

Submission to the Productivity Commission

Inquiry into Rural Research and Development

June 2010

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SUMMARY – Key Points

1. QFF represents the intensive agriculture sector in Queensland which accounts for about \$6 billion of value and half the annual agriculture output of the state and supports over 40,000 jobs. The intensive nature of these industries means that producers are aligned to supply chains and therefore need to be supported with world-class research programs integrated into mixed public and private activities.
2. QFF considers the estimated \$1.6 billion annual Australian investment in rural research as inadequate to provide the Australian community with attractive, vibrant and sustainable regional communities for whom many agricultural industries are a main stay. The rural RD&E effort is an integral part of delivering strong regional economies and it must have strong public funding support. The pooling of producers' and taxpayers' resources to fund part of the rural RD&E portfolio is a sound model that can be improved and extended to achieve the important ingredients of engagement, ownership and governance for the funding partners and the research community.
3. QFF strongly believes that all stakeholders need to accept the challenge of doubling food, fibre and foliage production in the next forty years in a carbon (greenhouse gases) and water constrained world. This will require a significant turnaround in rural industries productivity growth which has been slowing in recent time. QFF considers there to be strong evidence that the rural RD&E effort needed to meet the social, market and environmental challenges of the future are underfunded. QFF acknowledges that there is strong competition for taxpayer funds, but it is the taxpayer who is in the best position to fund and benefit from Australia's RD&E industry, provided it remains structured with a good mix of public and private activity.
4. QFF sees the Australian RDC model as effective and efficient for achieving a range of objectives that add to the capacity of primary industries to meet community expectations. The co-funding model provides an important driver for attaining engagement, ownership and governance for the parties. Public interests need to be periodically reviewed and assessed to ensure sustainable solutions emerge from the rural RD&E effort.
5. QFF believes that the RDCs are delivering good results for stakeholders and sees evidence that they must be encouraged to stay focused on the mission to **'improve the productivity, profitability, sustainability and global competitiveness of Australia's primary industries'**. In the absence of other specific performance measures these four overarching goals can offer key measures of rural RD&E performance.
6. QFF stresses it is important there be tangible outcomes from this Review. There is often an unfortunate disconnect between the provision of research information and expert advice to government and subsequent actions (or inactions) by governments. The recent National Drought Policy review is a case in point. Governments have continued with a demonstrably inefficient, drought programs despite the workable solutions contained in the 2009 Productivity Commission recommendations. Notwithstanding the May 2010 announcement of a small trial of a new preparedness approach in WA. QFF sees drought policy and RD&E funding as fiscally linked as we are recommending in the context of this Inquiry that governments be advised to redirect drought subsidies to an array of proactive climate risk management programs and R&D investment to boost overall R&D spend.

Background

Queensland Farmers' Federation (QFF) is the peak body representing and uniting sixteen rural and regional industry organisations who work on behalf of primary producers across the state. QFF was pleased with the opportunity in March to informally discuss with the Commissioners some of the issues to be addressed in this Inquiry. This submission incorporates discussion and detail on what is required of national research policy and programs to ensure continued opportunities for Queensland's intensive agriculture sector to contribute to our economies, industries and communities.

Detail of the industries involved in primary industries in Queensland is provided in Appendix 1. The intensive agriculture sector accounts for about half the \$13.7 billion annual agriculture output of the state and supports over 40,000 jobs in rural and regional Queensland. The intensive nature of these industries means they tend to be tightly aligned to supply chains, operate continuous production systems, and require secure water and energy inputs.

QFF therefore welcomes the opportunity to make known the requirements of the intensive agriculture sector in regards to national research funding policy and associated public investment and support programs. We note that the Productivity Commission has been provided terms of reference for the conduct of this inquiry, and has also produced an Issues Paper with much discussion and questions to help guide submissions. From these we have directed this submission into the following sections;

1. Australian government investment in rural RD&E.
2. Public and private investments in rural RD&E.
3. Current RD&E funding arrangements.
4. Effectiveness of the Australian RDC model.
5. RDC operational efficiencies.
6. The Primary Industries RD&E performance.
7. RDC balance of research priorities.
8. Levy arrangements.

QFF advises that it has made a number of submissions to government inquiries in recent times and finds the process frustrating in that, despite all our best efforts to provide practical recommendations for improvements in government policies and programs, we find generally governments are more inclined to not act on those recommendations. This is understandable for contentious matters or those covering highly politicised issues, but it should not be the case where consensus has emerged. The public inquiry process and the development of submissions are expensive for all concerned, so tangible outcomes must be a priority. We make this submission in that expectation.

This Inquiry covers the important matter of public funding of research for primary industries so that all stakeholders can acquire the relevant scientific and technical knowhow to perform to and beyond community expectations. QFF regards the provision of government funding for a portion of rural research, development and extension activities (hereafter referred to as rural RD&E) as vital for sustaining the international competitiveness and environmental sustainability of rural industries. We live in an ever changing world, therefore there are always opportunities to improve the way our nation goes about its research and innovation business. The material that follows is provided in expectation that it will assist improve the performance of the rural research industry in Australia.

1. Australian government investments in rural RD&E

The Inquiry terms of reference identifies that it wants advice on the “economic and policy rationale” for Australian Government investment in rural RD&E. The answer to this question is relatively simple – the government and the Australian people get a very good return on the total investment, variously estimated to be between 15% and 40% (Mullen (2010), Alston et al (2010), PC (2007)), so, in the absence of better returns elsewhere, it would be irrational to not make the investment. That data alone should cover the economic argument, and the policy rationale follows, namely it is a wise use of taxpayers’ money.

The only issue left for discussion should be about the quantum of money. Unfortunately, this is where the first challenge of this Inquiry is met. As spelled out in the Commission’s Issues Paper, it “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”. Likewise the DAFF November 2009 paper “A Retrospective on Rural R&D in Australia” (Peter Core) identifies that “aggregate data on rural research funding levels is weak” (p. 2). The key point here is that ABS data does not provide appropriate detail of the flow of funds from governments to research providers so we don’t know the full extent of government investment in rural RD&E.

This is a critical point because Commonwealth funding of rural research goes well beyond the formal RDC model (Research and Development Corporations) which accounted for \$207 million paid in 2008-09 as matching taxpayer funds for the farmer levies raised that year (\$244 million) (Issues Paper, Table 1). But the Commonwealth also uses taxpayers’ money to provide core funding to the Universities, CSIRO and the CRCs, some of which is used for rural RD&E. The Commonwealth also has specialist research agencies such as ABARE, BRS and the PC itself that provide some public rural research services.

Just looking at CSIRO, Peter Core has estimated that about \$470 million of its full research budget in 2008-09 was “directed at rural research if you take the broadest possible definition of ‘rural’ to include environmental portfolios”. On another measure Core identified 23 percent, or \$270 million of CSIRO’s outlays are to its agribusiness portfolio (p. 8). QFF regards this later figure as probably the more accurate reflection of Australian government investment in rural RD&E through this medium, because much of the higher figure would be dispersed across disciplines to the benefit of a much wider clientele.

Another key provider of rural RD&E is the collaborative Cooperative Research Centres (CRCs) system that has been in place since 1990. Peter Core identifies that of the 168 CRCs to date “more than one third had a rural industry focus” (p. 8). The 2008 National Innovation System Review provides some guidance about the effectiveness of this model and it will no doubt continue as part of the rural RD&E landscape. Likewise the universities which account for about 30 percent of total Commonwealth investment in science and innovation are important players in Australia’s RD&E industry, especially regional universities.

QFF is hopeful that more detail on the quantum of rural research funding and expenditure will become available during the course of this Inquiry, although the Commission has noted “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” (p. 14).

When one considers the long history of public investment in rural RD&E in Australia one might wonder how our nation’s evolution may have changed had it not happened. Australia has a unique set of biophysical conditions and this has always been a challenge for our farmers and scientists. So if “necessity is the mother of invention” then that necessity has caused Australia to become overachievers in a sense, given the size of annual export surpluses derived from primary production. Those surpluses have been a hallmark of Australia’s development and prosperity for over a century.

That is not to say that some “mistakes” were not made along the way. Problems of land degradation, erosion, salinity and pest plagues are examples, but these were more the result of social objectives placing priorities on settlement and production rather than a failure of the rural RD&E system. Indeed science and rural RD&E have helped correct those errors and the last thirty years has seen a major shift towards sustainable production systems rather than the earlier goals of maximum output or least cost efficiency.

Alongside this development has been the evolution of internationally acclaimed agriculturists and scientists that have helped keep both Australia’s primary industries and rural research industries ahead of the rest of the world. They have helped direct the needed changes by developing the science and knowledge to guide individuals to better practices and governments to appropriate policy responses. But these changes only come about because people are paid to examine the questions. It must remain a national priority to have Australian professionals engaged in rural RD&E if for no other reason but to ensure our fast track to an urbanised nation is balanced with prosperous regions.

It is now urgent to redress the underfunding of the rural RD&E industry. Evidence already before the PC suggests that reduced government spending on agricultural RD&E in the developed world correlates with declines in agricultural productivity growth. A keynote speech by John Kerin and a special R&D session at the 2010 ABARE Outlook conference provides considerable evidence that there may be dire consequences from Australia’s slow down in agricultural productivity growth and associated issues such as low numbers of agriculture and science graduates and the ageing of Australia’s rural research community.

It would seem to us that it would be instructive to analyse more deeply the amount and direction of public funding in rural RD&E. There is a clear parallel between public investment in national priorities and the development of innovation and comparative advantage in trade. While the Japanese electronics industry and the USA space industry are clear examples, the impressive performance of the Australian agricultural sector is in part due to the comparative advantage created by earlier science and economic research by Australia’s rural RD&E community. The nation will be poorer for it, if this decline is not reversed.

An important way forward is to rethink some of the Commonwealth expenditures in the rural sector that may be better directed. QFF and others have long argued that government expenditures on drought programs (Exceptional Circumstances at the national level) are misdirected, partly because they are reactive rather than proactive. The Australian farm and agribusiness sector has some two hundred years of experience dealing with climate variability and the extremes of droughts and floods. A general consensus emerged during the recent National Drought Policy review (PC report 46 Government Drought Support, February 2009) that the nation would be better served if the reactive and inequitable business support (interest rate subsidies) component of the EC program and state-based subsidies were replaced with proactive programs and research investments to better equip primary producers and communities to deal with climate risks (both variability and change).

In May 2010 the federal Minister announced a twelve-month trial in part of Western Australia to “pilot study” some aspects of the sixteen recommendations for reform of drought programs. QFF does not see this as sufficient action to generate needed change, since it does not provide impetus to change attitudes about sustainable solutions for the challenges that Australia’s highly variable and changing climate creates. Only well funded RD&E activities with strong industry involvement will achieve that.

In the context of this rural RD&E Inquiry, QFF recommends that governments take immediate steps to implement the 2009 Productivity Commission recommendations to improve governments' approach to drought. Governments must reform programs they have developed under the guise of National Drought Policy and put in place programs that support development and extension of farmers' capacity to improve self-reliance, preparedness and climate risk management. Specifically, the Australian government needs to commit to this reform path by allocating a part of the \$555 million it expended in 2008-09 on ECIRS (EC interest rate subsidies) to the rural RD&E activities required for farmers and the community to deal with climate variability and change.

2. Public and private investments in rural RD&E

As already noted there is a lack of precise and detailed information about the full extent of Australia's research industry and the rural RD&E sector within it. This is unsurprising given the wide scope and complexity of research activities and the mix of private and public sector players in the field. Broadly speaking it is estimated that in 2008-09 the rural RD&E industry spend was \$1.6 billion of which \$500 million was funded by the RDCs (the 15 levy funded organisations at the centre of this Inquiry). The diagram on page 12 of "A Retrospective on Rural R&D in Australia" provides a summary detail of key stakeholders in Australia's rural RD&E industry (interestingly, that chart does not disaggregate to include farmers, stopping the linkages at industry bodies, and that may suggest one of the rural RD&E structures that needs attention). The PC has noted that "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" (p. 1).

Former NSW DPI Principal Scientist John Mullen (2010) has estimated the total spend on agricultural research (a narrow definition and excludes forestry and fisheries) by research providers in 2006-07 at \$1,034 million and splits the shares as follows:-

- 38% State Departments
- 25% Universities
- 20% Business
- 17% Commonwealth Government (p. 24).

This discussion then is about the appropriateness or otherwise of this 3:1 to 4:1 split between public and private funding of rural RD&E. A good starting point would be a benchmark assessment of like industries/sectors in Australia and overseas. Again using a narrow "agricultural R&D" measure, the most recent international study suggests the public/private sector split is more 1:1 in developed countries (Pardey (2006) quoted by Mullen). It is noted that both previous Australian inquiries of this nature (1995 and 2007) concluded that "public funding" should be reduced, but the governments of the day did not respond in any formal way but rather affected a "scaling back" of public funding through other means.

This then suggests there is a policy dilemma when it comes to the question of balance between private and public sector support for rural RD&E. However, it is QFF's view that most policy dilemmas come about because of a failure to define clear objectives. Historically the private sector/public sector divide becomes blurred in virtually every activity and nation where both are permitted and encouraged. Education and health activities are clear examples and governments and communities are forever questioning whether "they have got the balance right".

QFF therefore suggests that there is little to be gained from furthering discussion about public goods and private benefits, but rather the focus should move to what outcomes the public expects from its expenditures on government activities. From that answer will come some clearer direction about how to achieve it. The public rightly expects to see tangible achievements and progress towards stated goals.

The point in this context is that the publicly funded rural RD&E industry needs to do more in communicating the public benefits of its existence. Industry can help, but generally in the public domain industry is seen as a vested interest and therefore less credible. So while QFF supports the direction that governments (PIMC and PISC) are taking in developing a national Primary Industries RD&E framework and an associated R&D Investment Plan we see a danger of too much process and not enough action.

For instance, in response to the 2006 Agriculture and Food Policy report (known as the Corish report) PIMC created the Climate Change Research Strategy for Primary Industries (CCRSPI), but as Peter Core noted “evidence of joint research projects in this area is still limited” (p. 14). Indeed, if the subsequent closure of a key cross-sectoral RDC, Land and Water Australia, in 2009 and the low funding of Australia’s Farming Future programs, then there is clearly a disconnect between what needs to be done and what the various governments are prepared to do.

QFF notes there has been a decline in public funding of rural RD&E and acknowledges this is partly the result of other sectors of the economy winning the battle for scarce public funds. But QFF also sees it as the result of misplaced public priorities. This debate is not a simple public good/private benefit one, nor can it be assumed that private sector funds can flow to fill RD&E gaps created by inadequate public funding. For instance, there are examples where public interest research might clash with private commercial interests (nitrogen use efficiency, energy use efficiency, water use efficiency, etc) and both farmers and the wider community are losers if the public research is not undertaken. Vested commercial interests often have priorities at odds with public interests.

Additionally, the rural sector possesses a few fundamental structural issues that distort market mechanisms needed for efficient signals to all potential participants. There are about 360,000 farmers and farm workers across about 150 rural industries in regional Australia, and it is QFF’s view that these people and industries (1.6 million people engaged along the supply chain to process, transform, transport, distribute and market to final consumers) require an RD&E effort with significant taxpayer support, otherwise the critical mass of resources will be insufficient to achieve sustainable results. It cannot be overemphasised that Australia is a small economy with a very small rural sector, so without significant injection of public funds the sector itself cannot generate sufficient research effort – outside help is a must.

When considering the private sector contribution to RD&E it is important to consider such things as the industry structure (capital, labour, input/output markets, ownership structures, etc), whether it is a new, emergent, mature or transitional one, and how production is organised relative to market channels. QFF makes this point because it seems that private sector contribution to RD&E is probably understated in official figures. In the case of rural RD&E this is probably more so because industry structures are so divergent and the company structures of those involved unlikely to capture the full extent of research and innovation activities along the full supply chain. Many smaller agribusinesses simply expense RD&E activities (other than CRC contributions) because obtaining RD&E tax concessions is complicated and involves precise record keeping. Likewise the family structure of most farming enterprises means they will depend on external sources for technical and innovative solutions to on-farm challenges in much the same way any small business does – through suppliers and professionals who are likewise similarly structured businesses. These families and businesses generally do not achieve sufficient size and scope to attract capital to be used for RD&E.

QFF acknowledges the new Research and Development legislation to take effect in 2010-11. The government’s aim is replace the complex and outdated R&D Tax Concession with simplified R&D Tax Credits and provide businesses with better incentives to invest in research and development. While there are to be more generous benefits for eligible

activities, the key changes are a 45 per cent refundable tax credit for eligible entities with an aggregated turnover of less than \$20 million per annum, and a non-refundable 40 per cent R&D tax credit for all other eligible entities. It remains to be seen if this will boost R&D business expenditure in Australia and QFF is interested to see if the rural RD&E industry view these changes as sufficient to boost business investment in their direction.

To arrest the decline in public support (meaning government funding, not public attitudes) for rural RD&E the task requires clarity of objectives. QFF strongly believes that all stakeholders need to accept the challenge of doubling food, fibre and foliage production in the next forty years in a carbon (greenhouse gases) and water constrained world. Additionally, in Australia and Queensland there is an ongoing need for decentralising the population to ease lifestyle and environmental pressures in our cities. As a nation we must also continue to improve natural resource management and pursue sustainable business practices wherever feasible. These challenges combined provide clear objectives for public funding of rural RD&E. Then we need some resilient policy, renewed institutions and “a re-invigoration of passion, leadership and vision” to correct the imbalance that fiscal frugality has caused.

Before moving to the remaining considerations before this Inquiry, QFF notes the considerable evidence that exists to support the Australian model of funding some rural RD&E activities with industry levies matched by taxpayer funds (the RDC Model). This model achieves some very important engagement, ownership and governance objectives. While some aspects of the operations of the 15 RDCs created by the PIERD Act 1989 may detract from the model, QFF is of the firm view that care needs to be taken in any reform of the system to avoid “throwing the baby out with the bath water”. Elsewhere we’ll make suggestions for improving RDC performance, but the benefits of co-funding part of the rural RD&E portfolio are great and the system should be extended where feasible.

More resources are needed to provide the Australian community with attractive, vibrant and sustainable regional communities. The rural RD&E effort is an integral part of delivering that outcome and it must have strong public funding support. The pooling of producers’ and taxpayers’ resources to fund part of the rural RD&E portfolio is a sound model that can be improved and extended to achieve the important ingredients of engagement, ownership and governance for the funding partners and the research community.

3. Current RD&E funding arrangements

As with the earlier sections, we feel somewhat constrained by the lack of detail on the overall operations of Australia’s RD&E industry and the rural component of it. This is a complex area because of the many stakeholders involved both in terms of getting research done (funders) and doing the research (service providers). From the earlier discussion it can be seen that QFF regards the total amount of rural RD&E investment as inadequate. We would also argue that initiatives such as the \$43 billion national broadband network (NBN) provide a benchmark to gauge the appropriateness or otherwise of government or sectoral spending.

The gross value of farm production from the estimated 125,000 Australian farms (and 358,000 farm workers) in 2009-10 is estimated to be \$40.7 billion and the net value \$5.6 billion. The 2008-09 value added in the first step agriculture, forestry and fishing sector was \$28.2 billion. So is \$1.6 billion adequate to sustain and grow this important part of the Australian economy? Given the consumer, climate and international market challenges ahead, almost certainly the answer is no.

So who is to step in and increase funding to the rural RD&E sector? Currently we can identify four principle funders of rural RD&E in Australia – the Australian government and universities, state governments, farmers through levies paid when product is sold, and private investors.

While these arrangements have evolved over time in response to changing circumstances they have probably never been adequate for the task. But by one measure, productivity growth, there have been periods when *ex poste* assessments would say it was in relation to the rest of the economy. There is a rich literature around this subject, but in the context of this Inquiry QFF wishes to highlight that productivity growth is ultimately driven by market forces. Farmers (and most economic agents) achieve productivity improvements in a combination of ways, namely through the creation of new knowledge and technologies, improved use of existing technologies and techniques, and changing scale and scope of operations (enterprise mix). Commercial businesses are forever renewing themselves in the search for these productivity gains because they drive profitability.

When it comes to the question of funding these productivity improvements there is the question of who pays. The answer comes partly from the industry or business structure and the resources it has available to it. In a simple capitalist world it would be “user pays”, or “he who gains, pays”. In a commune it would be “we all pay, or it doesn’t happen”. And in a mixed economy like Australia you get the mixed response. There are both public and private benefits to be had from conducting research to improve productivity, and such research is likely to create spillover benefits to all society as well. To choose to not publically fund research that will lead to productivity gains on the grounds that there is private gain is akin to driving a motor vehicle with one foot on the accelerator and the other on the brake.

In the context of the Australian farming community there is the additional aspects of externalities to improving farm production systems. For instance, the consumer gets better and safer products and the land, water and other inputs are managed more sustainably. The market mechanism does not fully capture these extra benefits so farmers are never fully compensated for their “stewardship” role. Indeed, in so far as there may be economic value in such externalities, it is probable they are captured further down the marketing chain depending on market power and concentration.

As industries evolve and marketing arrangements change it is possible that some rural businesses can achieve sufficient size and scale to have self-funded RD&E components that suit their business model. However, where this is likely to occur there are tradeoffs that need to be considered, especially those associated with market concentration. Recent commercialisation of grain marketing and grain handling bodies in Australia may not produce the total outcome needed to sustain those industries. Likewise the consolidation and corporatising of farms is unlikely to achieve the full mix of family, community and environmental objectives sought by Australians. This is not to suggest that governments should directly intervene to stop these developments, but rather they should have policies and programs that support the competitive mix of businesses and enterprises needed achieve the social objectives.

QFF considers there to be strong evidence that the rural RD&E effort needed to meet the social, market and environmental challenges of the future are underfunded. QFF acknowledges that there is strong competition for taxpayer funds, but it is the taxpayer who is in the best position to fund and benefit from Australia’s RD&E industry, provided it remains structured with a good mix of public and private activity.

4. Effectiveness of the Australian RDC model

QFF acknowledges that others are better equipped to comment on this topic, but being representative of a family of industries, regions and activities that will feature prominently in Queensland's rural landscape in the future, we do have the following observations that may assist this Inquiry synthesise the various assessments of any or all RDCs under scrutiny. A brief description of Queensland primary industries and the main intensive activities is included in Appendix 1 and the RDC involvement summarised in the table below (from PC Issues paper p 7).

Table 1. Intensive Agriculture RD&E Collections and Expenditures 2008-09 \$m

Statutory or IOC & PISC Lead	Producer Levies	Aust Govt Contribution	Expenditure
Cotton RDC - NSW	2.37	2.44	9.41
Fisheries RDC – Tas/Vic	9.52	5.30	27.75
Land & Water Australia - CSIRO	0	13.03	29.55
Rural Industries RDC – NSW/NT	1.84	16.54	23.83
Sugar RDC - Qld	4.32	5.11	8.04
Australian Pork Ltd - SA	3.10	2.76	5.39
Dairy Australia - Vic	19.17	19.17	33.68
Horticulture Australia Ltd - NHRN	40.91	39.80	84.64
Total above	81.23	104.15	222.29
Other RDCs and IOCs	162.93	103.07	245.39
TOTAL	244.16	207.22	467.68

**Since 2009 Primary Industries Steering Committee (PISC) designates a research leader to help coordinate research plans.*

The first observation is that they vary greatly in size and coverage. Their budgets in 2008-09 ranged from \$1 million to \$121 million and operated across very narrow to a very broad range of commercial interests. However, the delineation of what is an industry is unclear so just how involved some or all the processors of those industry outputs are, is unclear. QFF's membership covers eight of the sixteen – 5 of 7 statutory RDCs and 3 of 9 industry owned RDCs. It would seem those 16 RDCs provide near universal coverage of annual Primary Industry activity (the \$40.7 billion gross value of production referred to above). This is an achievement in itself and while the levies may not be even across the participating industries this is as it should be. All other things being equal, industry groups should decide on their common interests and take responsibility for the outcome, good or bad.

A second observation that follows from the above is that it is clear that "one size does not fit all" when it comes to industry participation. The reason for this diversity might be an interesting area of research, but it is a reality that perhaps should be accepted rather than questioned. To the extent that governments might wish to advise and influence the quantum and direction of industry RD&E there is a need for care, less they be seen as too prescriptive and diminish the value of the activity as seen from producers' eyes.

QFF appreciates that governments must prioritise their activities to where there is the most public good. We understand this is one of the reasons governments seek to achieve certain environmental and land management outcomes through rural RDCs. QFF however notes that the "track record" in this regard is not even and "special projects" have recently emerged to cover gaps in both the scientific and political agendas. The science effort required for water, water quality, reef and vegetation are hardly those that can be satisfactorily achieved through rural CRCs and RDCs, but nor can they be successful without partnering with them. Such is the complexity of the research, innovation and industry dynamics.

It is QFF's own experience and those of our members that governments and researchers often understate the importance of industry engagement in research activities. The CRC and rural RDC models are attempts to address this tendency and it is QFF's view that the approach needs to be nurtured and further developed to enhance Australia's research performance. This Inquiry should not underestimate the importance of developing "an RD&E culture" with farmers and along the supply chain. A structured and systematic approach to dealing with the challenges of sustainably supplying consumers with quality farm produce is proven, and must be supported with strong RD&E.

Additionally there needs to be checks and balances within the RD&E industry itself. We make further comment on this important matter in Section 7 of this submission, but in this context we note that in 2008 the Chairs of the RDCs saw a need to substantially boost rural R&D to combat climate change impacts and to engage more directly in the emerging "bioeconomy" that the OECD sees will become a central feature of the world economy over the next twenty years. This is interpreted to mean Australia has to focus its scientists on integrating agriculture into the "new world" where human health and wellbeing, energy, ICT (information communications technology) and biotechnology become integrated. This may be so, but the path our scientists may take us on to create this integration needs a continuous reality check, otherwise "leading edge" innovation can become "bleeding edge" if the balance isn't right.

QFF sees the Australian RDC model as effective and efficient one for achieving a range of objectives that add to the capacity of primary industries to meet community expectations. The co-funding model provides an important driver for attaining engagement, ownership and governance for the parties. Public interests need to be periodically reviewed and assessed to ensure sustainable solutions emerge from the rural RD&E effort.

5. RDC operational efficiencies

Measuring the performance of any research agent is a difficult assignment, even when the output and intellectual property is "commercialised". Of its nature research tends to be long term and continuous and often with unintended outcomes both good and bad. RD&E activities involve overlaps, intangibles, spillovers and collaboration thus making assignment of success and failure often difficult. In recent times performance measures for the RD&E industry have been developed to help improve both resource allocation and results assessments. However, there are no universally accepted ways to assess research performance and QFF understands the dilemma this creates for economists, accountants, managers and stakeholders.

An important issue for consideration in evaluating the specific RDCs involved in this review is whether or not they attain sufficient scale and scope to operate effectively. Others are probably in a better position to offer advice on this question, but from discussions within the QFF family of industries it is difficult to take proper account of influence of cross sectoral and national influences on the research agenda, let alone the year to year performance of a particular group of specialist researchers.

Despite this there has been an increasing tendency to require RD&E organisations to report against performance measures and these do offer some guidance in evaluating specific projects relative to each other and overall operational performance of the managing agent. Following the 2007 PC Report on Public Support for Science and Innovation some more formal performance measures have been in development, especially for assessing public benefits and spillovers from RD&E efforts. These are of some use for examining particular projects (cost benefit analysis) and assessing priorities, but they are by no means perfect.

This problem is akin to that faced by commercial entities. It wasn't that many years ago that profit was the key measure of commercial success and most company managers understood the mantra of Noble Laureate economist, Milton Friedman that "a corporation's sole responsibility is to shareholder value". This can be seen as a proxy for "wealth creation", but in today's complex business world it is seen as a narrow and limited measure of performance. Today there is an increasing tendency for companies to report on "triple bottom lines" (or even the quadruple bottom line if 'spirituality' is added to the list of stakeholder requirements), i.e. economic, social and environmental performances.

We note that the research community has been moving in a similar direction for slightly different reasons. The recent Simpson and Dargusch paper "Classifying public benefit in Australian agricultural research" (2010) provides a comprehensive review of the development of the triple bottom line framework for evaluating research impacts and QFF concurs with the extended frameworks they developed in the paper. The summary matrix for classifying research types and value (Table 5) seems a particularly useful tool for all stakeholders in research activities.

It is QFF's view that any research agent or institution requires some clarity of objectives before it is possible to have useful measures of performance. Effort should continue to improve the economic accountability of RD&E expenditures, and social and environmental measures should also be incorporated into performance reports, but care needs to be taken that double counting and exaggeration aren't injected into the reports, either qualitative or quantitative.

QFF believes there is sound evidence that RDCs are delivering good results for stakeholders and sees evidence that they must be encouraged to stay focused on the mission to 'improve the productivity, profitability, sustainability and global competitiveness of Australia's primary industries. In the absence of other specific performance measures these four over arching goals should offer key measures of rural RD&E performance.

6. The Primary Industries RD&E performance

As noted elsewhere this Inquiry has access to a wide variety of formal government reports and academic papers that point to a clear decline in the performance of Australia's rural RD&E sector. Others will offer more persuasive arguments of the cause and effect of this decline. For its part as a representative industry organisation QFF wishes the Inquiry to note the vital importance that RD&E activities have on the ultimate performance of the rural sector and its constituent parts. Rural industries can only remain sustainable as long as the RD&E industry performs.

To lift the performance of the rural RD&E industry there is a need for both more dollars and a re-engouring of the key players. QFF sees a need for Australians and their governments to rediscover the "value" of growing and prosperous rural industries in regional Australia. This will help solve the problem of the shrinking funding base. The rural RD&E industry needs to be revitalised to serve the value proposition that it is in the nation's interest to have an innovative, prosperous and growing rural sector. This repositioning needs to be done in a proactive and contributory manner so that the public at large is keen to see a healthy mix of public and private sector RD&E activities. Rural industries themselves no longer have the political clout to achieve this and the new emerging commercial entities are mostly of insufficient scale and scope to fund the public interest aspects of many primary industry activities.

Others have noted the shift towards research collaboration and institutional consolidation creates an uneasy tension across research objectives and often it is rural research that loses out in finalising priorities. We believe there is evidence of this in many of the "big

picture” issues and see this could compromise research performance when it comes to many of key challenges discussed in the next section. That is why QFF sees value in the Australian Academy of Sciences approach that identifies a five-way framework to manage priorities, namely;

- National Food Policy integrated within government policies
- RD&E coverage integrated along the supply chain
- Public research for the unique Australian biophysical challenges
- Comprehensive national natural resource management research
- Engaging all Australians in rural RD&E activities and outcomes (and consequences if not done).

7. RDC balance of research priorities

QFF acknowledges that RDCs serve a mix of interest groups, but their clear line of responsibility must be to those that provide funding, i.e. farmers and taxpayers. Setting research priorities should be within a stable framework and one that provides some certainty to both funders and researchers. QFF notes that there are now national research priorities (NRPs), the most recent being;

- An environmentally sustainable Australia - transforming the way we utilize our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies
- Good health – promoting good health and well being for all Australians
- Frontier technologies – stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research
- Safe Australia – safeguarding Australia from terrorism, crime, invasive diseases and pests, strengthening our understanding of Australia’s place in the region and the world, and securing our critical infrastructure, particularly with respect to our digital system.

From these are drawn the rural research priorities which define critical R&D investment needs and guide agricultural, fisheries, forestry and food industry RD&E efforts. This common understanding of rural research priorities helps position Australia’s agribusinesses to embrace innovations and adopt new technologies to respond to market changes, to open up new markets and maintain a competitive edge in the face of economic and climatic challenges. Currently these are identified as;

- Natural resource management
- Climate variability and climate change
- Productivity and adding value
- Supply chain and markets
- Innovation skills and technology
- Biosecurity.

The RD&E industry in general and the rural RDCs in particular are expected to report their activities in relation to the NRPs, and this is a reasonable expectation. However, given their very broad nature such categorisation of research activity and performance may not be overly informative. The rural RDCs claim to be spending about 85% of their annual budgets on NRPs thus giving the Australian government considerable leverage over those activities. However, the RDCs see themselves as being engaged in mostly applied R&D (which should be identified as RD&E) as distinct from basic research (‘blue sky’), and this positions them as being in the “innovation” part of the RD&E industry. QFF suggests this may be overstating the case somewhat because innovation, like adaption, is ultimately market driven and no amount of intermediaries “converting research outputs into practically and commercially viable outcomes” will improve uptake if economic agents see no value in it.

QFF draws this distinction because it is important in the context of climate change. Climate change adaptation is important and research effort is needed to create “critical knowledge for

national policy purposes and national industry development and management". Climate Change is a research priority for the family of industries and regions represented by QFF and the management of climate risks and opportunities requires a well structured and inclusive research plan. QFF therefore supports the Primary Industries NARP stated aim "to ensure Australia's primary industries will continue to be sustainable through future climate change", but the plan needs balance and should not over emphasise climate threats because that will direct too much research effort away from the opportunities and solutions that the agribusiness community is seeking.

We appreciate discussion about the development of the RD&E strategy for primary industries through PIMC culminating in the 2007 CCRSPI collaborative research plan, but note that one critical element of that plan involved the Australian Government's Australia's Farming Future 4-year initiative and to date it has involved comparatively limited funding relative to the scope of climate change issues. In particular, we see the Farm Ready skills and strategy elements as having little impact because of the limited funding to date.

In this context we draw attention to two other "reviews" that provide additional discussion on research priorities. The first is the House of Representatives *Farming the Future* report released in mid March that examined the role of government in assisting Australian farmers adapt to climate change. One of its recommendations is that R&D programs be "flexible and responsive to the needs of farmers and rural communities". One can assume that this is a specific recommendation to keep the R&D providers aware that sometimes they are not sufficiently engaged with farmers and their communities. Likewise the recommendation on skills development is made because Australia's R&D programs are not delivering enough in this regard. QFF concurs with this assessment.

QFF makes these observations because we are not sure that the draft plan's emphasis on modifying behaviour through *Mitigation* and *Adaptation* strategies is helpful (p. 6). At both the farm level and along supply chains in response to consumer demands there will be an array of activities that may not fit neatly into such definitions. Much more research effort is needed into reducing greenhouse gas emissions, and improving soil, water and energy efficiencies as part of the climate change agenda. QFF is of the view that primary industries have a demonstrable comparative advantage in dealing with climate risks and it needs to be further developed.

This is acknowledged in the draft research plan (Australia's "highly adaptive production and land management systems" in Australia (p. 22)) but then states that such "incremental adaptive management" may not be appropriate for the future. We appreciate the argument but suggest it needs to be balanced with the reality that "transforming production systems" is always going to be a time sensitive issue and that 10 to 20 year time frames are about the limit of useful. We are reminded that all science needs to pass an occasional reality check, namely "is it useful, or just interesting?"

The discussion on Climate Change Responses (Box 3 p. 24) raises the important question of "how much should we do about researching the big C change that requires industry transformation, and in which direction?". QFF sees it as important that the research effort be balanced across the continuum (Adjusting, Changing, Transforming) and if there is to be a bias, then it should be towards the former rather than the latter. Generally, discussions on adaptation needs must be balanced to reflect the practical realities of managing farm management systems in an ongoing manner. Farmers and agribusinesses need our researchers to be providing research that can improve adaptive capacity and transform if necessary, but hundreds of projections about climate catastrophes is neither useful or interesting.

Finally we concur with the draft NRP for Primary Industries Research Prioritisation Section and the six guiding criteria, but caution that “severity” and “immediacy” need to be well considered and based on scientific assessments, not populist suggestions.

8. Levy arrangements

QFF notes that the Australian RDCs are constituted to respond to their levy payers, i.e. active farmers producing the commodity output. QFF supports this structure because it provides each industry with its own self determination. While this can create some unevenness across industries, this is as it should be and is the outcome to be expected in a free and democratic society. It may not always sit comfortably with the other partner in the agreement, the government of the day representing taxpayers, but it is a sound and practical approach. In instances where the government sees inadequacies in either levy payments or program expenditures (priorities) QFF sees open and frank negotiations as the preferred course to resolve any such differences. The RD&E industry in Australia is quite transparent and any particular industry that may chart an independent course should have the opportunity to explain its priorities and actions.

QFF notes that the former Minister responsible for creating RDCs under *PIERD Act 1989* is now critical of the “mish-mash” of organisations, corporations and private companies that have emerged (May 2010). He is particularly critical that many have become “self-centred silos” that “do not make for sound cross-sectoral, cross-issue science” and that some have become “grower dominated” rather than with the specialist Boards he envisaged. QFF is of the view that this may be the price that has to be paid to have grower involvement in RD&E and that there is a trade-off when it comes to selecting Boards and the fee-payers democratic right to influence who is selected. This is no different in the commercial world and if the shareholders (or their representatives) make a poor choice, so be it. The agri-political scene is always in a state of flux and there will always be the odd “poor choice” just as there will be genius selections when it comes to selecting Boards.

QFF therefore supports the principle that individual industry groups determine their levy arrangements. QFF suggests that the business, reporting and responsibility structures for these co-funded organisations should be consistent with best practices for RD&E organisations.

Conclusion

QFF acknowledges the evidence that there is an urgent need to revitalise the rural RD&E industry in Australia. Basic, curiosity-driven research requires public support – many leading scientists and most Nobel laureates agree that “their work was unpredictable, long-term, and required a stable and supportive environment”.

QFF supports the goal that underpins the rural RD&E industry, namely to build strong regional economies through research and innovation that improves the productivity, profitability, sustainability and global competitiveness of Australia’s primary industries. The evidence is strong that the current \$1.6 billion annual investment is inadequate. Additional funding is required to achieve this outcome, and it should come from a mix of public and private sources in a well structured framework.

Appendix 1

Features of intensive agriculture in Queensland

Agriculture activities are usually classified by commodity output, land use or production systems. In Queensland, an often used convention is to differentiate between mostly coastal activities and those that take place in the wide expanses west of the Great Dividing Range. This division also tends to correlate with rainfall, the coast being a high rainfall zone relative to the drier inland. However, Queensland covers a wide range of possible agro-climatic definitions ranging from the wet tropics in the far north to the near desert conditions of the southwest channel country. Annual rainfalls vary from over 4000mm in the Tully-Babinda region of Far North Queensland to less than 200mm in the South West.

Importantly, Queensland farmers have adapted well to this diversity and a wide range of productive systems have evolved to make best use of the land and climatic conditions. This has given rise to farming systems that can be categorised as either intensive or extensive. The intensive sector gets its name from being generally intensive land users with support from irrigation systems to permit year round or continuous production.

Agriculture continues to be a major employer in Queensland providing 3.7 per cent of jobs or 79,400 positions in 2007. In 2002, prior to the drought taking hold 106,500 jobs were filled in rural industries representing 6.3 per cent of the Queensland workforce. Aside from drought, the last ten years have also coincided with strong employment growth in Queensland (except for the brief GFC decline in 2009), so attracting and retaining employees in primary industries is a significant challenge.

In the context of a changing climate where the science indicates that Queensland will experience reduced annual rainfall and increased average temperatures, it follows that intensive agricultural production systems are likely to be impacted differently than the extensive systems mainly because the former are dependent on stored water for year round production. The increased gaps between rain events and longer dry periods within seasons will exacerbate this. The main agriculture activities in Queensland are shown in the table 2 below and a brief description of the intensive industries are as follows;

1. Sugar. Approximately 94 per cent of Australia's sugar output comes from Queensland. Because cane requires processing very soon after it is cut, the sugarcane industry has regional processing centres and as such is an important regional employer for many coastal towns and cities along 2100 km of coastline between Mossman in Far North Queensland and Grafton in Northern New South Wales. The main cane growing regions are the wet tropics of Far North Queensland, the dry tropical Burdekin irrigation region south of Townsville, the semi-tropical Central region around Mackay, and the Southern region around Bundaberg and Maryborough.

2. Horticulture. Queensland fruit and vegetable industry is as diverse as the state itself. Horticulture contributes approximately 16 per cent of the gross value of the state's primary industries and directly employs about 25,000 people. Queensland growers produce more than 130 types of fruit and vegetables and hundreds more in different varieties. Queensland's production accounts for about 30 percent of all fruit and vegetables grown in Australia including 80 percent of Australia's tropical fruits. The industry incorporates tropical plantations, orchard trees, vines and high rotation field crops. It is reliant on irrigation and it is reduced water allocations and the unavailability of water that is the greatest risk for year to year operations.

Table 2. GROSS VALUE OF QUEENSLAND AGRICULTURE PRODUCTION (\$m)						
Commodity Group	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Beef Cattle	3,631	3,607	3,816	3,315	3,460	3,380
Sheep & Wool	170	155	165	160	165	150
Dairy	217	218	207	252	280	295
Pigs	235	230	237	234	235	240
Poultry & Eggs	333	314	333	420	470	465
Fruit	777	911	1,460	1,093	1,040	1,155
Vegetables	713	945	1,002	995	918	984
Amenity horticulture **	1,460	297	555	898	979	974
Sugar Cane	917	963	1,122	799	920	1,425
Raw Cotton	419	359	121	79	340	355
Cereal Grains	474	454	421	1,100	853	605
Miscellaneous	380	255	277	447	258	284
Fisheries	335	250	345	360	359	459
Forestry **	725	190	181	185	162	171
All Primary Production	10,786	9,148	10,242	10,337	10,439	10,942
Meat processing	977	971	1,026	936	977	1,155
Dairy processing	119	119	113	138	153	251
Fruit & vegetable processing	147	183	242	205	198	128
Sugar milling	385	404	471	336	386	722
Cotton ginning	48	41	14	9	39	40
Grain milling	88	85	78	205	159	57
Seafood processing	24	18	25	26	26	26
Nursery services	**	615	665	n.a	n.a	n.a.
Timber processing	**	330	343	321	281	353
Other	n.a	n.a	22	n.a	n.a	n.a.
Primary 1st Round Processing	1,787	2,766	3,000	2,176	2,221	2,732

Source: DEEDI Prospects March 2010. ** not disaggregated from GVP.

3. Nursery and Garden. The Queensland nursery industry is a significant horticultural sector with a combined supply chain (production to retail) valued at over one billion dollars annually with production approximately \$788 million. The production sector employs an estimated 6500 people spread over more than 1200 small to medium sized businesses contributing more than 20% of national production value. The industry produces more than 4000 species of plants targeting diverse markets including ornamentals, revegetation, forestry, fruit and vegetables. The industry has recovered from the downturn of the drought years and is again heavily involved in supplying the key interstate markets in Adelaide, Melbourne and Sydney.

4. Dairy. The Queensland dairy industry consists of approximately 600 producers in four principal regional areas. This is less than half the number of dairy farms that operated in 2000. In the last decade the industry has been transformed by drought and market forces to now being evolved almost exclusively in the fresh milk market. There are four milk processing companies operating in the state and it is estimated that the industry currently employs about 2,300 people. Because of drought and less reliable water supplies for irrigation most Queensland dairy farms now incorporate much higher supplementary feeding and the use of feeding systems then was the case previously.

5. Cotton. Queensland normally produces about 30 per cent of the nation's cotton crop. The Queensland cotton industry is concentrated where normally reliable summer irrigation supplies are available. The dryland area (rain fed) is normally an opportunity crop when conditions suit. The industry is characterised by its significant reliance on specialist agronomic and crop monitoring services while the crop is growing, and specialist harvesting and transport contractors for picking and delivering to regionally based cotton gins. This

feature means that a number of Queensland's regional centres (Emerald, Dalby, Goondiwindi and St George) have a significant reliance on the cotton industry.

6. Chicken Meat. The chicken meat industry is largely centred in the South East corner of Queensland and continues to experience strong growth. As elsewhere in Australia the chicken industry is highly integrated and is often portrayed as the success story of co-operation among all segments of the industry. The outcome has been a remarkable achievement in growth and consumer acceptance that perhaps only the Australian wine industry may have paralleled. Chicken meat consumption rose from 5kgs per head in the mid 1960s to 26kgs in 1990 and to 37kgs now.

7. Aquaculture. Aquaculture prawn farming began in the 1980's with most farms being located on flat land adjacent to seawater sources, such as tidal rivers or creeks. Prawn farms require temperatures above 25 C during production season, therefore 80 per cent of Australian prawn farms are located in Queensland. Total land currently used for production is in excess of 900 hectares and clusters of the farms can be found on the Logan River south of Brisbane and around Mackay, Townsville and Cairns. The biggest farm is located north of Cairns at Mossman and produces prawns all year round. It takes six months for prawns to grow to harvesting size and processing is carried out immediately after harvest, so most farms have their own production facilities that include grading, cooking and freezing. Prawn farming is the main element of Queensland's aquaculture sector providing the equivalent of 300 full-time jobs to produce in excess of 3,000 tonnes of product for an annual value that exceeds \$45 million.

8. Irrigation. Queenslanders experience a climate of extremes and wide variability. This is manifest most clearly with rainfall and that is why Queensland has developed much of its industry around human attempts to moderate the effects of that variance. While the principal of collecting rainfall in the summer "wet season" to be used later in the "dry season(s)" is simple enough, the practise has proven a great challenge because of the variability in Queensland's rainfall is far greater than variation between seasons. This has meant that water availability was and still is the major determinant of industry development, be it for coal mines, tourist resorts or farms.

Because of the variability and strong seasonality of these climate influences, there is little scope in Queensland for reliable water supply from "run-of-river" diversions. Instead storages need to be constructed with sufficient capacity to enable supply through prolonged dry periods. By 1990, 420,000 hectares or 14% of the total area cropped was irrigated from either private operations (bores, farm dams or stream diversions) or the Government irrigation schemes. At that time irrigated output amounted to about half the value of all crop output.

The Australian Water Account 2004-05 identified that the irrigated area in Queensland had risen to 542,000 hectares and that 63 per cent of this was irrigated by "self-extraction". An important consideration in managing water for irrigation of agriculture production systems is the evaporation. It is this climate influence that reduces both water availability and soil moisture (plant available water). Queensland is generally moisture deficient because of the mostly hot and dry (for eight months) climate. Annual evaporation rates range from 1270mm in the south-east to 3500mm in the far south-west. Only the wet tropics generally have surplus moisture on a year to year basis.

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