assisting our rural industries to remain internationally competitive through innovation.

The University's core mission is to conduct education and research of the highest quality for the benefit of Australia and the wider world. We believe fundamentally that many of the most pressing challenges that humanity will face over the coming decades will only be addressed through the maintenance and continual development of national capacities for knowledge development and innovation in rural R&D. We are committed to underpinning this capacity in Australia and the Asia Pacific region through the pursuit of teaching, research and research training of the highest quality in close cooperation with governments, rural industries and communities.

In this regard we note the findings and recommendations of the landmark report of the *Royal Society, Reaping the Benefits: Science and the Sustainable Intensification of Global Agriculture.* The report details the scale of the food production challenge humanity will face this century as populations grow, consumption patterns change; and as the impacts of climate change, land and water scarcity are felt. The University of Sydney is similarly concerned to ensure that Australia's overall approach to agricultural policy and research ensures that we have in place the underpinning capacity, both in terms of people and infrastructure, required to 'future proof' our agricultural and environmental research.

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Over the last five years, half of the University's 16 faculties have had researchers actively engaged in projects supported by RDCs. Between 2004 to 2009 the University received some 350 grants from ten RDCs valued at some $37 million in direct funding, with 80 per cent of these grants held with four RDCs: the RIRDC; GRDC; Dairy Australia and Horticulture Australia. During this period the Chief Investigators holding RDC grants published in excess of 2000 papers and filed patent applications for some 20 inventions. The scale and breadth of the University's rural research activity indicates both its importance to the University's mission and the multidisciplinary nature of modern rural R&D. The University would be pleased to provide detailed data on its research activities linked to RDCs if that would be off assistance to the Commission.

Over many decades the University has made a particularly significant contribution to Australia's relationships with its neighbours in the Asia Pacific Region through educating and training hundreds of international students in the agricultural, economic and veterinary sciences. While it is difficult to quantify in economic terms the value of the relationships and improved practices that result from such interactions, these are important 'spill over' benefits that must be taken into account when considering the overall value and impact of investing public funds in rural R&D programs.

While the University of Sydney is a strong supporter of the RDC program as a fundamental contributor to national capacity building for rural R&D, industry and practice, there are some areas where we believe changes to the program could improve its effectiveness and enhance outcomes. The attached submission summarises some of the key issues from the University's perspective and suggests some ideas for reform, which we believe would serve to enhance the effectiveness of the program.

In broad terms, we feel that the long term, public good missions of universities and the sometimes shorter term, more commercially-driven imperatives of industry, too often give rise to tensions in areas such as the focus and design of research projects, the publication of findings from publicly funded research, and the management of intellectual property. From a practical perspective we see room to reduce administrative costs and improve overall program outcomes by streamlining the governance/administrative structures of RDCs and standardising the terms of research funding agreements. We also see a need for policy to formally encourage RDCs to pursue longer term collaborative public good research projects through the establishment of a jointly-managed strategic research fund. Critically, we see a need for the overall framework to support the nation's underpinning agricultural research capacity, both in terms of people and infrastructure. This will be essential if we are to tackle the challenges that we look certain to face over the coming decade as a result of domestic and international population growth and climate change.

We understand that the Commission has already made some visits to universities as part of its review. We invite you to the visit the University of Sydney to further understand our views.

Yours sincerely

*(Signature withheld for electronic publication)*

Professor Jill Trewhella
Deputy Vice Chancellor (Research)

# University of Sydney comments on the Productivity Commission Rural Research and Development Corporations, Issues Paper, March 2010

## Recommendations

**Recommendation 1**
*Require all RDCs to dedicate an agreed proportion of their annual funding to support national capacity building in relevant areas of research, and to work with each other, governments and educational institutions to agree strategies, targets and plans to 'future proof' Australian rural research.*

**Recommendation 2**
*Quarantine an agreed percentage of RDC research funding annually (both Commonwealth contributions and producer levy funds) to establish a 'Strategic Research Fund.' The purpose of the fund would be to support research projects in areas of national priority agreed by the Council of Rural Research and Development Corporation Chairs (CRRDCC). Funding would be allocated through open, competitive, peer reviewed processes.*

**Recommendation 3**
*Pursue governance, management and administrative reforms that promote coordination and collaboration between RDCs and IOCs.*

**Recommendation 4**
*Require all RDCs and IOCs to agree on a single template funding agreement for all research contracts with universities and other publicly funded research organisations.*

**Recommendation 5**
*Establish a funding model for RDCs that enables funding for research to be maintained during prolonged downturns caused by drought or other natural disasters.*

**Recommendation 6**
*Ensure that all RDC funding is allocated through transparent, open and competitive processes.*

**Recommendation 7**
*Establish a robust process, independent of the RDCs and research organisations, to evaluate the quality and impact of RDC funded research.*

## 1. Overview & context

The University of Sydney greatly values its relationships with Rural Research and Development Corporations, rural industries and communities. We strongly favour the continuation of a model of public support for rural R&D that supports and encourages close relationships between producers, researchers and universities. One of the great strengths of the existing RDC model is that the RDCs tend to maintain much closer and more personal relationships with the researchers they fund compared with the larger government funding agencies. The RDCs generally act as effective 'bridges' between researchers and industry, ensuring that the research they fund is responsive, grounded, relevant, time and cost effective. Importantly, RDCs provide an effective avenue for ensuring that new knowledge that results from research, whether undertaken in Australia or elsewhere, is applied by producers to improve practices and outcomes.

The University's mission is to conduct education and research of the highest quality for the benefit of Australia and the wider world. We believe fundamentally that many of the most pressing challenges faced by humanity in areas such as: food and water security; global warming and carbon sequestration; biofuels; environmental sustainability; and animal borne diseases - can only be addressed through the maintenance and continual development of national capacities for knowledge development and innovation in R&D. We are committed to underpinning this capacity in Australia and the Asia Pacific region through the pursuit of teaching, research and research training of the highest quality in close cooperation with governments, rural industries and communities.

The comments provided below are based on feedback received from University of Sydney researchers and other staff who are closely involved with RDCs. They are provided to assist the Commission to make recommendations to Government about how it can best build upon current arrangements to maximise public good outcomes from publicly funded rural research.

In providing these comments we note that compared to agricultural industries in other developed countries, Australian producers operate under a relatively 'free market' framework, with very limited (and declining) direct or indirect subsidies provided to support agricultural industries in the national interest. As the Productivity Commission itself found in its 2005 study, *Trends in Australian Agriculture*, Australia's agricultural producers receive one of the lowest levels of government support in OECD. That study concluded that key factors behind the very strong productivity growth achieved by Australia's agricultural sector (2.3% annually from 1974 to 2004 in trend terms compared to 1% per annum for the overall domestic market sector) were its capacity to generate and adapt new knowledge and technologies, combined with changes to practices that resulted from having to compete on price and quality in key export markets without the luxury of government subsidies:

> ***Drivers of productivity growth in agriculture***
> A key source of productivity growth in agriculture has been the generation and adoption of new knowledge or technologies. Some examples include:
> - the development of more sophisticated farm machinery and equipment;
> - the development of improved herbicides, fertilisers and other chemicals that have enhanced yields; and
> - genetic modification involving the manipulation of the genetic structure of living organisms (more directly than through conventional plant and animal breeding), which has created opportunities for raising the productive potential of plants or animals by, for example, enhancing their resilience to disease.
>
> Productivity growth has also come about as farmers have made better use of available technologies and management practices. Key influences in this context have been pressures from competing overseas producers, the enabling effects of new process technologies such as IT and the internet, as well as changes to various institutional and regulatory arrangements (including reforms to statutory marketing arrangements for several industries). In addition, productivity growth within the agriculture sector has been shaped by structural changes such as increases in farm size, shifts in the industry mix of the sector and the exit of lower performing farmers.[1]

One of the great strengths of the Australia's approach to agricultural policy since the 1970s has been that its focus on competition and the development of new knowledge has served to encourage innovation. In this context the RDC model has complemented the broadly deregulatory approach to agricultural policy that has characterised the approach of successive Australian governments. As a result, substantial benefits have flowed to producers and Australians more broadly through the achievement of more internationally competitive export industries; higher quality, safer and better-priced food; and other outcomes that are more difficult to quantify such as improved sustainability and maintaining and developing and underpinning research capacity.

We also note and draw the Commission's attention to the landmark report, *Reaping the Benefits: Science and the Sustainable Intensification of Global Agriculture*, released by the Royal Society in October 2009. This report details the scale of the food production challenge humanity will face over the next forty years as populations grow, consumption patterns change; and as the impacts of climate change, land and water scarcity are felt. Critically, one of the 12 recommendations made by the Royal Society was that:

> Universities should work with funding bodies to reverse the decline in subjects relevant to a sustainable intensification of food crop production, such as agronomy, plant physiology, pathology and general botany, soil science, environmental microbiology, weed science and entomology. We recommend that attempts by universities and funding bodies to address this skills gap look globally. Studentships and postdoctoral research positions should provide targeted subsidies in developing countries to visit the UK and work with UK researchers.[2]

[1] Productivity Commission 2005, *Trends in Australian Agriculture*, p.XL:http://www.pc.gov.au/__data/assets/pdf_file/0018/8361/agriculture.pdf
[2] Royal Society 2009, *Reaping the Benefits: Science and the Sustainable Intensification of Global Agriculture*, p.X: http://royalsociety.org/Reapingthebenefits/

Australia faces very similar challenges to those articulated by the Royal Society with a focus on the United Kingdom and its role in global research. We have a rapidly ageing research workforce.[3] It appears inevitable that climate change and national and global responses to it will result in increased demand for people with high level scientific and agricultural expertise. We must therefore ensure that we are investing adequately in the future of our animal and agricultural research capacity. As the final report of the 2008 Garnaut Climate Change Review noted:

> ... more than 2.5 million jobs will need to be filled over the next two decades. Many of these jobs will be in areas either directly or indirectly influenced by the climate change response. In addition to the construction and energy sectors, areas of potential employment change include transport, agriculture and a range of services. Many of these jobs will be in industry subsectors that barely exist today and some that lie within the imagination of farsighted entrepreneurs. The need to supply appropriately skilled people for these jobs is in addition to the need to develop new knowledge and skills in existing roles and sectors around the issues that emerge from the implementation of climate change policies. There will be few sectors left untouched. The implications of these changes for Australia's education and training sector are yet to be fully appreciated.[4]

For the national interest to be served well by the RDC scheme into the future, it will be critical to ensure that it makes a greater contribution to national rural R&D capacity building than it does currently. At present we estimate that around 15-20% of our postgraduate research students in key faculties are supported by RDC funding. We would like to see that level increase substantially over the next decade, alongside a strong increase in the numbers of domestic and international students completing studies at this level.

**Recommendation 1**
*Require all RDCs to dedicate an agreed proportion of their annual funding to support national capacity building in relevant areas of research, and to work with each other, governments and educational institutions to agree strategies, targets and plans to 'future proof' Australian rural research.*

## 2. Rationales for public investment in rural R&D

We note the data contained in the Issues Paper evidencing the strong economic benefits that have been found through analysis of some specific RDC funded projects. We further note the substantial work undertaken recently by the Commission and others to quantify the economic returns on public investment in R&D broadly and rural R&D in particular. While we acknowledge the value and importance of economic analysis, we also emphasise the need to ensure that broader environmental and social benefits, which are more difficult to quantify, are nevertheless taken into account when assessing the value of public investment. In our view, public funding for rural R&D should be viewed as essential to supporting national capacity building, knowledge development and innovation. We do not believe that the private sector alone can be relied upon to ensure that:

- this underpinning national capacity and university/industry linkages exist;
- there is an appropriate mix of R&D (goal oriented, applied, and long term public good);
- the scope of our rural research is suitably broad so that spill-over benefits are maximised;
- the maximum amount of available funds flows to support the actual research as opposed to administration and other activities.

Over the last five years, half of the University's 16 faculties: Agriculture Food and Natural Resources; Economics and Business; Engineering & Information Technologies; Pharmacy; Health Sciences; Veterinary Science; Science and Medicine have had researchers actively engaged in projects supported by RDCs. Between 2004 to 2009 the University received some 350 grants from ten RDCs valued at some $37 million in direct funding, with 80 per cent of these grants held with four RDCs: the RIRDC; GRDC; Dairy Australia and Horticulture Australia. During this period the Chief Investigators holding RDC grants published in excess of 2000 papers and filed patent applications for some 20 inventions. The scale and breadth of the University's rural research activity indicates both its importance to the University's mission and the multidisciplinary nature of

[3] Hugo, G, 2008, *The demographic outlook for Australian universities' academic staff, Presentation to the Council for the Humanities Arts and Social Sciences*: http://www.chass.org.au/submissions/pdf/SUB20080515TG.pdf
[4] Garnaut, R, 2009, *The Garnaut Climate Change Review*, p.586

modern rural R&D. The following case study, demonstrating the economic and other impacts of the University's research in the field of cereal crop research, is provided for the Commission's consideration. We would be more than happy to provide similar details for research undertaken in other areas if that would be of assistance.

### *2.1 Case Study - Australian Cereal Rust Control Program*

Rust diseases of cereals are caused by pathogenic fungi. They are 'social diseases' and successful control through resistance breeding comprises a significant component of public good, requiring serious commitment from the grains industry as a whole. The use of genetic resistance to control rust diseases is analogous to the principles of vaccination, which can only be totally successful if a threshold level of vaccination against a disease is maintained in a population.

The University of Sydney has been engaged in developing genetically resistant cereal cultivars since the 1920s, and is a world leader in this field. This research is now conducted under the umbrella of the Australian Cereal Rust Control Program (ACRCP), and involves rust pathogen surveillance, research on the genetics of rust resistance in cereals, germplasm enhancement and screening services to all Australian cereal breeders, and postgraduate training in genetics of rust resistance and plant breeding.

The University has received financial support from the Grains Research and Development Corporation (GRDC) for the cereal rust research it has undertaken. A recent independent evaluation by Agtrans Research Ltd indicated that the 1991-2007 investment in cereal rust research of $57.6m by GRDC and its research partners, including the University of Sydney, produced a return of $2.1 billion to the grains industry, a cost: benefit ratio of 23:1. Mr Keith Perrett, GRDC Chair, was quoted as saying that the high returns identified supported the GRDCs view that cereal rust research is one of the most important grains industry investments. In addition to this, the University's Plant Breeding Institute has had significant international impact through its postgraduate training program in rust genetics and cereal breeding, with 27 postgraduate local and international students receiving training to Masters or PhD levels over the past 50 years.

## 3. Current issues

### *3.1 Research focus - public versus private good*

Over the years we have noticed some important shifts in the strategic directions taken by RDCs. For example, from organisations that at origin were essentially managers of research funding, have now evolved to have diverse roles, providing a range of services to their members including research executors, developers, translators, advocates and marketers. This may mean that government and levy-based funds that were originally intended to support research, are being diluted or are cross-subsidising other activities. It may also have resulted in some RDCs duplicating the services provided by publicly funded research organisations such as universities.

We have observed an increasing trend towards some RDCs preferring to fund market specific, short-term applied research, rather than research that is more broadly based, has longer (or less defined lead times) but has the potential to deliver broader public benefits. New knowledge development does not appear to be viewed as a manageable process by some RDCs, which see it as high risk and non-aligned to their missions. They appear to have difficulty reconciling such research with the immediate needs of their levy payers for tangible commercial outcomes. In our view, the perspective of some RDC stakeholders that research without an industry application is not research, is too narrow, particularly given that so much of the funding comes from taxpayers. The commercial imperative driving some RDCs has had implications for universities in terms of their desire and obligation to disseminate findings from funded research in the public interest through publications and technology transfer (see below).

**Recommendation 2**

*Quarantine an agreed percentage of RDC research funding annually (both Commonwealth contributions and producer levy funds) to establish a 'Strategic Research Fund.' The purpose of the fund would be to support research projects in areas of national priority agreed by the Council of Rural Research and Development Corporation Chairs (CRRDCC). Funding would be allocated through open, competitive, peer reviewed processes.*

### *3.2 Publication rights and other contractual issues*

The University of Sydney recently made the difficult decision not to enter into valuable research contracts with a particular RDC due to its inability over a lengthy period, to reach agreement over the rights of its researchers to publish, within a reasonable timeframe, findings arising from the research the RDC was to sponsor. The University feels strongly that the results of research conducted in public universities, most especially research that is funded by the taxpaying public, belong in the public domain. Academic publications should not be subject to a veto right by the RDCs which fund the research. While the University finally achieved a positive outcome in relation to this matter through negotiation, too often we find ourselves having to resolve the same type of issues in relation to publication rights with RDCs.

While the right to publication is the key issue that is regularly the subject of our negotiations with RDCs, there are other provisions that appear regularly in RDC research funding agreements, which are problematic for the University. These include: provisions relating to limitations on freedom to conduct research for other organisations; waivers of 'moral rights'; broad background IP licenses; ownership of IP and limitations on commercialisation of IP; transferring responsibility for the risk associated with the research to universities; and termination rights.

Negotiating these matters with RDCs on a case by case basis is extremely time consuming and inefficient for all parties. In an effort to address these concerns the University, both individually and in collaboration with other Group of Eight universities, has embarked upon a process to try to agree standard template funding agreements with a number of key RDCs.

### *3.3 Intellectual property*

The National Principles of Intellectual Property Management for Publicly Funded Research require universities to have in place systems of IP identification, protection and management in order to facilitate technology transfer and the exploitation of IP generated as a result of publicly-funded research 'Project IP' for the benefit of the public. We believe that universities have the obligation, as well as the resources, to capture and steward IP in the public interest. Although RDCs and universities are often both trying to achieve the same public good outcome from Project IP, we believe that the IP ownership model adopted by the RDCs undermines the prospects of successfully achieving this outcome.

RDC funding agreements generally provide that all Project IP is jointly owned by the RDC and all university participants based upon an 'Interest' model, rather than by the research party that creates the IP. Interest is determined based on the cash and in-kind contributions made by the various parties to the research. The RDC can also elect at its discretion to own 100% ownership of the Project IP. The University believes that by claiming ownership of all or part of the Project IP created by universities, the RDCs are not implementing the most effective model to support the maximum dissemination of Project IP for the public good. In our view, many RDCs do not have the specialised resources that are necessary to protect and manage IP effectively, while many universities do have this capacity and expertise. Further, this model generally results in Project IP being jointly-owned by two or more different parties. Joint-ownership of IP dramatically reduces the chances of the Project IP being disseminated for the public good, in part because no party is capable of dealing with the IP unless it can reach agreement with all of the other co-owners.

In one recent example, during a project funded by one RDC a University researcher discovered a protein which, if commercialised, could lead to better management of breeding programs for certain animals, with the potential to provide enhanced economic outcomes for breeders and the industry generally. If this Project IP were owned by the University it would be protected by patent and commercialised. In this case, however, although the IP was solely created by the University under the terms of the RDC agreement, the ownership of the Project IP is unclear. It is likely that it will involve up to 8 parties as co-owners - some of which are based overseas. In order to take the IP forward the University will need to enter into an agreement which each of the 7 co-owners about matters including IP ownership, payment of patent costs, commercialisation and the sharing of proceeds. Such complexity represents a significant barrier to the University being able to commit the resources to take this project forward.

### *3.4 Fragmentation & collaboration*

Collaboration and multidisciplinary projects are hindered by fragmentation of R&D to specific RDCs. As noted above, negotiating agreements with a multitude of RDCs/IOCs is inefficient and costly. It leads to administrative multiplication and higher than necessary legal costs as a result of

with delays caused by diversity of legal opinion and adversarial arguments. This ultimately serves to delay the implementation of projects and can result in discontinuity between research projects. Fragmentation can also lead to duplication, siloed communities of interest and increases the risk of the overall research agenda lacking strategic coherence.

**Recommendation 3**
*Pursue governance, management and administrative reforms that promote coordination and collaboration between RDCs and IOCs.*

**Recommendation 4**
*Require all RDCs and IOCs to agree on a single template funding agreement for all research contracts with universities and other publicly funded research organisations.*

### *3.5 Funding fluctuations*

The current funding arrangements, which in most cases see the Government's contribution match producer levies up to a maximum of 0.5 per cent of the gross value of production, are highly susceptible to fluctuations in production and the value of output. This means, for example, that in times of drought, when the sector arguably most needs research, the available funding is reduced. Universities are especially vulnerable to fluctuations in funding as research staff in universities, unlike their colleagues in publicly funded research agencies such as the CSIRO and state-based agencies, cannot be sustained over long periods. This can have serious implications for overall capacity and the continuity of research programs in universities.

**Recommendation 5**
*Establish a funding model for RDCs that enables funding for research to be maintained during prolonged downturns caused by drought or other natural disasters.*

### *3.6 National Rural Research, Development and Extension Strategies*

The National Rural Research, Development and Extension Strategy has been devised at ministerial level to coordinate and rationalise national activities in rural research, development and extension. In our view, by giving more weight to non-competitive funding the National Rural R, D&E strategies potentially risk compromising excellence in research and over time reducing national capacity and outcomes.

**Recommendation 6**
*Ensure that all RDC funding is allocated through transparent, open and competitive processes.*

### *3.7 Collaborative State-based approaches*

Over the last two decades we have observed substantial changes in the approach to agricultural research taken by State governments. In general, we would like to see much greater levels of collaboration between universities and state departments of primary industries, focused around building critical capacity and improving the coordination of research and research training in line with state priorities. The collaborative approach taken by the Tasmanian Government and the University of Tasmania, through their Tasmanian Institute of Agricultural Research (TIAR) jointventure, is one very sound partnership model which we believe could be applied successfully in other states. It is similar to the model that has been in place for many years in the United States where state governments partner with one or more university to provide the state's underpinning agricultural research capacity and supporting infrastructure.

### *3.8 Evaluation of outcomes*

We agree with the Commission's desire to see more and higher quality evaluation, including ex post evaluation of the RDC funded research. As noted above, the University of Sydney holds detailed data about all research funded by RDCs in recent times. As incentives exist for both RDC and research providers to demonstrate optimal economic and other outcomes from RDC funded research, there would appear to be a need for an independent body such as the Productivity Commission, to establish a robust methodology and process to routinely evaluate the impact of this and other similar government programs.

**Recommendation 7**
*Establish a robust process, independent of the RDCs and research organisations, to evaluate the quality and impact of RDC funded research.*