

R&D INQUIRY
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Submission to

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for

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submitted by

the Grains Research and Development Corporation (GRDC)

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1. INTRODUCTION

The Grains Research & Development Corporation (the GRDC) is one of the numerous 'quasi-public-sector' organisations in Australia, referred to by such terms as Statutory Corporations, Government Owned Corporations ('GOCs') and Government Trading Enterprises ('GTEs'). Perhaps these should be referred to as 'quasi-private-sector', in recognition of their characteristic and intended strategic direction, rather than their genesis. The GRDC is a member of the class of such entities within the Commonwealth domain and pertaining to science and technology. These include the CSIRO, university derived Cooperative Research Centres (CRCs), and the fourteen Research and Development Corporations (RDCs), of which the GRDC is the largest. Most of the RDCs operate under the *Commonwealth Authorities and Companies (CAC) Act 1997* and the *Primary Industries and Energy Research and Development (PIERD) Act 1989*. Some (currently four) have moved to operating under Corporations Law, as part of the process of moving to "industry ownership" and issuing equity to primary producer stakeholders.

Collectively, these Commonwealth quasi-private-sector entities are critical to the evolution of the interface of public investment and private capital. For several reasons articulated within this submission, the evolution of this interface will be one of the key determinants of Australia's competitive advantage in the global competition of deploying and bringing to the market the technology and knowledge developed by scientists and researchers. This is particularly the case for the Australian primary industry and agribusiness sector.

Ours is a nation with a well developed public sector in science and technology, a relatively low level of private sector business expenditure on research and development (BERD), and (compared to some of our competitors) poorly developed links between science and business. There is an important role for government in facilitating and encouraging the development of this science/business interface, and this is potentially a powerful means of engaging business in investment into research and development. This submission is primarily focused on this pathway to 'business commitment'. There is a particular focus on the GRDC as a case study, but many of the general principles and possibilities are applicable to other Commonwealth based research and development entities and beyond.

1.2 Some important characteristics of the RDC model

RDCs emerged from a model based on combining a 'levy' on the first point of sale of primary industry products, combined with "government matching dollars", which is a dollar for dollar contribution up to a maximum of 0.5% of the Gross Value of Production (GVP) of the commodity or product.

There are several justifications for such levies, including the provision to specific small business owners of an equivalent to private sector R&D investment concessions, and remediating 'free rider' problems in a sector where businesses are small but the nature of investment is large.

In regard to the matching dollars, it can and has been argued that this provides the primary producers with the equivalent of private sector tax concession for R&D, and is therefore a general stimulus to innovation. Or it can be regarded as providing a

vehicle for the Commonwealth to purchase 'public good', such as environmental and social outcomes of various kinds. Or it can be regarded as both, as is probably (and implicitly) the current case. The model may well evolve, as per other Statutory Corporation/GOC/GTE arrangements, towards clarification and separation of quasi-shareholder and government-as-customer purchaser-provider relationships.

Grower levies need to be distinguished from general taxation in terms of the legitimate expectations of those who pay the levy, and the corresponding nature of levy-derived capital. A primary producer levy is, in a real sense, an investment that is intended to provide a tangible return to the grower as a distinct sector of the economy. In a genuine sense it is discretionary investment, in that graingrowers can (collectively) reduce the levy or abolish it. Grower representatives formally consider this once a year. Support for the levy ultimately depends on investment performance that at least equals the opportunity cost of graingrower (in the case of the GRDC) capital, whether that return is in cash or non-cash form or both.

Currently the GRDC's income is made up of approximately 37% government matching dollars, 52.5% graingrower levies, 9.5% from income earned through reserves, and nearly 1% from other commercial revenue, including royalties (based on the financial year 2000/01). Moreover, the GRDC 'leverages' its budget (of around \$115 to \$120 million per annum) at a ratio of around 3 to 1. This is primarily through 'in-kind' contributions of state based public sector agencies (such as state agriculture departments) in partnership and/or provider relationships with the GRDC, but increasingly is through cash contributions from the private sector.

An understanding of the sources of capital, and the associated legitimate expectations of the respective 'investor' sources, is central to developing a position on appropriate funding mixes and options for the future. This includes issues around the role and potential role of commercial revenue. Levy-derived capital, Commonwealth derived (taxpayer) capital, commercial revenue, and leverage ('shared input') all have some distinctive characteristics, including those specified above.

It is also important to note that the PIERD Act and CAC Act, under which most RDCs operate, are pointedly liberal on matters of commercial behaviour. RDCs have generally not been inclined to operate as liberally and commercially as the act allows for. RDCs willing to test the boundaries have tended to move from operating under the CAC Act to operating under Corporations Law, concurrently issuing equity to their respective levy-paying stakeholders, and sometimes also merging with marketing and/or promotional entities.

2. KEY ISSUES ON THE SCIENCE / BUSINESS AND PUBLIC / PRIVATE SECTOR INTERFACE.

2.1 Cultural antipathy

Australia continues to sit on intellectual property, not knowing what to do with it, or to give away our intellectual property to more entrepreneurial nations. This is not because of lack of funding but is due to a lack of appropriately placed business expertise. This lack is partly due to factors of culture and attitude.

When Australian science is deployed through (very scarce) domestic venture capital it often ends up in trouble. When our science links to international venture capital, we tend not to secure a business partnership that allows us to capture the benefit and develop our own commercialisation competencies.

Given the attitudes of scientists and public sector science managers, this shortcoming is no surprise. An endemic cultural and attitudinal antipathy exists between Australian public sector and academic scientists and the world of business. While this is not exclusive to Australia, it seems to be particularly salient here. There are some exceptions but as a general phenomenon it is difficult to overstate the problem.

So why is this happening and what are the drivers of this discord?

Firstly, Australia does suffer from an "ugly entrepreneur syndrome". Australians tend to have negative associations with the term "entrepreneur". However the Americans, with whom much of our science competes, have positive associations.

Furthermore, the public sector and academic science culture is built on values of peer review, the sharing of knowledge, the delivery of broad benefit to humanity, and the "publish or perish" imperative. Scientists are uneasy about locking up knowledge or technology. Business, on the other hand, is based on commercial sensitivity, confidentiality and savvy management of intellectual property.

Moreover, business culture is based on the imperatives of 'faster, better and cheaper', in contrast with science culture which is slow and methodical. This can breed mutual disrespect in the absence of appropriate leadership.

Another issue is a misconception that business influence poses a threat to the funding of basic and strategic research. On the contrary, a competent 'portfolio management' approach to research investment can underpin on-going resources for basic research. This means ensuring that the 'blue sky' work is, in a sense, underwritten by other parts of the portfolio. Nobody knows the future of government funding for science. But statutory corporations and government owned business entities can contribute to securing the future of Australian science, independent of the politics of the day.

There is also a misconception that business poses a threat to 'public good' research. 'Public good' and 'public goods' can be created and purchased by governments through either public sector organisations, private sector organisations or hybrid business entities. This approach is common in such areas as the delivery of public transport and health services, but can also be applied to most areas of science, technology and upstream research. Such activities can be skewed towards specific outcomes through contracts with governments.

Scientists are often not comfortable in dealing with business relationships unless they are particularly talented in this area and have been trained with this role in mind. Related to this, Australian scientists do not generally understand contractual relationships based on 'joint value creation'. Contracts involving the private sector are often interpreted in terms of profit, greed and the giving away of public value.

Public sector and academic science organisations appear to have a limited understanding of business and commercial practices. There is an excessive and exclusive focus on the management of intellectual property. Within this there is a preoccupation with identifying intellectual property rights rather than effective deployment of those rights. Although intellectual property is an important element of the 'business of science', this is only one of the many competencies essential to managing the interface between science and business.

Partnerships are required to allow product and market developments to occur in parallel with the science, wherever possible. This rarely occurs. We do the science and only then, at best, think about what to do next.

2.2 More on the ‘public good’ issue

As mentioned, widely held misconceptions are based on a lack of contemporary understanding of ‘public good’ and the options for creating it, with an associated lack of understanding of the nature of contracting with the private sector and the possibilities presented by public-private-partnerships (PPPs).

The GRDC looks for opportunities for contractual relationships with the private sector based on either:

- ‘joint value creation’, where each party is contributing and sharing risk in return for potential value to both, value that could not be achieved without an alliance or contract, and/or
- more specifically represents a ‘purchase’ of a public good outcome through a non-public sector capacity.

The GRDC can provide illustrative examples of both. Private entities seek profit for their shareholders. RDCs seek value for their ‘stakeholders’.

Moreover, “value-chains” rhetoric is currently popular, and forms one of the ‘priorities’ for RDCs from the Commonwealth. There are many opportunities to develop ventures with ‘value-chain’ partners. But, of course, most of the value-chain is dominated by private capital. Unless RDCs limit themselves to generic, academic theory on value chains they need to cultivate relationships and negotiate with such partners. Due diligence and fiduciary duty then dictate that the RDC should be commercially competent in its dealings, to avoid ‘giving away value’ from its graingrower stakeholders and/or Australian taxpayers.

Competence in this respect will inevitably generate revenue through such mechanisms as royalties (including downstream product royalties, whether or not primary industry stakeholders are comfortable with any royalties adding to their levy payments), assignment of IP and/or licences, divestment of IP that for one reason or another the RDC does not wish to hold, service fees to partners (depending on the nature of the contractual relationship), publications and information products with a price, and numerous other possible mechanisms.

However, these relationships require the leadership of managers with a strong background (or access to a strong background) in developing a range of contractual relationships with the private sector. Otherwise the fear of ‘private gains through public investments’ is a realistic fear.

2.3 Competencies for working with private capital

‘Competencies for working with private capital’ is a more appropriate phrase for dealing with the public science-private sector interface, than is the phrase ‘commercial competencies’. The latter phrase tends to have strong and varied interpretations, and working with private capital may or may not involve ‘commercial’ outcomes.

Characteristically, public sector scientists and science managers equate commercial competencies with a narrow view of ‘IP management’, focused only on the identification and valuation of intellectual property. Much more than this is involved. But depending on the management role, these competencies often need only be sufficiently understood for a manager to know:

- a. when it needs to be done, and
- b. where and how that competency can be accessed.

Bringing managers or staff to this level of awareness and understanding is not as daunting as it first appears. Essential competencies include:

- Contractual relationship development. Different approaches and the multitude of ways of allocating risk and reward/benefit in a contract. Relating these factors to pricing within contractual relationships. The joint value-capture approach and the multitude of ways of capturing value.
- Related to this, real commercial negotiation skills.
- Understanding costing and pricing. Most large public sector organisations do not understand commercial costing and cannot work out the true cost of any given activity, service or product. Coverage to include: allocation of overheads and fixed costs, marginal costs, long run avoidable costs versus full costs, the cost of capital (in terms of both asset management and the sourcing of funds), approaches to setting rates of return (including weighted average cost of capital).
- Accessing market signals and markets, including the treasure chest of accessing via strategic alliances and joint ventures (you do not need to do your own marketing analysis, and most consumer surveying is a waste of time and money), test marketing, developing product and market in parallel with scientific development.
- General principles of marketing and product development.
- Asset valuation - in general, for R&D, real options approaches, approaches to valuing intangible assets including IP.
- Cradle to grave asset management and infrastructure investment and management.
- Legal, regulatory and related aspects of creating, designing, structuring, and managing business entities and vehicles of various types.
- Balance sheet management, including the options and advantage and disadvantages (under various circumstance) for placing assets on own balance sheet, partner's balance sheet, or on other or third party balance sheet.
- Own and control strategy versus accessing skills, assets and resources through strategic alliances and joint ventures.
- Mergers and acquisitions - basic theory.
- Discounted cash flow analysis and financial scenario analysis.
- IP management, including identification, protection (via legal or via 'trade secret'), valuation, path to market strategy. But most importantly it involves overall IP strategy...Where might this technology/knowledge take us in terms of benefit? What total IP requirements do we need to get there? What elements of this IP 'package' do we already have? What do we need to access or purchase from elsewhere? What do we need to create ourselves? Who can we work with to create it? What strategic alliances and contractual relationships do we need to develop to access and/or create what is needed? How do we hold the total IP package and prevent 'leakage'? How can we facilitate product and market development in parallel with research development? Which partnerships/alliances will help us do this?

2.4 Market failure and 'crowding out'

RDCs (and some other Commonwealth public sector and quasi-public sector agencies) were established largely within a framework of "market failure" and "public good". This can no longer dominate or constrain RDC activities to the same degree, if RDCs are to effectively serve its stakeholders. Some of the reasons for this shift, and the dynamics of this imperative (from a GRDC perspective), include:

- Globally there is accelerating vertical (and horizontal) integration of agricultural research and other elements of the agribusiness, food and industrial products industries. The crossing of these boundaries in business will be a source of innovation and competitive advantage. Hence the importance of ensuring that production based R&D does not remain isolated from these other sectors, and hence the importance of value-chain R&D.
- Through such partnerships delivery of value to the GRDC's stakeholders can be derived from:
 - market access through business relationships linked through to those markets;
 - influence to avoid restricted access or discriminatory pricing of new technology with respect to Australian graingrowers, biotechnology being a salient current example;
 - linking Australian IP to private sector or international IP that enables or accelerates development, deployment and delivery to market of the outcomes;
 - product and market development can often occur in parallel with the science when appropriate skills and assets are brought together, thus providing Australia with competitive advantage based on speed and agility, in the global knowledge and technology market place;
 - influence to limit leakage of new knowledge and technology to overseas competitors;
 - influence over the terms through which Australian graingrowers are offered 'contract growing' arrangements with private sector entities;
 - direct revenue (and input sharing arrangements) to offset other sources of revenue and/or fund additional R&D with more direct on-farm benefit and/or underwrite 'basic' or future high-risk research.

This is not just theory. The GRDC has and is entering contractual relationships with potential to deliver all of the above.

The GRDC's reasons for engaging with private capital are succinctly outlined on page 15 of the new GRDC Five Year Plan ('Driving Innovation'). Four rationales are summarised:

- 1) Joint venturing with other parts of the industry can be a powerful means of accessing or holding paths to premium markets, with dedicated linkage to Australian sources.
- 2) Related to this, willingness of private capital to link with RDC funds often provides the best possible 'market signal' for R&D.
- 3) There may be sound reasons, in terms of stakeholder interests, to retain and control specific IP assets, even when this IP needs to link to private sector resources to be effectively and efficiently deployed. Examples from the GRDC portfolio include grain storage technologies or grain testing equipment, where manufacturing is involved.

- 4) Sometimes these arrangements allow parallel development of products and markets at relatively early stages of development. This can be crucial where speed of adoption and deployment is important to national competitive advantage.

A significant proportion of the RDC's expenditure will undoubtedly continue to be associated with 'market failure', in the sense that private capital would not do the job in the absence of the RDC's involvement. However, for the above reasons it does not follow that RDCs should not involve themselves in any investment domain where the private sector is prepared to invest, or is even prepared to drive development.

The concept of market failure is further complicated by the difficulties of identifying what may or may not be potentially commercial knowledge or technology at a future date. This is increasingly the case in an economy which is progressively more knowledge based. In such an environment it can be argued that most of what the GRDC produces (cultivars and knowledge) could potentially command a price.

In the context of the sort of contractual relationships discussed under 'public good', this is not an approach that is vulnerable to the 'crowding out' of private capital argument, as propounded by many economists. This is an approach that harnesses private capital, and treats RDC 'stakeholders' more like shareholder-investors, who link with the shareholder-investors of other organisations for joint value creation and mutual benefit. It opens up the possibilities for private capital rather than crowding it out. Crowding out public sector capital would be the more realistic risk.

3. IMPLICATIONS FOR BUSINESS COMMITMENT TO R&D IN AUSTRALIA

The above analysis generates a host of potential implications and possible ways forward in further encouraging business commitment to R&D in Australia, for consideration by the Standing Committee on Science and Innovation.

3.1 Corporate governance and the private/public interface

The Commonwealth can take a leading position in facilitating and advancing the corporate governance and regulatory frameworks that enable strengthening of the links between science and business. In the Australian context, particularly, this means strengthening the links between public sector science and private sector assets and capital. This is more than a matter of the mechanics of complex policy and legislative consultation and drafting. This needs to take place within a climate of policy rhetoric that encourages private-public-partnerships (PPPs), does not encourage excessive risk aversion, and supports quasi-private-sector entities when they move beyond the tried, true and conservative styles of investment.

Some areas for special attention include working with and through quasi-private-sector-entities to evolve prudential guidelines, policies, practices and protocols in areas such as:

- competition policy and trade practices issues;
- costing and pricing issues and methodologies;
- approaches to various forms of business vehicles and contractual relationships of the PPP type;
- balance sheet management;
- liability exposures, and
- other business risk management systems and methodologies.

3.2 Business competence development

The broader set of business competencies needs special attention. The Australian Centre for Intellectual Property in Agriculture (ACIPA), sited at ANU, has been established and funded jointly by the GRDC and the Department of Agriculture, Fisheries and Forestry (AFFA). This will be an important vehicle for addressing the commercial competencies agenda. Moreover, a number of academic institutions are developing tertiary business/science courses, and these can also make an important contribution if course design and delivery accesses people with proven business competence. However, the total strategy for achieving substantive change cannot be left primarily to the tertiary education sector.

Other initiatives could include

- maturing the corporate governance framework for PPPs;
- the appointment of well rewarded and strategically positioned business leaders in research and development / science agencies;
- in service training and development for scientists and researchers;
- encouraging a broad range of frameworks for cross-fertilising business and public-sector and/or academic skill-sets, and
- developing performance measurement frameworks with a stronger business outcome orientation for entities such as CRCs and RDCs.

The BERD measure of private sector investment in R&D is an input measure, and can be misleading to the extent that contrived accounting can be encouraged. More important is a clear national focus on business outcome measures associated with R&D. More appropriate measures might be related to market revenue of entities which include Australian equity and associated with 'highly transformed' products, including licensing, royalty fees (including downstream product royalties, right through to retail level) and funds derived from divestment of IP. Also, perhaps, penetration of specified technology-based or knowledge-based markets by entities which include Australian equity.

3.3 Siting of major international corporate R&D investment in Australia and accessing 'experienced capital'.

On the face of it, many of the Australian innovation incentive schemes are oriented towards small to medium enterprises, 'start-ups' and 'spin-offs'. The problem is that this can create a predisposition towards 'inexperienced capital', with the increased risk and reduced benefits associated with this. There needs to be greater focus on major corporations with a track record of success in deploying and bringing to market science, technology and knowledge.

This submission has briefly explored 'value-chain-alliances', the associated 'vertical integration' of agribusiness, and PPPs in general. It is through such ventures that Australian scientists can be placed within alliances, partnerships and joint ventures where the science is embedded within professional market development, product development and business development competencies and systems. As these relationships develop, the siting of 'experienced capital' and skill within Australia becomes easier and more attractive.

The GRDC's own experience in international negotiations of this type indicates high potential for using contractual relationship development to encourage the siting of international investment and expertise within Australia. Well developed contractual relationship negotiation skills can capture value from these relationships for the Australian economy. The GRDC could discuss 'commercial-in-confidence' examples of this.

3.4 Impediments to business investment

Key impediments to business investment need to be addressed through means such as the above three areas of policy development. These impediments include:

- the 'cultural antipathy' factor, and this should not be under-rated or glossed over; the nature of key senior appointments are an important factor in ameliorating this;
- relative lack of maturity of public-private-partnership frameworks;
- scarcity of true business competence in key positions within Australian R&D organisations, and
- R&D tax incentives appear to be relatively difficult to access, and could be redesigned to encourage the proliferation of private-public-partnerships (PPPs) of various kinds.

4. CONCLUSION

The new GRDC Five Year Plan, 'Driving Innovation', highlights that "the GRDC is committed to making a major contribution to leading the development of appropriate governance frameworks and organisational competencies for industry R&D to operate in commercial business arrangements". Therefore, the GRDC is genuinely interested in offering further contribution and involvement in the deliberations of the House of Representatives Standing Committee on Science and Innovation, and in further actions or initiatives that follow from those deliberations.

For further discussion or questions, please contact:

JOHN LOVETT
Managing Director, GRDC

MORRIS LLOYD
Executive Manager Strategic Development, GRDC