Australian Government
Productivity Commission

Rural Research and Development Corporations

Productivity Commission Issues Paper

March 2010

The Issues Paper

The Commission has released this issues paper to assist individuals and organisations to prepare submissions to the inquiry. It outlines:

- the scope of the inquiry
- matters about which the Commission is seeking comment and information, and
- how to make a submission.

Those making submissions should not feel restricted to commenting only on matters raised in the paper. The Commission wishes to receive input on any issues which are relevant to the inquiry's terms of reference.

Key inquiry dates

Receipt of terms of reference	15 February 2010
Date for submissions	no later than 25 June 2010
Release of draft report	September 2010
Public hearings	October/November 2010
Final report to Government	15 February 2011

Submissions can be made:

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au) or by contacting Media and Publications on (03) 9653 2244 or email: maps@pc.gov.au

Terms of reference

PRODUCTIVITY COMMISSION INQUIRY INTO THE AUSTRALIAN GOVERNMENT RESEARCH AND DEVELOPMENT CORPORATIONS MODEL

I, Nick Sherry, pursuant to Parts 2 and 3 of the *Productivity Commission Act 1998*, hereby refer rural research and development corporation arrangements in Australia to the Productivity Commission for inquiry and report within twelve months of receipt of this reference.

Outline

Investment in agricultural research and development is undertaken primarily through the Rural Development Corporations (RDCs), State and Territory governments, CSIRO, the tertiary education sector, cooperative research centres and private sector businesses. Total expenditure by all sectors on rural research and development was of the order of $1.6 billion in 2006-07.

The RDCs, who commission research and development from public and private providers, are funded by a co-investment model based on industry levies and matching Australian Government funding. The Australian Government collects industry levies under legislation for the purpose of research and development and matches expenditure on research and development on a 1:1 basis, up to 0.5 per cent of industry gross value of production. In 2008-09, expenditure by RDCs on R&D was about $460 million, including $207 million from the Australian Government. RDCs are accountable to both industry and government for their expenditure.

Terms of Reference

The review will:

- examine the economic and policy rationale for Commonwealth Government investment in rural R&D;
- examine the appropriate level of, and balance between public and private investment in rural R&D;
- consider the effectiveness of the current RDC model in improving competitiveness and productivity in the agriculture, fisheries and forestry industries through research and development;
- examine the appropriateness of current funding levels and arrangements for agricultural research and development, particularly levy arrangements, and Commonwealth matching and other financial contributions to agriculture, fisheries and forestry RDCs;
- consider any impediments to the efficient and effective functioning of the RDC model and identify any scope for improvements, including in respect to governance, management and any administrative duplication;
- consider the extent to which the agriculture, fisheries and forestry industries differ from other sectors of the economy with regard to research and development; how the current RDC model compares and interacts with other research and development arrangements, including the university sector, cooperative research centres and other providers; and whether there are other models which could address policy objectives more effectively;

- examine the extent to which RDCs provide an appropriate balance between projects that provide benefits to specific industries versus broader public interests including examining interactions and potential overlaps across governments and programs, such as mitigating and adapting to climate change; managing the natural resource base; understanding and responding better to markets and consumers; food security, and managing biosecurity threats;

- examine whether the current levy arrangements address free rider concerns effectively and whether all industry participants are receiving appropriate benefits from their levy contributions.

The Commission is to hold hearings for the purpose of the inquiry and produce a draft and final report.

NICK SHERRY

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Abbreviations

CRC	Cooperative Research Centre
CRRDCC	Council of Rural Research and Development Corporation Chairs
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry
IOC	Industry-owned corporation
PC	Productivity Commission
PIERD Act	*Primary Industries and Energy Research and Development Act 1989* (Cwlth)
R&D	Research and development
RIRDC	Rural Industries Research and Development Corporation
RDC	Rural Research and Development Corporation

1 What has the Commission been asked to do?

Research and development (R&D), together with 'extension' that facilitates the uptake of research outcomes, plays a key role in enhancing the competitiveness and productivity of Australia's agricultural, fishing and forestry industries. Some of this activity also provides wider benefits to the community by, for example, enhancing environmental outcomes.

Partly in recognition of these wider benefits, the Australian and state and territory Governments fund an estimated three-quarters of the $1.7 billion reportedly spent each year on rural R&D. This government funding is distributed in various ways. At the Australian Government level, the single most important funding program is for the 15 Rural Research and Development Corporations (RDCs). These organisations (listed in table 1 later) commission R&D from both public and private providers, and draw on funding from industry levies as well as contributions from the Australian Government.

Over the last decade or so, the efficiency and effectiveness of the RDC model has been discussed in a number of reports — see, for example, Core 2009; Frontier Economics 2006; and PC 2007; 2009. These reports have pointed to various strengths of the model, including as a means to share the costs of R&D that both directly benefits primary producers and provides wider benefits to the community.

However, concerns have been raised about aspects of the model, including in regard to the balance between public and private funding, governance arrangements, seemingly high administrative costs, and duplication of research effort across RDCs and with other government-funded research programs.

Against this backdrop, the Government has asked the Commission to inquire into the RDC arrangements. Amongst other things, the inquiry will examine:

- the rationale for Australian Government investment in rural R&D
- the appropriateness of current funding levels and arrangements — particularly levy arrangements, and the basis for Australian Government contributions
- the effectiveness of the RDC model in enhancing the competitiveness and productivity of Australia's rural industries
- the extent to which RDC-funded projects deliver an appropriate balance between industry-specific and wider community benefits
- how the current RDC model compares and interacts with other arrangements for funding and delivering rural R&D

- the scope for improvements to the current model and any alternative models that could deliver better outcomes.

The full terms of reference for the inquiry, which is to be completed within 12 months, are provided at the front of this paper.

There are also several related policy processes underway or in prospect. In particular:

- The Rural Research and Development Council — a body established in 2009 to advise the Australian Government on rural research matters (Burke 2009; DAFF 2010a) — is preparing an R&D investment plan for the sector.
- Through the R&D subcommittee of the Primary Industries Ministerial Council, the Australian and state and territory governments are working with the RDCs and other relevant research bodies such as the CSIRO to develop a 'National Primary Industries research, development and extension framework'. This framework is intended to enhance national R&D and extension capability through the development of strategic plans for 21 industry-specific and cross-industry streams. The intention is that research and extension capacity for each of these streams will be concentrated in particular jurisdictions to promote centres of research excellence. (For further information, see DAFF 2010b.)

The Commission will be liaising with the bodies concerned to try to minimise duplication of analytical effort.

The Commission's approach

In keeping with its legislation, the Commission will be basing its assessments on what set of arrangements would give the best outcomes for the community as a whole. In this regard, the interests of primary producers and the rural sector more generally will be a key consideration. However, in framing its recommendations, the Commission will also be taking account of wider impacts, including for other parts of the R&D system, the environment and taxpayers.

To facilitate soundly-based assessments and reform options, input from the various stakeholders will be critical. The subsequent sections of this paper outline some specific matters on which such input would be particularly helpful. In addition, the Commission will be drawing on the analysis and findings in previous reviews and, where appropriate, on approaches employed in other countries.

2 How does the RDC model operate?

RDCs were first established in 1989 under the Primary Industries and Energy Research and Development (PIERD) Act — though the first example of the broad approach (wool) dates back to 1936. As a group, RDCs plan, fund and manage more than a quarter of estimated total rural R&D in Australia.

Importantly, while often referred to as a single model, there is in fact considerable variation across individual RDCs in relation to such things as legislative underpinnings, research focus, roles in other activities (e.g. marketing and promotion), governance arrangements, and specific funding formulas.

Positioning within the broader institutional framework

The RDCs sit within a broader institutional framework and set of arrangements for funding and undertaking rural R&D. Thus, for example:

- The Australian Government sets high level research priorities informed, as appropriate, by entities such as the Primary Industries Ministerial Council and the Rural Research and Development Council.
- As well as partly funding the RDCs, the Australian Government funds other programs that encompass research of benefit to the rural sector (e.g. Australia's Farming Future initiative (DAFF 2010c) and the 'Caring for our Country' natural resource management program (CFOC 2010)); provides the bulk of funds for the CSIRO; contributes to the costs of cooperative research centres (CRCs); and funds the universities which are in turn important research providers in this area.
- State Governments are major funders and providers of research and extension services, though their contribution has been declining in recent years.
- Beyond the contribution of primary producers to the R&D undertaken by the RDCs (see below), private entities separately fund a variety of in-house and other rural research, and are also involved in supplying various R&D services.

The Commission has not yet been able to assemble precise data on the respective contributions of governments and private parties to the reported annual spending of $1.7 billion on rural R&D.

Coverage, functions and funding

There are currently 15 RDCs: 6 statutory corporations and 9 industry-owned companies (IOCs). All bar one cover single (though often broad) rural industries (e.g. horticulture, grains). The exception is the Rural Industries Research and Development Corporation (RIRDC) which covers several smaller industries, as well as sponsoring research on national rural issues. Land and Water Australia, which ceased operations at the end of 2009, was also a cross-sectoral entity.

The functions of the statutory corporations are limited to R&D-related activities. However, the IOCs also undertake various marketing and promotion activity, and a few have industry representation roles.

Although the precise funding arrangements differ across individual RDCs, all derive the bulk, or all, of their research-related revenue from statutory levies on primary producers and contributions from the Australian Government. In most cases, the Australian Government's contribution is paid on a matching basis up to a ceiling of 0.5 per cent of the industry's gross value of production. Some of the RDCs derive additional revenue from royalties and licensing agreements, and those established as IOCs also receive revenue from (unmatched) levies collected to fund marketing and promotion activity.

The rate of the levy is determined by members of the industry concerned. Some industries having elected to pay at a higher rate than the ceiling on the Australian Government matching contribution and others at a lower rate. Though often involved in influencing the nature of RDC research programs, in the majority of cases, processors do not pay a levy.

Governance arrangements

To help ensure that the RDCs are accountable to the Government and other stakeholders, there is a governance regime that:

- is designed to translate the Government's national research priorities and the associated rural research priorities, together with those of industry levy payers, into five year strategic plans and annual operating plans
- provides for after-the-event annual reporting on outcomes and performance.

As part of these arrangements, there are various formal and informal channels and consultation processes through which the Government and other stakeholders can convey their views to the RDCs.

Again, however, there is considerable diversity in the specific arrangements, and especially between those for the statutory corporations and those for the IOCs. For example:

- The boards of the statutory corporations are appointed by the Minister for Agriculture, Fisheries and Forestry, whereas IOC board appointments are determined by the members (in the main a subset of the levy payers) in keeping with Corporations law.
- The relationship between the statutory corporations and the Government is dictated by the PIERD Act, whereas for the IOCs it is specified in legislation providing for the conversion of these companies from government to private ownership (e.g. the Wool Services Privatisation Act 2000) and in 'Statutory Funding Agreements'. These legislative provisions and agreements overlay the more general requirements in Corporations law making the directors of IOCs responsible for meeting the needs of members.
- The IOCs, but not the statutory corporations, are subject to explicit three or four yearly performance reviews, undertaken by independent consultants.

There are also differences in the arrangements for consultation with levy payers and industry associations as part of the preparation of strategic and annual plans. In some cases, the entities which must be consulted are prescribed in the legislation. In other cases, the nature of the consultation process and which bodies are involved are determined by the RDC concerned. Also, some RDCs have established panels/industry advisory bodies that consult with levy payers on research priorities and on the uptake of research outputs.

There has also been diversity in the extent of project evaluation. A few of the RDCs have a long history of benefit–cost analysis. However, in many cases, it appears that such analysis has been a more recent development in response to the commencement in 2008 of a rolling evaluation process across the RDCs.

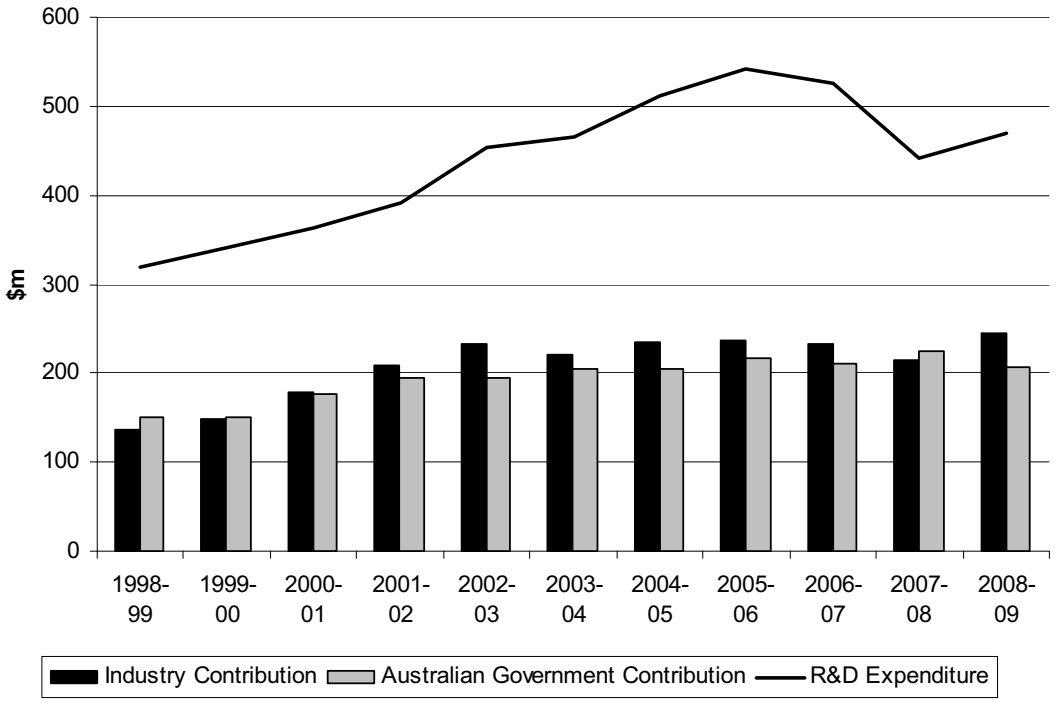
Coordination and collaboration

The Council of Rural Research and Development Corporation Chairs (CRRDCC) is the peak forum for coordinating the activities of the RDCs to help avoid duplication of research effort and, where appropriate, to encourage work on a collaborative basis. There is also a range of informal project-specific collaboration between individual RDCs, with some involved in collaborative work with international research bodies. Additionally, there has been some exploration of the scope for administrative consolidation — though so far this has not led to any significant changes.

Recent activity

Over the last decade, the RDCs have funded R&D projects worth more than $4 billion. Expenditure of around $470 million in 2008-09 was somewhat lower than in some recent years, due partly to the impact of the drought on industry output and hence on levy collections and the matching contributions from the Australian Government (see figure 1). However, such year to year fluctuations are dampened by, amongst other things, the capacity of RDCs to accumulate reserves and by the use of a three-year rolling average to determine the value of industry output on which the Government's contribution is based.

Figure 1 **RDC expenditure and funding sources over time**



Source: Based on estimates supplied by DAFF.

The Grains RDC, Horticulture Australia and Meat and Livestock Australia accounted for nearly 60 per cent of total R&D expenditure by the RDCs in 2008-09. At the other end of the spectrum, LiveCorp and the Australian Egg Corporation expended less than $1 million and $2 million dollars on R&D, respectively (see table 1).

Over the last decade, a little over half of total RDC expenditure on R&D has been funded by levies paid by primary producers, with most of the balance coming from matching appropriations from the Australian Government. However, for those

RDCs focusing more heavily on R&D of benefit to the wider community rather than a particular sector — the RIRDC, the Fisheries RDC, and previously Land and Water Australia — general (non-matching) appropriations from the Australian Government have been the primary source of funds in most or all years.

Table 1 **Estimated R&D expenditure[a] by RDCs, 2008-09**

	Levy receipts	*Australian Government matching contributions*[b]	*R&D Expenditure*[c]
	$m	$m	$m
Statutory Corporation			
Cotton RDC	2.37	2.44	9.41
Fisheries RDC	9.52	5.30	27.75
Grains RDC	89.21	43.90	121.27
Grape and Wine RDC	13.33	11.70	26.16
Land and Water Australia	0.00	13.02	29.55
Rural Industries RDC	1.84	16.54	23.83
Sugar RDC	4.32	5.11	8.04
Subtotal	***120.59***	***98.01***	***246.01***
IOCs			
Australian Egg Corporation	1.09	0.91	1.41
Australia Meat Processor Corp.	10.55	0.00	na
Australian Pork Ltd	3.10	2.76	5.39
Australian Wool Innovation	10.29	11.40	21.38
Dairy Australia	19.17	19.17	33.68
Forest and Wood Products Australia	5.06	3.73	7.71
Horticulture Australia Ltd	40.91	39.80	84.64
LiveCorp Ltd	1.96	0.00	0.76
Meat and Livestock Australia	31.44	31.44	66.70
Subtotal	***123.57***	***109.21***	***221.67***
TOTAL	**244.16**	**207.22**	**467.68**

[a] Excludes IOC expenditure on marketing, promotion and, in some cases, industry representation. As noted in the text, such expenditure is funded by separate producer levies. [b] Charges for research performed for the RDCs by universities, CSIRO and State Governments apparently often do not fully cover the costs incurred by these provider entities. Hence, the total share of RDC research costs ultimately met by government is almost certainly greater than indicated by the Australian Government's matching contributions. [c] Includes other sources of income such as royalties, interest, voluntary contributions and co-investments with public sector agencies and other RDCs. Contributions in one year may not be expended in the same year.

Source: Information provided by DAFF.

Broadly, it appears that between 10 and 20 per cent of the R&D expenditure by each RDC is absorbed by administrative costs. Based on the input from individual RDCs, the Commission is intending to compile data on how the remainder of their expenditure is distributed across the main R&D provider groups (State Governments, universities, CSIRO, CRCs and private suppliers (local and

overseas)). That said, any such delineation will be imprecise because of further subcontracting by some 'first level' providers.

Reflecting the diversity of Australia's rural sector, the R&D activity sponsored by the RDCs traverses a wide range of areas. Moreover, although the focus has historically mainly been on industry-specific R&D, some projects are claimed to have delivered wider environmental and social benefits. For example, the most recent evaluation of the impacts of a selection of RDC projects (CRRDCC 2010), details a range of such benefits — including reduced nutrient run-off and other forms of water contamination, greater water-use efficiency, improved soil conservation, enhanced animal welfare, increased research capacities within the community, and reduced risks to health through less harmful residues in food and reduced community exposure to toxic chemicals.

3 Rationales for government funding support

As noted, the terms of reference ask the Commission to report on the rationales for the Australian Government to invest in rural R&D.

There is widespread agreement that soundly-based R&D, supported by an environment that encourages adoption of the results, can provide significant economic and other benefits. Indeed, the particular benefits of investment in rural R&D have been subject to extensive empirical assessments (see box 2). Those assessments suggest that the payoffs to past investments in both Australia and overseas have been considerable.

However, a high total return to the community from past investment in rural R&D is unlikely to be a sufficient reason to maintain (or increase) the current level of government funding support. In addition, there needs to be evidence that, without the government contribution, some socially valuable investment in R&D would be permanently discouraged. Otherwise, taxpayer's funds might simply displace private funding sources, with no overall increase in longer-term R&D activity.

So called 'market failures' that, in the absence of government funding support, might lead to underinvestment in R&D from the community's point of view have been widely explored — including by the Commission (see IC 1995; PC 2007). Even so, the Commission is intending to revisit and test the various arguments in the particular context of the RDC model. Issues that arise here include:

- whether there are features of the rural sector that make R&D-related market failure more likely than in other parts of the economy and, if so, whether those features apply uniformly across the sector

Box 2 **The benefits of rural R&D: what do the empirics suggest?**

Various empirical work indicates that there are significant returns to investment in rural R&D. For example:

- An analysis by Alston et al. (2000) of more than 1100 agricultural R&D projects conducted around the world found a median return on investment of nearly 50 per cent and an average return of nearly 100 per cent.
- Mullen (2007) estimated average returns on investment in Australian agricultural R&D to be between 15 and 40 per cent.
- An evaluation by ACIL Tasman for the CRRDCC (2010) reported an average benefit–cost ratio of nearly 11:1 for a sample of 59 RDC projects, assessed 25 years after investment. According to the assessment, all projects in the sample provided a positive return within 10 years.
- The Productivity Commission (2007) reported that returns from public investment in agricultural R&D measured across 42 global studies averaged nearly 60 per cent with a median return of more than 40 per cent.

There has also been recent work linking declines in productivity growth in the agricultural sector in Australia and other developed countries to falling investment in R&D. (See, for example, Alston 2010, and Sheng, Mullen and Zhao 2010.)

As discussed at length in the Commission's 2007 report on Public Support for Science and Innovation, considerable caution is required in interpreting the results of these studies. As well as data reliability and sampling issues, the array of factors that can affect the reported returns include: the extent to which particular outcomes are attributed to R&D relative to other factors; the rate at which expected future benefits and costs are discounted to compute a value in 'year 1'; the nature of the assumptions about what would have happened had the R&D not occurred; and the way in which environmental and social benefits are accounted for (if at all).

Moreover, R&D is inherently risky and a considerable number of projects will fail. Particularly where problematic projects are discontinued at a relatively early stage, it can be difficult to capture them in after-the-event, case study-based, evaluations.

Even so, portfolio-wide assessments reveal a still significant overall return to rural R&D. As one example of this, the Productivity Commission (2007) reported an average benefit–cost ratio from various portfolio assessments of around 2 to 1.

That said, as discussed in the text, evidence of a sizeable return from investment in rural R&D does not, of itself, provide much guidance on whether current public and/or private funding levels should be higher or lower.

- the extent to which industry levies can address the 'free-rider' problem that might otherwise make it difficult for an individual primary producer to justify investment in some R&D activity

- the magnitude of the wider community benefits from rural R&D relative to those that accrue directly to primary producers
- the extent to which it is practically possible when formulating government funding programs to delineate between private/industry benefits and wider community benefits
- whether there are reasons why, for projects that offer the prospect of significant private benefits, primary producers might not, after some adjustment time, step in to fill any funding gap resulting from a reduction in government contributions
- whether it is appropriate to view the case for government funding support solely through a market failure lens.

Why should government provide funding support for rural R&D? Does the basic case for such support rest mainly on wider (spillover) benefits for the community, or are there other important rationales that the Commission should take into account?

Is the case for government funding support for rural R&D stronger than in other parts of the economy and, if so, why? Do the various rationales apply with equal force to the RDC component of rural research as to the activities of, say, CSIRO and the universities? What specific evidence is there to indicate that projects funded by the RDCs have produced wider benefits for the community that are significant relative to those enjoyed by the industries concerned?

What are the practical constraints on basing government funding support for rural R&D around notions of private/industry benefits versus wider benefits, and/or on the degree to which government funding is likely to induce additional R&D activity? Could a naïve application of such an approach have unintended consequences? Where does the appropriate 'sweet spot' between principles and practice lie? For example, can the notion of industry versus wider benefits usefully be employed to determine that at least some R&D should either clearly be inside or clearly outside the government funding net?

What factors might mute the strength and/or timing of any increase in private funding in response to a withdrawal of public funding for industry-focused R&D? How important in this context are:

- **divergences between the point in the supply chain where the research is funded and conducted, and the point where most of the benefits of that research are realised**
- **the long lags before many of the benefits may be realised?**

Are differences in the benefits that individual producers receive from RDC-funded R&D likely to constrain their collective willingness to offset any reduction in government funding through increased levy payments? Are there other features of the levy system, or any regulatory issues, that discourage private investment in rural R&D?

How important is it that government contributes to the cost of maintaining core rural research skills and infrastructure? Without that support, how specifically would the capacity to adapt overseas technologies to meet the particular requirements of Australia's rural sector be compromised? What role do RDCs play in maintaining core rural R&D capacities?

What importance should be placed on outcomes-based rationales for government funding support for rural R&D, such as enabling Australia's rural industries to meet increased global competition; facilitating adjustment to climate change; furthering food and bio-security objectives; and fostering regional development? Is there a risk that seeking to use government funding to drive specific outcomes such as these could distort the pattern of R&D investment and thereby reduce the overall returns to the community?

Should the level of public funding have any regard to government support for rural industries in other countries?

4 Is the RDC model fundamentally sound?

Some overarching system-wide issues

Whatever the particular role of government in relation to rural R&D, significant investment in R&D will seemingly be very important for the future well-being of Australian primary producers and the broader community.

From this perspective, assessment of the RDC model must look beyond the detailed configuration of the model and how it might be improved. Thus, the positioning of the model within the broader rural R&D and extension framework, and its interaction with other components of the framework, are also relevant considerations. Moreover, even though the model is widely considered to have served Australia well in the past, there is a need to examine whether it is the most appropriate one to meet the challenges of the future.

How effective is the current rural R&D and extension framework, and is the role of the RDCs within that framework appropriate and clearly defined?

- **Does the significant number of entities, research programs and funding pools cause problems? For example, are there areas of major R&D overlap or gaps? Does any focus on 'leveraging' contributions across the various funding pools cause inefficiencies or perverse outcomes, or does it incentivise desirable behaviour?**
- **Is there sufficient oversight of, and coordination and collaboration between, the different components of the framework? Are there any particular difficulties created for the RDCs by the current arrangements?**
- **Does the framework facilitate strategic assessment of R&D needs across the whole of the rural sector?**
  - **Does it encourage consideration of whether available funding is going into the right areas from Australia's point of view?**
  - **Is there an appropriate mix between longer-term and broadly applicable R&D and shorter-term adaptive research, and where in this context should the RDCs be focussing their activities?**
- **Is the framework sufficiently flexible to accommodate future changes in circumstances and requirements? What impacts have recent initiatives to improve the framework had on outcomes thus far? What are likely to be the particular implications of recent and prospective changes to the framework for the RDCs?**
- **Are there significant gaps in the data base which are impeding the effectiveness of the framework? For example, should there be greater effort devoted to assembling data on the total amount of public funding for rural R&D available through the variety of funding programs?**
- **Is there sufficient emphasis on the evaluation of outcomes and sharing the lessons learned? Are there any particular lessons for the RDC model from developments in other components of the framework?**

Some specific strengths and weaknesses of the RDC model

The RDC model seemingly has some important strengths. As well as being a mechanism to share the costs of R&D which provides a mix of private and wider community benefits, it is also a means to: foster awareness and support within industry of the importance of investment in R&D; help ensure that the R&D undertaken is suitably reflective of industry needs and priorities; and facilitate uptake of research outcomes by the industries concerned.

At the same time, it is clear from the Commission's early discussions that there is a growing tension between the requirements of levy payers and of the Australian

Government. Not unreasonably, the former wish to see their contributions spent on R&D (and extension) of direct benefit to the industry concerned. However, the Australian Government is increasingly seeking to encourage the RDCs to undertake cross-sectoral or so-called 'cross cutting' R&D of benefit beyond the industry (as well as more downstream supply chain research where the benefits to primary producers may be less immediately apparent).

Various other 'big picture' concerns have also been raised with the Commission, including that:

- despite the RDC model having been designed to help ensure that the research undertaken is reflective of stakeholder needs, in practice, that research can still become driven by the existing skills, interests and capabilities of the research providers and managers
- the bigger RDCs are able to exert undue influence on the direction of other R&D programs — especially given requirements and financial incentives for the universities and the CSIRO to partner with other research funders
- collectively, the RDCs do not have sufficient regard to the health of the wider rural R&D and extension framework, including to the infrastructure and skills required to sustain an effective research capacity over the longer term.

It may be that such tensions and concerns (to the extent they are valid) can be satisfactorily resolved through changes to the detailed configuration of the RDC model (see section 6).

However, in keeping with its terms of reference, the Commission will also be looking at alternative approaches. Options already raised in discussions include:

- using RDCs, funded solely by levies and other private sources, to deliver industry-specific R&D, and reallocating their current public funding for broader research to a new body, or to other research programs — such as those run by CSIRO or the universities
- replacing the formulaic approach for allocating government funds to each of the RDCs with some form of contestable grants arrangement. For example, individual RDCs might compete amongst themselves, and with other research managers, to deliver specific cross-cutting research projects, nominated and fully funded by the Government.

Are there any reasons to argue that the RDC model is no longer fundamentally sound? Or can deficiencies in the model be addressed through more minor modifications to the current requirements?

If more fundamental changes might be warranted, what form could these take? How difficult would it be to replicate the strengths of the RDC model within such approaches? Is there scope for 'halfway' house approaches that would harness the respective strengths of the RDC model and alternatives to it? Are there any overseas approaches that are particularly instructive?

Are there other major changes required to the role of the RDCs? For example:

- **Do the current levy payment and governance arrangements for the RDCs lead to an excessive focus on R&D effort within the 'farm gate' and, if so, how might this be addressed? If there are prospective, high payoff, research opportunities further down the value chain, why are these not being taken up by processors and other downstream stakeholders?**
- **Is overlap with the work of the CRCs largely complementary, or are changes warranted to either or both programs to reduce that overlap? Will the new guidelines for CRCs make it more difficult to get new rural CRCs approved and, if so, what are the implications for the future role and activities of the RDCs?**
- **If State Governments continue to wind back their role in R&D and extension, should the RDCs be seeking to fill the gap, or are there private players that could effectively fill this role?**

Do RDCs manage Intellectual Property issues effectively? In particular, do their current approaches give rise to any difficulties for bringing new technologies to market? Can any shortcomings in this area be readily addressed within the current model?

(Issues related to the combination within the IOCs of responsibility for R&D and marketing and promotion are discussed in section 6.)

5 Funding level issues

The terms of reference ask the Commission to report on the overall funding requirement for rural R&D, and how this requirement should be shared between private parties and government.

In regard to the overall funding requirement, it is not clear at this stage how much this inquiry will be able to add to the findings in the Commission's 2007 report on Public Support for Science and Innovation. As discussed in chapter 4 of that report, the array of econometric work on the benefits of investment in rural R&D is of limited guidance in indicating what impact changes in the current level of investment (up or down) would have on community well-being. In the

Commission's early discussions, there has been little consensus on whether the current level of overall investment — estimated to be of the order of 3 to 3.5 per cent of the gross value of rural output (Mullen 2010) — is about right, too high, or too low to meet the community's requirements.

As to the issue of whether the current level of government funding support is appropriate, here too, the econometric evidence examined at length in the Commission's 2007 report is not particularly instructive. As noted in box 2, more recent work by Alston et al. 2010 and Sheng, Mullen and Zhao 2010 reports a correlation between reduced government spending on agricultural R&D in the developed countries and declines in agricultural productivity growth. However, it is not clear that such aggregate correlations can be used to calibrate the appropriate level of government funding support for the various R&D programs. Amongst other things, rural R&D spans a wide range of activity from basic science through to producer-specific applications of particular technologies. Hence, public and private spending will be potentially substitutable for at least some of the overall research task — with the extent of this substitutability likely to vary across individual programs.

What principles and benchmarks should the Commission bring to bear in assessing appropriate funding for the totality of rural R&D, and the right balance between public and private funding? Is there any new empirical work which specifically focuses on how changes to current overall funding would affect community well-being? Is it possible to determine the right balance between public and private funding across the totality of rural R&D using broad indicators and principles? Or must such assessment have regard to the characteristics of individual programs that provide public funding for rural R&D and, in particular, to the type of R&D that is sponsored through each of these programs?

Some particular considerations

One important consideration in assessing whether the current level of public funding for the RDC program is broadly appropriate, is whether there is a sufficient bank of socially worthwhile new projects for the government to co-invest in. Under contestable funding models (see above), the social worth of the projects would be an explicit consideration. However, even under the current co-investment model, ex post evaluations of the wider community benefits of projects sponsored by the RDCs might provide one indication of whether the level of public funding should be adjusted.

Another more conceptual consideration is how closely the sort of projects funded through the RDC program align with the broad rationales for government to contribute to the cost of rural R&D. For example, the greater the share of the benefits of R&D funded by the RDCs which accrues to the wider community then, other things being equal, the stronger the in-principle case to maintain (or even increase) the government's funding contribution to the program.

A further perspective may come from a comparison of the level of public funding support under the RDC program with public support for R&D in other sectors of the economy, or for rural R&D in other countries. Although caution is required in pushing such comparisons too far, they may nonetheless offer a useful check on the robustness of conclusions emerging from other assessment benchmarks.

Is there evidence to suggest that available funding prevents RDCs from investing in R&D which could provide a significant payoff to the wider community; or, alternatively, that RDCs are investing in some projects expected to generate only very modest returns? What does the fact that some RDCs have built up significant surpluses indicate about the availability of worthwhile projects to invest in?

If the focus of most of the RDCs is on industry-specific and adaptive R&D and related extension, does this suggest that the bulk of the benefits accrue to levy payers? If so, and given the recent evaluations suggesting that these benefits are large in overall terms, why is a significant public contribution justified?

Are there particular features of the rural sector, or parts of it, which provide the basis for a significantly higher level of public funding support for R&D than in most other areas of the economy (see PC 2007, p. 435)? Are the wider community benefits from rural R&D commensurate with governments meeting an estimated three-quarters of the total cost of this R&D and, as part of this, the Australian Government meeting nearly half of the cost of the R&D sponsored by the RDCs? What other benchmarks should the Commission consider in assessing the appropriate level of public funding support for the RDC program?

The allocation of public funding across RDCs

The Commission is interested in whether there is any evidence to suggest that the value of production basis for distributing the Government's funding contribution across the individual RDCs *significantly* detracts from the overall return on that investment. A related issue is whether the RDC model, as it is currently configured,

will provide sufficient scope to direct some public funding to new primary industries that may emerge in the future.

Is there any need to rebalance the Government's funding contribution across the individual RDCs? For example, do the general appropriations for the RIRDC and the Fisheries RDC give too much or too little weight to the somewhat different nature of the R&D projects that they fund?

Does the RDC model — and, in particular, the RIRDC industry umbrella arrangement — appropriately cater for the research needs of emerging primary industries? If not, what should be changed? In allocating government funding to the industry RDCs, should any account be taken of differences in the longer term competitive prospects of those industries, or their potential for productivity improvements? Alternatively, does basing the government contribution on the value of industry output provide an appropriate means to calibrate contributions given the inherent risks in trying to pick winners or losers?

6 Improving the RDC model

Ways to enhance governance arrangements

The governance arrangements for the RDCs have previously been characterised as 'light-handed' (Frontier Economics 2006, p. 17). Such light handedness has advantages — especially in giving the RDCs flexibility to discharge their responsibilities in a way that suits the particular needs of their industries. However, if governance arrangements are unduly weak, the disciplines on RDCs to operate efficiently and effectively, and to respond to the reasonable expectations of all stakeholders, will be diminished.

In the Commission's early consultations a range of governance-related concerns have been raised, including:

- a perceived failure by the Government to effectively and consistently communicate priorities and requirements to RDCs and to follow these through when oversighting strategic and operational plans
- a weakening of government input and direction into the activities of the statutory corporations following the (Uhrig review induced) removal of a government nominee on each of their boards
- differences in the stringency of governance requirements between the statutory corporations and the IOCs

- deficiencies in requirements for consultation with industry stakeholders, particularly given changes over time in the degree to which nominated peak bodies are representative of levy payers
- difficulties posed for effective governance of the IOCs by the blurring of the boundaries between their R&D-related responsibilities (and associated funding), and their broader marketing, promotion, education and, in some cases, policy representation roles
- shortcomings in project evaluation protocols and approaches, and in collaboration and coordination mechanisms (see separate sections below).

Where do the main opportunities for enhancing the current governance regime lie? Does the fact that some RDCs seem to have more satisfied stakeholders than others provide any insights on how to improve governance arrangements, or are such differences mainly due to the nature of the industries concerned? What changes might be possible to reward (or punish) good or (bad) governance without risking perverse outcomes?

More specifically:

- **What practical impacts (positive and negative) have the national and rural research priorities had on the activities of the RDCs?**
  - **Does the specification of these priorities strike an appropriate balance between signalling what the Government is seeking in return for its funding contribution, and providing the RDCs with flexibility to carry out their responsibilities efficiently and effectively? If not, what changes should be made?**
  - **Is there in fact significant synergy between the research needs of the sector and the Government's stated research priorities?**
  - **Are there likely to be greater challenges in securing industry uptake of some of the outcomes of R&D directed at meeting the Government's priorities than for R&D which reflects the priorities of levy payers? If so, can this problem be cost-effectively addressed?**
- **Does feedback from the Government on strategic and annual plans add significant value to the process and is that feedback communicated effectively? If not, what could be done to improve the arrangements?**
- **What is the scope to improve the effectiveness of RDC boards?**
  - **Is there an appropriate balance on boards between industry expertise and more general skills? If not, is this a result of deficiencies in the processes for electing/appointing boards, or does it reflect other factors?**

  - **How has the Ministerial approval process for appointments to the boards of the statutory corporations affected outcomes?**
  - **How might any negative impacts of the removal of government nominees from the boards of the statutory corporations be ameliorated? For example, has the attendance of a departmental representative at the board meetings of some of these corporations been helpful?**
  - **What lessons can be learned from differences in the procedures for appointments to individual IOC boards?**
  - **Has board composition influenced whether individual RDCs have focussed on encouraging adoption of new technologies by more innovative 'top end' producers or, alternatively, on pulling 'bottom end' producers up? What other factors have played a role in the different strategies in this area and what lessons can be learned from the results?**
- **Are there any significant conflict of interest issues that need to be addressed in regard to the appointment and membership of boards, the relationships between RDCs and industry representative bodies etc?**
- **Are there aspects of the governance arrangements applying only to the statutory corporations, or only to the IOCs, that should apply across the board? For example, would it be possible and desirable to increase the input of the Minister into the strategic and annual plans of the IOCs? Would there be benefits in extending the periodic external review requirements for the IOCs to the statutory corporations?**
- **How useful are the Statutory Funding Agreements, including as a means to ensure that the IOCs meet the core requirements in the PIERD Act? Would greater standardisation of these agreements across the IOCs be desirable?**
- **To what extent would governance be simplified if the Government's contribution was separately managed, leaving the RDCs to manage contributions from levy payers? Do the benefits for RDCs and levy payers that come with the government contribution outweigh the costs of the more complex governance regime and, in particular, the constraints on the way in which funds can be spent?**
- **How effective are current industry consultation protocols? Are all of the key stakeholders routinely consulted, or at least provided with adequate opportunity to make their views known? Should the legislative requirement for some RDCs to consult with particular peak industry groups be scrapped and replaced by a more generic requirement simply requiring consultation with an appropriate range of stakeholders?**

- **What are the benefits and costs of the combination within the IOCs of R&D responsibilities and other industry services? To what extent have synergies between the two been a factor which has motivated the transformation of some statutory corporations into IOCs? What have been the other drivers and what have been the downsides experienced during and after such moves? What are the particular benefits and costs of combining R&D and industry representation responsibilities within a single entity?**

Increasing administrative efficiency

Efficient administrative structures are important to ensure that levy payers and the Government get maximum value from their funding contributions.

The scope for rationalisation of the broader rural R&D framework to eliminate duplication of functions (see earlier) is one consideration here. Such rationalisation might also help to shorten the length of the contracting chain and the accompanying leakage of funding for administrative and stakeholder consultation purposes. Currently, for example, this chain can involve an RDC providing funding to a CRC, which may in turn subcontract aspects of the research task to another provider. In addition, through rationalisation of funding arrangements, it might be possible to reduce the resources devoted to shuffling available funding around the different programs and providers.

Addressing administrative inefficiencies specific to the RDC model might also provide significant cost savings — especially as administrative costs seemingly absorb broadly between 10 and 20 per cent of the total budgets of individual RDCs. Amongst the issues that arise here are whether there are opportunities for administrative consolidation; what savings are potentially available from more effective collaboration and coordination across RDCs; and the extent to which improvements in governance arrangements would provide greater incentives for efficient service delivery.

What scope is there to reduce the costs of administering the RDC model without diminishing the outcomes it delivers?

Are there too many RDCs and, if so, how might this number be reduced? How big are the potential downsides of amalgamations, such as loss of focus and the increased challenges of dealing with a more diverse, and possibly hostile, range of industry stakeholders? Would wider application of the RIRDC approach be a means to reduce total administrative overheads, while still allowing individual industries to retain their 'research identity'?

Are there examples where ineffective collaboration and coordination across the RDCs has lead to a significant wastage of administrative resources? Are there unrealised opportunities for greater sharing of skills amongst the RDCs? Are there other features of the RDC operating environment or governance regimes which lead to unjustified escalation in executive salaries, board fees, infrastructure costs, overheads and the like?

More robust ex post project evaluation

Examining the likely benefits and costs of proposed R&D projects is an integral part of the RDC function. However, no less important is ex post project evaluation examining whether expected outcomes were realised. As well as helping to inform the future activities of the RDCs, ex post evaluation is a key part of the governance regime — providing a way for stakeholders to assess performance and, in turn, reinforcing incentives for the RDCs to operate efficiently, and to pay attention to the timely adoption of the outcomes of the R&D that they sponsor.

Under the auspices of the CRRDCC, a process for systematically evaluating returns to the R&D sponsored by the RDCs has recently been implemented. There have so far been two such evaluations. The first evaluation in 2008 examined the returns to 36 'highly successful' and 32 other projects, while the second in 2009 evaluated 59 selected project clusters (programs). Both evaluations produced projected benefit–cost ratios of around 11 to 1 after 25 years, with smaller though still very significant ratios in the intervening period. (For example, in the 2009 evaluation, the ratios were 2.36 to 1 after 5 years and 5.56 after 10 years.) Moreover, these ratios largely reflect measurable net economic benefits, with broader environmental and social benefits handled qualitatively.

This process is very much seen as being work in progress. It is in this context that the Commission is seeking input on the outcomes of the evaluations so far and on where the need for further development work is most pressing. A particular issue is whether the numbers generated to date are compatible with the contention that, without public funding support through the RDC program, private investment in rural R&D would fall away significantly.

Do the program-wide benefit–cost ratios emerging from the two evaluations so far appear reasonable in the context of previous quantitative work and other more qualitative indicators of what the RDC model has delivered for farmers and other stakeholders? How do the numbers compare to those emerging from evaluations by individual RDCs (both before and after the event) and for comparable projects by other research entities such as the CRCs and the

CSIRO? If there are significant differences, what are some of the possible reasons for them?

Are there particular methodological issues that need to be addressed? For example:

- **Has the project sampling process been sufficiently random? Have evaluations given sufficient weight to failed projects, especially those terminated at a relatively early stage?**
- **Has there been adequate recognition of the contribution of the core R&D and/or background knowledge on which adaptive research work sponsored by the RDCs is based?**
- **Has proper account been taken of the implicit subsidies embedded in some of the research services provided to RDCs by State governments, universities and the CSIRO?**
- **Has there been sufficient rigor and consistency in the way in which 'counterfactuals' for individual projects have been constructed?**
- **Has adequate account been taken of the potential for projects with long payback periods to be rendered less valuable or obsolescent by the next wave of research effort? Should there be more focus on returns in the medium term?**
- **Have the assessments assumed levels of adoption which can be supported by previous experience?**
- **Has there been sufficient sensitivity analysis in regard to all of the key influences on reported project returns?**

Should the next stage of the evaluation process provide for follow-up of initial project evaluations to see whether the expected outcomes have in fact been realised? Should there be more focus on the value added by RDC involvement in a project as distinct from the overall return to that project? What other evaluation initiatives might be helpful, including to facilitate more rigorous and consistent assessment of environmental and social benefits?

Is sufficient data already collected to allow for these sorts of improvements and refinements to the evaluation process? If not, how might any gaps be addressed? For instance, when undertaking stakeholder surveys, should RDCs solicit more information on the farm-level impacts of specific R&D outputs to feed into the evaluation process?

Are any changes required to the governance regime for RDCs to encourage improvements in evaluation protocols and methodologies? Should there be

greater efforts to encourage consistency in the approaches adopted by the individual consultants employed by RDCs to undertake evaluations? What would be the most cost-effective way of providing for regular independent scrutiny of the evaluation process and its outcomes? Should evaluation outcomes be 'reality tested' with stakeholders?

More effective coordination and collaboration

Effective coordination and collaboration between the RDCs, with other parts of the rural R&D framework, and with counterpart organisations in other countries, is likely to have a range of benefits. As well as preventing wasteful duplication, it can help to realise research synergies and foster specialisation, critical mass and areas of excellence within the RDC community; minimise administrative burdens on those providing the R&D; and facilitate the uptake of research outputs.

As the informal collaborative arrangements within the RDC community and with overseas entities indicate, there are commercial and other incentives for RDCs to coordinate their activities to at least some degree. In addition, through the CRRDCC there is a more formal mechanism for encouraging collaboration and coordination between the individual corporations. More broadly, through the development of the 'National Primary Industries research, development and extension framework' and the activities of the Rural R&D Council, efforts are now being made to consider issues such as an overall rural R&D investment plan and to coordinate R&D and extension spending and delivery across the whole of the rural sector.

Nonetheless, there appears to be a view — especially within parts of government — that there is much greater scope for the RDCs to cooperatively sponsor research of benefit to both primary producers and the wider community. Concerns about the effectiveness of the CRRDCC mechanism, and about aspects of the broader coordination initiatives now in train, have also been raised with the Commission.

Are there significant opportunities for additional collaborative research effort across the RDCs which would have significant payoffs? If so, where specifically do these unrealised opportunities lie and why do they still exist? For example, are some of the RDCs unnecessarily siloed and reluctant to work with others on value adding areas of common interest? Or is it simply that these collaborative projects are expected to provide a lesser return than other project options within each silo?

Is there scope for RDCs to do more collaborative work with overseas entities? Are there any particular features of the current arrangements that discourage such collaboration?

As a mechanism for encouraging coordination and collaboration, what are the strengths and weaknesses of the CRRDCC? What specific initiatives might improve its effectiveness? Are there other mechanisms that might be employed instead of, or in addition to, the CRRDCC?

To what extent will the National Primary Industries R&D and extension framework, once fully implemented, be likely to improve broader coordination and prioritisation of the research task and facilitate its execution in an efficient and effective manner? Will it provide flexibility to cater for future changes in the composition of the rural sector, or could it tend to lock in the current levels of funding support and infrastructure relevant to individual industries? How might the activities of the Rural R&D Council best add value to the overall effectiveness of the rural R&D effort?

Improving the levy arrangements

Issues bearing on the effectiveness of the levy arrangements as a means to address free-rider problems were briefly canvassed earlier in the paper. However, in the Commission's early consultations, a suite of more specific levy-related issues have been raised, including in regard to the legislative underpinning for levies; the basis on which they are set; the arrangements governing changes to levy rates; the potential for wider application of levies on processors; and the benefits and/or costs of any pressure for regional focus in the expenditure of levy receipts by the RDCs.

- **What are the relative merits of compulsory and voluntary levies for addressing free-rider problems? What lessons can be drawn from the voluntary levy arrangements that apply in the fisheries and cotton area? In practical terms, what are the differences between a voluntary levy and a compulsory levy where the levy rate is left to the levy payers to decide and can be set at zero?**
- **Are the arrangements for collecting the levy and channelling these collections to the RDCs administratively efficient? Does the (variable) levy collection charge closely reflect the costs incurred by the Department of Agriculture, Fisheries and Forestry in collecting and distributing levy funds?**
- **Are the processes for amending levy rates unduly cumbersome? Are there options for streamlining these processes that would maintain appropriate protections against unduly frequent and potentially disruptive or costly attempts to change levy rates?**
- **Could the basis for the matching government contribution be modified so as to give better effect to the underlying rationales for public funding support?**

For instance, would it be desirable to pay a higher contribution on classes of R&D with a demonstrable focus on wider community benefits, offset by a lower rate on R&D with an industry-specific focus? Is there any case for differentiating the rate of the matching contribution between start up or high growth rural industries and more mature industries?

- **Should there continue to be scope for RDCs whose levy receipts are below the ceiling on the matching government contribution to accept funds from 'donor companies' for specific research projects and use this funding to secure an additional taxpayer contribution?**
- **Should processors generally pay a levy for R&D? If they were required to do so, what is the likelihood that they would simply pass the cost back down the line to the primary producer? Does this happen in those industries where processors currently pay a levy?**
- **Is there any evidence of a significant mismatch between the regional distribution of levy payments and the regional distribution of the benefits from the ensuing R&D, for particular RDCs or across the program as a whole? Would an explicit effort to more closely align the two materially reduce the overall return to the community from the RDC program?**

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