Revitalising Rural Research and Development in Australia

... the story so far

Siwan Lovett

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Canberra 1997

Published by: Land and Water Resources Research and Development Corporation
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Publication data: 'Revitalising Rural Research and Development in Australia ...the story so far', by Siwan Lovett.

ISBN 0 642 26711 1

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Editing and pre-press production: Arawang, Canberra

November 1997

Foreword

Despite its limited natural resource base, Australian agriculture has been remarkably successful. The combination of a highly-variable climate, and old, shallow and largely infertile soils has not prevented the emergence of a wide range of agricultural industries that generated substantial wealth to fund the development of the nation. Although other industries have risen to greater overall importance to national production in recent times, agriculture remains the mainstay of much of regional Australia, generating significant exports and providing the basis for expanding processing industries.

The success of Australian agriculture is testimony to the capacity of our farmers take up technical innovations, backed up by a substantial research and development effort. Continued innovation is essential if Australian agriculture is to maintain its position in increasingly-competitive international markets, This requirement, together with the sheer size of the R&D effort, stimulate continuous interest in the arrangements for funding rural research and development.

This monograph, which draws on material from Dr Lovett's PhD thesis,* identifies and comments on far-reaching recent changes in the funding arrangements for rural R&D. These changes are aimed at improving the responsiveness of R&D funders and providers to industry needs and related public good issues, and at enhancing the contribution that a strong scientific community can make to rural production. The establishment of the rural research and development corporations within the Commonwealth Primary Industries and Energy portfolio coincided with a period of significant shift in research priorities to include not only matters of production but also post-farm issues such as marketing and processing, and sustainable resource management. An important objective of the changed arrangements was to encourage industry to increase its commitment to, and participation in, R&D and, as this monograph shows, this objective has been met with a good degree of success.

Another feature of the corporation model for R&D, as it has come to be known, is that the organisations are tasked, under the PIERD Act, to be involved not just in supporting R&D but also in making sure that research outputs are taken up and implemented. A prerequisite for achieving this aim is, of course, that the R&D addresses national and industry needs in the first place, but the corporations have also been required to invest

* 'A Corporate Conundrum: the Reform of Australian Rural Research and Development'. A thesis submitted for the degree of Doctor of Philosophy of the Australian National University, February 1996.

in communication and demonstration/extension activities, which in many cases have involved assisting industry participants to move to a position where they could fully use research results.

The monograph reports the outcomes of recent reviews of the performance of the corporation model. It records a range of views and opinions about the changed funding arrangements and whether they are living up to expectations.

The matters herein will be important reading for anyone concerned with the future of Australia's rural industries, and particularly with the funding and management of R&D. The corporation model has aroused wide interest from other countries because it is a unique system, particularly as the corporations are concerned with the whole process of innovation, not just the R&D that is one component of it. The monograph will therefore also be of interest to those concerned with research management, and with science and research policy more generally.

This publication was produced by a number of R&D corporations as a means of placing on record the purpose, process and initial results of the recent changes to funding for rural R&D.

Phil Price
Executive Director
LWRRDC

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Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
AMLC	Australian Meat and Livestock Corporation
AMLRDC	Australian Meat and Livestock Research and Development Corporation
AMRC	Australian Meat Research Council
ANAO	Australian National Audit Office
ARC	Australian Research Council
ASRRC	Australian Special Rural Research Council (RIRDC's predecessor)
ASTEC	Australian Science and Technology Council
BMR	Bureau of Mineral Resources
BRR	Bureau of Rural Resources
CRC(s)	Cooperative Research Centre(s)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPI	Department of Primary Industry
DPIE	Department of Primary Industries and Energy
FDTA	Fisheries Development Trust Account
FIRDTF	Fisheries Industry Research and Development Trust Fund
FRDC	Fisheries Research and Development Corporation
GRDC	Grains Research and Development Corporation
GVP	Gross Value of Production
HRDC	Horticultural Research and Development Corporation
IC	Industry Commission
LWRRDC	Land and Water Resources Research and Development Corporation
MRC	Meat Research Corporation
NAP	National Afforestation Program
NERDDP	National Energy Research, Development and Demonstration Program
NFF	National Farmers' Federation
NSCP	National Soil Conservation Program
NWRP	National Water Resources Program
PIERC	Primary Industry and Energy Research and Development Council
PIERD Act	*Primary Industries and Energy Research and Development Act 1989*
R&D	Research and development
RDC(s)	Research and development corporation(s)
RIR Act	*Rural Industries Research Act 1985*
RIRDC	Rural Industries Research and Development Corporation
RIRF	Rural Industries Research Fund
SMA(s)	Statutory marketing authority(ies)

Introduction

A state without some means of change is without the means of its conservation

Edmund Burke

Rural research and development (R&D) has consistently played a significant role in advancing agricultural production and marketing in Australia. Australians not only look to the farming sector for an assured supply of wholesome food at affordable prices, but also expect it to boost the nation's foreign exchange earnings. More than 200 years of exploitative farming practices have, however, taken a great toll on Australia's fragile countryside, creating widespread erosion, increasing salinity and polluted waterways. It is the challenge of balancing continued profitable agricultural production with the sustainable management of Australia's natural resources that currently confronts government, farmers, scientists and R&D organisations.

This monograph concentrates on Australia's rural R&D effort. It examines the dramatic changes that occurred over the past decade to make rural R&D more relevant to the needs of the nation and asks whether the corporate model, adopted in the late 1980s, is the answer. This model and its proponents were responsible for revolutionising rural R&D from a scattered, disparate and isolated research effort to one that is now targeted and market driven.

Despite the extensive changes experienced in rural R&D, there has been little analysis of the philosophies, processes and people responsible for the formulation and implementation of this reform program. This monograph attempts to remedy this situation by examining the reasons behind the reforms, the processes used to implement those reforms and, finally, whether the reforms accomplished the goals they were designed to attain.

Importantly, it goes further in its discussion of why reform was essential by pointing out that, contrary to popular opinion, the transition to corporatisation was not smooth or evolutionary but, rather, a spasmodic and ad hoc process, with the eventual establishment of a network of rural research and development corporations (RDCs) a triumph over adversity.

How Things Were

Ever since the arrival of the first settlers in the late 1700s, the rural sector has been vital to the nation's economy. This has been despite the fact that the country has limited agricultural resources—with low and variable rainfall, poor soil fertility and problematic topography combining to create an environment unsuitable for the development of self-sustaining industries. It was the problems that developed as a result of the unsustainable exploitation of resources that led to the establishment of a Government sponsored rural R&D effort.

Since the beginning of the 20th century, State and Federal governments have directed financial, organisational and human resources towards the provision of rural R&D services. This investment not only recognised the importance of the rural sector to the Australian economy, but also the fact

that farmers working on mainly small and isolated holdings, did not have the funds, organisational ability or foresight to develop an effective R&D structure of their own.

The key institutions established to provide rural R&D were the Council for Scientific and Industrial Research (1918) later to become the Commonwealth Scientific and Industrial Research Organisation (CSIRO), universities, State Departments of Agriculture and a mixture of Statutory and Non-Statutory Industry Research Schemes. These schemes tended to be commodity based, with Rural Research Committees developed in the late 1940s to manage Rural Industry Research Funds and investment activities.

Rural Industry Research Funds were derived from specific levies on the sale of commodities. This levy was matched by government on a dollar for dollar basis, with industry determining research priorities through the requirement for producer membership on those Rural Research Committees responsible for managing the Rural Research Funds. These Research Committees had high producer representation and were characterised by a narrowness of research focus, State and regional biases, as well as ad hoc managerial arrangements.

The combined effect of the above institutional developments was that the early R&D focus was on immediate, short-term benefits. There was an abundance of land to be exploited and international markets were buoyant—with little talk about sustainable agricultural production. Within such a climate, farmers and government preferred research that returned quick financial results rather than investing in less-certain, basic, long term research investigations.

Gradually, as a result of financial constraints, organisational rivalry and researcher-based parochialism, rural R&D became institutionalised —with research being conducted in a few organisations and investigation becoming largely dependent upon the specific interests of those researchers that received funding. Institutions that received funding failed to co-ordinate with other agencies and, on the whole, operated as autonomous units. This meant that research was often inefficiently duplicated, with researchers in different organisations having little knowledge of the work others may have been doing in particular fields of inquiry. The environment in which rural research was conducted became, therefore, characterised by complexity and a lack of direction.

A New Political and Economic Climate

There was a significant change in the political and economic environment following the election of the Hawke Labor Government in 1983. Soon after taking office, it called a National Economic Summit as a guide to introducing radical changes that reduced reliance on industry protection and sought a more competitive economy. Early innovations included floating the dollar, licensing foreign banks and deregulating financial markets. A three-tier reform approach based upon macro-economic, micro-economic and new managerialist philosophies was used by the Labor government to systematically change the economic and managerial landscape of Australian industry and government.

Within this climate of change, rural R&D became a focus for reform. It has long been recognised that government involvement in R&D is justified by the advantages that accrue to both producers and consumers—producers enjoy greater productivity and consumers better quality and cheaper commodities. Increased exports add to foreign exchange reserves and expand employment opportunities. Without government funding for rural R&D, therefore, Australian exports would be less competitive and more farms would be at risk. However, although government support of R&D was economically and socially valid, the question being asked by the early 1980s was whether existing research arrangements were appropriate?

In 1983, John Kerin, as the new Minister for Primary Industries, initiated a series of changes that were to transform the management and

provision of rural R&D. In introducing the *Rural Industries Research Act* (RIR Act) into Parliament in 1985, he set out to remove many of the problems highlighted in a 1984 review of the rural R&D system. He told parliament that the Bill would put R&D on a sound administrative and financial footing, ensure the best possible returns for each dollar spent and make those administering and undertaking research more responsible to the providers of funds.

Never before had such emphasis been placed on accountability, competitiveness and profitability. The Bill imposed a common set of policy and administrative principles upon all R&D agencies, replacing the previous disparate industry research legislation. Rural research was to reflect industry needs and give tangible returns to government and industry. The RIR Act introduced a single legislative and policy framework across all commodities, with funds based on the government's commitment to provide research money on a dollar-for-dollar basis up to a level of 0.5 per cent of the gross value of production for leviable commodities.

According to Kerin, success would be measured by the levies from industry being channelled into projects that produced results to enhance the performance of agriculture. Kerin, for the first time, was declaring that Australia could no longer afford to continue supporting research that was not producing relevant and commercially applicable results.

The RIR Act saw a plethora of research committees replaced by 14 industry research councils that were charged with funding and administering research that would increase commercial returns. In addition, they were to look beyond their own industry needs towards the wider economic, industrial and research environment. An Australian Special Rural Research Council (ASRRC) was established to ensure that small and emerging industries were not neglected.

Of great significance was the selection of council members on the basis of expertise rather than merely representing an industry. This was a break with past practice that had seen a high proportion of growers on committees with a lack of expertise in research, finance and other important skills. An infusion of skills was important, especially because the demands upon the councils were more onerous than those on the old research committees. For example, the councils were charged with investigating and evaluating the R&D requirements of their industries; developing five-year strategic plans; reporting to Parliament, industry organisations and fund providers on their activities; and participating in research council co-ordination meetings. Councils had to meet these obligations in order to ensure they received further funds.

Importantly, the new reform agenda for R&D was driven by government, not rural industries or researchers. Some researchers, used to assured annual funding, saw no reason to change the system, with the shift to evaluation being measured according to industry relevance and applicability to a wider commercial environment, a threatening development for many. Under the RIR Act, the research community had to seek funds under competitive tendering and, therefore, faced much more rigorous accountability requirements.

The establishment of the research councils integrated individuals and groups in a more constructive and commodity-orientated manner and this, along with active consultation between industry, researcher and government, ensured that research undertaken had relevance and was valued by all the parties. The National Farmers' Federation (NFF) gave its support for the councils, arguing that they improved the prospects for the conduct of research beneficial to farmers.

Corporatisation of R&D

The councils were, however, to have a short life, as the government soon sought further changes to increase the level of co-ordination and communication between councils. Kerin stressed that Australia had to get more efficient and competitive, enhance its productive capacity and protect

its resources. The government wanted to work in partnership with industries that were determined to be lean, flexible and ready for future opportunities as they arose.

In 1989, the RIR Act was superseded by the *Primary Industry and Energy Research and Development Act* (PIERD Act), which turned the majority of rural industry research councils into research and development corporations (RDCs). There was some amalgamation of councils, such as the four grains councils into the Grains Research and Development Corporation (GRDC). The benefits of corporatisation, it was argued, would lie in providing for operational and financial flexibility and in bringing the RDCs to play a proactive role in identifying and rectifying gaps in the research effort. RDCs would expand research resources, improve the return for money spent and focus on the high payoff areas. Under the PIERD Act, the RDCs were placed in the same position as any other private sector corporation operating under the purview of the Australian Securities Commission. They could borrow funds and enter into joint ventures, with research carried out by contracted experts from the private or public sector. Management was by full-time professionals rather than the Department of Primary Industries and Energy (DPIE), a situation that had seen some argue that the councils had been beholden to that department.

The transition from council to corporation was by no means smooth and, as explained in some detail later in this monograph, it may not have happened without the persistent efforts of Geoff Miller, the then Deputy Secretary of the Department of Primary Industries. He had faith in corporatisation as the vehicle for successful organisational change as well as a way to make a break with the past. He saw the RDCs as best able to address the key problem of identifying research priorities, a problem that had plagued the pre-1985 system. Miller believed that, although people tried to be intellectually objective in the priority-setting process, committee members from research institutions tended to favour the organisations they represented. This meant that people gave more support to funding applications from their institutions, with research priorities for rural R&D being set by scientists, conducted by scientists and measured according to the scientific profession's standards. Scientists were judging the suitability of papers for publication as a primary determinant for the allocation of funding and, although publications benefited scientists, Miller questioned if there were parallel benefits to producers or the community.

Miller felt that the establishment of RDCs would ameliorate this problem. Their structure featured transparent decision-making processes which paid attention to operational realities. The RDCs also utilised a productive incentive system to achieve the best outcomes. The best incentive was money and this was emphasised by the matching government/industry levy arrangement. As productivity increased so did funding, a factor that overcome the annual fight with Treasury over R&D funding.

Miller wanted the RDCs imbued with the entrepreneurial spirit to avoid the 'pitfalls of bureaucratic and political life'. With the appointment of the right people, the R&D system, he argued, would have a dynamic and flexible style of operations for the first time. This monograph records the initial setback for Miller when the corporatisation model failed to gain broad acceptance, especially after his test case, the Australian Meat and Livestock Research and Development Corporation (AMLRDC), became surrounded by controversy.

However, despite some setbacks Miller persisted and his role in contributing to the government's Research, Innovation and Competitiveness statement of May 1989 was vital in getting the RDC model back on the agenda. The introduction to the statement included a clear justification for an R&D model that combined industry and government in a 'partnership' arrangement, with details also provided about how such a model could be implemented. Miller's arguments appealed to the wider government goals of efficiency, effectiveness and economy, thereby ensuring its

acceptance by the Cabinet and Parliament. Ultimately, it was argued by Miller and Kerin, corporatisation provided the chance for a 'profitable' R&D system that focused on 'highest ultimate returns'.

Kerin played a vital role in getting Cabinet acceptance and declared the statement a crucial document that ensured victory. The enactment of the PIERD Bill saw the establishment of the RDC network that exists today. Kerin believed corporatisation would attract more money for research, make research more contestable, broaden research horizons, gain producer funding commitment and enhance the competitiveness of Australian agriculture.

A significant outcome of the long battle for the RDC system was its extension beyond specific commodity corporations to the establishment of corporations to tackle important issues that, while crossing sectoral lines, are vital for the long term survival of Australian agriculture. For example, the Land and Water Resources Research and Development Corporation (LWRRDC) focuses on sustainability issues such as water quality and land degradation while the Rural Industries Research and Development Corporation (RIRDC) is concerned with assisting emerging industries.

Rural R&D No Longer a Backwater

The R&D reforms were a win against the odds. The reformers were up against a spasmodic reform process combined with an agricultural downturn of the 1980s that had dampened the interest of some Cabinet ministers in supporting rural R&D. The achievement of guaranteed government funding to the RDC network was, therefore, little short of a triumph, with rural R&D shifted from a forgotten backwater to its rightful place in the new economic environment.

This monograph discusses not only the mechanics of corporatisation—why it occurred and the forces and personalities behind it—but also whether it has achieved its objectives. The RDCs were subject, in the early 1990s, to 'analysis paralysis' as executives and staff complied with four major government-initiated reviews and specific Senate inquiries to determine if they were: increasing the economic, environmental or social benefit to primary industries and the community in general; achieving the sustainable use and management of natural resources; making more efficient use of resources and skills; and improving the accountability of expenditure.

The reviews are discussed and evaluated in some detail later. The most positive finding of each review was that the RDCs were meeting the objectives of corporatisation as they relate to rural industries. Investment in R&D had increased and farmers were actively involved in determining research priorities. Industry support was strong with a GRDC survey (1995) reporting that 51% of producers had changed farming practices through the adoption of research findings over the previous five years.

Researchers were most affected by the changes to R&D. Competitive tendering required them to develop new skills in submitting bids, and positions of influence held under the old system were now lost. Researchers came under greater challenge when they declared they knew what was best for an industry. The RDC style was more abrasive and less benevolent, and generated resentment in some research agencies. However, many researchers have made a smooth transition to the new system and benefited from the contact and networks created and the administrative workload undertaken by the RDCs. For those researchers whose project applications are successful, funding can be assured for longer periods than under the previous arrangements.

Value for Money?

Overall, the reviews were favourable, despite the fact that the objectives of the PIERD Act were so diffuse as to create confusion rather than clarity about the role of RDCs. This allowed RDCs latitude in interpreting their adherence to the

Act. The downside was that each review seemed to heighten tensions, as demands were made for more detail, evaluation and accountability between RDCs and government. Each review queried whether government was getting value for money and it was perceived that industry, rather than taxpayers, was deriving most benefit. This perception supports the message of the Innovation Statement that industry had a responsibility to provide more funds for R&D. However, the government remains a co-investor in research through matching contributions.

While the dramatic changes to the R&D system occurred predominantly under the Hawke and Keating Labor governments of 1983 to 1996, the current National Party Minister for Primary Industries and Energy, John Anderson, has retained the RDC model. This, however, has not ruled out future reviews of rural R&D and, in recognition of the fact that the monograph limits its analysis to the period up to March 1996, when the Howard Liberal Government came to power, an epilogue has been provided. The epilogue discusses, briefly, the issues that have faced the RDCs during 1996–1997. These issues include further review, the push for a higher proportion of industry investment in R&D and changes to the organisational structure of some RDCs.

2 Change in the Governance of Australian Rural Research and Development

Change is not made without inconvenience, even from worse to better

Samuel Johnson

The Australian rural sector was under siege by the early 1980s. The sector's declining economic performance and dependence upon government for the provision of a wide range of services meant that the strong bargaining position it once held had been eroded. In line with the philosophies of the time, this sector experienced an era of sustained organisational and managerial change during the 1980s and early 1990s. Rural R&D was not immune to this wave of reform and underwent a transition from a scattered and disparate research effort to one that became highly structured, commodity specific and results orientated. The reforms led to the creation of a more 'market-driven' and industry focused rural R&D effort, distinctly different from the ad hoc system that had preceded it.

Surveys of the reforms undertaken in rural R&D have tended to focus upon changes that occurred after 1985. These surveys have characterised the reforms as neat evolutionary processes of change. A series of defined stages served to mark crucial changes to the sector, with each stage identified by the passage of a government Act. The apparent ease with which these changes were made has led to the development of a commonly held impression that the reforms to rural R&D were smoothly and uncontroversially accomplished. However, recent research has shown this perception to be fundamentally flawed.

It is not until the developments before 1985 are examined that the apparent ease and seamlessness of the reforms becomes challenged. It is now clear that rather than being a planned and ordered process, the changes made to rural R&D were sporadic and dependent upon specific personalities who happened to be in 'the right place at the right time'.

Uncoordinated Agencies: the Basis for Change

Australia's geographic isolation from world markets meant that it was, and still is, removed from the major centres of learning and research. This situation has necessitated a commitment to indigenous R&D in order that Australia has a body of knowledge to enable it to face its own particular problems and remain competitively viable in world markets. By the 1980s, however, problems associated with duplication, provincial outlooks and empire building had come to characterise parts of the research effort. The fact that the research conducted in Australia was of high quality failed to compensate for the lack of national focus and institutional parochialism that had come to characterise the nation's research effort. The difficulties that became synonymous with rural R&D, led Williams and Evans (1988), assessing the situation in the early eighties, to describe it as follows:

> The situation which exists is one essentially of a multitude of interests providing funds in pursuit of a complexity of objectives within a range of autonomous institutions. The overall

> objective of these institutions, of major programs within them, and often of individual projects, are confused as to major directions and perceptions of the requirements of the end-users of the research.

The main problems identified with the system related to the type of rural research being undertaken. Although it was often of relevance to farmers' production requirements, it tended to have little application for post-farmgate Australian industries. This meant that value-adding continued to be an overseas activity, rather than one provided by domestic enterprises. The R&D that existed concentrated on the factors that were limiting production, rather than broadening the scope to cover issues such as the sustainable use of resources and alternative farming practices. The difficulties associated with co-ordination meant there was a lack of appropriate institutional structures designed to bring the producers and providers of R&D together. This gap in the system meant that research was criticised for not moving beyond the laboratory door and served to perpetuate the 'ivory tower' image of the research scientist. It was this rural R&D system that came under scrutiny in the mid 1980s and, subsequently, was transformed.

Remedy via Restructuring: the *Rural Industries Research Act 1985*

In 1983, John Kerin took over the Federal primary industries portfolio and initiated a series of changes that were to transform the arrangements governing the management and organisation of rural R&D in Australia. Many of the problems that existed with the rural R&D system had been identified by a Joint Management Review in 1984. It highlighted complicated managerial arrangements, the plethora of research committees and the overall lack of direction that characterised the area, as deficiencies with the system. Kerin and his advisers addressed these problems through the creation and implementation of the *Rural Industries Research Act* (RIR Act) in 1985. In introducing the Bill to Parliament, Kerin said:

> The major impact of the Bill will be in establishing rural research and development on a sound administrative and financial footing, in ensuring that the greatest possible returns are achieved from each dollar spent on research and in making sure that those who administer and undertake research are accountable to the providers of funds. This is vital if rural industries are to remain progressive, competitive and profitable in years to come.

Accountability, competitiveness and profitability were goals that had not previously been associated with rural R&D. The Bill was enacted on 3 October 1985. It imposed a new structural and managerial framework upon rural research. There was a set of common policy and administrative principles to be applied across all rural R&D agencies, thereby replacing the pre-existing disparate industry research legislation. This Act emphasised the requirement for rural research to reflect industry needs. Kerin believed that there should be tangible returns from research going to the provider of funds, in this case, government and industry. Industry contributions to rural research began in the early 1900s. In most cases, this resulted from producer groups keen to finance and set priorities for research relevant to their industries. This interest saw various statutory and non-statutory schemes developed, with government providing various means of financial support. Each of the research schemes was based upon legislaton that detailed the responsibilities and organisational arrangements designed to manage R&D programs in specific commodity areas.

The RIR Act changed these individual statutory industry arrangements to enable uniform funding conditions to be applied across all commodities. Alan Newton, a senior officer in the Department of Primary Industries, saw this as a breakthrough in terms of the organisational arrangements that governed the sector. Newton came from a managerialist background and had been concerned to ensure that the reforms were

'legally enshrined' in order that the confusion, characteristic of the past, could be effectively eliminated.

The real coup of 1985, however, lay in the decision by the Commonwealth Government to apply a single policy across all commodities for R&D monies. Funds for rural research became based upon the Commonwealth Government's commitment to provide research monies, dollar-for-dollar, up to the level of 0.5 per cent of the gross value of production (GVP) of leviable commodities. Interestingly, the 0.5% figure was reached apparently more by chance than anything else, a contemporary participant in the events noting:

> ...someone suggested we should go for around 0.25% gross value of production for the Rural Research Councils. This 'bid' was increased to 0.5% just to see what would happen when it was taken to Cabinet. It was thought that this level could then be beaten back down to the 0.25% we had originally envisaged. It was a real shock when Cabinet approved the 0.5%—a major breakthrough really.

The fact that Cabinet agreed to 0.5% GVP was due mainly to Kerin's strong role as advocate for the rural R&D sector. Kerin argued that the success of funding under these new arrangements would be measured by the levies from industry being channelled into rural research projects that produced relevant, commodity-specific results designed to enhance the rural sector's performance.

The direct link between tangible returns for industry and the organisation of research had never before been so explicitly stated. Considerable weight was placed by Kerin upon the necessity for a productive relationship between government and industry, an emphasis that reflected broader macro and micro-economic objectives. The adoption of this philosophy supported Kerin's belief that Australia could not afford to continue supporting research unable to produce relevant and commercially applicable results.

A New Organisational Network

The RIR Act established a network of 14 industry-specific research councils, replacing the plethora of industry groups that had developed over preceding years. Each research council was based upon a particular commodity: for example, the grains industry was represented by the Grain Legumes, Barley, Oilseeds and Wheat Research Councils. The main objective of these councils was to fund and administer R&D that would increase commercial returns to industry. In addition to serving the needs of their particular industries, the councils were to consider the wider outlooks and prospects of the economic, industrial and research environment within which they functioned. An Australian Special Rural Research Council (ASRRC) for small and emerging industries and inter-commodity research was also created to ensure that no potential or existing industries were neglected within the new organisational framework.

The direct linkages that were put in place between the research councils and industry had not previously been made explicit. Government, as represented in Figure 1 by the Minister, was placed in direct contact with the activities of these organisations through annual meetings with the chairpersons of each research council. The RIR Act instituted a totally new approach to the management of rural research in Australia. The councils were to:

- investigate and evaluate the R&D requirements of industry;
- develop five-year strategic plans;
- report to Parliament and the relevant industry organisations as the providers of funds on their activities; and
- participate in research council co-ordination meetings.

This new approach to the management of R&D meant that the allocation of funds became conditional upon meeting the detailed obligations set out in the RIR Act.

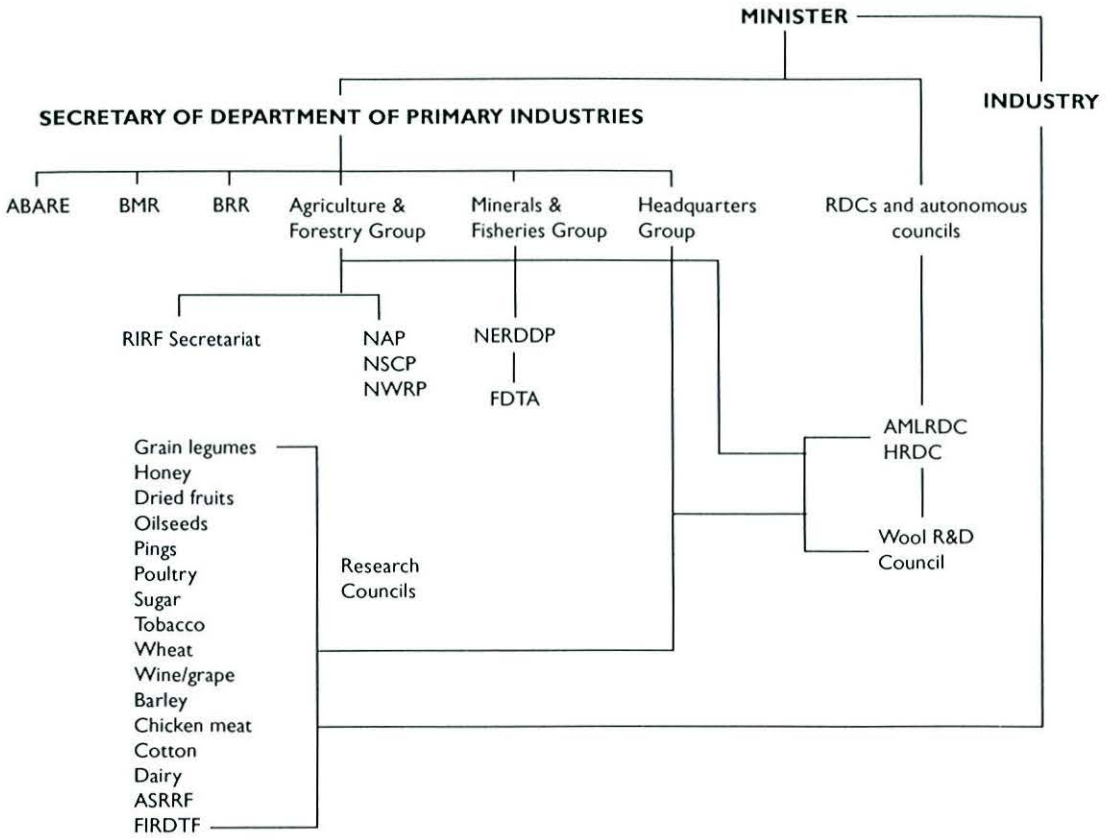


Figure 1. Primary industry organisational arrangements following the passage of the *Rural Industries Research Act*.

These changes placed researchers and those involved in rural industries in more clearly defined roles. The consequent funding arrangements required researchers to become performance-orientated, with an emphasis on effective and efficient management and communication. Strategic planning was emphasised as the key to a successful organisational system, with considerable importance placed upon the production of reports and plans. The RIR Act stated explicitly that each of the research councils had to prepare an R&D plan defining the principal objectives of the organisation. This plan also had to outline the strategies that were going to be used to attain those objectives.

An independent expert in strategic planning, Dr Lionel Ward, was appointed to provide guidelines for councils to follow to meet the requirements of the Act. Ward's guidelines stressed the councils' direct accountability relationship not only with government, but also industry. For its part, industry was to play a greater role in identifying the areas where research needed to be undertaken. The selection of industry-orientated research directions was enhanced by changes in the selection process that saw membership of the council boards based upon expertise, rather than on a representational basis as had been the case. In this way, the 1985 Act established formal accountability linkages

between the three main stakeholders in rural R&D: government, researchers and industry. The research councils were a mechanism that could facilitate the development of projects that reflected the needs of all three groups.

A Government-driven Agenda

It is important to emphasise that it was government that drove the reform agenda for rural R&D. There is no evidence to suggest that either the researchers or industry were active in lobbying for change in rural research. In fact, a contrary situation existed. Those researchers that had received funding before 1985 tended to occupy autonomous positions in institutions, shielded from outside issues and concerns. The pursuit of research was dependent upon vested interest, with projects not subject to evaluation on the basis of industry relevant outcomes or the applicability of research results to the wider commercial environment. This situation was not something that researchers wished to surrender, particularly in light of the competitive tendering process for research monies that was to replace previous funding arrangements. The research community that had existed before 1985 had evolved over a number of years; particular individuals and groups guarded their own interests and, consequently, were not keen to be part of wholesale legislative and structural changes.

The inertia on the part of researchers and the rural industry was circumvented through the passage of legislation that not only specified the objectives of the new changes but also their structure, operation and implementation. The RIR Act placed legislative conditions upon the research community that saw the rural research councils utilise a competitive tendering process. For those organisations and individuals who were successful in gaining research council funding, the accountability requirements saw a much greater level of funding control by producers and government.

In line with the enhanced role producers were to play under the new research council structure came an increased awareness and desire by growers to be involved in the R&D process. Although the RIR Act did not legislate for the establishment of industry organisations, as it had done with the research councils, it stimulated existing producer groups to adopt more formal roles as industry representatives. The increasing professionalisation of these groups became evident as the reforms to the rural sector began to place considerable emphasis on the role of industry in decision-making as it affected their particular commodity area.

The establishment of research councils integrated individuals and groups within a particular rural industry into a more structured and commodity-orientated system. The drawing together of industry interests, researchers and government, led to an active consultation and planning process that was designed to guarantee the research undertaken would be relevant and of value to all parties involved. It was recognised at the time that the new system placed industry in a unique position to make the best judgments on which projects would provide the greatest returns. The increased involvement of those in the agricultural industry led John Mackenzie, of the NFF, to declare his organisation's support of the research councils. The councils, he argued, were valuable because they drew together people and organisations from a broad range of skills and backgrounds to determine research priorities that would benefit rural industries.

In summary, the RIR Act instituted a new approach to the management and orientation of rural R&D. The Act provided a framework for more effective R&D, planning and management, with particular emphasis placed upon market forces and the adoption of research results. In addition, the legislation established a partnership between the Commonwealth Government and industry. This 'partnership philosophy' was believed to be the key to a stronger and more relevant and profitable research effort. In the broader context, the rationalisation and restructuring of public enterprises was considered vital for micro-economic reform. The RIR Act

laid the foundations upon which further, far-reaching reforms could be built.

The Continued Quest for Change: the Interim Stage 1985–1989

Despite producer support of the research council model, the period between its implementation and the *1989 Primary Industry and Energy Development Act* (PIERD Act) was one characterised by persistent government pressures for further change. This change, it was argued, was needed to increase the level of co-ordination and communication between the councils. Common categories of research, joint secretarial facilities, linked computer systems and commercialisation were cited as being dependent upon the development of effective relationships between researchers and industry. In addition, Kerin continued to emphasise that economic activity and government policy involved an inextricable link that affected the cost, outlook and performance of all industry. For Kerin, Australia had to:

> ...continue to improve our efficiency and therefore our trade competitiveness ... (thereby) enhancing productive capacity and protecting our resources ... the Government will work in partnership with industry, determined to be lean and flexible, to be ready for future opportunities as they arise, and to contribute more than ever before to the welfare of all Australians.

Statements of this nature placed pressure upon the rural research effort to produce commercially applicable results. The attention paid to the wooing of industry was one that placed researchers in a vulnerable position. While there was the rhetoric to support long term R&D programs, it was the short term, quick benefit research project that tended to be chosen by the research councils. This situation arose from the emphasis placed upon the dissemination and adoption of tangible research results, as well as the economic imperative researchers faced in securing money for their organisations.

For those researchers who opposed change it was fear about a loss of their autonomy, and the implications of further restructuring to the organisation of research, that were the basis for their concerns. They were also wearied by the seemingly endless quest by government for more accountability and evaluative reporting, requirements that had been instituted in the RIR Act and were liable to increase, rather than decrease, if the sector underwent further change.

Some private sector groups welcomed further change in anticipation of increased economic benefits. For other producer groups, however, promises of further modifications were treated warily, as they might involve demands for more R&D resources from the private sector. Despite these reservations, by the end of 1988 the Department of Primary Industries and Energy, under Kerin's leadership, was moving towards a new phase in the organisation of rural research. This new phase had one principal component—corporatisation.

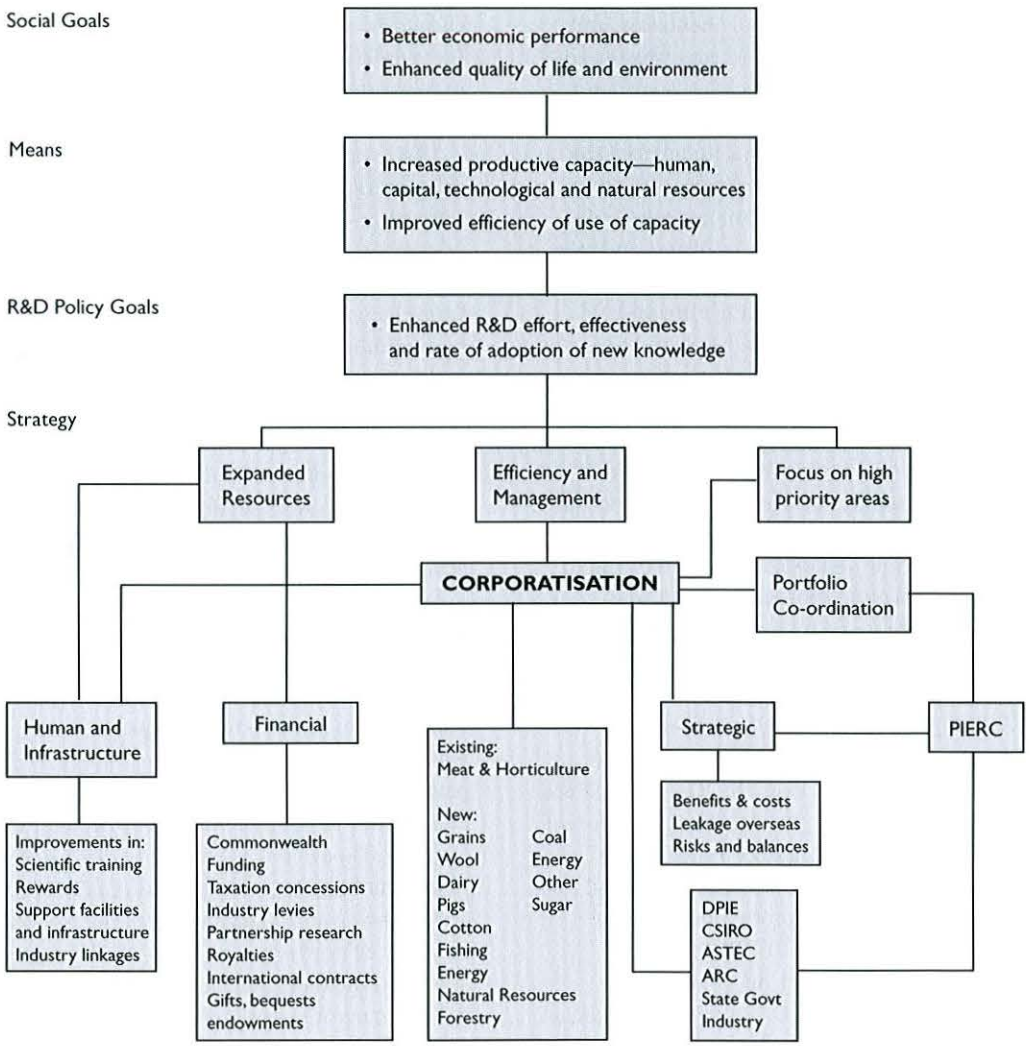
Council Corporatisation: the *Primary Industry and Energy Research and Development Act 1989*

Despite the lack of enthusiasm displayed by both industry and researchers to further changes, Kerin pushed forward. The 'partnership philosophy' declared to exist between government and business had not reaped the benefits expected and, in light of this, further modification to the organisation of research was believed necessary to enable it to be even more effective and responsive to the needs of industry. Newton shared the view that although the 1985 Act was a major breakthrough in Australian public sector management, assiduous reform was necessary to continue to improve the R&D sector. He believed that the councils needed to concentrate on developing their commercial viability and strategic orientation in order to meet the demands of a market environment. This was a view shared by others in the DPIE.

The PIERD Bill was enacted in 1989. This Act largely superseded the RIR Act by turning the majority of Rural Industry Research Councils into Research and Development Corporations (RDCs). For example, the four Grains Research Councils mentioned previously, were amalgamated to form the Grains Research and Development Corporation (GRDC). This pattern was mirrored across all other commodity areas. Figure 2 presents a schematic representation of the structure, function and orientation of the RDCs following the passage of the PIERD Act.

Corporatisation, it was argued, would enable R&D to be more autonomous and flexible. The corporate form of administration provided for operational and financial flexibility, an objective

Figure 2. The structure and rationale behind the corporatisation of rural research and development.



discussed at the beginning of the reform process as one that the sector needed to attain. The establishment of corporations was expected to result in these agencies fulfilling a pro-active role, identifying and rectifying gaps in the research effort. Corporatisation was designed to expand the level of resources available for research, improve the efficiency with which research monies were spent and focus research on high payoff areas. Thus, corporatisation was heralded by the government as the vehicle to enhance commercial gains from research.

The PIERD Act provided the structural and operational details for the implementation and management of corporatisation, and was founded upon the same corporate principles as private sector companies. These founding properties were drawn from corporate law and placed the RDCs on exactly the same footing as any other private sector corporation. Corporations could borrow funds, enter into joint ventures and take out patents in their own right. The corporate form was to provide greater flexibility and capacity for joint ventures, with research conducted by contracted experts. Contractors could come from private or public sector organisations operating within a competitive bidding environment that would enhance the chances of obtaining the best possible service, in terms of both efficiency and effectiveness. Strategic planning and decision-making were to govern the allocation of research funds and became a corporate board activity, with government assuming a new role as client, rather than director of R&D.

Although the form of organisation was different, the other main feature that distinguished the PIERD Act from the RIR Act was the emphasis it placed upon the commercialisation of R&D activity. This had not been specifically stated in the RIR Act and further emphasised the desire of government for profitable research results. According to the PIERD Act the 'facilitation, dissemination, adoption and commercialisation' of R&D activity were listed as one of the main functions of the RDCs. In addition, the PIERD Act was explicit about the accountability and evaluation requirements each RDC was to abide by. Although the Act devolved decision-making and the daily running of rural R&D to the corporation boards, accountability provisions were rigorous. Various forms of accountability to industry were ensured through the requirement that each corporation consult with the relevant industry body in the development of its five-year corporate plan, the professional auditing of accounts, and the presentation of its annual report to industry representatives. It was also expected that corporations would maintain separate accounts for industry contributions, so that industry could monitor the use of funds, whether for commodity-specific or generic projects.

The appointment of a full-time executive director and staff to each corporation was designed to ensure that rural industries had professional personnel with expertise in particular commodity and management areas. This marked a departure from the research councils that had previously been administered and managed by DPIE staff and were, as a result, still considered to be part of the department. The PIERD Act was designed to create separate organisations capable of functioning without DPIE interference. These improvements were to enable research to become demand-driven, rather than being largely governed by available resources.

The Transition: Confusion to Council to Corporatisation

Examination of the reforms experienced by the rural R&D community over the 1980s reveals a period of immense change in the management and orientation of a sector previously sheltered from outside events. Table 1 provides a summary of the changes since the reforms commenced in 1985. The evolutionary nature of the reforms becomes evident when charting the changes shown in the table. Each of the columns highlights the main features of the reform process in terms of their impact upon the funding,

orientation and effect of R&D activity within the wider economic environment. Overall, the table conveys the impression of a seemingly natural and incremental reform process.

Note that the terminology becomes progressively more commercial and market-orientated, and R&D becomes an activity that can no longer be undertaken in isolation. Changed relationships between the providers and consumers of research mean that R&D becomes catalytic and synergistic rather than an isolated element in the Australian economy. The table highlights the shift towards private sector operational goals as the principal aims of the corporations, as well as a dramatic shift in attitudinal perceptions and expectations about the role R&D should play in the Australian rural sector.

Table 1 might suggest that the reforms made to rural R&D occurred in a systematic and ordered manner. However, a very different impression was gained from interviews with the people responsible for the changes to rural R&D. Rather than being a seamless, evolutionary progression of change, it was a period typified by sporadic reform 'episodes', that came about only because of the actions of particular individuals at particular times.

Taking a Closer Look: the Rural R&D Reforms Re-examined

The reforms imposed upon rural R&D were largely the brainchild of one man—Geoff Miller. Miller, an economist, has held many senior appointments in the bureaucracy, describing himself as both a 'player' and 'manager' of the system. In 1983, following the election of the Labor Government, he was appointed Deputy Secretary of the Department of Primary Industries. His appointment came as no surprise for those working in the area, as Kerin, his Minister, had worked with Miller for many years on agricultural issues. Both men shared a commitment to rural R&D that has since been recognised as responsible for transforming the sector and defining the context of change.

Kerin saw research as vital to the nation's economic survival, stating that 'if you don't do research you are dead'. This commitment was important in light of the political context within which Kerin operated. The Labor Party, upon its election, wanted to cut costs, with serious reservations expressed about the value of investment in R&D. This scepticism was also fuelled by comments made by the then Minister for Science, Barry Jones, against spending on agricultural R&D. Jones had a particular axe to grind over the management of one of the government's animal health laboratories, which he described as 'Spandau without Hess'. He also held the view that agriculture was a declining proportion of Australia's gross national product and, therefore, it was safe to wind down R&D expenditure in that area. This type of thinking was described by Kerin as being prevalent amongst the 'non-knowing elements' in Canberra who had little appreciation of the importance of rural R&D in maintaining export viability.

Table 1. Evolution of rural research and development funding.

	Pre 1985	1985–1991	1992–1997
Funding basis	Allocated grants	Competitive grants	Industry investment
Funding response	Reactive	Proactive	Targeted
Focus	Research & Development	Adoption	End-user
Relationship	Researchers set agenda	Researchers as customer	Stakeholders as customer
Status	Commodity	Commodity	Product/Brand
Affiliation	States	National/State	National/Regional
Economic effect	Additive	Additive	Catalytic

The sector was subject, therefore, to the combined effect of bad publicity, an unsupportive Science Minister and a Cabinet committed to 'peeling back' government expenditure. This placed it in a somewhat precarious position. Miller, with Kerin's support, was given the task of producing reform proposals that would reinstate the sector as a vital and productive part of the Australian economy.

Miller had paid particular attention to rural R&D in the years preceding his appointment to the DPI. He was a strong believer in the benefits of R&D and held Australian scientists in high regard. Technical progress, he believed, was the key to the future of rural R&D, a fact that had not been recognised by government and had resulted in the under-funding of the sector for many years. This lack of investment had prevented the R&D community from realising its potential in assisting the development of agriculturally competitive industries.

These problems raised questions in Miller's mind about how the expertise of agricultural scientists could be harnessed to achieve faster productivity growth in agriculture. Miller believed, in light of the political and economic climate surrounding the area, it was only through the production of useful results that rural R&D could have a firm basis to seek public sector financial support. His vision for rural R&D was that it should create an agricultural sector that was more flexible, dynamic and competitive, and could export its services. This vision, combined with Kerin's commitment to the maintenance of Australia's rural R&D capabilities, provided the motivation for the development of a reform agenda that would radically change operations of the past.

Seizing the Opportunity: the Australian Meat and Livestock Corporation in Crisis

The Australian Meat and Livestock Corporation (AMLC) was in chaos at the time Kerin took over the Primary Industries portfolio, with the producer-dominated board said to be characterised by conflict between the chairman and board members. This corporation was part of the network of Commonwealth statutory marketing authorities. The original intent was to give farmers bargaining power through centralised selling commensurate with that enjoyed by those who bought their products. Each authority was headed by a board largely made up of producers. Over the years, each board's activities had developed to provide marketing services that ranged from generic promotion to the funding of market research. The administration of market regulations, such as export licensing and quality control, also came under their auspices.

Problems with the operation of the authorities had developed over the years, tainting their existence. These problems placed Kerin under increasing pressure to deal with difficulties that the AMLC, in particular, was exhibiting. Keith Campbell, in his 1973 book, *Agricultural Marketing and Pricing*, wrote that the difficulties stemmed from the fact that, in 'trying to bolster up the market power of the farmer vis-à-vis other sectors of the economy, the government had actually tipped the balance of power too far in the farmer's favour'. These problems, combined with the embarrassment the AMLC was causing the government, meant that, by the early 1980s, it was ripe for reform.

R&D was at that time managed through a system of research committees linked to each commodity-specific statutory marketing authority. However, there were no uniform procedures or standards to regulate these organisational relationships and, as a result, difficulties surrounded the nature and scope of some of the R&D activities being undertaken. The opportunity presented by the re-organisation of the AMLC to also review the R&D research committee system was taken up by Kerin and Miller as they attempted to reorientate the Australian rural sector towards increased productivity and profitability.

Miller, in consultation with meat industry leaders, developed a new organisational design for the AMLC. The new arrangements

emphasised accountability, expertise, corporate operational principles and the professional undertaking of meat industry marketing responsibilities. The producer domination of boards was altered, with Kerin arguing that producers did not necessarily have the right expertise to direct the marketing of their produce. This resulted in the professionalisation of the AMLC, with producer representation on the board significantly reduced in favour of people with industry, market and policy expertise. A selection committee, in accordance with legislatively defined criteria, was required to ensure that members of the board were drawn from a wide range of industry expertise. This was to make sure producers retained ownership of the new organisation. The simplification of organisational arrangements also provided better access for producers to an organisation responsive to their needs. Figures 3 and 4 show how the proposed changes altered patterns of interaction within the system and simplified the arrangements that had operated previously.

The changes were widely supported by the meat industry, an outcome that surprised Miller. Due to the positive reception, he decided to push forward with changes to the meat R&D committee structure. His push to extend reform into the area of rural R&D was supported by an argument he attributed to the Dutch economist Tinbergen. He argued that rather than melding together a range of functions in the one organisation, specific institutions with discrete and particular tasks needed to be created. It was only through such specificity that efficiency and effectiveness could be achieved. He went on to say that R&D should not be 'tacked on' to a marketing institution; rather, it should be the concern of a single organisation. This reasoning was employed by Miller to successfully argue the case for change. He also stated that the low regard in which meat producers held R&D may also have contributed to their relaxed attitude towards the modification of arrangements for their research committee. The overall result was that the support he had gained through the restructuring of the AMLC provided him with a mandate to reform R&D for the meat industry.

The Corporatisation Model

In effect, the changes made to the Australian Meat and Livestock Corporation (AMLC) were based upon the corporatisation model of organisation and management. It was Miller's faith in corporatisation as a vehicle for successful organisational change, that led to its further use as the blueprint for changes to rural R&D. He described the concept of the RDCs as being the 'cornerstone' of the changes made in the 1980s to the research system. The corporation model was chosen primarily, he argues, to address what he saw as the paramount problem—the identification of research priorities. As a manager within the primary industry administrative system, Miller had been involved in the allocation of research priorities at both State and Federal levels. His experiences led him to believe that it was poor priority setting that was the downfall of the pre-1985 rural R&D system.

Priority setting depended upon the network of research committees responsible for making decisions about the allocation of R&D dollars across particular commodity areas. These committees tended to be made up of eminent ex-scientists drawn from a predictable set of institutions, namely the CSIRO, departments of agriculture and some universities that specialised in agricultural research. The result was, according to Miller, that although these people tried to be intellectually objective it was impossible for them to divorce their own interests from the public interest. This meant that research priorities were skewed in favour of the particular individuals and the research organisations they represented.

Although the committees were made up of people well-respected in their various scientific fields, this did not alter the fact they were derived from organisations that, on the whole, undertook the research funded by the committees, a decidedly incestuous relationship. Institutional interests meant that, even when people tried to be

Figure 3. Arrangements for the management of the meat and livestock industry, 1984. AAC, Australian Agricultural Council; AMLC, Australian Meat & Livestock Corporation; AMRC, Australian Meat Research Committee; IS, Inspection Services; LECG, Livestock Exporters Consultative Group; MEACG, Meat Exporters and Abattoir Owners Consultative Group; PCG, Producers Consultative Group.

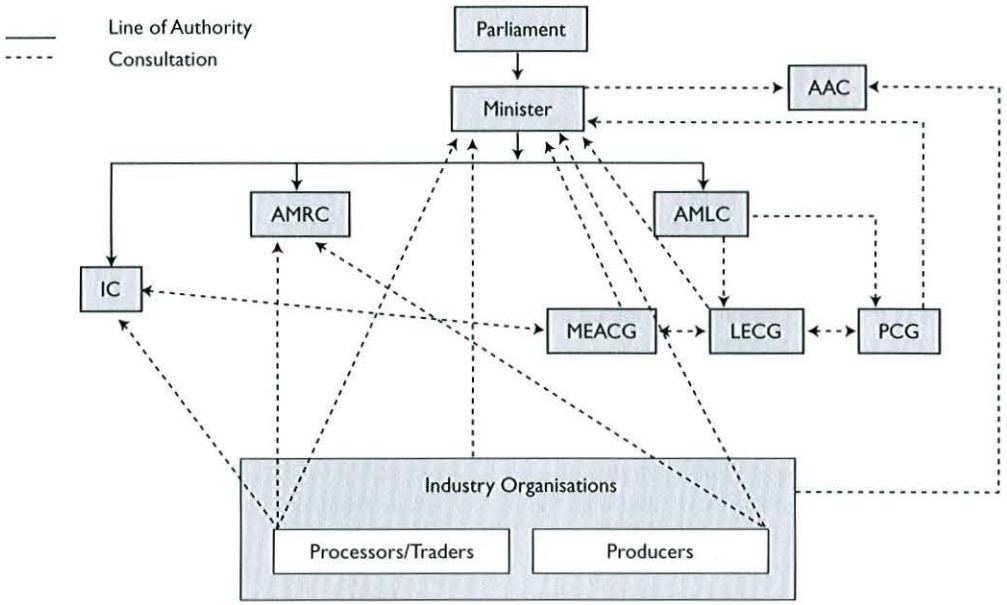
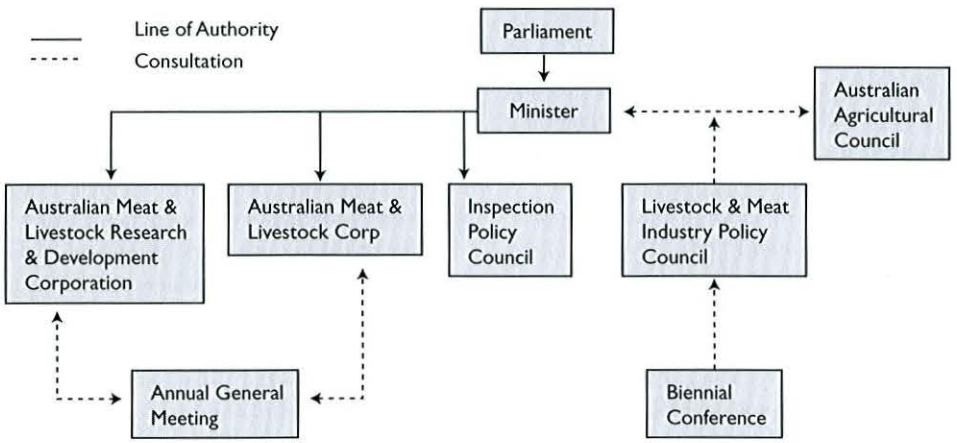


Figure 4. Proposed changes for policy development and administration of the meat and livestock industry, 1984.



as objective as possible, they inevitably gave more support to the applications from their own organisations than to those submitted by other agencies.

Thus, individuals on the research committees, perhaps unconsciously, sought to better their own agencies' positions through the allocation of research funds. Research priorities for rural R&D were being set by scientists, conducted by scientists and measured according to the scientific profession's standards. Scientists were using the suitability of papers for publication as a primary determining factor in the allocation of funds. Although publications benefited scientists and the research system, Miller questioned whether this was a system delivering benefits to producers or to the general community.

In addition to the difficulties inherent in the research committee system, other problems with priority setting existed at the national level. They were attributed by Miller to the level of abstraction involved in setting broad national research priorities. Even with wide consultation with a range of experts, he believed there would be only a million-to-one chance the priorities discovered would be in accord with any underlying 'real' or 'optimum' set of priorities. The rectification of processes governing the determination of priorities for rural R&D thus became the focus of his ensuing reform program.

Corporatisation was the model Miller believed best able to redress the priority setting problems he had identified as the main fault in the R&D system. The RDCs created the right incentives, he believed, to maintain and develop an R&D system. Miller argued that it was only through a productive incentive structure that the best outcomes for industry could be achieved. This structure had to be based upon decision-making processes that were transparent, made at different levels within the system and which paid attention to operational realities.

Rather than set up a committee of 'wise men', Miller advocated the introduction of a system containing incentives to achievement. The best incentive for any system, Miller and Denis Hussey (a senior DPI economist) reasoned, was money. This resulted in the development of a scheme designed to overcome the constant battles fought with Treasury each year for rural R&D funds. The formula developed was based upon a matching government/industry levy arrangement. This levy was set at 0.5% of GVP and designed to provide incentives to expand funding by both farmers and government through higher productivity levels. To avoid the free-rider problem that characterised the primary industry sector, this levy was made compulsory. Hussey argued that producers would readily take up such a generous offer, as dollar-for-dollar matching government funding arrangements were not something likely to be passed up by a cash hungry sector. Although Miller argued the matching levy was one that provided ownership of R&D by producers, Hussey believed it appealed to any innate desire of farmers to 'gain more for less' and, therefore, constituted an effective incentive system.

With both the priority setting processes and incentive structure addressed, the final phase in the development of a new model for rural R&D involved the creation of an organisational structure and staff to work within its framework. Miller believed that the sector had been lacking people committed to the promotion of R&D. He wished to devise a system in which those working within it had a vested interest in its expansion. This would then, he argued, lead to the promotion of R&D to farmers, government and the community at large.

Miller had a strong faith in the value of entrepreneurial activity which, he argued, was needed to 'avoid the pitfalls of bureaucratic and political life'. Individuals who were entrepreneurial would, according to Miller, provide the R&D system with the dynamism and flexibility it had previously lacked. For these people to be effective, however, the organisation within which they worked had to provide them with the ability to exploit their entrepreneurial capacities. The organisation that would enable such capacities to be realised was one that was commercially orientated and corporate in form.

Miller, having taken into account the features of the rural R&D environment, the outcomes that producers and government wished to gain from investment in research and the need for an organisation to deliver these results, put into place a proposal for the corporatisation of research activity in the agricultural sector. Accountability, expertise, corporate objectives and the creation of an environment that would provide opportunities for R&D expansion were all features of the model. The adoption of R&D results that were relevant for producers was a central objective, with farmers maintaining an active role in the process through their board representatives. It was this model, therefore, that was used to transform the former Meat Research Committee into the Australian Meat and Livestock Research and Development Corporation (AMLRDC) on 1 July 1985.

The AMLRDC was based upon the operational and managerial principles that featured in the corporatisation model—as later introduced in the 1989 PIERD Act. Corporatisation was designed to transform this organisation into a commercially successful and independent agency, capable of responding to producer needs and of furthering the development of the commodity as a whole. Miller had intended that domestic and international partnerships would also be forged to enhance the productivity of Australia's primary industries. Corporatisation was, therefore, conceived of by Miller as the vehicle for lasting and irreversible change in the management and orientation of rural R&D.

Which Came First: the Corporation or the Council?

The AMLC and the AMLRDC were the first organisations to be reformed through the application of the RDC model. The fact that these organisations were established in 1984 and 1985, respectively, negates earlier interpretations of the reforms to R&D as progressing through neat sequential stages that culminated in the corporatisation of the sector. The immediate question that this finding raises is why, when Miller had devised the model in the early 1980s, was it not applied across all the rural research committees at that time?

The AMLRDC was conceived of by Miller as a test case for the RDC model. At this time, however, Miller's expectations for the corporation failed to be realised. A series of decisions made by the new board, brought discredit to the corporation model. The board redirected resources away from the traditional providers of meat research, the CSIRO meat laboratories, in favour of market promotion and advertising R&D. This action caused an immediate backlash against the RDC model by research providers. Rather than distributing resources across a range of research activities, the AMLRDC had opted for research projects that concentrated on the applied end of the research spectrum. The corporation had also, in its decision to cut funding to the CSIRO, attacked the meat industry's main research provider. These actions led to calls for the RDC to be dissolved and engendered political resistance to the model. The eventual result of the controversy was the 1986 'compromise' legislation that set up the network of research councils.

The failure of the corporatisation model to gain widespread acceptance must have been embarrassing for Miller, as he had been a strong advocate for the establishment of RDCs across all agricultural industries. The controversy surrounding the AMLRDC came at a time of transition in the management of the DPI. In 1984, Miller was appointed Director of the Economic Planning Advisory Council. Although he continued to advocate the corporation model, the backlash caused by the AMLRDC led Kerin to seek to minimise the damage by opting for a different approach to the reform of rural R&D. The 1985 RIR Act was, thus, a compromise.

Noel Fitzpatrick (who had taken over Miller's job as Deputy Secretary of the DPI) and senior advisers, undertook the task of developing a new model for rural R&D. The model developed was

the rural research council structure instituted through the 1985 RIR Act. The fact that the RIR Act came about as a result of the difficulties experienced by the AMLRDC is not generally acknowledged in government accounts of the period. This is because it highlights that, rather than being the interim stage in a planned corporatisation process, it was a pragmatic reaction to political damage.

It can be seen in retrospect, that the changes made through the passage of the 1985 Act drew heavily from ideas developed by Miller for the corporatisation of the AMLC and the AMLRDC. Strategic planning, the creation of selection committees, the appointment of experts and the accountability requirements that were instituted through the RIR Act were all features of the earlier RDC model devised by Miller. The difference between the RDC model and that established by the RIR Act was, however, that the research councils were serviced by a secretariat in the DPI. In this way R&D management became highly centralised and remained dependent upon government administrative support services.

The RIR Act did, nevertheless, mark a new phase in the development of rural R&D in Australia. It was designed to provide a blueprint for a new and lasting research organisation structure. It was argued by Hussey and others that a research enterprise had to be able to juggle public sector accountability requirements with sufficient corporate flexibility to allow it to obtain income by way of joint ventures and patents. The ensuing research council model was believed to provide this corporate freedom but, at the same time, restrict the actions of the rural research councils through stringent accountability requirements. This was necessary to ensure that the problems of the type created by the AMLRDC were not repeated. The research councils thus remained part of the DPI managerial portfolio, rather than being located at 'elbows' length from government, the intention of the corporation model.

Miller Returns to Primary Industry: Corporatisation Back On The Agenda

As has been documented previously, the rural research councils were conceived as lasting organisations. Why was it then that most of the rural research councils existed for only two to three years? Previous accounts of the period saw the research councils as the interim stage before the full corporatisation of R&D could be accomplished. However, this was not the case. A more plausible reason for the rural research councils being subject to further change was Miller's appointment in 1986 as Secretary of DPI.

The rural sector in 1986 was, once again, in crisis as a result of poor seasons and overseas trade difficulties. Miller's first task in responding to these problems was to lead a comprehensive review of economic and rural policy. This resulted in the drafting of a White Paper on Economic and Rural Policy (1986). This paper outlined a 'new' government approach to the management of rural problems, incorporating economic and industry policies. It also included Miller's plan for the research councils to be immediately supplanted by the RDC model.

Evidence of Miller's intention can be seen in the contents of the 1986 White Paper. The paper included three important decisions that were to impact upon R&D. These were: the formal agreement by government of the dollar-for-dollar matching of industry contributions for R&D up to a maximum combined fund of 1% of each industry's GVP; the establishment of a second RDC covering the horticultural industry; and the commitment to review all rural R&D programs administered by the Department of Primary Industry so as to consider other managerial models.

The decision to provide a matching levy arrangement for rural R&D brought to an end the 'skirmishes' that the department had engaged in with the Department of Finance each time an industry research fund was established or expanded. Although the 0.5% of GVP funding level had been agreed for the rural research

council structure, it was the Commonwealth Government's uniform commitment to a dollar-for-dollar matching arrangement across all primary industries that was the real achievement of the 1986 White Paper.

The creation of the Horticultural Research and Development Corporation was viewed by Miller as a step in the right direction for the eventual application of the RDC model across all rural research councils. The government also accepted an earlier White Paper on Statutory Marketing Authority Reform and undertook to go ahead with its implementation. These reforms were based upon those that Miller had already established through the restructuring of the AMLC. Their acceptance across all statutory marketing authorities was a coup for the RDC model. However, it was the decision to conduct a review of the rural R&D programs administered by the DPI that enabled Miller to create the conditions necessary to push, once again, the adoption of the RDCs model.

Corporatisation Secured: the *Research, Innovation and Competitiveness* Statement

In August 1987 the government implemented sweeping changes to the structure of portfolios. DPI was merged with the Department of Resources and Energy and part of the former Department of Trade to become the Department of Primary Industries and Energy (DPIE). Miller was assigned for 12 months by Prime Minister Hawke, to oversee international trade negotiations as Associate Secretary of the Department of Foreign Affairs and Trade.

In the meantime, the review of rural research continued to be undertaken with submissions drawn from a wide range of organisations and individuals involved with R&D. In August 1988, Miller returned to the DPIE as Secretary. By this time, the review of rural research had been going for about a year. Miller noted, however, that despite recommendations put forward, consensus had not been gained about the application of the RDC model to all rural research councils. Debate on the issue centred around the question of whether the proposed RDCs would be able to maintain their viability. For Miller this was a non-issue as he maintained that, if the organisations were well-structured and disciplined, they would automatically be successful.

Ultimately, Cabinet and Parliament accepted this view, with a joint major policy statement on *Research, Innovation and Competitiveness* released in May 1989 by Minister Kerin and Peter Cook, who was then Minister for Resources. This policy document laid the foundations for the passage of the PIERD Act later in the same year. The *Research, Innovation and Competitiveness* statement was, therefore, a crucial vehicle for Miller in the realisation of his R&D corporatisation objective. The statement was jointly sponsored by Kerin and Cook and significantly influenced the future directions taken in the primary industries and energy sector. Although much of the review of rural R&D had been undertaken, its translation into the statement saw Miller redraft some parts of it, and take responsibility for writing its introduction and conclusion. The introduction provided clear justification for a model of R&D that combined industry and government in a 'partnership' arrangement and gave details about how such an arrangement could be achieved. Those details advocated the introduction of new type of R&D organisation, with some sections of the *Research, Innovation and Competitiveness* statement explicitly advocating the adoption of the RDC model.

This was confirmed by the author in discussions with Miller about the influence and intent of the *Research, Innovation and Competitiveness* document. The persuasive arguments, slick presentation and appeal to wider government goals of efficiency and effectiveness were designed to ensure its acceptance by Cabinet and Parliament. Operational and structural details of the RDC model were provided in the introduction to the statement, couched within economic and managerial rhetoric that advocated its desirability as a 'profitable' R&D system. The focus of research on 'high pay-off' areas was also added to

arguments in support of the RDCs model. However, this concept was clarified in order that the main beneficiaries of the corporations—the producers—were focused upon as gaining the 'highest ultimate returns' from their operation.

It is important to note that the statement could only have been as successful as its advocates. Kerin provided the necessary political expertise to ensure its acceptance by Cabinet. Commenting on the document, Kerin placed considerable weight upon its importance:

> The *Research, Innovation and Competitiveness* statement was a crucial document, without this document they (the DPIE) would not have won. Rather, we would have lurched from one thing to another ... it established a basis. Writing a book or a policy document of this kind is the only way to get anything done. I wish I could have written something more about Public Resource Use so that we had a Labor policy on the environment that was more than just about getting votes.

The *Research, Innovation and Competitiveness* statement enabled the RDC model to be enshrined within arguments that supported the involvement of government in a system that could eventually gain more private than public sector funding. Although both Kerin and Miller were committed to the provision of public monies for R&D, they were also well aware that explicit arguments for a model that would encourage private sector investment were more likely to gain support from Treasury. The *Research, Innovation and Competitiveness* statement concluded by once again emphasising the benefits of the RDC model as an 'appropriate structure for effectively administering the portfolio of R&D programs and for providing a more pro-active approach to research and development'. The means by which the RDCs would be established was also provided in the *Research, Innovation and Competitiveness* statement, with the mechanics of transition from the RIR Act to the PIERD Act clearly explained. With this final component in place, Miller had ensured his corporatisation model could not be rejected on the basis of implementation difficulties. The acceptance of the statement meant that Miller's vision for R&D, conceived 5 years previously, was finally realised. In 1989 legislation was passed to enact the PIERD Bill that established the network of RDCs that exists in Australia today.

Why Corporatisation?

The immediate answer to this question is 'Miller'. It was Miller who developed the RDC model and remained faithful to it throughout the 1980s. The model provided a blueprint for the organisation of research within an environment committed to greater efficiency and effectiveness in public sector operations. A primary feature of the Labor Government's management strategy throughout this period had been the devolution and decentralisation of public sector activities. Corporatisation facilitated the implementation of this strategy by removing DPIE managerial responsibility from R&D, but maintaining departmental control through the allocation of research monies. Corporatisation became justified as the vehicle through which the decentralisation of research away from the DPIE's direct managerial and administrative responsibility could be achieved. In his book *Public Administration in Australia: a Watershed*, John Power makes the comment that strategies of this nature were prevalent under the Labor Government, with the rationale being that politicians, in this case Minister Kerin, maintain strategic control of policy while its implementation is unimpeded.

The perception that changes were needed to management of rural R&D also stemmed from a wider Commonwealth Government belief in the rationalisation of research bodies to produce a primary emphasis on practical research that would assist the export drive. In order to achieve this goal there was considerable emphasis by managers of the reform process upon making public sector organisations function much like their private sector counterparts. The pervasiveness of this philosophy, combined with the managerialist strategies described previously,

further legitimised the drive for reform of rural R&D.

When the question is raised as to why rural R&D was corporatised, it must be recognised that there were a number of other factors influencing the decision. Kerin argued that corporatisation was chosen because of the political imperative of gaining more money for the sector. He added that the reforms were also designed to make research more contestable; to broaden research horizons beyond the CSIRO; to gain producer commitment to the funding of R&D; and to ensure that the R&D undertaken would enhance the economic competitiveness of Australian rural industries. Hussey supplemented this list by emphasising the need to break researcher provider capture; the need to get more demand-related research and, finally, to allow R&D organisations greater operational autonomy. The prevailing climate of reform was also vitally important as it provided the context within which such far-reaching changes could be implemented. These reasons highlight the numerous issues that surrounded the management of R&D throughout the 1980s.

However, it must be recognised that it was Miller's vision for R&D that was the primary motivating force behind the eventual acceptance of the RDCs model. Miller was able to convince Kerin of the merits of the model, as the following statement from Kerin demonstrates:

> Corporatisation was from the outset the main goal. It was an idea, that in all honesty, was developed in the department more than in my office. The result of this was the *Research, Innovation and Competitiveness* statement that argued the case sufficiently well to have the attention caught of the senior bureaucrats who were responsible for much of the decision making in government and would have been happy to get rid of R&D funding.

The path by which corporatisation was achieved must have sometimes been a tortuous one for Miller, who knew from the outset the direction he wanted the sector to take. Table 2 shows that each push for the adoption of the RDC model coincided with Miller's return to DPIE. Without his continued commitment to the model, it seems unlikely that the RDC model would have been adopted.

Miller's patience did, however, reap rewards, with the corporatisation model currently extending to cover 13 rural RDCs, with scope for some of the smaller research councils, such as dried fruits, to become corporations in the future. The corporations and councils established during this period of reform are listed in the box below.

In addition to commodity-specific corporations, some RDCs have been established to tackle trans-sectoral issues. For example, the Land and Water Resources Research and Development Corporation (LWRRDC) focuses on sustainability issues such as water quality and land degradation, while the Rural Industries Research and Development Corporation (RIRDC) is concerned with assisting newly emerging rural industries. RIRDC is the successor to ASRRC.

Rural RDCs

Cotton RDC
Dairy RDC
Energy RDC
Fishing Industry RDC
Forest and Wood Products RDC
Grains RDC
Horticultural RDC
International Wool Secretariat
Land and Water Resources RDC
Meat Research Corporation
Pig RDC
Rural Industries RDC
Sugar RDC

Rural Research Councils

Chicken Meat Research Council
Dried Fruits Research Council
Egg Industry Research Council
Honeybee Research Council
Tobacco Research Council

Table 2. Chronology of events controlling the reform of rural R&D.

Date	State of R&D system	Key individuals
1983	Ad hoc system of Rural Research Committees linked to SMAs and also funded by government direct appropriations.	John Kerin gains portfolio of the Minister of the DPI. Geoff Miller appointed Deputy Secretary of the DPI.
	Review of the AMLC undertaken.	Miller placed in charge of review. Corporation model floated as possible new structure.
	Proposal put forward for the creation of the AMLC	Industry accepts Miller' s proposal. Kerin and Miller decide to reform the Meat R&D Committee as well.
1984	Establishment of the AMLC.	Meat R&D Committee arrangements reviewed. Recommendations made for the R&D corporation model to be used to reform Meat R&D.
		Miller takes up position as Director of Economic Planning Advisory Council.
1985	Establishment of the AMLRDC (July).	
	AMLRDC board pass controversial decisions. Support for the R&D corporation model diminished.	Kerin politically embarrassed by failure of the R&D corporation model.
		Damage control leads to review of R&D arrangements. Newton and Gleeson involved in drafting of new proposals for R&D system.
	RIR Act passed establishing a network of Rural Research Councils (October).	Kerin gains commitment from Cabinet for 0.5% GVP funds
1986	Release of Economic and Rural Policy White Paper	Miller returned to DPI as Secretary
	Statutory Marketing Reform White Paper accepted for implementation	Application of corporation model across all Statutory Marketing Authorities.
1987	Review of rural R&D undertaken	Miller moved to Department of Foreign Affairs and Trade. (August)
	DPI merged with Energy to become the DPIE.	Newton and Gleeson undertake review.
1988	Review of R&D continues	Miller returns to DPIE, continues to advocate the R&D Corporation model. These ideas are incorporated in the review of R&D.
	Release of Research, Innovation and Competitiveness Statement.	Joint Statement by Minister Kerin and Cook Miller involved in production of Research, Innovation and Competitiveness Statement. R&D corporation model is central feature of the document.
	Research, Innovation and Competitiveness Statement supported by Cabinet.	R&D Corporation model accepted.
1989	Primary Industries and Energy Research and Development Act passed.	
	Establishment of the Corporation model	Miller' s vision realised

Reinterpreting the Rural R&D Reforms

The changes that have occurred over the last 10 years in Australian rural R&D were essentially the realisation of one reform agenda—an agenda managed and controlled by government. Government, in this case represented by Kerin and his department, had the capacity to set an agenda with which researchers and industry, in order to protect their own interests, had to comply. The dependence of researchers upon public support meant that they had little option but to conform to the reforms. Failure to do so would basically have meant the dissipation of research funding. The industry position was not quite as vulnerable as that of the researchers. However, without government support, producers would have found it difficult to fund research. Appeasement seemed to be the strategy that was utilised by industry and their involvement in rural R&D may, therefore, be characterised as one of continual adjustment to governmental initiatives.

In many ways, the reforms accomplished in the rural R&D sector should be viewed as a triumph over adversity. The sporadic nature of the reform process, the dependence upon one individual's vision of reform and the fact that, at the beginning of the 1980s agriculture was a diminishing economic player, contributed to the low importance Minister Barry Jones and others in the Cabinet had placed upon rural R&D. The fact that the sector secured guaranteed Commonwealth Government funding and established a new network of R&D agencies was no mean feat in light of the rural R&D position of the early 1980s. The importance of particular individuals in designing and implementing the reforms made to rural R&D in Australia cannot be overstated. Miller provided the leadership and vision for a research effort distinctly different from that which had preceded it. Hussey and others provided the managerial expertise to see that vision realised, and Kerin had the consummate political skill to ensure acceptance of the changes at the producer, researcher and government level.

However, questions now need to be asked about whether the objectives of the reforms are the right ones? Has the nature and scope of research activity been altered through the application of corporate managerial and operational frameworks? Even more fundamentally, has the quality of research improved or suffered in the quest for more commercially applicable and profitable results? Corporatisation was not the only model that could have been used to reform rural R&D in Australia. For example, the R&D reforms that have been undertaken in New Zealand, a country with a similar contextual environment to that which characterised Australia in the 1980s, followed a different path.

It may be pertinent to conclude this review of the Australian R&D reforms with the words of their primary architect, Geoff Miller, who, at a 1994 Australian Institute of Agricultural Science workshop focusing upon the external funding of rural research, threw down the challenge for future reformers:

> I hope that the RDCs continue to fertilise Australian R&D for some time to come. But the innovations of the 1980's and early 1990's will have to be supported by further innovations in the balance of this decade and beyond. I have made some suggestions for you (agricultural scientists)—and governments—to consider. I will maintain an active interest in the future progress you make.

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3 Analysis Paralysis: the Rural Research and Development Corporations Under Review

My sense of government evaluation is that program managers do the required evaluation, as a form of ritual compliance, to satisfy the evaluation guidelines and one-hit reviews of treasuries and departments of finance

D. Caulley

The analysis of reform in Australian rural R&D has, up to this point, focused upon answering three of the four questions posed at the beginning: what is corporatisation, why did it occur, and who/what drove the process? The answers to these questions have provided the historical background of agricultural R&D in Australia, the nature of the industry it has sought to serve and the demands that have affected its operation over the years.

This chapter focuses on the fourth, and in many ways the most important question, namely: has corporatisation achieved the objectives for which it was created? Government-initiated attempts to answer this question have resulted in four major external reviews of the RDCs being undertaken over the space of five years. This preoccupation with review has been driven, in large part, by political agendas. A new Minister for Primary Industries and Energy, Simon Crean, provided the trigger that started the round of reviews. Crean, unlike Kerin, appeared uncomfortable with the RDC model and its 'arm's length' relationship with government. He was known to prefer centralised, rather than decentralised organisational arrangements. This resulted in DPIE commissioning a review to assess the R&D corporation model just 6 months after the organisations had been established.

The forthcoming discussion demonstrates that, although the reviews experienced by the RDCs have been comprehensive in content, design and structure, they have, on the whole, failed to answer the question of whether the objectives of corporatisation have been achieved. A fundamental problem has been the lack of understanding demonstrated by some of the reviewers about R&D and its outcomes. This criticism will be explained through the use of primary research data obtained from a range of individuals who work both within and outside the RDCs. RDC managers, government representatives, and people located at the periphery of the system who are able to provide some broader insights about the R&D environment and the corporations' role within it, were interviewed. A fundamental question will be addressed: if corporatisation has achieved the objectives for which it was initially created, were they the 'right' objectives in the first place?

The Objectives of Corporatisation

To answer the question of whether the objectives of corporatisation have been achieved, we need first to understand the objectives. The PIERD Act states:

> 3. The objects of this Act are to make provision for the funding and administration of research and development relating to primary industries with a view to:

(a) increasing the economic, environmental or social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport or marketing of the products of primary industries; and,
(b) achieving the sustainable use and sustainable management of natural resources; and,
(c) making more effective use of the resources and skills of the community in general and the scientific community in particular; and
(d) improving accountability for expenditure upon research and development activities in relation to primary industries.

These objectives were derived from a concern to make R&D more effective, efficient and capable of responding to industry demands. Each was designed to be sufficiently broad to enable coverage of the full range of R&D activity from the production to the marketing of agricultural products. The RDCs were conceived of as linking mechanisms, capable of integrating research investors with both the providers and consumers of research outcomes. Central to this concept was the belief that, through a process of co-investment, government and industry would gain equally from the monies they were investing in R&D. This understanding was based upon recognition that most research comprised both public and private good components and, as such, need not be provided for in isolation. As will be shown, this ideological basis proved to be incomprehensible for some sectors of the bureaucracy. Accompanying this lack of understanding was a desire to retain, rather than relinquish control over what had previously been a government-controlled R&D environment. The conflict between centralised versus decentralised management, dependent versus autonomous functioning and controller versus co-investor was one that became increasingly obvious as subsequent reviews of the RDCs were undertaken. The following discussion provides an analysis of these reviews and highlights the ways in which misunderstanding and conceptual limitations resulted in evaluations that confused rather than clarified the role of the RDCs.

Review Overkill: an Evaluation of the Rural R&D Reviews

The Rural RDCs, with the exception of the Meat Research Corporation (1985) and the HRDC (1987), had been in operation for only five years when my research was undertaken. Nevertheless, they had experienced an inordinate number of reviews. There had been an apparent preoccupation by government, at both the departmental and executive level, with evaluation of the RDC model. The majority of the RDCs had not only to contend with four major government initiated reviews, but also had to face scrutiny from specific Senate inquiries. An outside observer might conclude that there has been 'review overkill'.

The following sections briefly outline the key government reviews that have focused upon the RDCs during the early 1990s. Each of these reviews was commissioned with a particular purpose in mind and this has been reflected in the backgrounds of those conducting the evaluations. All of the reviews essentially supported the RDC model, with some modifications recommended according to the particular evaluation agenda of the reviewers. It will also become clear that the responses of the RDCs to each of the reviews have varied depending on the recommendations made, the level of understanding about the nature of the RDC charter demonstrated by the reviewers and the agenda driving each of their evaluations.

Review of the Research and Development Corporation Model (1991)

This review was commissioned by the Primary Industries and Energy Research Council in early 1991 and took place during the initial establishment phase of the RDCs. The review team consisted of two consultants: Gleeson, a former senior bureaucrat with the DPIE and one of the individuals responsible for the establishment of the Rural Research Council model and Lascelles, also involved in the R&D community. Both reviewers have moved between public and

private sector institutions. It is important to understand the backgrounds from which the review team were drawn, as the tension between bureaucratic and managerialist understandings of organisational activity is evident throughout the review and accounts in part for the somewhat eclectic nature of the final report.

The terms of reference for this review were specifically focused upon RDC operational activities. These activities included: the achievement of corporate goals, the processes through which research priorities were set, the balance of expertise on corporation boards, the impact of the RDCs on research infrastructure issues, and the adequacy of accountability processes. The rationale behind the selection of these activities was that they reflected government concerns about the operation and impact of the RDCs upon the wider R&D community.

As mentioned previously, Crean was understood to have been concerned with the amount of autonomy accorded the RDCs. The decentralised nature of the RDC model was contrary to the centralised control of government activity that Crean was believed to prefer. This predilection for greater, rather than lesser government involvement, meant that the establishment phase of the RDCs was characterised by conflicting interpretations of how these organisations were supposed to operate. The Gleeson and Lascelles review was faced, therefore, with a fledgling set of RDCs that were already having questions raised about the independence accorded to them by the previous minister.

Recognition of the short time most RDCs had been in operation was given by those commissioning the review. On average, the executive directors of the RDCs had been appointed only six months before the assessment taking place. This led to the decision to use the AMLRDC, established in 1985, as the model for the evaluation. The team's findings on this organisation were then to be applied to the RDCs in general.

The final report produced by Gleeson and Lascelles gave a comprehensive assessment of each of the RDC objectives as they were outlined in the terms of reference. Contradictions within and between each of the recommendations, however, made the report difficult to interpret as a whole. The heavy use of bureaucratic and managerialist jargon and the convoluted style in which the review was written, made it hard to work out exactly what the reviewers were trying to say in some of their findings, for example:

> ...the reviewers conclude that while there is a widespread appreciation of the need to improve the effectiveness and efficiency of research and development and commercialisation, the corporations, the bodies to whom they are accountable and research institutions need also to recognise that the responsibilities of the corporations to improve the effectiveness of research and development and commercialisation encompass the totality of research and development related to their particular set of concerns.

Recommendations ranged from the very complex to the almost deceptively simple. Of the recommendations that could be understood, some, such as the following, would have had significant ramifications if adopted.

- The reviewers recommend that executive directors develop procedures which reduce the variability of requirements of individual corporations to a minimum.
- The preparation and interlocking of research and development plans, particularly by corporations, State departments, CSIRO and selected universities, would greatly enhance the synergy between the principal research and development funding agencies.

Both these recommendations sought to formalise and co-ordinate RDC activity. On the surface this seemed a logical objective. However, had the first of these recommendations been acted upon, it would have undermined the very basis upon which the RDCs were founded. Each of the RDCs was designed to respond to and

reflect the needs of a particular industry. This charter necessarily meant a conglomeration of RDCs that were different from each other. The standardisation of procedures and processes would have smothered the flexibility and dynamism that the RDC model had been designed to provide so that it could respond to particular industry demands.

The second of the above recommendations also sought to homogenise the RDCs by placing them on a par with agencies that were, essentially, research providers. Although the intent was to further a cohesive national approach to R&D, the interlocking of research plans between research funder (RDC) and provider (e.g. CSIRO) would not only have created research provider monopolies but also would have negated the basis upon which the contracting of research by the RDCs was envisioned to operate; that is, through contestable and competitive bids. One of the primary goals of the reforms, as promoted by Miller, was to liberate an R&D system that had become researcher-dominated in terms of its direction and control. The development of research plans between RDCs and specific research providers would have restricted access to the bidding process by agencies without established linkages. Indeed, one of the primary tasks for some of the RDCs such as the Sugar R&D Corporation, was to encourage new research providers to conduct R&D in order to break such monopolies. Although appearing reasonable, this recommendation would have removed the objective and independent foundations of the RDC model.

The role of the DPIE was also accorded a considerable amount of attention in the report. Recommendations in relation to the DPIE were interesting, as a number of them called upon the department to recognise the diversity inherent in the RDC model and adapt its role accordingly.

> The reviewers recommend that the DPIE in its capability to ensure its particular role in the accountability process for the research and development corporations... takes into consideration the diversity of industry situations faced by the corporations and the need for corporations to determine operational procedures which best meet their particular needs.

This type of recommendation was supported by others that appeared to doubt whether the RDC model could actually operate within the general R&D environment.

> The reviewers conclude that the pluralistic system of management of research and development cannot be expected to operate efficiently in the absence of mutual understanding of cultures, requirements and capabilities of all parties.

This broad 'motherhood' type of statement typified a number of the recommendations made in the review. There appeared to be a considerable variation of interpretation about what the RDCs were supposed to be doing and how the environment within which they operated should, or should not, be altered to accommodate that function. The tension that existed was one that had, at its core, difficulty in understanding the role of the RDCs. Recommendations that supported the autonomous nature of the RDCs discussed the need for acceptance of that diversity and the development of management strategies that supported this feature. The corporation as an independent entity was recognised in these findings, with the need for a strong industry focus and the involvement of experts drawn from such sectors emphasised. Yet, in contrast to this perspective, the view was also put that an RDC was an organisation like the CSIRO or a State department of agriculture and, as such, should be treated as a dependent rather than quasi-autonomous organisation. The recommendations that perceived the RDC in this role were those that placed the DPIE in an overseer capacity and sought to formalise processes and relationships within the R&D community.

One can only speculate whether the two types of interpretation reflected divergent perceptions of the two reviewers, but as a whole the report lacked consistency and clarity.

Another factor that hindered a useful outcome of the review was its use of the AMLRDC as representative of all RDCs. In retrospect, the distinctiveness of the AMLRDC led to the overall findings of the review being skewed, as the reviewers attempted to generalise from the specifics of one corporation across 11 newly established RDCs. As a report on the AMLRDC, the review may have been useful in identifying problems and issues in the functioning of that organisation. Applying the findings to corporations that had not even begun their operational lives was, however, overly ambitious. The meat industry could never be considered representative of all other rural industries when comparisons of size, scale, history, markets and nature of product are made.

Another problem was that the AMLRDC had been established under a separate Act. As a result, it had a strictly industry-focused charter that made no allowances for community-based criteria in the development of its research projects. This was in contrast to the PIERD Act that made specific reference to the need for RDCs to increase 'economic, environmental and social benefits to members of primary industries and the community in general'. The inclusion of this latter requirement had a range of implications for the management of dual stakeholder accountability responsibilities. These implications were to be picked up in later reviews.

The overall impact of the Gleeson and Lascelles review was two-fold. Firstly, the report, although not acted upon, did provide a starting point for another review commissioned to further investigate evaluation and accountability procedures. The second contribution made by Gleeson and Lascelles was to demonstrate the difficulties of reviewing the RDC model. The tension between industry and government (bureaucratic) objectives was one that was highlighted in the findings and demonstrated the skilled jugglers the RDCs had to be to reconcile their two stakeholders. It was this tension that remained as a thorn in the side of the RDCs and which served to fuel the scepticism of some observers who were calling for further review.

The Australian National Audit Office Review (1993)

The Australian National Audit Office Review has the dubious reputation of being the evaluation generally considered by the RDCs to have demonstrated the least understanding about their role and the nature of R&D in general. When asked about the impact of this review, the majority of those interviewed gave somewhat derogatory answers that ranged from 'they were completely off the beam' to 'this review may as well have not happened'. Despite the negative reception given to the review findings, the Audit Office report did serve to identify governmental concerns about deficiencies in accountability and evaluation procedures as they related to the RDCs.

The Audit Office was commissioned by DPIE to examine the rural R&D program with reference to the costs it imposed upon the Commonwealth budget. The management of the RDCs was also under review, with particular attention paid to the ways RDCs and DPIE were measuring the performance of research programs. The Audit Office was to conduct the review by undertaking selected audits of four of the RDCs. The information gathered was to form the basis of their subsequent recommendations.

Due to the nature of the review's objectives and the background from which the reviewers came, it was hardly surprising that the thrust of the Audit Office's report was for more rigorous evaluation of RDC activities. The introduction of a range of new reporting requirements, the adoption of a more commercial focus, and the incorporation of a number of new evaluation techniques into RDC and DPIE management regimes were recommended. The specific intent of these requirements was to improve the program management, planning and reporting practices of the RDCs.

These recommendations were made on the basis of Audit Office investigations that discovered insufficient evaluation activity by the RDCs and the DPIE, alike. The corporations, they argued, had concentrated on the assessment of

project results, whereas the DPIE's main contribution to evaluation had been to commission a review of the corporation model. Neither organisation had examined program performance and, as a result, the development of sound program management and performance measurement strategies underwrote each of the 14 recommendations made in the final Australian National Audit Office report.

The attention paid to the area of performance measurement in the Audit Office report was noted by some of the RDC managers as having been of some benefit. The audit of the GRDC revealed that 18 research projects commissioned by the corporation had failed to include any adoption strategies to ensure the effective transmission of results to the end-user. This omission highlighted the need for better management and evaluation of research activity throughout the investment cycle from idea to commercialisation.

In general terms, while some of the Audit Office findings were useful in pointing out deficiencies, the report as a whole was largely disregarded. This was because of its seeming inability to understand that R&D is an activity that is qualitatively different from the activities of most other public and private sector organisations. In discussions with those involved in the Audit Office review, it was pointed out that R&D was not something that took place in neat causal relationships that enabled guaranteed predictions to be made on the basis of time, amount of money invested and the size of problem tackled. Rather, investment in R&D involved a large element of risk, uncertainty and trial and error. As a result, the output of a particular research project may not be a tangible product but rather, knowledge about the conditions under which a formula, for example, will not work. The difficulty that faced the Audit Office was that the failure of a research project to produce the desired outcome was not necessarily considered a total loss by those in the R&D community. This was because even a failed attempt at producing something contributed to the stock of knowledge about the particular product sought. The intangible nature of R&D findings of this kind made compliance with the Audit Office's application of discrete and specific evaluation techniques very difficult.

The fact that such recommendations had been made was, in large part, due to the conceptual problems displayed by the Audit Office in its assessment of the RDCs. These difficulties were manifest in the preoccupation with quantitative, as opposed to qualitative, measures of success adopted by the report. For example, the use of the expression 'research outcome' in the context of R&D activity did not refer, as the Audit Office thought, to a simple input to output equation, but covered research benefits that went beyond the purely economic to also include environmental, social and other, more intangible, gains. The expression was also used by the RDCs to refer to results that met the requirements, as laid out in the PIERD Act, for R&D to provide benefits to primary industries and the community. This usage was one that ran counter to the Audit Office's understandings about the need for R&D to be measured according to easily quantifiable stages of activity and results. As a result, many within the R&D community criticised the Audit Office for its restricted focus and its predilection for economic and financial indicators as the only measure of success.

The DPIE was also accorded particular attention by the reviewers, who perceived it to be the representative government stakeholder in the RDCs. This was an incorrect assumption, as the RDCs under their Act are directly accountable to the Parliament, Minister, and representative organisations, not to the DPIE. This difficulty aside, the Audit Office did not believe that DPIE had given sufficient attention to assessing the performance of the corporations. The particular area highlighted by the review as lacking was evaluation of public good as opposed to private benefit research outputs. The Audit Office argued this deficiency meant that there was no assessment being made about whether the achievements of the RDCs were sufficient to warrant the level of funding provided by

government and industry alike. This problem led to the reviewers further recommending that the level of taxpayer funds channelled into the RDCs be reviewed.

The issue of public versus private benefit was to become a continuing problem for the RDCs, with endless debates on the relative merits and difficulties of attempting to distinguish between the two elements of any research outcome. DPIE's initial response to recommendations on this issue was that it was 'inappropriate to divide public interest and private interest research for reporting, since many R&D projects contained a mixture of both public and private good components'. When viewed from this perspective, attempts to separate public versus private benefit are largely futile and detract from the work of the RDCs. Although the focus of each RDC is on a particular commodity or groups of similar commodities, it is recognised that enhancing the market competitiveness of a product reaps economic benefits that flow through to the community at large. This alone should be enough justification, it is argued by some, for the public good component of government dollars in the RDCs. The corollary to this is that attempts to impose arbitrary measures upon research outcomes fail to appreciate the interlocking nature of public and private good benefits from R&D activity. The DPIE's supportive line on this issue sent out a message to the RDCs that their matching funding arrangement was, for the time being, secure.

DPIE's reaction to the Audit Office report was largely negative, moving the Audit Office to comment on the Department's 'uniformly negative' response to its results. Of the eight recommendations made by the Audit Office in relation to the department, seven were rejected. However, this low strike rate of Audit Office success was due, in large part, to the DPIE's decision to commission another follow-up review. The effect of this impending review was to provide an escape clause for DPIE, with the majority of their responses conforming to a set format, namely, 'Not agreed. These issues are considered in the Budget Rural Research Review'.

When participants in the Audit Office review were asked why the evaluation was so widely discredited, diverse reasons were given, but most highlighted the inability of the review team to understand the R&D environment. The Audit Office, it was argued, assumed that the RDCs were just another part of the bureaucracy and that the answers the reviewers needed would be easily accessible and on file. This type of approach meant that they had failed to grasp the complexity of the R&D environment and the part played in it by the RDCs. The point was made that most people entering the industry took at least a year to adjust to the peculiarities of the RDC environment, with the implication being that an outside review team could not possibly expect to come to grips with it in just a few weeks.

Perhaps the biggest problem that faced the Audit Office was that predicability, clear causal relationships and easily identifiable inputs and outputs were not characteristics of R&D activity. This meant that the foundations upon which the Audit Office team approached the review were inappropriate, especially given the short time the RDCs had been operating and the lack of understanding by the reviewers about what it was they had actually been designed to accomplish.

Although the Audit Office largely failed in its attempts to impose new evaluation and accountability techniques upon the RDCs and the DPIE, the review succeeded in placing such issues at the top of the government agenda. In fact, the forthcoming review by DPIE had, as one of its primary focuses, an examination of performance measurement as undertaken in the RDCs. This served to shift back to the RDCs the onus of responsibility for more effective and efficient evaluation procedures placed upon DPIE by the Audit Office.

The Budget Rural Research Task Force Review (The Byrne Report) (1993–1994)

The DPIE commissioned a review to follow up some of the findings of the Audit Office review. It was undertaken within the context of the 1993–94 Budget process by a four-person task force. The chair of the task force was Tony Byrne, a senior DPIE bureaucrat. He was joined by two officers from the Department of Finance, one from Treasury and an outside consultant, Don Blesing, a former chairman of the GRDC and a primary producer. Their brief was to review the administrative efficiency of RDC arrangements and provide options for improved coordination with other Commonwealth programs involved in the promotion of rural industry development. In order to respond to this the task force also focused upon the objectives of the RDCs as outlined in the PIERD Act.

From the outset, this task force appeared to demonstrate a much sounder understanding of the part the RDCs were supposed to be playing in the rural R&D system. The primary reason the RDC model had been created, according to the Byrne Report, was to facilitate closer involvement and investment by industry in the determination of rural research objectives. The translation of these objectives into adaptable and useable research outcomes was to be achieved through the creation of organisations that were designed to be efficient, flexible, autonomous and accountable for their activities to joint industry and government stakeholders. This statement of understanding about the role of the RDCs provided the basis from which the reviewers conducted their evaluation and immediately placed the subsequent findings on a sounder footing than those of previous reviewers.

The primary resource used by the reviewers was the organisations involved in the rural R&D system. A questionnaire was used to obtain information from each of the RDCs. It covered a number of issues, including performance evaluation, the nature of relationships with government, the training of directors, and the effectiveness of linkages between various research agencies. In addition, written submissions were sought from the CSIRO, DPIE, State departments of agriculture, the NFF, and the Commonwealth rural-based statutory marketing authorities, about the RDCs and the role they played. This broad canvassing of opinion from those most closely involved in R&D provided the task force with a comprehensive range of views, issues and problems for consideration.

Twelve recommendations were made in the Byrne Report, many of which have subsequently been acted upon by the various organisations they concerned. The overall finding was that the RDC model was 'performing well and that its broad objectives, as stated in the Research, Innovation and Competitiveness statement are being achieved'. The report went on to conclude that the RDCs were succeeding in making R&D more relevant to industry needs and were facilitating increased involvement and investment by industry in research. This was one of the primary objectives of the RDC model and, just three years after their establishment, was considered to be a significant positive finding of the review.

Although, in general terms, the Byrne Report's findings were positive about the RDCs, the reviewers believed that it was time for the corporations to take account of a number of broader issues and requirements relating to their legislative charter. Of the 12 recommendations, 6 related to the need for improved strategic planning and for enhanced measurement of 'innovation performance'. By 'innovation' the report appeared to mean the gamut of R&D from 'concept to commercialisation' and the role of the RDCs in providing this range in their research project investments. 'Innovation' also included acknowledgment of 'linkages between industry, the research community and government in all aspects of R&D from identifying needs to adopting outcomes'. This broader 'innovation' landscape was one not discussed in the two previous reviews and again

served to highlight the enhanced understanding of the R&D environment demonstrated by the Byrne review team.

The co-ordination of RDC and industry objectives in the development of strategic plans was seen to be crucial, as was the requirement for investment portfolios that covered research on processing, storage and marketing aspects of commodity management. Performance indicators were also needed, the report argued, for RDCs to assess their administrative, managerial and investment performance. The information gathered through such processes could be incorporated into strategic planning and reporting processes and detailed in R&D plans and annual reports.

The difficult question of measuring public good as against private benefit research outcomes was also addressed by the report, with the overall conclusion being that the RDCs were poorly equipped to assess the effectiveness of reporting on the public good part of their research activities. This finding was tempered by recognition that, given the commodity focus of the RDCs, there was little incentive to pursue public good research.

This finding can be disputed on the grounds that investment in commodity research necessarily has flow-through benefits to the community. Government favoured this perception of R&D benefits to negate calls for the delineation of public as opposed to private research gains. Perhaps in recognition of this, the Byrne report did not advocate allocation of a specific proportion of RDC budgets to public good research. The reviewers' decision not to do so flowed from their understanding of how the public good part of research was integrated within the RDC approach. Thus, their report endorsed:

> ...the view of Gleeson and Lascelles (1992) that well conceived and executed R&D for primary industries' advancement and sustainable use and management of resources, should not be in conflict. Further, long term national and industry interests will be protected by the integration of industry, environmental and other public objectives at the earliest possible point in the R&D cycle.

The reviewers listed a number of joint RDC projects that produced community benefits, such as sustainability, energy efficiency, irrigation and drainage, water management, and human nutrition, all research areas that were perceived as benefiting not only primary industries but the public at large.

This approach to the public good versus private benefit debate made considerably more sense than the Audit Office's requirement of a separation of the two elements for accountability purposes. The Byrne report did, however, point out that the expectations of industry and government would differ and that RDC boards had to be careful to manage the tension that existed between the two. The development of performance indicators for projects that focused upon public good elements, the report argued, would be one way to ensure that industry remained aware that the matching taxpayer dollar they received was not for their benefit alone, but had to flow through to all Australians.

The adoption and commercialisation of research results was highlighted by the report as an area that required attention by RDC management, pointing to the shortcomings in some GRDC projects identified by the Audit Office review. The involvement of industry at the earliest stage of a research project was recommended as one way to ensure the adoption of research outcomes. Although the introduction of these types of strategies was considered to be beneficial by most RDCs, there was a perceived danger that the process could develop into one in which 'picking winners' could become the main aim. This would work to preclude high-risk projects which, nevertheless, had the potential for high returns.

Another strand of recommendations that ran through the report concerned the relationship between DPIE and the RDCs. Within an 'innovation' system, it was stated, linkages between all organisations and individuals

involved in R&D were essential to ensure that research outcomes met the needs of both the industry and the community at large. The report found that interaction with DPIE took place largely through the industry section that related to a particular RDC. While this was logical, it meant that there was no specific group or section of the department that dealt with the RDCs as a whole. The effect of this, the Byrne report noted, was that the RDCs were not generally aware of broad DPIE policy and program developments until they were announced. This was identified as a problem by the task force, as both the RDCs and DPIE could benefit through communication before decision-making. A recommendation was made that the responsibility for improving information flow lay with both organisations and that it was a matter to be given particular attention. DPIE, according to the report, needed to clarify its role in relation to the RDCs so that mechanisms could be developed to keep information and communication channels open.

Under the legislation, one of the ways in which the RDCs should be informed about relevant DPIE activities is through the government director on the corporation board. This person is approved by the Minister on the basis of their sound knowledge of government policy processes and public administration. The Byrne report pointed out that the role of the government director was unclear in many RDCs, and recommended that the role and responsibilities of the position be reviewed and specified more clearly.

The improvement of coordination and collaboration between the RDCs and all organisations within the R&D system was also focused on by the Byrne report. These issues were raised mainly in research provider submissions to the review team that criticised the difficulties of establishing linkages with the RDCs. In particular, there was criticism of the lack of commonality in administrative procedures across the RDCs, something the Gleeson and Lascelles review had also highlighted. It was suggested by research providers that the RDCs should standardise application procedures, financial management and reporting, project monitoring, contracts and the way in which project outcomes were evaluated. There was also criticism of the impact the RDCs were having on research priorities, with research providers perceiving that short-term projects were favoured at the expense of longer-term, strategic projects.

In dealing with these comments the reviewers stressed that the system was new and that its full acceptance would take time. The formation of the RDCs meant that researchers were no longer driving the R&D agenda. Rather, it was industry, through the RDCs, that was defining priorities and allocating funds. This change was bound to have caused resentment and some problems for research providers. However, the Byrne report avoided a potentially contentious issue by emphasising the need for coordination and support between research providers and the RDCs. In so doing, it gave the RDCs the benefit of the doubt over the concerns of the research providers.

Overall, the Byrne report found that the RDC model was operating well, though consideration was given to the amalgamation of marketing and research bodies. A test case of such a match had been provided by the Australian Wool Research and Promotion Organisation. At the time the Byrne report was being written the dairy industry was also considering a union between its research and marketing agencies. The advantages of amalgamating the functions of the statutory marketing authorities with the research investment portfolios of the RDCs were believed to be: the provision of enhanced marketing opportunities for new products and processes; stronger linkages with the end-user of the product; and savings in administrative costs through the development of a single and coherent industry development strategy.

The counter argument to this union was that, as independent bodies, each statutory marketing authority and RDC could focus on its particular functions and develop expertise accordingly. Combining the two functions would also bring

into conflict the priorities and philosophies of each type of organisation. Priorities for research funding were generally made on the basis of prospective returns, while from a marketing perspective time became a more important element: the quicker the return the better. This latter approach, according to the Byrne report, would restrict the channelling of research funds into longer-term projects. The implications for public good research, cross-commodity research and networking between RDCs if such an amalgamation were to occur would therefore be significant, as marketing and promotion activities tend to outweigh longer-term strategic approaches to industry development. On the evidence available, the reviewers could not make a case for or against the amalgamation of research and marketing bodies.

The Byrne report was well received by the RDCs. In general, those RDC managers interviewed said the review was useful, with one respondent stating it was valuable because it had involved the Department of Finance and the Treasury and had, as a result, served to educate 'mind sets' that would not otherwise have understood the peculiarities of R&D activity. The Byrne report made few waves within the R&D community. The emphasis placed on coordination, collaboration and communication meant that most research providers were appeased by its findings and, at the same time, RDCs were made aware that they needed to pay more attention to building bridges with particular sections of the research community.

A senior bureaucrat, commenting on the Byrne report, encapsulated the purpose of the document when he said that the review 'was intended to push home some messages to the RDCs about their role within the system as it was perceived by government'. This was a telling comment, as subsequent pressures on the RDCs over the next year were to concern performance measurement, strategic planning and accountability provisions.

The Industry Commission Inquiry into Research and Development (1994)

The Industry Commission (IC) inquiry has been, without doubt, the most controversial of the reviews undertaken. It took over 18 months to complete, with its revised recommendations handed down in July 1995. The major issues addressed were: (i) the effect of R&D on industry competitiveness and economic growth; and (ii) the performance of policies and programs which influence R&D and innovation in Australia. This brief was distinctive because of its broad and all-encompassing nature. The breadth of the inquiry meant that all aspects of R&D in Australia were covered under the terms of the review with submissions sought from all the major institutions involved in the research environment. In addition, public sessions were conducted around the country. As a result of this process the findings were claimed by the IC to reflect prevailing views about the roles and responsibilities of identified research agencies within the R&D community. The following discussion examines both the IC's draft and final reports.

The key recommendations

Interestingly, the broadness of the IC inquiry was not considered a problem by the reviewers. Rather, it was seen as providing an assessment of all the components of the Australian innovation system. Previous reviews, it was noted by the IC, had been criticised because they had limited their focus to single elements of a system and, in so doing, had failed to consider the interconnected nature of institutions within any R&D system. The IC chose, therefore, to concentrate on the main institutions and the processes that influenced their performance. This approach was based on the belief that the 'appropriate' research outcomes would emerge from any system provided the processes and incentives for R&D were right. The term 'research outcomes', as used by the IC, covered not only economic, but also social, cultural and environmental benefits. The IC also adopted the 'New Growth Theory'

approach to understanding the nature and impact of innovation upon economic growth and society. This meant that the IC focused upon the role of government in creating and strengthening markets for the promotion of R&D activity.

The IC assessed each of the institutional elements that made up the Australian R&D system as well as the range of State and Commonwealth government research incentive schemes. The overall findings were that the system as a whole was one with many positive features. The high quality of research institutions and the improvements that had been made in the system through various programs of reform were recognised as having modified conditions within Australia to provide for a much improved 'innovation' system. But, and there always seems to be a 'but' clause in reviews of this kind, because so much of the R&D sector was dependent upon government funding, the general public now needed more assurances about the quality, quantity and relevance of the research that was being undertaken. In essence, the IC was emphasising that government needed to find out what it was getting back for its investment dollar. The parallels between this approach and that which motivated reforms in New Zealand* were considerable and emerged as a characteristic feature of the IC report's recommendations. The following section discusses the findings of the IC's draft report and considers the reaction of the R&D community to the recommendations.

CSIRO

CSIRO accounts for 50% of the Commonwealth-provided research budget and received $462 million for 1994–1995. Over the years, the scope of CSIRO's research has expanded considerably and this led the IC to comment that the organisation had become 'all things to all people'. The corollary to this, according to the reviewers, was a loss of focus and clarity about what it was the agency was actually meant to be doing. In order to rectify this problem, the IC recommended that CSIRO concentrate its resources on those research activities that had direct value to industry and the community, but which lacked sufficient private returns to be performed or sponsored by firms. In other words, the IC believed that CSIRO needed to return to its original research charter, which was to conduct and disseminate public good research for the benefit of the Australian nation.

The recommendation that CSIRO conduct public good research did not preclude the organisation from continuing to provide some commercial services, with the agency maintaining the 30% external funding requirement imposed upon it by the Commonwealth Government in earlier reforms. However, the provision of such commercial services should not, argued the IC, be undertaken at the expense of the organisation's duty to provide research for the general community. Therefore, the IC recommended that each project conducted by CSIRO using external funds be costed on a fully funded, rather than marginal, basis. This proposal was designed to alleviate research infrastructure problems and to ensure that the public was not subsidising private interests.

In line with the recommendation that CSIRO should focus on conducting more public good research was a further requirement that government, rather than the researchers within the institution, specify the areas in which such research should be undertaken. Under existing arrangements the CSIRO was allowed to allocate money on the basis of its own requirements. The IC asserted that this made it very difficult for the government to know whether Australia was getting the best value out of the organisation with respect to the type of research it undertook and the cost of its operations to the taxpayer. In order to counter this situation, it was recommended that government directly commission the CSIRO to undertake public good research on a project or program basis, according to broad national priorities established from outside the agency. The IC believed this would alleviate the range of problems associated with researcher vested

* For more details see Lovett, S. (1994c) in bibliography.

interest, as well as enhance the focus of the organisation and improve accountability and evaluation arrangements. The move to a research purchasing role for government bore strong parallels to the Crown Research Institute system established in New Zealand. This approach by the IC signalled the strong belief, demonstrated throughout the report, in an R&D system in which taxpayers knew exactly what they were getting for their money.

The universities

Universities collectively account for around one-quarter of Australia's total research expenditure and dominate the provision of basic research. The bulk of funds for universities is provided by the Commonwealth Government through a 'dual funding' system of block grants to institutions, combined with competitive grants for selected research projects or programs. A portion of the block funding is notionally identified for research and is commonly referred to as the 'Research Quantum'. On the whole, universities are free to allocate these funds as they see fit. A competitive pool of funds is also available to universities and is administered and controlled by the Australian Research Council.

The IC considered that the universities had two roles to play in the R&D system. Firstly, they were to educate students and secondly, they were to contribute to the creation of new knowledge. The distinction made between these two 'types' of research function served as the basis for the IC's subsequent recommendations. The IC believed that research undertaken as an aspect of teaching should remain part of the direct operating grant, whereas research provided for through the Research Quantum should be contestably allocated on the basis of research performance. The advantage of contestable allocation was that it would reward strongly performing institutions and enhance competitiveness in the tertiary education system.

In accordance with the competitive nature of the grant, the administration of the Research Quantum would no longer be part of the block funding allocation. It would instead be assigned by the independent Australian Research Council. The council would make funding allocation decisions through a contestable process based on meeting national priorities. It was also recommended that infrastructure costs relating directly to these projects be incorporated in an organisation's bid, as the submission of projects on a fully funded basis would ensure adequate research infrastructure resources were maintained.

State government agricultural research

State departments of agriculture have developed particular expertise in the area of applied research and extension. These organisations conduct more than half of the total rural research carried out in Australia. A considerable proportion of the funds for these departments is derived from State government block grants, although the introduction of RDCs has provided another conduit for channelling Commonwealth funds.

State agricultural research bodies were identified by the IC as playing two roles within the R&D system. These were, firstly, to act as providers of commissioned research and, secondly, to undertake research of particular benefit to the State concerned. It was the second of these roles that the IC felt was most appropriate. However, the evidence collected by the IC revealed that the first role was, in fact, predominant. This development had occurred despite the fact that externally commissioned research may not necessarily coincide with the priorities of the States. The problem identified by the IC was that external funds had become necessary for State departments to maintain their research capacity. This source of funds had also allowed State governments to pull back resources on the basis that their agricultural departments were able to get Commonwealth money to support them. This was an unintended consequence of the introduction of the RDCs and one which State governments were fully exploiting.

In light of this trend, the IC recommended that State agricultural departments should fully

cost and charge for all externally commissioned research. The report also recommended that the New Zealand model be considered for implementation across all the States. Arguments made in support of this proposal were, unsurprisingly, the same as those made in New Zealand when that country's reforms were being implemented. Cost competitiveness, consumer-driven research and the development of a proactive and responsive network of R&D agencies were all cited as positive outcomes of the adoption of the New Zealand approach. In line with this proposal was IC support for the trend towards a more commercial approach to the provision of extension services. This line was somewhat tempered by recognition that there was still a role for government to play in the provision of State agricultural services on the grounds of market failure and community benefits, although the report did not specify how this need would be met.

Business enterprises

Although business expenditure in rural R&D is very low, it is important to consider briefly the recommendations made by the IC in relation to this sector. This is because, as later discussions will reveal, some of the proposals made to change the RDCs were premised on comparisons with the private sector. Government support for this sector has been very generous in Australia, particularly over the last decade, and has been provided through a range of mechanisms that include: the 150% tax concession available across all firms; competitive grants for R&D; and concessional loans for the commercialisation of technological innovations. Various partnerships and joint venture arrangements have also been promoted, with government generally playing a co-financing role. The Cooperative Research Centres are perhaps the best example of this type of partnership, with the maintenance of patents and other intellectual property laws encouraging such investments.

A Bureau of Industry Economics review of the 150% tax concession, conducted in 1992–93, concluded that it was 'more likely to have generated a net social benefit for Australia than not'. This was hardly a ringing endorsement for the success of the program, although it was sufficient to prevent the IC from making any attempts to alter its current form. The competitive grants scheme administered by the Industry R&D Board was, in contrast, paid particular attention, with the IC expressing reservations about the level of discretion enjoyed by the Board in the selection of projects. The approach of the Board was described by the IC as one that was primarily concerned with 'picking winners'. While such an approach was understandable, the IC questioned the relationship of such projects to the provision of wider social and national benefits. The point was made that the projects most likely to provide commercial success were ones that the industry would probably have funded of its own accord. In such cases, where was the justification for government subsidies?

In order to combat these problems, the IC recommended the extension of the 150% tax concession to include tax loss companies that previously would have applied for grants rather than undertake R&D activity on their own. The IC argued on equity, efficiency and administrative grounds, that this was a more appropriate way to provide assistance. The IC warned against government over-subsidisation of the sector and rejected calls made by some companies for the extension of the 150% tax concession to cover commercialisation activities. This was felt to be inappropriate as the benefits from product commercialisation were largely captured by the individual firm. The IC appeared to adopt the view that it was time for the private sector to initiate R&D without necessarily having to rely on government to pick up the tab.

Cooperative Research Centres

Cooperative Research Centres (CRCs) were the brain-child of Professor Ralph Slatyer, Chief Scientific Adviser to the Hawke Labor Government. These centres are seen as having objectives such as to channel more money into the universities; to develop linkages between

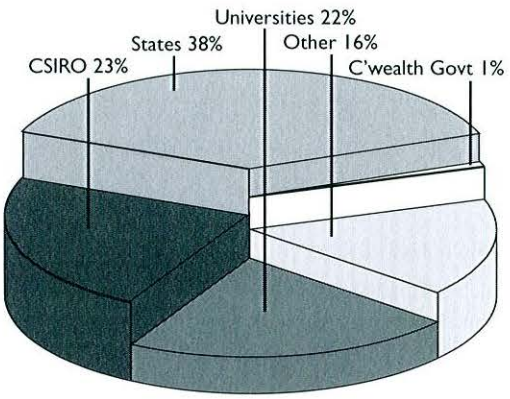
research institutions and industry; and to provide the means by which experts from particular areas could be drawn together to work on a particular problem. Each centre had to have, as a core participant, a university partner. However, there is considerable variation across the organisations in terms of level of industry involvement, composition and research orientation. As a result of this diversity, research activity can range from strategic to applied projects, with the overall trend being for applied projects that have commercialisation potential. The IC did not spend a lot of time on the centres as they were to be the subject of a detailed review in 1995. It did, however, recommend that because CRCs emphasised commercial activities the context of government support for such institutions be re-evaluated in light of the public good rationale for government funding. Questions were raised about the cost-effectiveness of the centres as well as the basic recurring issue pressed by the IC of who was benefiting from such research and what government was getting for its investment?

Rural Research and Development Corporations

All of the institutions discussed so far are, in one form or another, research providers. The establishment of the RDCs altered arrangements so that a new research purchaser and investor entered the R&D network. As a result, the allocation of R&D expenditure has been altered, with Commonwealth funds directed to the RDCs being invested through a contestable bidding process. This has placed pressure upon research providers to competitively price their services in order to 'win' RDC contracts. Figure 5 shows the profile of research providers used by the RDCs in 1994–95.

The RDCs have become responsible for the allocation of monies to other government sponsored institutions. The justification for this arrangement is that the RDCs are investing only in research that their particular industry wishes to be undertaken and the organisations that are successful in gaining an R&D contract are those that are competitive and cost effective. On this basis, the overall assessment of the RDCs made by the IC was favourable, with some reference to the fact that the organisations had operated for only a few years. The IC noted that one of the main aims of the RDCs, namely increased industry investment in R&D, had been achieved. Table 3 shows the increase over time in industry investment since the establishment of the RDCs. It highlights the success of the RDCs in gaining more industry dollars, with the HRDC most notable in this regard.

Figure 5. Allocation of research and development corporation expenditure, 1994–95.



Despite this, significant changes to the RDCs were recommended in the IC Report. These changes were justified on two grounds: firstly, the IC believed that the beneficiaries of research should pay in proportion to the benefits received; and secondly, it was argued that the greater the spillover benefits, the greater the proportion the government should contribute. On this basis, the IC recommended that half the benefits from the research investments of commodity-based RDCs should accrue to farmers and the other half to the community. It was this latter community benefit that the IC focused upon by asking the question — were the RDCs providing this community benefit, or were farmers gaining disproportionately from the dollar-for-dollar matching levy arrangement? The answer, in light of the recommendations made, appeared to be the former.

Table 3. Percentage increase between 1988 and 1994 in the estimated expenditure of R&D corporations and councils.

Corporation/Council	1988–89 ($m)	1993–94 ($m)	Increase (%)
Cotton RDC	2.4	6.8	182
Dairy RDC	3.6	15.4	326
Fisheries RDC	7.7	10.7	39
Forest & Wood Products RDC	0	0	0
Grains RDC	23.3	51.0	119
Grape & Wine RDC	1.8	3.7	104
Horticultural RDC	0.5	17.4	3398
Meat Research Corporation	30.2	50.8	68
Pig RDC	3.0	7.2	140
Sugar RDC	1.9	7.5	285
Wool RDC	40.9	40.8	0
Land & Water Resources RDC [a]	9.2	14.5	57
Rural Industries RDC [b]	4.3	14.9	246
Chicken Meat R&D Council	1.1	1.6	46
Dried Fruits R&D Council	0.7	1.5	131
Egg Industry R&D Council	0.7	1.3	79
Honeybee R&D Council	0.2	0.3	57
Tobacco R&D Council	1.6	1.6	2
TOTAL	133.1	247.0	85

[a] LWRRDC is totally funded by Commonwealth appropriations
[b] Some components of the RIRDC budget are funded solely by Commonwealth appropriations and some by industry levies and matching Commonwealth contributions.

The ratio

The RDCs were established on the basis that they could invest in research that ranged along the entire R&D continuum, from 'concept to commercialisation'. The IC concluded, however, that the strong industry influence over RDC decision making has resulted in their activities being biased towards the applied end of the research spectrum. Taking this argument one step further led the IC to argue that, as the research project progresses along the R&D continuum, the smaller, proportionately, the spillovers were likely to be and the less the justification for government support. The IC believed that, in light of this, the benefit to government stakeholders in the RDCs was less than that to industry. It therefore recommended that the government contribution to the RDCs be altered from the matching ratio of dollar-for-dollar to a new rate of $1 for every $4 of industry funds.

The rate of $1:$4 was believed by the IC to be a more generous level of assistance than that provided to business through the 150% tax concession, as levies were also 100% tax deductible. Although not specifically stated, the revised ratio implied that the IC believed that rural industry, as the main beneficiary of the RDCs, should contribute more of the money for R&D. Industry interests, the report argued, did not always coincide with those of society in general and a mismatch of public good and private benefit had been created through the dollar-for-dollar matching arrangement. The funds saved by the government through the application of the new ratio could be channelled into research for the public good.

Removal of the ceiling

As described previously, the imposition of a ceiling of 0.5% of GVP on government matching contributions was a somewhat ad hoc decision. In recognition of this, it was noted in the 1989 *Research, Innovation and Competitiveness* statement that by the time industry contributions reached this level of contribution it would be necessary for primary producers to reconsider the amount and determine whether increased funding was warranted. The IC provided data that demonstrated increases in the funds provided by industry. In response to this success, the IC recommended the removal of the cap on the levy so that industry could be encouraged to contribute more. This would allow industry to decide for itself what an appropriate levy amount for their industry was, as well as provide for greater flexibility in the management of R&D

funds. The IC pointed out that this would enable industry to:

> ...make choices between maintaining, increasing, or spending reserve funds, or, alternatively, maintaining or increasing the level of the levy without losing the government contribution if, in some years, total spending goes above 1 per cent of GVP.

The IC believed that the combined effect of a lower ratio of government contribution (i.e. 1:4) and the absence of any set ceiling would provide sufficient incentive for the RDC model to continue operating successfully.

Other issues

The IC recommendations to reduce the levy and remove the ceiling caused the most debate. Other issues raised by the IC's review included the following:

Basic vs applied research

Concern was registered in some of the submissions about the short-term perspective of the RDCs. This concern was rebutted with data that demonstrated some of the RDCs spent around 60% of their budget on strategic research. Under the RDC charter they were to reflect industry interests and, on this basis, the IC argued that the corporations should not be expected to commission pure public good research. This finding provided further support for the IC's recommendation of an overall reduction in the matching levy. The bottom line appeared to be that if the research was benefiting industry, then industry, not government, should pay.

Differentiated levies

Funds collected through the levy system can be directed only to the solution of generic industry problems. The IC recommended that thought be given to the introduction of extra voluntary levies in order that region-specific issues could be addressed by farmers prepared to invest in research on them. This recommendation was also made in light of the resource constraints being placed upon State departments of agriculture that had previously provided such services.

A differentiated levy system was also proposed to enable growers to choose which corporations they wished their levy to support. For example, a beef producer might decide that, as water table levels were threatening his/her productive land, the levy should go to LWRRDC rather than the Meat Research Corporation (MRC). This type of approach was reminiscent of the New Zealand user-pay system and was thought by the IC to provide rural industry producers with greater freedom and flexibility.

Fully funded project submissions

In line with previous recommendations, the IC proposed that the RDCs fully fund research projects, rather than work on the basis of marginal funding. It was believed that fully funding projects would ameliorate the problems of research infrastructure maintenance being experienced in the R&D system .

Gaps, duplication and collaboration

Criticisms were levelled at the RDCs about the narrow commodity focus of the research projects commissioned. It was argued by some of the research providers that this focus had led to gaps in the coverage of rural problems. However, the charter of the RDCs required them to focus on meeting the needs of their industry, yet at the same time these organisations were also to address broader rural issues. Allegations were made by some researchers that the broader rural issues and problems were not being covered through RDC research portfolios. Duplication as a result of insufficient co-ordination and collaboration between the RDCs was also a concern.

Assessing research outcomes

The evaluation and assessment of research outcomes was emphasised as a vital RDC activity if the corporations were to be held accountable for the management of stakeholder funds. As has been mentioned previously, evaluation was an area focused upon by both the ANOA and Byrne reports. The impact of these two reviews appeared to satisfy the IC that the RDCs were engaging in sufficient assessment activities,

although the report did highlight the benefits that arose from the 'rigorous and comprehensive ex-post evaluation of research programs'.

Accountability

The IC had reservations about the effectiveness of the process by which industry preferences were conveyed to those responsible for setting the levy. It was not always the case that a producer had access to the representative industry body responsible for decisions concerning the levy. In order to make the process a truly democratic one, the IC recommended each RDC hold an annual general meeting at which levy payers could vote on the level of the levy. For those growers unable to attend the meeting, a proxy voting system could be implemented. To minimise costs the IC suggested that meetings could be held at the same time as major industry conferences. Mandatory annual general meetings would achieve greater transparency in the RDCs' activities.

The initial response: the draft report considered

Consideration of the IC recommendations leads to the conclusion that their philosophical basis is similar to that which drove the reforms to New Zealand rural R&D. The preoccupation with getting the most out of the government dollar, ensuring the taxpayers knew what they were getting for their research investment, as well as user-pays financial arrangements were fundamental tenets used to justify change in New Zealand. The IC had, in fact, advocated the introduction of the New Zealand model to Australian State departments of agriculture and was clearly sympathetic with the approach taken by that country to reform of its rural R&D effort.

Why was New Zealand taken as a model? It is certainly true that the context of reform in both Australia and New Zealand was pervaded by economic rationalism and its associated rhetoric. It could also be that, in attempting to clarify the role of each of the research institutions in Australia's R&D system, the IC found it necessary to adopt a somewhat reductionist approach that attempted to simplify and categorise roles and responsibilities on the basis of predictable and tangible outcomes. The problem with this approach, as has been demonstrated in New Zealand, is the danger of over-simplification.

The release of the IC's Draft Report in December 1994 resulted in a flood of submissions critical of its findings and recommendations. CSIRO and the universities were the most outspoken about the report, with both questioning the proposed alteration in funding arrangements. The RDCs prepared a joint submission that argued a strong case against the adoption of the IC findings, particularly as they related to the funding arrangements of the corporations. This document served to crystallise many of the more controversial issues common to the reviews covered here. It is thus useful to present a synopsis of it here.

The RDCs respond. The RDCs response to the IC was a lengthy, well argued and well presented paper, that strongly advocated maintenance of the status quo. The paper began by acknowledging the attempt made by the IC to clarify the roles and responsibilities of each element that made up the R&D system. The separation of research customers and research contractors within a contestable environment was supported, as well as the view that government should set priorities for public good research investment. The RDCs' central criticism of the IC recommendations was, however, that there was an 'unbridgeable gap' between IC policy guidelines and the way it sought to apply them to the RDCs. The RDCs described the potential impact of adopting the IC's recommendations as one that would deal a 'body blow' to a system the Commission itself had reported was working well.

The conceptual 'gap' described above, referred to the broad set of principles produced by the IC report as guidelines by which decisions in the R&D environment should be made. These policy principles were outlined in the draft report of the IC as follows:

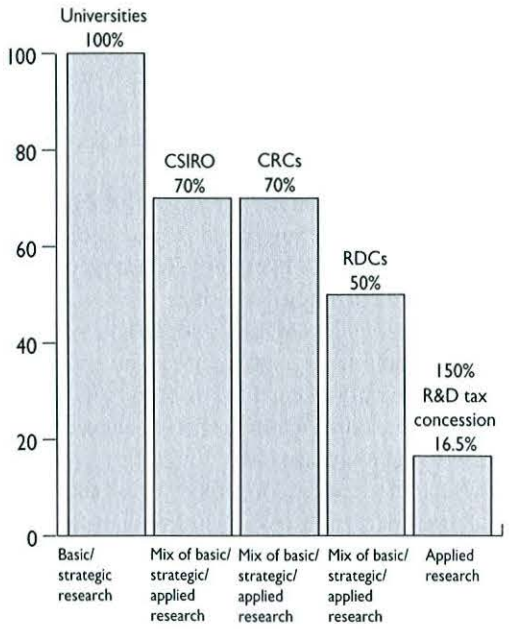
- Diversity should be encouraged.
- Private incentives should be built on where possible.
- Assistance schemes should be simple and transparent, with well defined criteria.
- Assistance levels should be broadly consistent.
- Research should be monitored and evaluated.
- Government's non research and development requirements should be clearly articulated.
- 'Contestability' should have a major role in research funding.
- Government's separate roles in research and development should be clear.

The outline of the main recommendations, as they applied to the various types of research institutions, clearly reflects these underlying principles. The IC systematically broke down the system into distinct parts and attempted to simplify the roles of each institution in order that greater clarity and consistency could be achieved.

Under the IC plan, it became clear that there was a role to play for each research institution at a particular stage of the research continuum. This continuum ranged from basic/strategic to applied and commercial R&D activity. The IC placed the universities and CSIRO at the basic end of the scale, with the State departments of agriculture restricted to extension work and the Cooperative Research Centres and RDCs located at the applied/commercial end of the research spectrum. Public good research was seen as occurring only at the basic end of this range, and its primary providers were, therefore, the universities and CSIRO. This provided the justification behind the IC recommendations that since RDC activities tended to be towards the applied end of R&D, where the benefits and spillovers were appropriated by industry, the amount of government funding channelled into these institutions should be reduced.

In response to the IC, the RDCs provided data to counter what they believed to be an over-simplified conception of the organisation of R&D activity (Figure 6).

Figure 6. Research mix of government funding of research and development, 1995.



What Figure 6 illustrates, argued the RDCs, is that a mix of research activity is undertaken by each set of institutions. The figure shows that as the mix of research shifts from basic to strategic and to applied research there is an associated tendency for the share of government funding to fall. The RDCs, on the basis of this evidence, asserted that they were meeting their obligations for the provision of a mix of public good and industry research investment, with their 50% government investment providing a mix of basic, strategic and applied research. Their response noted, *inter alia:*

> There is no necessary connection between the movement toward more relevant research and development and a shift from basic research to applied research. The RDCs by focusing the whole research process on high priority issues, both for the industry and public good aspects may not necessarily change the basic, strategic and applied research balance very much at all. There are in fact signs that as the RDCs mature they are becoming much more aware of the interdependence of basic, strategic and applied

research and willing to support a balance mix of research effort as envisaged by Ministers Kerin and Cook in their 1989 Statement.

The key point to be made by the RDCs on the basis of this evidence, was that their activities were not confined to applied research from which only industry had benefited and, hence, they were fulfilling their public good obligations.

Another argument used to support the RDC matching-funding arrangement related to the spillovers from R&D. Even if the RDCs were investing only in applied activities, it was reasoned, the spillovers from undertaking such research would still be sufficient to warrant the matching levy arrangement. The economic, social, cultural and environmental benefits that accrued from R&D at any stage of the innovation process were such that the general public always gained. It followed, said the RDCs, that the dollar-for-dollar matching levy arrangement should not be altered.

The RDCs also disagreed with the IC about its comparison between the 150% research tax concession and the rural RDCs funding arrangements. The IC argued for roughly equivalent incentives for assistance to be provided for RDC research and industrial research. The rationale behind the approach was that RDC research was equivalent to research supported by the 150% tax concession. However, the RDCs demonstrated that when comparisons were made between the tax concession and the work of the RDCs it was clear that differences existed between the two. The four main distinctions that were drawn by the RDCs from such a comparison were that: (i) the objectives of the RDCs as stated in the PIERD Act made explicit allowances for the performance of public good research; (ii) the R&D tax concession went to firms who decided what R&D they wished performed while the RDCs made decisions on behalf of industry and the community; (iii) most firms performed R&D in their own in-house facilities, while most RDC research was performed by State departments of agriculture, CSIRO and the universities; and (iv) that R&D undertaken by private firms benefits those organisations alone, whereas RDC research results are generally made available across the agricultural sector and the general community.

These points were based on a distinction being made between the tax concession, which was described as a general, non-directed form of support for R&D performed by firms, and the RDC research investment approach, that was legislatively required to incorporate both community and industry interests. Each corporation was accountable and responsible to levy payers and the government, in recognition of the fact that the spillovers accruing from their activities were likely to be substantially greater than those associated with the R&D tax concession. These misunderstandings led the RDCs to argue that the IC recommendations were flawed.

The RDC submission argued, on the basis of this evidence, that a strong case for changing the role of the corporations as envisaged by government in 1989 did not exist. The removal of responsibility for public good research from the RDC portfolio would not only, it was said, fragment the rural research system, but also defy all previous government documentation that had disputed attempts to partition public good and industry driven R&D.

The RDCs were not as vehemently opposed to the other recommendations of the IC report as they had been to the issue of funding. The removal of the ceiling on levies was recognised as a valid issue, as a number of the RDCs were approaching or had exceeded the 0.5% of GVP industry contribution. The stimulation of industry investment over and above this levy was highlighted by the RDCs in two options they presented to the IC. Firstly, the ceiling on government matching funding could be raised to 0.75% of GVP and secondly, a tapered ceiling could be applied with the amount of matching funds decreasing as industry invested over the 0.5% (e.g. at 0.75% GVP the ratio might be $1 for every $1.50 from industry).

Criticisms concerning the lack of collaboration and duplication of effort were rejected, with evidence provided on the number of joint projects

undertaken between the RDCs serving to demonstrate that coordination did occur. Joint meetings of all RDC executive directors, communications and business managers were noted as examples of attempts by the corporations to ensure that issues did not 'fall between the cracks'. Interestingly, the IC suggestion that both the CSIRO and State agencies charge the full cost for externally funded R&D was accepted in principle, but amended by the RDCs on the basis that in many cases the R&D projects undertaken by these agencies also supported their interests. The RDCs suggested instead that the IC should distinguish between (i) R&D that was specifically commissioned by an RDC to research a specific problem, and (ii) collaborative R&D where several groups were involved in defining the scope and objectives of the project. In the former situation, the RDCs said that they would accept the full costs of the research project, whereas in the latter case the cost of the research would be dependent upon negotiation between all groups involved. This distinction would enable projects to be considered on a case-by-case basis with the relative interests and benefits to be obtained reflected in the proportion of the costs shared by each party.

The IC Recommendations Reconsidered

The IC, in light of the RDC submission, reconsidered a number of the issues that had caused controversy. Submissions prepared by other institutions, such as the universities and CSIRO had a similar effect, although the universities failed to win the battle over the removal of the Research Quantum from direct block appropriations. The CSIRO funding recommendations were withdrawn and replaced by a new recommendation for an annual workshop to be instituted at which officials of all stakeholder government departments could develop broad priorities for public good research. Evaluation and performance measurement continued to be emphasised as important in order that the institution be given an increased amount of public scrutiny.

The grants scheme provided for business through the Industrial R&D Board was retained, in contrast to the IC's initial recommendation that it be abolished on the grounds of inefficiency and ineffectiveness. For State departments, the blatant advocacy of the New Zealand model was removed and substituted with references to the need for these organisations to 'consider' establishing agricultural research departments as separate corporations. The IC withdrew the recommendation for government support to be reduced in the RDCs to $1:$4 but maintained that the rate of $1:$1 was not justifiable. On this basis the IC recommended a $1:$2 ratio be put in place but with no government ceiling. All other recommendations made in relation to the RDCs remained the same.

This final series of recommendations was a disappointment for many, as the IC was seen to have backed down from its original strong stance on the roles and responsibilities of organisations within the R&D system. Although the findings were based on recommendations made in the draft document, there seemed to be an attitude of 'take it or leave it' rather than the stronger 'this is what needs to happen' that ran through the initial findings. The length of time taken to conduct the review, the negative response the draft report had received and the political flak that was generated by the findings, may have had the combined effect of quelling enthusiasm on the part of the IC for its task.

Speculation Abounds: Will Government Implement the IC?

The Government's response to the IC report was originally expected in October 1995, but was continually put off, with the deadline extended into December. This was to enable yet another CSIRO internally commissioned review to be incorporated into the Labor Government's 'Innovation Statement'. In addition, the looming election may have made it politically expedient for the Prime Minister to launch the document in the lead-up to the campaign proper. Speculation about the likely outcome of the IC report was, in

the meantime, provided by those the proposed reforms would affect. In interviews conducted with the executive directors of the RDCs an interesting mix of responses was recorded.

For many, the timing of the IC was such that they did not believe the report would be acted upon by the Labor Government. This was because a Federal election was to be held by May 1996 and was predicted to be a close contest dependent upon winning votes in marginal electorates, many of them located in rural areas. As far as the RDCs were concerned, the Labor Government was unlikely to institute changes that would directly impact upon rural producers. The proposed reduction in funding was an issue that had already incited producer wrath, with the NFF arguing a strong case against such changes being introduced. Industry ownership of the RDC model meant that it would be a brave government that would change the system in any way. In addition, a commitment had been given by John Anderson, the shadow minister for primary industries and energy, that under a Coalition government the dollar-for-dollar matching funds formula was secure. On the whole, therefore, most felt the dollar-for-dollar funding formula was likely to be retained.

Arguments against alterations to the funding arrangements were also disputed through appeals to the original charter of the RDCs. The RDCs, it was argued, were set up to institute a co-investment partnership between industry and government. The removal of one of the partners would jeopardise this relationship, as would altering the funding balance between the two. One of the respondents said that, even in respect of the most value-added part of the rural production market, the food processing sector, the level of investment in R&D was low, at around 0.6%. This rate compared with around 0.8% for an industry like electronics. How then, it was pointed out, could 'you ask a primary producer, who is on the bones of his backside, facing bad year after bad, to put more money into R&D when they are already contributing 0.5%?'. An additional observation was made that a reduction in the amount of money from government could initiate a crisis of confidence, particularly in some smaller industries that did not have the capacity to invest more money in rural R&D.

As far as the other, less controversial, recommendations were concerned, participants did not believe that the 0.5% ceiling would be lifted. This was a view shared by others outside the system and was based upon a belief that Treasury would be too worried about the possibility of industry suddenly deciding to increase contributions and government having to match them up to an unspecified level. The open-endedness of such an arrangement was not one that Treasury or the Department of Finance was likely to support. In response to this fear, the example was given that if a farmer had to choose between increasing capital stock such as a tractor or investing more in R&D, the tractor would more than likely win out. It was also the case, argued one manager that, although most farmers felt R&D was a 'good thing', many of them would not be prepared to invest any more money than they were at present, a fact that could be used to mitigate Treasury fears.

The introduction of a competitive, differentiated, levy that would allow producers to allocate funds on the basis of who they wanted their money to go to was rejected on the basis of its implementation being an administrative nightmare as well as the fragmentation it would cause across the system as whole. While many supported the freedom of choice this approach accorded the producer, the problems that would be created by RDCs having to vie for research dollars amongst growers would transfer resources away from research into self marketing and promotion activities. This would undermine the original purpose of the RDCs which was to invest and promote R&D, not chase dollars from producer groups.

These responses to questions about the likely impact of the IC Inquiry were countered by those who said that, although they did not believe the recommendations would be acted upon, they did in fact support some of the findings. Newton,

involved in the initial establishment of the RDCs, argued that the IC recommendations were both timely and inevitable, 'with a few less dollars the RDCs might start to think about their priorities and really get it together in terms of making profitable investment decisions'. This type of attitude was echoed by others who did not believe the RDCs warranted the matching funding arrangement and, as a result, felt that industry should be paying more. One respondent felt that the dollar-for-dollar matching was probably appropriate for those RDCs that were doing largely basic/strategic research. However, for those corporations that were concentrating on the other end of the research spectrum, a reduced rate of matching should apply.

Opinions such as these reflected the range of perceptions that existed about the role of the RDCs and the part they were perceived to play in the R&D system. In line with support for some of the findings were comments that the IC did not, in fact, go far enough. Hussey contends that the backdown by the IC was largely because they did not do enough analysis to ensure the recommendations they made could stand fast in the face of criticism. He believed that the IC was on the right track when it talked about spillovers in relation to the RDCs and raised questions about whether the general community was getting the best 'investment bang for the government dollar'? However, the failure of the IC to explain exactly what these spillovers were, meant that they had left their recommendations open to attack by those that wished to retain government funding. This view was echoed by other respondents who believed that, at the end of the day, the IC had found the whole thing too hard and this had accounted for the watered-down version of its initial findings. Whatever the outcome, opinion was clearly divided about whether the IC inquiry had done a good or bad job. The level of scrutiny it imposed upon the system, combined with the amount of time and effort the RDCs devoted to the preparation of submissions, meant that the release of the 'Innovation Statement' in December 1995 was awaited with interest.

Have the Corporations Been Over-Reviewed?

The amount of discussion that surrounded the reviews of the RDCs over the period 1991–95 was warranted because of the issues they raised and the impact they had upon the corporations themselves. As has been shown, the various review teams released findings that were less than earth shattering, with Hussey arguing that the government has induced a situation of 'analysis paralysis' throughout the R&D community. The fact that so many reviews occurred must, in part, be attributed to a problem that has remained consistent throughout this examination of the reviews, namely the complete failure on the part of some sections of government to understand the nature of R&D activity and the role which the RDCs were conceived of as playing in its accomplishment. This problem was discussed at length by the majority of people interviewed, both from bureaucratic and government backgrounds. Constant evaluations have left many of the RDCs in positions where they have had to direct a significant proportion of their resources into the preparation of responses, leading one respondent to say that he was 'sick of constantly having to fight a rear guard action' as it limited the ability of the corporation to stay on top of the research that was supposed to be its primary task. Similar views were recorded across most executive directors with phrases such as the 'paper war' and 'you become jaundiced' used to describe the effect of constant, externally-imposed scrutinies.

Others were more pragmatic about the cycles of reviews that had occurred, believing that it was a general manifestation of the present environment in which they were located. Evaluation, said one of the respondents whose corporation was located in Canberra, 'is the business of this town, we just have to learn to accept it and get on with the job as best we can'. This type of response was made by many participants who seemed to accept that reviews were going to occur so long as the matching funding arrangement stayed. The key tc survival

was giving the reviewers what they wanted and protecting your interests as best as you could.

The value of undertaking all these reviews must, however, be questioned. The logic behind reviewing a system so young appears to be flawed, particularly when consideration is given to the fact that research is an investment activity, with many projects needing to run for 5–7 years or more before results can be recorded. The examination undertaken in this chapter has also revealed that, while the objectives of corporatisation were referred to by each of the review teams, none of the findings related specifically to the four objectives of corporatisation given in clause 3 of the 1989 PIERD Act (see page 27). Despite explicit reference not being made to the PIERD Act, issues of accountability, efficient and effective resource management and research outcomes that benefited both the community and industry were certainly raised in the reviews. These factors essentially provide the substance of each of the 1989 objectives of corporatisation. In light of these findings can we assume, therefore, that the corporatisation of rural R&D has achieved the objectives for which it was created?

The diffuse and all-encompassing nature of the objectives as specified in the PIERD Act was, ostensibly, designed to provide the RDCs with sufficient flexibility to allow them to reflect their particular industry's needs. However, in light of the review findings examined thus far, there may be some merit in asking whether the capacious nature of the objectives has actually created some of the problems the RDCs are currently experiencing? Most of the reviews paid particular attention to discovering information about RDC operational specifics, rather than continuing to promote the more generalist government line espoused in the PIERD Act. The PIERD Act does not require such detail in order for its objectives to be met. Rather it accords the RDCs a wide scope for interpretation of how to meet these goals. Have the reviews now created a situation in which these objectives are now under threat? If so, were the reviews asking the right questions in the first place? It was hoped that the release of the 'Innovation Statement' would answer these questions by providing some clarification about what role government actually wanted to play in relation to the RDCs. For those within these organisations, the content of the document was to prove a rude shock.

'Innovate Australia': a shock for the RDCs

On 6 December 1995 the long awaited 'Innovate Australia' statement was finally released by government. The media hype surrounding the launch of the document was considerable with Prime Minister Keating using the occasion to begin campaigning in earnest for the 1996 Federal election, with the date set for 2 March. The breadth of the document was such that everything from research, training, education, small business and the information super highway were covered. The necessity for Australia to become an innovative nation was made repeatedly, but because Keating was not compelled to define exactly what the term 'innovation' meant, some of the force behind its promotion was dissipated.

Government used the IC report as the basis for all the recommendations made in relation to rural R&D. The general R&D environment was to be improved through a research commercialisation program, the strengthening of the rules governing intellectual property, expansion of international science and technology linkages, and access to the information super highway. CSIRO was to be given a key role to play in the international scene through the establishment of a panel of experts whose job it was to promote Australian R&D, as well as ensure the nation was kept in touch with global developments. The government accepted the IC recommendations that clarification of the role of CSIRO was needed and endorsed the introduction of a number of measures to enhance the accountability of the organisation. These measures included costing and pricing guidelines, the evaluation of research and increased advisory and consultative processes. The idea of an annual consultative forum at which the directions of CSIRO would be set was also endorsed.

As regards the IC recommendations that dealt with funding arrangements, government accepted proposals to introduce consistency in cost recovery and pricing policies across research agencies and universities. The system of block grant funding to the universities was to be retained, with government rejecting the granting of statutory authority to the Australia Research Council. The 150% tax concession system was to be maintained, though fine-tuned to improve accessibility, management and cost effectiveness. In addition, industry was to see the renewal of the $40 million a year R&D competitive grants scheme. Five new Cooperative Research Centres were announced with funding guaranteed by government for seven years, establishing these organisations as permanent features of the R&D system. Overall, therefore, the Innovation Statement talked a lot about government's role as one of creating the right environment to facilitate the process of wealth creation and innovation, as well as the need for Australia to be at the forefront of technological progress.

For the RDCs, the release of this document transmitted some strong signals from government about the need for industry to become more involved in the provision of resources for R&D. The most significant decision in relation to this push for more industry dollars was not the continuation of the matching levy arrangement, but dropping the level from 0.5% to 0.4% of GVP. Beyond this point, the Commonwealth undertook to provide one dollar for every two dollars contributed by industry, with the ceiling to Commonwealth contributions removed. The removal of this cap represented the biggest surprise of the statement and was welcomed by the RDCs.

These decisions were to take effect from 1 July 1996. The Minister for Primary Industries and Energy, Bob Collins, argued that this new arrangement would 'provide a stable basis for the future growth of the RDCs' as well as allow the level of rural R&D to grow in accordance with the needs of industry. Other changes included the extension of voluntary levy arrangements so that contributions could be made by producers who wanted funds directed into purely regional issues, as well as the inclusion of downstream processors in the RDC system. This meant that not only producers but also the industries that handled their commodities could invest in R&D through the RDCs. The only requirement was that such industries agree to the compulsory levy.

The main message to come out of the Innovation Statement was, therefore, one of support for the IC's recommendations. This support provided a strong indication to the RDCs that their long-term future would require increased industry investment. Although funding from government would still be provided, in order for the matching arrangement to continue over 0.4% of GVP, industry had to commit itself to allocating more resources to R&D.

Taken as a whole, reaction to the Innovation Statement seemed to be characterised by ambivalence from those within the R&D community. This ambivalence may have stemmed from the fact that the document did not tackle thorny issues like research infrastructure and where the funds to maintain a basic research capacity were to be found. Although the statement used the rhetoric of 'innovation', its actual effect was to reduce marginally the amount of funding allocated to the area of rural R&D. As such, perhaps the clearest message it provided was that government felt it was time others took on the challenge of funding and promoting R&D. For the RDCs, this message presented both threats and opportunities. Increased industry investment would be met by continued government support, but failure to gain such industry support would inhibit the development of RDC research portfolios.

A number of issues as they relate to the RDCs and their environment have been discussed in this chapter. The analysis undertaken has been based upon a series of 'review' snapshots with the most recent of these being of the December 1995 Innovation Statement. The next chapter raises a number of questions in relation to the various review findings and speculates upon the future challenges which the RDCs may face as a result.

4 Are We Asking the Right Questions? An Evaluation of the Corporatisation of Australian Rural Research and Development

'Would you tell me, please which way I ought to go from here?'
'That depends a good deal on where you want to get to', said the Cat.
'I don't much care where ... ' said Alice.
'Then it doesn't matter which way you go,' said the Cat.

Lewis Carroll

The analysis of the reviews experienced in the rural R&D sector over the period 1991–95 has served to crystallise many of the issues currently causing difficulties for the RDCs. It has also become increasingly obvious that, rather than clarification about the role of the RDCs resulting from such evaluations, confusion and ambiguity have typified both the recommendations of the reviews and the responses of those most affected by them. A number of questions have emerged from the examination of the reviews ranging from specific operational issues to more amorphous, conceptual, problems that deal with the nature of R&D and the prevailing research environment. These questions are built upon by decisions made in the Innovation Statement that have both confirmed and modified some of the foundations upon which the RDCs were originally based.

This chapter will address each of the questions raised in the previous one. It will supplement the material already presented with information gathered through interviews and will consider both the immediate difficulties confronting the RDCs and possible future challenges. In order to clarify these issues, this chapter isolates problems as they relate to each of the RDCs' key stakeholders and their environment. Thus, industry, researchers, government, the RDCs and the R&D environment itself, are each considered.

Breaking these issues into five distinct categories allows key themes and questions to be drawn out in relation to each of the focal areas listed above. For example, the way in which industry has responded positively to the introduction of the RDCs has, on the surface, been a triumph for those responsible for establishing the corporations. However, the question arises as to whether this support is real, or whether the RDCs have merely provided another vehicle through which the rural sector can gain resources. In light of the Innovation Statement, will industry actually contribute more resources to R&D, or will the RDCs be faced with a reduced funding base? In contrast to industry, those researchers that must now gain contracts through the RDCs have, on the whole, reacted negatively to the changes and have raised a number of problems. Are we depleting our research infrastructure to the extent that in, say, 10 years time we will not have a research capacity in Australia? Has the amount of basic research declined to the extent that there is a danger of losing the foundations from which other, more applied research can be conducted?

In light of recent decisions, the role of government in relation to the RDCs appears to be under question. Is the Innovation Statement indicative of a government unsure of the value of its investment in the RDCs? Has the IC recommendation for a distinction to be drawn

between public good and private benefit resulted in a government more concerned with monitoring the process than with the outcomes of research activity? For example, are we moving towards the adoption of the New Zealand approach to R&D*, with government becoming a *purchaser of*, rather than *co-investor in*, research?

These questions place the RDCs in a difficult position as they must respond to stakeholder demands as well as undertake the core business of R&D investment and management. Are the RDCs losing sight of their original goals in order to meet these demands? Are the corporations becoming over-bureaucratised as they attempt to negotiate their way through an increasing work load? As State and Federal governments pull back resources from the area have the RDCs become the de facto funding source for rural R&D? What does the future hold for these organisations as they face an R&D environment that is placing considerably more, rather than less, demands upon them? In light of the importance of these questions, this section addresses each of the problems and concerns upon which such difficulties are based. In so doing consideration is given to both the threats and opportunities that will determine the future of the RDCs.

Industry: the Perception of Success?

Perhaps the most positive finding of each review has been that the RDCs are meeting the objectives of corporatisation. There has been a substantial increase in industry R&D investment, with rural producers reported in all the reviews as being actively involved in the determination of research priorities. Industry support and awareness of the model appears to be strong, with a recent producer survey conducted by GRDC reporting 51% of farmers as having changed farming practices through the adoption of research findings over the last five years. In addition, 'unaided awareness' of the existence of the GRDC had more than doubled over the same period, from 7% to 18%. These findings are consistent with comments made by other RDC managers about the increase in producer R&D knowledge and support of the corporations in general. Further evidence of support has been increased activity by the NFF to promote the benefits of investment in rural R&D.

A number of reasons may be suggested for this success in gaining producer support. The most frequently cited explanation given by producers and RDCs alike is that, under the new system, it is the industries rather than the researchers that are driving the research agenda. It is argued by RDC managers that this change is responsible for the development of a genuine realisation amongst rural producers that R&D is producing tangible and, more importantly, useable results designed to assist them. This assertion is supported by anecdotal evidence of an attitudinal change occurring within the rural sector. For example, early attempts by one corporation to bring together industry and researchers to develop a joint plan for the industry concerned revealed a dichotomy of interest and understanding between the two groups. This was demonstrated through an exercise that involved researchers listing the main research breakthroughs that had occurred in that particular commodity area over the previous 20 years. While researchers rated 27, producers rated only 3 of these as having been of any benefit to the industry. This kind of disparity was representative of one of the main problems that existed in the R&D sector before the introduction of the RDC model, namely a lack of communication and contact between the stakeholders involved in rural R&D.

Words such as 'transparent', 'responsive', 'effective', 'efficient' and 'approachable' were used by RDC managers to describe the services which industry has come to expect the corporations to provide. The epithet 'honest broker' is being used to describe the role of RDCs. Producers can depend upon their particular corporation as an honest broker providing objective, expert advice about rural issues. The

* For more details see Lovett, S. (1994c) in bibliography.

perceived apolitical nature of the RDCs has meant that producers can use these organisations, secure in the knowledge that their main concern is the betterment of their particular industry in not only economic, but also social, cultural and environmental terms.

The honest broker role is one that has also served to shift the distribution of influence in the rural R&D sector. Before the changes introduced in the 1989 PIERD Act it was clear that researchers were in control of the research agenda. For producers, challenging this researcher-dominated system was inconceivable because of the monopoly of knowledge held by the research community. Producers were described by some RDC managers as being wary of entering into negotiations with this traditionally separate and 'clever' community. The establishment of the RDCs has shifted influence away from the researchers and enfranchised producers so that they may take a more active role in the determination of research priorities. This means that rural producers now put forward R&D proposals with greater confidence, rather than the previous situation in which it was felt that researchers patronised growers by telling them what they could and could not do.

Although researcher dominance of the system before the 1989 reforms was a reality, it must also be recognised that producers were not lobbying to draw attention to their R&D needs. The main characteristic of the rural sector, like other industrial sectors in Australia, was apathy rather than enthusiasm about the possible benefits of R&D. The introduction of the RDCs transformed some producers' attitudes about the potential of R&D to assist in the development of more commercially profitable commodities. This 'transformation' has been attributed by the RDCs to their subtle education campaign. Educating minds traditionally opposed to anything scholastic has proved, it was said, to be one of the most fundamental components of RDC research programs.

The effect of the introduction of the RDCs has been, therefore, to boost producer interest and involvement in the management and direction of R&D as it affected particular rural commodities. The perception of success that currently surrounds the RDC model is thus due primarily to the producer support the system appears to have gained. Producers are described by the RDCs as possessing a strong feeling of ownership of the model, which has led, in some cases, to industry, rather than researchers, pushing the R&D case to government and other agencies.

Re-assessing the Perception of Success

Industry support for the model has meant that government and producers alike pay significantly more attention to R&D than was the case five years ago. This attention has raised the profile of the rural R&D sector to a level unanticipated by those responsible for initially establishing the RDC system. However, it needs to be asked whether industry support is as widespread as reported, or if a few politically astute producers have recognised the resource benefits provided through the RDCs and the significant amount of government money that is channelled through these organisations.

In August 1995, a NFF conference hinted at the possibility of producers using R&D to further their own interests, rather than because of any sustained commitment to research per se. This conference was convened to address a 'Draft National Agricultural Research Strategy for Australia'. Over 200 delegates attended, with the NFF gaining a great deal of media attention and praise for organising such a forum. Both the Minister for the Department of Primary Industries and Energy, Senator Bob Collins, and Senator Peter Cook, Minister for Industry, Science and Technology, addressed the conference, adding to the media hype that surrounded proceedings. Research had seemingly become vital to the nation with the NFF espousing the rhetoric of innovation and the benefits of Australia being a 'clever country'.

Most of the delegates at the conference, however, were there as a result of government funding in one form or another, a situation characteristic of R&D in Australia. People from publicly funded research institutions, the RDCs, educational institutions and rural industry representatives attended, as well as a new breed of professionals who provide consultancy services for rural industries and lobby for producers' interests. Of the producers present, most held positions in off-farm industries or were members of the boards of RDCs. 'Independent' producers, unattached to a government or government-sponsored organisation, were conspicuous by their absence.

The timing of this particular conference was such that, with an election looming, the NFF was able to promote rural sector interests by using the issue of R&D to gain media, political and financial support. Given the large number of marginal seats in rural electorates, the two Ministers attending the conference were unlikely to make any controversial statements that would upset the farm lobby—there was no hint of any forthcoming funding cuts. The NFF and some representatives of rural industries exploited this situation to raise a number of issues and problems, many of which were unrelated to R&D. Overall, the conference achieved very little in furthering the development of a National Agricultural Research Strategy for Australia.

The conference proceedings contained a series of 'motherhood' statements about commitment to research, partnerships between industry and government and the need to ensure that Australia was part of the global innovation system. The statements lacked substance in that they failed to place on any organisation the responsibility for carrying such commitments forward. As a result, the conference was a lost opportunity for the production of a research strategy for the nation, but it was politically beneficial for the Australian rural lobby, which placed demands and pressures upon government for maintenance of drought-related financial assistance packages.

These observations suggest that the rural sector had supported the RDC model largely because it provided another conduit for government funds. Producers have to invest in R&D because the matching levy is compulsory. Rather than a widespread enlightenment of all producers about the benefits of R&D, it is more likely a case of rural growers having little choice but to comply with legally enforceable obligations. Many of the RDC managers noted that this was the case for their particular industries, with doubts expressed about whether the majority of producers would ever invest in R&D of their own free will.

An Arranged Marriage? Industry and R&D

The preceding comments suggest that, on the whole, some rural industries are still investing in R&D only because they have to. The real test of this proposition will be whether industry responds positively to the challenge presented by a reduction of government funds in the RDCs. As shown in Table 4, for industries that currently contribute below the new level of 0.4% GVP there will be little impact. In the grains, sugar and pig industries, producers are already investing at more than 0.5% GVP. This means that these RDCs will come close to maintaining existing funding levels despite the drop in government funding to 0.4% GVP. The GRDC will, in fact, be better off under the new arrangements, as the $1 government to $2 industry matching arrangement over the 0.4% level will result in producers in this sector being rewarded for their current commitment to 0.77% GVP.

The position of the grain industry contrasts with others such as meat and wool, whose R&D levies fall between 0.4 and 0.5% GVP. These RDCs predict that the reduced rate of matching dollars will have a significant effect on their operations. For example, although the Meat Research Corporation (MRC) has a large number of producers, the ceiling of 0.5% levy contributions has been capped by growers who refuse to

commit further money to R&D. This means that the MRC will lose a substantial amount of funds unless its producers are prepared to lift the cap. The NFF also made the point that the government's decision to reduce funding had occurred at a time when the sector could ill-afford any increased financial burdens because of the effects drought, flooding and other environmental problems were having in rural communities. The corollary was that it was unlikely these industries would invest more in R&D and, in fact, would prefer to see the overall level of funding dropped.

The differences between the RDCs in relation to the level of R&D contribution, present one of the main stumbling blocks for policy makers trying to grapple with the issues surrounding rural R&D. It is impossible to generalise across all the RDCs when each is so very different in terms of industry composition, culture and, more specifically, conception of the value of R&D. Many rural industries are no more alike than chalk and cheese and, if decisions are to be taken that alter current RDC funding and management arrangements, a case-by-case approach needs to be taken. This is the only way that issues such as the capacity of industry to pay and the economic, political and social environment in which particular RDCs are located, can be taken into consideration.

Table 4. Projected impact of new government matching levy arrangements on rural research and development corporation funds.

	Industry contribution (% of GVP)	Industry GVP ($m)	Industry levy ($m)	New Government contribution ($m)	Difference ($m)
Commodities					
Cotton	0.36	719	2.6	2.6	0
Dairy	0.29	2,238	6.5	6.5	0
Fisheries	0.16	1,294	2.1	2.1	0
Grains	0.77	4,238	32.6	24.2	2.9
Grape & Wine	0.14	1,200	1.7	1.7	0
Horticulture	0.26	3,500	9.1	9.1	0
Meat	0.49	5,010	24.6	22.3	-2.3
Pig	0.54	654	3.5	3.1	-0.2
Sugar	0.57	781	4.5	3.9	-0.1
Wool	0.50	2,536	12.7	11.4	-1.3
RIRDC	na	na	na	na	na
Rice	0.39	198	0.8	0.8	-0.2
Chicken Meat	0.06	645	0.4	0.4	0
Dried Fruits	0.42	110	0.5	0.5	0
Eggs	0.23	284	0.7	0.7	0
Honeybee	0.50	30	0.2	0.1	0
Tobacco	1.02	63	0.6	0.4	0.1
Total		**23,500**	**103.1**	**89.8**	**-1.3**

* Calculations based on 93/94 Figures

Researchers: a Period of Adjustment

The group most affected by the changes to rural R&D has been, without doubt, the researchers. The advent of the RDCs has dramatically altered the dynamics of the R&D sector. Researchers now have to respond to industry-defined research directions. It is no surprise that the transition to these new arrangements has not been easy, with the reform environment being particularly threatening to a group of professionals who had held a position of overriding influence for so long. Competitive tendering has forced them to develop new skills in order to submit bids that are not only succinct, but also relevant to the industry concerned. This latter requirement had not been explicit in previous funding arrangements and had resulted, it was argued, in researchers believing that they knew what was best for industry without actually asking the producers concerned. The disparity between researcher and producer perceptions of these needs had been large and it was this discrepancy that formed the basis of Miller's contention that it was time that industry, rather than 'wise old men', directed R&D.

The strength of the relationship between researchers and industry stakeholders varies from one RDC to another. The Cotton RDC has an excellent relationship with researchers. This is largely because it established its own R&D centre, the Cotton Research Institute. The SRDC invested in the development of a new sugar research organisation, to break the 'closed shop' through which research had previously been done for the industry. The MRC, on the other hand, has an uneasy relationship with its research community due to the corporation's self-confessed adoption of a 'crash through or crash' management philosophy. The change from a somewhat paternalistic and benevolent government managerial style to that of an abrasive and demanding RDC was one that generated resentment and hostility in some research agencies.

The main reason researchers are now being treated differently is a fundamental belief in the need for R&D to reflect industry objectives. While some researchers still have difficulties with the new arrangements, it is also the case that many have made the transition relatively smoothly and are equipping their organisations to deal with the reformed system. It was pointed out by one manager that the RDCs had not been created to 'attack researchers', but rather to refocus R&D on rural industry objectives.

The new system can also help researchers to get on with the business of R&D. As the agencies in which government, industry and researcher interests are brought together, it is the RDCs that are responsible for maintaining linkages, establishing relationships and ensuring these groups work together cohesively. The RDCs facilitate contact between groups and individuals, which in turn leads to the formation of networks, as well as dealing with the administrative work load of investing in R&D. This was described by one RDC manager as 'freeing up' researchers from some of the time-consuming administrative difficulties that tend to characterise the management of R&D. The recent introduction of longer-term funding cycles has meant that, although researchers are initially 'put through the hoops', they may then be funded for up to 5 years. This source of guaranteed funds provides researchers with a measure of security that was lacking when the RDCs were first introduced.

Theoretically, therefore, the potential freedom that the RDCs can provide to researchers could be recognised as a positive outcome of the reforms. However, many scientists believe that to gain access to these benefits, they now have spend more time than ever filling out forms. The increasing number of research submissions to RDCs has led some of the corporations to develop a range of mechanisms for screening the 'good' from the 'bad' research projects, with the corollary being an increase in the detail required in research submissions. The GRDC, for example, requires a benefit–cost analysis for each full research submission, something that one researcher estimated cost his organisation an additional $3000 in time and effort to provide.

Other corporations use other tactics to try and weed out those research bids that may not deliver what they promise. The overall result is a demand for analytical rigour that did not previously exist in the sector.

In order to cope with these new demands, researchers have had to equip themselves with a range of new skills. In some cases, professional agencies are used to prepare bids, in order to boost the chances of a research agency gaining a contract. Other strategies have involved the development of alliances with industry groups, so that particular research facilities become affiliated or recognised as being the 'experts' in a commodity area. One of the most important parts of any research submission is whether the results of the proposed R&D will benefit industry. This has required researchers to become significantly more aware of the problems and needs of rural industries they serve.

Although the RDC-promoted rhetoric behind these changes in management style and operation seems sound, it is still the case that many research institutions have been slow to adopt these new processes and requirements. Michael Hitchens, an Assistant Secretary in the DPIE Corporate Policy Division, believes that many research institutes are failing to appreciate the operational differences involved in the transition from a public sector to a more commercial environment. He argues that the main stumbling block for some research agencies is that they cost rather than price their research. By this he is referring to the fact that some research institutes, notably CSIRO and the universities, attempt full cost recovery by adding everything up and putting an extra bit here and there to cover a variety of sundry expenses. This is not the way that professional organisations competitively price the services they provide. Price takes account of market demand, level of competition and potential benefit to the organisation of gaining the contract. In contrast to the adoption of this type of approach, research submissions from the CSIRO were described as generally consisting of over-inflated bids designed to cover the organisation's overheads, rather than provide a competitive, market-orientated service.

The change in R&D culture stimulated by the introduction of the RDCs has required a change in approach by researchers seeking corporation funds. However, a major problem has arisen in the sector because State governments, in particular, are tending to view the RDCs as replacement R&D funding organisations rather than as complementary sources of funding. The RDCs, as a result, are becoming increasingly relied upon by researchers to provide all the funding and infrastructure for the rural R&D system. If this attitude persists it could have dire consequences for the maintenance of an Australian R&D capacity.

Australia's R&D Capacity Under Threat?

Some researchers have argued that the strong industry focus of the RDCs has resulted in a decrease in the amount of basic research being undertaken and a corresponding erosion of research infrastructure. Research infrastructure covers all those things required to enable a research program to be undertaken, including the provision of support for the work of individual scientists. Richard Williams, a Senior Research Policy Adviser with the Bureau of Resource Sciences, believes that if the current decline in infrastructure is allowed to continue, within 10 years the nation could face a crisis in its R&D sector. The issue of research infrastructure was highlighted in the IC Report as one of the main problems facing the R&D community. The IC's subsequent recommendation was that all research projects, whether from public or private sector organisations, be submitted on a fully funded rather than marginal basis. This would mean that researchers would factor into each research bid the costs of maintaining existing infrastructure or investing in new capital equipment.

The response of RDC managers to the suggestion of fully funded research bids was positive, although some individuals believed that the research infrastructure argument was

essentially a 'furphy'. When a bid was successful in gaining RDC funds it was pointed out that the money had few restrictions placed upon it in terms of where or on what the research institution could spend it. The implication of this attitude is that money gained through an RDC could, quite easily, be spent on infrastructure. Most RDC managers said that they did not want to know what the money they provided was spent on so long as agreed milestones in the research project were met. Researchers might also spend the money on, for example, overseas travel or new equipment—the only proviso was that the performance targets set by the RDC were accomplished. RDC managers said that infrastructure costs were justified when a contract for a particular research project was awarded to an organisation. However, research projects submitted to the RDC for funding should not expect infrastructure costs to be met. There is no contradiction here. What is being said is that infrastructure costs may be provided if they meet an industry-defined need but not if they are addressing a research institution need. It should be noted that, although the freedom granted to the researchers has been considerable, failure to meet agreed milestones could lead to the RDC suing the research agency for breach of contract. This is a very real incentive for researchers to spend sensibly and responsibly the funds they gain.

One RDC manager noted an interesting episode relating to funding for the maintenance of research infrastructure. His corporation had been presented with a submission that sought funds to retain a staff member in a State agricultural research department. The justification for this bid was that the individual concerned was the only expert left in this particular region who could deal with a particular type of commodity problem. The RDC was thus placed in a position where it would be 'damned if it did and damned if it didn't'. If the RDC chose to fund the researcher's salary, it would be providing monies for what was a State government responsibility. If the RDC did not provide the money, growers in that particular region would lose expertise of value to their industry. In the end it was decided that the precedent the corporation would have set by providing funds that were essentially for salary would have released a floodgate of similar applications from research groups that were feeling the pinch of Commonwealth and State funding cuts.

If submissions are made to the RDCs for funds to conduct a research project, there is no prerequisite for details of where those funds are to be spent. In cases where the funds are explicitly attached to infrastructure the allocation of funds becomes more difficult for the RDCs. The effect of this is to encourage researchers to place submissions for research contracts without specifying that the money will, in fact, be spent on infrastructure.

An additional factor that needs to be considered is that, in order for research infrastructure costs to be covered by an RDC, the project proposed must relate to a particular commodity. If this situation is taken a step further, it is possible to speculate that the R&D community may face the problem of infrastructure being maintained only for those researchers that tailor their work to a particular corporation. An increase in RDC submissions from organisations such as the universities and CSIRO might mean that Australia could lose its R&D capacity in those areas that do not specifically meet RDC goals and objectives. Thus, it might eventuate that only commodity-based R&D was being done, with the broader issues facing the rural sector and the community at large left untouched.

The issue of research infrastructure is clearly one of importance for the R&D community. Some have viewed it as a research management problem. If organisations such as CSIRO and the universities are to be competitive, it is argued, they have to manage their funds better so that infrastructure costs are covered. This argument has been used by both government and RDC personnel who have felt that the infrastructure issue was being hijacked by researchers uncomfortable with the new arrangements and concerned to protect their interests.

Whatever the reason, if the issue of research infrastructure is not considered by policymakers, very real problems might develop in relation to the maintenance of Australia's R&D capacity. The 1995 Innovation Statement failed to address this problem, a source of disappointment for many in the R&D community. The suggestion made by the IC of explicitly recognising the costs of infrastructure by fully funding research submissions appears to have been rejected by government. It must be recognised that research infrastructure is not only an RDC responsibility but one that government, at both the State and Federal levels, must continue to address. The problem currently appears to be one in which the RDCs are the organisations with the money and, as such, they attract researchers faced with scarce resources. The danger is that, as State governments, in particular, continue to pull back resources, the RDCs will become increasingly relied upon to provide support for infrastructure. The issue remains, therefore, of governments abdicating their responsibilities for maintaining Australia's research capacity. This strategy in the long term will erode infrastructure to the point where basic facilities may not exist in areas that do not conform to RDC needs.

The Research Mix

Another issue identified by researchers as resulting from the rural R&D reforms has been the perceived decline in the amount of basic research being undertaken. Their concern is that basic research provides the foundations for more applied and strategic research. According to Keith Pavitt, in his study 'Technical Innovation and British Economic Performance' (1980), without such foundations there is little chance of a country remaining competitive.

Some researchers believe that the entrance of the RDCs into the R&D marketplace has led to an overemphasis on short term, tangible research gains to the detriment of funding of basic research. RDC research investment patterns tend to support this assertion. Table 5 shows that 62% of R&D undertaken by the RDCs is applied research. However, the picture does not seem to be as grim as that painted by researchers, with 11% of R&D investment in basic research and another 27% in strategic research. Examination of the table also reveals considerable differences between RDCs as regards the amount of investment undertaken in various research categories. This is not surprising given that the research mix of each corporation reflects industry demands for R&D to be undertaken in particular areas. It is also important to note that most of the RDCs, contrary to researcher perceptions, invest in a number of projects that range across the entire R&D spectrum.

RDC managers therefore largely rejected suggestions that investment in basic research had declined. They said that, if they were doing their job properly, research investment would range along the entire R&D continuum. Indeed, the point was made that the RDCs were, in fact, in a better position than private companies to undertake basic research. A high-risk project may have only a 10% chance of return, a rate that would preclude some private companies from investing. Government matching of industry funds means that the RDCs have the leverage to invest in high-risk research from which returns were not guaranteed. The RDCs are thus able to support research that has the potential to break new ground. Overall, interviews undertaken with RDC managers indicated no lack of understanding about the need for basic research. Indeed, most respondents were strong supporters of such research.

It is also pertinent to consider the findings of the Byrne Report on this issue. It noted the short time the RDCs had been in operation, with the corollary being that short-term, more immediate R&D problems were being funded first. If industry could gain some tangible research benefits relatively quickly, producers would be more likely to maintain their interest and financial support for R&D. This was important for the long-term future of the R&D sector. The logical outcome of this strategy is that investment

at the basic end of the research spectrum is now more likely to increase, as the shorter term problems are progressively solved.

The issues that arise in relation to basic research, as with those concerning research infrastructure are, inevitably, matters which only government can resolve. A complicating factor that partially accounts for the call by researchers for a greater amount of basic research to be funded by the RDCs is the requirement for some research institutes, in particular the universities, to gain external funds. This has meant that those involved in basic research are more vulnerable to financial constraints than researchers involved more exclusively in commercially applicable R&D projects. Modifying long-term projects to suit RDC requirements is not an easy task, although it is becoming a feature of the R&D environment as the imperative of securing funds sees researchers putting in submissions to the corporation in the hope of gaining financial support. This was not a situation Miller had envisaged.

Problems relating to the research mix are closely linked to issues surrounding infrastructure. Miller designed the RDCs to complement other research institutions and their programs. On this basis, he expected funding to be maintained for basic research in organisations such as CSIRO and the universities. But this has not happened, with funds generally decreasing rather than increasing for such institutions. This has meant that the RDCs are now focused upon by researchers as the de facto funding source and, therefore, the main targets for gripes about the

Table 5. Rural research and development corporations research investment patterns, 1995.

R&D Corporation/Council	% Basic	% Strategic	% Applied	1994–95 Budget ($m)
Cotton R&D Corporation	25	28	47	6.1
Dairy R&D Corporation	13	32	55	18.4
Energy R&D Corporation	0	0	100	17.1
Fisheries R&D Corporation	15	45	40	14.0
Forest & Wood Products R&D Corporation	2	13	85	3.2
Grains R&D Corporation	13	22	65	51.0
Grape & Wine R&D Corporation	19	44	37	3.8
Horticultural R&D Corporation	5	20	75	21.5
International Wool Secretariat	0	22	78	32.8
Land & Water Resources R&D Corporation	15	65	20	21.0
Meat Research Corporation	15	20	65	52.7
Pig R&D Corporation	38	20	42	7.9
Rural Industries R&D Corporation	5	22	73	15.6
Sugar R&D Corporation	7	50	43	9.4
Chicken Meat Research Council	15	35	50	1.7
Dried Fruits Research Council	4	13	83	1.5
Egg Industry Research Council	16	37	47	1.2
Honeybee Research Council	0	60	40	0.3
Tobacco Research Council	7	41	52	1.3
Total $m				**280.5**
Percent	**11**	**27**	**62**	**100%**

nature of the research mix being funded. Casting the RDCs in this position is unjustified, as these organisations were not designed to fulfil this role. In addition, concentrating on the RDCs deflects attention away from the real issue, which is the declining level of assistance from government. The long-term implications of this problem are, as already highlighted, that the research mix in Australia will become that which reflects only RDC industry needs and neglects broader R&D directed to the benefit of the community as a whole.

The Quality of Research

Whether the quality of research has improved as a result of the introduction of the RDCs was a question notably missing from the terms of all the reviews examined earlier. Although a seemingly obvious measure of RDC success, quality has not been a specific focus of attention in any of the terms of reference or recommendations developed by the various review teams. This may be because 'quality' is a diffuse concept difficult to tie down. What exactly does 'quality' mean in relation to R&D? Does quality mean scientific rigour? Does quality relate to the applicability of research results? Does quality refer to the process by which the R&D was undertaken?

When this was put to RDC managers, it became apparent that the primary criterion used to determine the quality or otherwise of research was whether or not the results could be used by industry. Industry relevance stood out as the main measure by which the RDCs evaluated their operation in the R&D community. With this as the basis of assessment, most RDC managers said that they felt R&D had improved as a result of the reforms. It was argued that the processes which governed whether or not a project was funded ensured that the R&D undertaken would meet industry needs. For corporations such as LWRRDC that engaged in more generic studies such as, for example, environmentally sustainable water use, industry relevance was still an important criterion of success.

Industry relevance was also emphasised by the RDCs as being dependent upon R&D that was conducted efficiently and effectively. Considerable pressure is now placed upon researchers to meet rigorous reporting and milestone requirements. These requirements serve to guide researchers, and to enable the RDCs to track the results of their R&D investment. Because the RDCs receive all the submissions for research to be undertaken in a particular area, significantly less duplication now occurs throughout rural R&D. Generally, only one of these submissions actually gains the funds, with those researchers that fail to gain financial support having to work in different areas. The application process thus reduces duplication and provides a leading focus on results and outputs. This focus was one that was lacking before the introduction of the RDCs, when researchers conducted projects of interest to them, rather than responding to the needs of a particular group or organisation.

The words used by RDC managers to determine the quality of research were, therefore, those that seemed to relate primarily to the relevance of its outcomes and the process by which R&D was being conducted. Although RDC managers were confident that the quality of research had improved, Williams argued that it would take at least 10 years of operation for each RDC to make a confident and valid assessment of such assertions. This was a sentiment echoed by a number of those interviewed, although all RDC managers agreed that, insofar as their organisations were concerned, it was whether the research undertaken could be used by industry that remained the main gauge of success or failure.

Coping with the Changes: Researcher Tactics

In summary, the picture so far is of an R&D community that has had to adjust to a significant degree of change in its environment. This change has affected the way researchers do their business as well as how clients needs are met. This

'adjustment' has created problems for many researchers but there are signs that scientists are coming to terms with the reforms and are, in fact, learning to appreciate the benefits the new system can provide. Researchers also seem, in some measure, to be re-building the power base that the adoption of this model had initially eroded. For example, although it is denied by RDC managers, those researchers able to put in the 'glossiest' application in terms of design and presentation are more likely to gain RDC research contracts than those less well presented. This might mean that research projects that are actually more worth while in terms of their potential benefits to industry might be passed over in favour of the more 'professional' application. RDC managers refute this suggestion, despite the fact that it follows that, in organisations valuing efficiency, effectiveness and professionalism so highly, the best presented applications would be more likely to gain the funds. Investment in the professional production of research bids may therefore become a worth while expense if it means a research organisation gains a lucrative RDC contract.

There are, nevertheless, problems emerging as the research community attempts to protect its interests. Some research institutes are endeavouring to develop strategic alliances with parts of industry in order to become the 'natural' choice for investment by particular RDCs. By getting closer to industry, researchers are also able to influence those who are involved in the selection of research projects. Interviews with RDC managers revealed that some corporations were experiencing problems because their governing boards were inclining towards 'gee-whiz' projects involving new technologies. These choices may be made over other projects that do not have the technical interest but which provide solutions more appropriate to the needs of their industry. The level of board involvement varies across corporations, but researchers are becoming aware of the predilection outlined above, and have sometimes, it has been reported, geared up their bids to increase the chances of industry support, even if in some cases the research is dressed up to look more ground-breaking than is the case.

All RDCs need to be aware of and manage these kinds of researcher tactics. However, a growing problem highlighted by one RDC manager has the potential to degrade the system completely. This manager stressed the importance of being sure that submissions put to the corporations were, in fact, for new research, rather than for research that had already been done! It appears that some researchers have sought funds for projects that have already been completed and then used those funds for other activities. The monopoly on knowledge held by researchers puts the RDCs at a severe disadvantage in dealing with this problem, particularly if there are only a few scientists working in that particular commodity area. While it is likely that such scams are still rare, to detect and expose them, the RDCs will need to maintain vigilance. Spurious proposals have the potential to bring great discredit to the R&D grant allocation system as well as a further drain on diminishing research resources.

Government: a Maze of Contradictions

Government has been the advocate for change in many aspects of rural R&D, with the parts it has played in the reform process ranging from motivating agent to co-ordinator to stakeholder and reviewer. It has been in these latter roles that recent difficulties have arisen. A conceptual distinction is beginning to develop between those who perceive the RDCs as autonomous units at 'elbow's length' from government and those that view the corporations as government entities and, therefore, subject to accountability, reporting and evaluation requirements like any other public service department. This conceptual conflict has been heightened through government-initiated reviews and reports that have questioned the accountability arrangements that exist between the RDCs and their joint stakeholders, Parliament and industry. The issues that have arisen from this conflict raise

questions about the very basis upon which the RDCs were founded, and challenge the role which Miller and Kerin saw government performing.

Dual Accountability Under Threat?

The RDC model is dependent upon each corporation having freedom to operate independently in a commercial environment. In order to grant these organisations this freedom, the accountability arrangements conceived by the architects of the reforms rested upon both dual and strategic accountability techniques. In the case of the RDCs, they are accountable to Parliament through the Minister and to industry through representative producer organisations. The accountability mechanism operates through the use of strategic planning and reporting requirements, with an annual report the main means through which each RDC is held accountable to its stakeholders. In addition to an annual report, each RDC must also produce five-year strategic and annual operational plans for the Minister's approval. These plans are developed in consultation with industry to ensure that they reflect the needs of the particular commodity sector concerned. Once approval has been gained from the Minister, each of these reports and plans is subsequently presented to industry for scrutiny.

These accountability arrangements were designed to assure both RDCs and stakeholders that the corporations were meeting their objectives as laid out in the PIERD Act. Dual accountability decentralised the accountability process and was designed to replace more rigid and centralised control mechanisms in a system that maintained, but did not restrict, the accountability relationship between RDC and stakeholder. The adoption of this system of accountability represented a new approach to the management of statutory authorities and sought to grant organisations like the RDCs a free rein in terms of their operational and managerial practices while, at the same time, ensuring that they remained aware of their public and private stakeholder responsibilities. Despite the logic of these arrangements this system of dual and strategic accountability now appears to be under threat.

This threat has been encapsulated in a Department of Finance document that has sought to impose further reporting requirements upon the RDCs. In 1991, the Joint Committee of Public Accounts released a report entitled 'Annual Reporting Guidelines for Statutory Authorities'. The report put the view that 'there were no consistent or all embracing legislative requirements for every statutory authority to report to Parliament annually'. This finding led the committee to recommend that new guidelines be developed to ensure all government statutory authorities prepared annual reports that met uniform operational and financial requirements. It was not until 1995 that this recommendation was acted upon, with the Department of Finance commissioned to develop the principles, standards and contents of annual reports as they related to government statutory authorities. The results of this work were to then form the basis for the inclusion of an Annual Report requirement schedule in the *Commonwealth Authorities and Companies Act 1995*.

In mid 1995, a Department of Finance Exposure Draft dealing with these reporting requirements was released and circulated to all government statutory authorities for comment. The RDCs saw this document as an attempt by government to impose further reporting requirements on them and, not surprisingly, they did not support it. In a joint submission to the Department of Finance, the RDCs noted that:

> ...the document seemed to represent a proposal for a generic reporting model for both small as well as very large authorities, together with additional requirements for authorities such as R&D Corporations. As such, it must suffer from its lack of recognition of the circumstances of individual authorities and the burdens it imposes on them.

The generic nature of the exposure draft meant, the corporations argued, that the particular characteristics of each individual RDC had not

been considered. The Department of Finance had also appeared to neglect consideration of the dual and strategic accountability arrangements with which the corporations already had to comply. As was pointed in the RDC response, Division 4 of the 1989 PIERD Act was devoted entirely to outlining the content of an annual report designed to provide the key mechanism through which each RDC was held accountable. Adoption of the draft would, effectively, supersede the PIERD Act as well as impose requirements for new and, it was argued, largely irrelevant details of RDC operations.

The RDC managers also pointed out that the draft required details from the corporations that misunderstood the work of these organisations and sought to impose generic criteria upon a group of agencies for which such categories were inappropriate. Profit and loss statements in relation to the net cost of the services provided by the RDCs were required for each area of corporation expense. The RDCs noted, in response to such requests, that the nature of the activities they undertook could not, in fact, be measured according to such criteria. In addition, the draft sought details of the minutes of board meetings; all research results including those that were confidential and had commercialisation potential; personal details of executive officers employed by the RDC; and staff details including gender breakdown, absenteeism and human resource management training programs.

The scale and extent of such detail was, according to the RDCs, not only inappropriate but also irrelevant in terms of the work of their organisations. On the whole, it was argued that the imposition of these reporting requirements actually deflected attention and resources away from the RDCs' primary goal, which was to produce industry-relevant R&D outcomes. (Some interviewees also asserted that adoption of the guidelines could result in some RDCs employing additional staff just to fulfil reporting requirements.)

In summary, the RDCs' objections to the draft reporting guidelines rested on three main issues. Firstly, the draft did not take account of current disclosure arrangements; secondly, it did not recognise that the reporting requirements it listed could not easily be met by a number of authorities without increasing their current administrative and management resources; and thirdly, it failed to account for existing legislative reporting requirements. The overall impression gained from the uniformly negative reaction by the RDCs was that these organisations were tired of the seemingly endless reporting and review requirements imposed upon them. It could be argued on the other hand that, since these organisations are getting half of their funds from government, they must be prepared to respond to the requirements of that stakeholder.

Whether or not the Department of Finance guidelines are implemented in their current form, the accountability issues they raise highlight current difficulties that surround government and its relationship with the RDCs. Despite the fact that accountability mechanisms exist and were considered by those that established the corporations to provide sufficient feedback on performance, the period under review has seen the RDCs placed under consistent pressure for additional information and increased reporting requirements.

A variety of responses was gathered from interviewees on the issue of DPIE interference in corporation activities. A number of the RDCs said that they felt the term 'overseer' was too strong to describe the role of the department. Rather, some argued that DPIE was doing a good job of advising the Minister on what the RDCs were doing. However, these supportive comments were countered by others who argued that the covert way in which some sections of DPIE sought information was annoying, unprofessional and a constant source of irritation for their organisations. Others felt that DPIE did not know what it was doing anyway and that so long as they gave the department the information it thought it required they could manage its demands. A last group of responses related to those RDCs that had difficulties with areas in the

department specialising in the same commodity area. In these situations, DPIE divisions concerned were reported as being quite hostile to the RDCs, with the corporations apparently viewed as competitors. In contrast, one RDC manager reported relations with its divisional body as excellent, supportive and extremely beneficial.

The range of perceptions of DPIE—from 'nuisance' to 'advocate'—once again demonstrates the diversity that characterises RDC operations. A factor influencing perceptions of DPIE—positive or negative—was the home base of the RDC manager being interviewed. RDCs in Canberra, close to DPIE, seemed to experience greater intervention than for those located in other centres.

Whatever the perception of DPIE, it is clearly the case that interactions between the bureaucracy and RDCs are producing both positive and negative effects. Patronising comments were made from both bureaucrats and RDC managers alike about their relationships. On the one hand, bureaucrats seemed to think that the RDCs were a bit 'precious' in relation to their claims of being different to other statutory authorities, while the RDC managers conveyed an impression of the 'bumbling' bureaucracy as basically having no idea of what was going on either within or outside its organisational boundaries.

However, the reality of the situation for the RDCs is that they must comply with the demands placed upon them by government. As a stakeholder, government, whether in the form of the Department of Finance, DPIE or a Senate Estimates Committee, has the right to request information and details about RDC operations. Although this situation places the RDCs in a somewhat vulnerable position, there is also a responsibility upon government to consider the impact of the demands it places upon the corporations. In light of both interviews and observations, the increasing pressures placed upon the RDCs for reporting and evaluation documents are directing resources into monitoring the process rather than the outcomes of the work the corporations were created to accomplish.

Means More Important than the Ends: Government Losing Its Way?

The reviews undertaken over the period 1991–95 focused attention upon the evaluation of RDC activity. On the whole, this arose from the question: Are the government dollars going into the RDCs delivering public good outcomes? Although this is a valid question, the quest to evaluate is becoming an end in itself—the means by which work is accomplished is becoming more important than its outcomes and benefits for industry and the community.

The attention paid to this issue was not something intended by those who established the RDCs. Miller argues that attempting to separate public and private good is futile, as both are interrelated in any form of research outcome. This was a view echoed in both the Gleeson/Lascelles and Byrne reports, and is one supported by Kerin, Cook and Collins. The IC recommendations sought to reduce government funding on the basis that the public good outcomes of RDC activity were insufficient to warrant the matching dollar-for-dollar arrangement. These recommendations were also supported by those who saw some government funding of the RDCs as essential, but, in light of the applied nature of the research outcomes, less than that currently granted.

Whatever the position taken, the point at issue remains as to whether or not public good can be distinguished from private good R&D outcomes. This issue has not been resolved by the creation of a model or formula to work out exactly what the government money going into a corporation produces. The IC recommendations provided government with valid grounds upon which to question their involvement in the RDCs. These recommendations have been considered in the Innovation Statement with the requirement for industry to contribute more funds to R&D clearly stated. Without increased industry investment, government, through the Innovation Statement, has shown that it is no longer prepared to carry the bulk of the burden for the provision of funds for research activity.

Should industry fail to meet this challenge and government funding is reduced, albeit marginally, it will be interesting to see if a decrease in public sector resources will also lead to a reduction in evaluation demands.

Recommendations made by the IC in relation to the importance of evaluation were picked up in the Innovation Statement, with particular emphasis placed upon ex-ante evaluation. Recently, DPIE initiated an attempt to develop a set of generic performance measures for all corporations. From the outset this was doomed to fail. The uniqueness of each RDC means that performance indicators need to reflect the type of research being undertaken. The development by DPIE of a set of performance indicators to cover all RDCs has resulted in a group of statements that are too broad and all-encompassing to mean much. All the RDCs were using performance indicators before government identified such measures as being important. This meant that, from the beginning, the work done by DPIE was considered to be a fairly meaningless activity. Most of those interviewed agreed with this summation, with some also commenting that at least it kept the bureaucracy out of their hair. Cynicism aside, one cannot escape the conclusion that the resources channelled into the project by DPIE and the RDCs were largely wasted and hence misallocated. The question needs to be asked, has a system been created in which the RDCs must continuously appease government in order to deliver the benefits were created to deliver?

DPIE has argued that the development of performance indicators for the RDCs has, in fact, been done to safeguard the future of these organisations. In this scenario, DPIE casts itself in the role of RDC defender, with the enemies being the Department of Finance and the Treasury. As earlier discussions revealed, the Department of Finance draft reporting guidelines place greater rather than less demands for accountability on the RDCs. DPIE says that by ensuring that the RDCs can counter such requirements through well-developed evaluative processes, it is guarding their interests and enabling them to better manage bureaucratic demands.

However, the bureaucracy is generally not seen as being particularly helpful. One RDC manager estimated that the matching government dollar received by her corporation was spent wholly on producing and meeting bureaucratic reporting and auditing requirements—a situation inimical to the commercial, productive and profitability objectives to which the RDCs were supposed to be orientated. Similar situations were recounted by other RDC managers who reported the amount of time and effort spent on producing submissions for government reviews and assessments as considerable. The RDCs, it was pointed out, were not created to generate reports but rather to stimulate, invest and produce research outcomes that could benefit Australian rural industries and the nation as a whole.

In light of the previous discussion it is reasonable to ask whether the level of accountability sought by government and the degree of its intervention into the RDCs have gone 'over the top'. Miller felt that the RDCs seemed to have to comply with a range of unnecessary review processes. Government's role, he argued, was to invest in R&D and promote the benefits of so doing in order that industry could be encouraged to put more money into research. He pointed out that Australia still sat towards the bottom end of the OECD R&D investment list, a position that reflected badly upon the country within the international community.

The difficulties faced by the RDCs seem to lie in the management of their position, which is between the public and private sector. It is this position that Williams highlights as representing a basic inconsistency in the arrangements under which the RDCs were established. Williams argues that government intervention in rural R&D is warranted, given arguments concerning the nature of the agricultural environment, producer capacity for investment and dispersion of research results, with their combined effect undeniably creating a situation of market failure. The problem revolves around the relevance of an

R&D sector based on market failure, yet expecting the greatest measure of its success to be productivity gains in the marketplace. How can such a system, Williams asks, produce benefits for the public good when economic gain for the industry concerned is the outcome to which R&D is orientated? He suggests that, in situations where the R&D is being spent on basic research, the dollar-for-dollar matching arrangement is appropriate but where the outcomes of the research have commercial application, the proportion of government money should be reduced, because it is industry, not the general public, that is reaping the rewards.

Williams's argument is supported by both the IC report and data showing the investment spread of the RDCs across R&D categories. However, the fact that a spread of investment occurs along the R&D continuum militates against a broad-band, cost-cutting approach to reduce government investment in the RDCs. Despite this problem, the decision made in the Innovation Statement to reduce funding has been applied across the board, with no mention of the ratio of funding being dependent upon the type of research undertaken. What is required is a sliding scale of investment that allocates government money according to the potential breakdown of benefits the research is likely to produce. A case-by-case approach would need to be taken in order for such a system to work.

That such an approach would be too difficult to manage may account for the decision by government to apply funding uniformly. Most RDC managers argued that government and industry were co-investors in the R&D undertaken by the corporations. As co-investors, both stakeholders gained the research benefits directly through specific products, or indirectly through enhanced economic returns or political, social, cultural and environmental benefits. This co-investment argument has catalysed consideration of a number of issues bearing on government's relationship with the corporations.

Co-investor versus Purchaser: the Need for Clarification

The move towards the need to quantify public good as opposed to private R&D benefits is one that has evolved over the years the RDCs have been in operation. It has been driven largely by the series of reviews examined earlier. This move has been a threatening one for the RDCs, as it has challenged the government/industry joint investment approach upon which these organisations were originally founded. As one RDC manager pointed out:

> ...when we were first set up the pure intent of the government dollar was to assist industry development and now it is being brought around by various political forces that the RDCs have to demonstrate that they are doing public good research.

The reasons for the development alluded to in the above quotation are interesting. While the rhetoric of government has remained supportive of the RDCs, with the co-investment approach emphasised as fundamental to the success of the model, there has also been increased pressure placed upon the corporations to comply with the Department of Finance directives discussed previously. As the following quotation by Senator Bob Collins demonstrates, despite the demands placed upon government to ascertain what exactly the money it puts into the RDCs is actually accomplishing, statements that reject the separation of public and private good research outcomes were being made by government representatives as recently as 1995.

> Regarding the public good, I accept that all rural R&D, even projects that are specifically targeted at industry needs, contains a blend of potential public and private benefits. These benefits are, in practice, impossible to separate and quantify.

DPIE has adopted the more general term 'public benefit' instead of public good which has an explicit economic meaning. Public benefit, according to DPIE, expanded the relevance of research outcomes so that they moved beyond the

commonly held economic conception of the work of the RDCs to an emphasis on social, cultural and environmental benefits.

In line with the adoption of this term, Collins identified six government priority areas for the RDCs to consider when making their investment decisions. These areas were: the management of land and water resources; the monitoring of international and domestic market changes; value-adding and processing technologies; the structure and diversification of farming enterprises; productivity growth and technological improvements; and the need to pay attention to rural communities and social welfare issues. The intention behind the government's focus on these issues was not that they should become prescriptive but rather they provide some guidance on where the RDCs should be orientating their research. The broadly defined nature of these priority areas made it relatively easy for the RDCs to ensure that R&D investment decisions took account of them and, therefore, satisfied government's expectations. It also enabled the RDCs to demonstrate that the matching government dollar was warranted. The objectives were such that it was only through R&D investment over a wide spectrum of research activity that the problems government sought to address could be targeted. It simply was not possible to go out and purchase the solution, like a product off a supermarket shelf.

Despite the fact that the former DPIE minister's rhetoric supports the RDCs, there are forces at work undermining the investment approach to R&D activity. The empowerment of industry through the introduction of the RDC system has contributed to the push for an increase in tangible research results. At the same time as industry confidence in the promotion of its research interests and demands for results has grown, government has initiated a series of reviews that has attempted to assess whether the RDC model is working. The findings of these reviews have questioned whether, in light of the strong industry focus of the RDCs, government is getting value for money out of its investment dollar. This has led, subsequently, to calls for the separation of research outcomes so that a distinction can be made between those benefits accruing to industry and those accruing to the Australian taxpayer. The overall result has been that government has attempted to clarify the nature of its investment in the RDCs, with the Innovation Statement providing some indication of the direction in which it might be moving.

This sequence of developments suggests that, although government accepts the rationale for public sector intervention in R&D and the broad areas in which investment should be undertaken, the emphasis upon evaluation has led to a heightened preoccupation with performance measurement and re-assessment of the appropriateness of RDC activities. It would appear that government, perhaps unwittingly, is diverting attention away from the issue of research outcomes, towards the evaluation of RDC activity. The problem with this move is that because research outcomes are so difficult to evaluate, the process receives undue attention. This input and process focus serves to deflect thinking away from what seems to be a general reluctance by government to state unequivocally that their investment in the RDCs is warranted given the public and private benefits that accrue from R&D.

The problem with emphasising evaluation is that the more of it that's done, the more restricted becomes the outlook as attempts are made to compartmentalise research activity. This reductionist approach tends to supplant important broader goals with more easily measured results, with the corollary that the RDCs will, inevitably, focus on tangible research outcomes that meet the demands of reporting requirements. A long-term effect of this trend might be the incapacity of the RDCs to address wider concerns in favour of concentrating on projects that are more likely to fulfil evaluation requirements. In one sense, the evaluation criteria provide perverse incentives to skew research so that it will fit neatly into a particular category. The development of this situation

would then justify questions about whether government should be involved in co-investing with industry in the RDCs.

Co-investment is dependent upon both public good and private benefit issues being considered. The co-investment approach provides the RDCs with a mandate to explore wider issues and concerns beyond the purely economic, to include social and environmental problems. The removal of part of the government dollar, as has occurred recently, should necessarily result in a corresponding decrease in projects that supplement commodity-specific R&D to address broader domestic and international problems. This is because, as government reduces its investment, so does the requirement for the RDCs to engage in projects for the public good. The decision made by government to reduce the amount of funds going into the RDCs provides a measure of how willing it is to invest taxpayer dollars in organisations that cannot provide guaranteed measures of exactly what that money is producing in terms of public good outcomes. It could be the case that government now wishes to become a purchaser of research outcomes, as has occurred in New Zealand. If so, it will have to curb its desire for increasingly more extensive evaluation requirements, as this level of involvement is inappropriate when a strictly buyer/supplier relationship applies.

Currently, the ultimate resolution of the co-investment versus purchaser issue appears to have been placed in the 'too hard' basket, with the RDCs continuing to focus upon their ability to produce measures of productivity and profitability according to government guidelines. The issue is not, however, one that is going to go away, with policymakers eventually having to come to terms with the confusion that exists around what role government wants to play. The choice is between a co-investor in research or a purchaser of research, with either choice having significant implications for the outlook and success of the RDCs. At present, the RDCs are having to spend more time on justifying the means by which they operate rather than being able to produce the ends they were established to attain. This may well be the safest option for the RDCs, rather than attempting to clarify governments position and in so doing risking the loss of more funds.

The Rural RDCs: Betwixt and Between

The RDCs now co-ordinate and reconcile the demands of industry and government with the available research capacity. The RDCs, in effect, are responsible for juggling the interests of each of these groups in order to achieve the best possible R&D outcomes for the industry concerned. Currently, however, the RDCs appear to be grappling with a number of issues that have arisen as a result of their position 'betwixt and between' this group of stakeholders. The drawing together of these issues has revealed a number of problems that range from concerns about the role of the RDCs in the provision of extension services, the relevance of RDC research outcomes, and the need for possible changes in the legislative framework under which the corporations have been established. The broad range of problems that exists indicates the difficulties facing the RDCs. Perhaps the strongest message to come out of investigation into why these problems have arisen is that there is a lack of clarity about what each of the stakeholders involved in the corporations expects the organisations to provide. This confusion needs to be addressed in the immediate future as the survival of the RDCs depends upon it.

Meeting the Demands of Industry: Extension and Technology Transfer

The evaluation of research outcomes is one of the RDCs' primary concerns. This concern has become particularly important because of the emphasis placed upon evaluation by all the reviews examined earlier. The most significant measure of success for most corporation managers was whether the results of a particular research project could be used by industry. This goal was one that, under ideal circumstances,

would provide useable research results from every project undertaken by an RDC. However, getting the scientific community involved in producing such accessible research has not been an easy task. It has been in the area of technology transfer that the gap between producer and researcher interests has become most apparent, with the RDCs seeking to rectify this problem using a number of different strategies.

Though researchers are now more aware of industry needs, the communication of research results remains a problem for the RDCs. The bulk of producer interaction has traditionally been initiated by the State departments of agriculture. The reluctance of the research community to provide such services may stem from the historical divide that has, up until the advent of the RDCs, seemed to exist between producers and scientists. This divide has meant that communication between the two groups has been limited, the overall result being an isolated research community. However, the combined effect of declining State department of agriculture extension services and the requirement by the RDCs that research be tangible and relevant has meant that scientists have had to become better equipped at outlining the ways in which their research results can be used.

Despite the emphasis placed upon the development of adoption strategies by the corporations, the reaction by some researchers to meeting these demands has been tardy, with bids continuing to be submitted without sufficient attention paid to how results will be used. In many cases, the stock response from scientists to the issue of the dissemination of research findings has been the publication of their work in research reports and the convening of a workshop. This minimalist approach is rejected by RDCs and government alike, who argue that interactive and innovative approaches are needed to get industry and researchers working together. With the changing farming environment, many producers have access to technology such as computers, CD-ROM and other interactive media. Being able to tap into these new types of technology transfer is viewed by the RDCs as vital if research results are to reach those they are designed to assist.

Most RDC managers believe that, in light of the increasingly competitive climate within which R&D is located, scientists will eventually have to take extension work more seriously. RDCs now require adoption strategies to be built into submissions for research funds, with considerable attention paid to this aspect of the proposal. These demands on researchers have probably been generated by the evaluation pressures placed on the RDCs by each of the reviews examined in the preceding chapter. Without tangible research results, measurement of the work of the corporations becomes increasingly difficult and leads to greater demands for proof of what it is the RDCs are doing with the funds they receive.

Nevertheless, adoption is not all, and attention still needs to be paid to the research project itself. Technology transfer is important but the content and excellence of research results must not be compromised in favour of the most progressive way of delivering information. The overall message to the RDCs is that they must continue to impress upon the research community the importance of being able to communicate information, as well as ensuring that the industry to which that material is directed is able to understand and use the findings. The adoption of research results entails a two-way interaction between scientists and industry, with the RDCs as facilitators.

Legislative Leverage: the Need for an Updated Act

The 1989 PIERD Act was designed to provide a generic legislative framework under which the corporations could be established. It thus had to be sufficiently broad to allow common administrative and accountability principles to underpin the operations of each of the RDCs created. The objectives of the PIERD Act can be interpreted with a considerable degree of flexibility by the organisations they are designed to guide. This has

meant that, in terms of the broad thrust of each of the objectives, the RDCs have met all their key requirements.

Though the RDCs have been successful in meeting the objectives of the PIERD Act, there have been calls for its amendment. These calls appear to have been stimulated by the various reviews undertaken, and by scrutiny of RDC operations by government and private sector organisations. The speculation generated by these examinations has been focused upon resolving a number of problems and anomalies that have the PIERD Act as their source.

A central theme in this monograph has been increased pressure placed upon the RDCs for a clear distinction to be made between private and public good research outcomes. This issue has been manifested in many ways. Hussey believes that the confusion over public good and private benefits has arisen because of the lack of specificity in the PIERD Act about the types of projects in which the RDCs are supposed to be channelling investment. The *Research Innovation and Competitiveness Statement* (1989) that provided the foundations of the RDC model, dealt specifically with the grounds upon which government intervention in R&D was warranted. It was this part of the document that Hussey believes was omitted from the PIERD Act and which may have prevented the current difficulties faced by the RDCs in determining the benefits of undertaking particular research projects.

In essence, Hussey argues that the PIERD Act fails to emphasise sufficiently the fact that the RDCs owe their existence to market failure. The implications of this deficiency are that the RDCs are generally unable to justify, on the grounds of market failure, where the government dollars going into their investment portfolio are being spent and who is benefiting from that expenditure. The lack of specificity in the PIERD Act has resulted in the RDCs being placed in a policy vacuum, with little guidance about where they should and should not be investing public money. The consequence of this is that the RDCs, in Hussey's opinion, are failing to ask: Why should government money be going into this project?; and Where is the market failure that justifies the use of taxpayers money in this way?

These issues are particularly pertinent in light of the recommendation of the IC and other reviews that much more detail was required about where, how and to what the government funds going into the RDCs were being directed. When these criticisms were put to interviewees, most respondents said that the RDCs did, in part, owe their existence to market failure but disagreed with the way in which Hussey defined the term. The term 'market failure' as used by Hussey was one, it was argued by respondents, based on economic assumptions about things that happen in perfect worlds under ideal circumstances. Under these assumptions, the RDCs would invest only in R&D projects that would never be taken up by the private sector because of the risks involved and problems in protecting access to the results produced. Adoption of these assumptions would result in the investment portfolios of the RDCs being quite restricted. RDC managers believed that, although market failure was important, there was also a more general commitment for the organisations to invest in public capital and public good projects across a wide spectrum of activity.

Several examples were subsequently provided by the corporations of investment undertaken by the RDCs that would be deemed inappropriate by Hussey, but which the boards of these corporations had deemed to be an appropriate use of funds. For example, the board of the MRC chose to invest in a project that would contravene Hussey's criteria. Meat processing companies in Australia have failed to invest in R&D because of an organisational culture opposed to anything academic. In order to overcome this, the MRC has begun an education campaign that aims to develop an appreciation and understanding of the benefits of investing in R&D. This campaign has a number of strands, with the MRC currently providing funds for the trial establishment of a research facility accessible to meat-processing companies. It is hoped that this investment will

help engender an enhanced appreciation of the benefits of R&D and eventually lead to the companies concerned developing their own R&D capacity.

Such an intervention in the meat processing sector would not be supported by Hussey as, technically, there is no market failure. The sole reason that these companies are not investing in R&D is an ingrained culture unable to recognise the potential benefits of investment in research. Hussey argues that, if these companies started to suffer in world markets as a result of their lack of R&D investment, they would, of necessity, develop a research capacity—their continuing market success would demand it.

This view is countered by the MRC, pointing to the abysmal history of under-investment in R&D across all Australian industries, and asks: Why wait for the crash of a company when through a small investment such organisations can be educated about the benefits of R&D? It is also the case that incomplete information can lead to market failure. In this instance, the fact that meat processing companies fail to understand the connection between economic growth and R&D could provide support for the MRC's actions. It is attempting to rectify a situation in which there is a lack of knowledge about the benefits of undertaking R&D. In so doing it could be argued that it is intervening in a situation of market failure.

In the context of the work of the RDCs, therefore, it would appear that a broader definition of market failure is deemed more appropriate by most managers. The point to be drawn from the Hussey versus RDC interpretation of market failure is that, during the initial establishment phase of the corporations such issues were not raised. However, in light of recent reviews and calls for evaluation there now appears to be a need for government to say which definition of market failure it wants the RDCs to work to.

An area of the Act that all RDC managers emphasised as requiring reassessment, was the set of the rules controlling the appointment and role of the government director. The appointment of departmental officials as government directors was originally designed to ensure that taxpayer funds were spent wisely and responsibly. However, confusion has always existed amongst the RDCs about what it is that the government directors are supposed to do. Are they watchdogs? Do they represent the Minister? Are government directors able to provide details of what government is likely to support or reject in terms of RDC investment activity? Do government directors act as the mouthpiece for the RDC in government? These questions point to the difficulties faced by the RDCs in their relationship with the government director.

The ambiguity of the government director's position was picked up in the Gleeson and Lascelles review, which suggested the presence of the individual on the board blurred the otherwise clear line of accountability that existed between the RDC and the Minister. The comments made by Gleeson and Lascelles demonstrate that this review team felt existing accountability arrangements to be sufficient without the presence of the government director. According to Phil Price, Executive Director of LWRRDC, government directors face problems of conflict of interest as well as the general ambiguity that surrounds their position. This is because all government directors have positions in the bureaucracy. Problems arise when, in the case of resource allocation decisions, the director has to reconcile the demands of two different organisations. This can lead to situations in which the director is actually in conflict with the RDC he or she is supposed to serve.

Complacency on the Increase?

The problems and issues raised in relation to the RDCs up to this point clearly require resolution. On the whole, however, the corporations have been very successful in establishing themselves within the R&D community. It is certainly the case that these organisations now hold a significant amount of power, particularly in relation to the distribution of funds within the

R&D sector. The success of these organisations could, however, also have negative consequences. This statement is made as a result of observations that seem to suggest that some of the RDCs may be losing sight of their original goals.

While the increased support of producers cannot be denied, the RDCs could become lulled into a false sense of security that prevents them from looking out for pitfalls ahead. Industry has clearly taken a strong interest in the development of the RDCs. However, the empowerment of producers could eventually threaten the basis upon which the RDCs have been founded. As industry becomes increasingly strident in its demands for R&D, the case for a reduction of government money will become stronger. This is because a greater industry focus will necessarily result in a decline in the extent of public good projects undertaken by the RDCs. The NFF has suggested that government should increase the matching levy contribution up to 0.75% in recognition of the benefits that investment in R&D provides. However, this recommendation did not ask whether such an increase was actually warranted in terms of the amount of benefit accruing to the general public as a result of such government investment.

The problem with the NFF scenario is that, though rural industries may call upon government to invest more money in the RDCs, those same industries are, on the whole, unwilling to increase their own contributions. The empowerment of industry when viewed in this light is something that the RDCs need to be able to manage, as it could quite easily result in a decline of government support and an industry body not inclined to make up the shortfall. Indeed, the strong producer support and sentiment expressed concerning the value of the RDCs may well have reduced government doubts about mooting possible fund reductions in the sector.

Complacency about this issue could also lead to the RDCs continuing to 'satisfise' rather than 'maximise' their operations. A. Newton believes that the corporations are still too narrow in outlook and focus. He argues that they should develop a broader vision that considers developments in the international arena rather than concentrating only on the domestic R&D environment. Research ventures, joint partnerships and the adoption of a commercial approach are required, he believes, for the RDCs to reach the cutting edge of world technological developments. At present, the domination of industry means that a local or regional focus tends to preclude a broadening of research horizons.

Newton says that just because the RDCs received a compulsory levy did not mean that the level at which that levy was set was optimal in terms of the amount of money being spent on R&D. It was up to the RDCs, he believed, to continue to push for greater industry investment, without necessarily having public sector dollars smoothing the way. Failure to work on the development of such strategies would, he argued, result in organisations always dependent upon government for support. This dependency was one that, in the face of economic cost cutting, represented a naive approach to the future environment in which the RDCs will be located. The reality, according to Newton, is that government will continue to pull back funds—financial constraints will demand it. The RDCs need to prepare for this eventuality and seek alternative sources of funds.

The somewhat pessimistic outlook for the RDCs of both Newton and Hussey, highlights the necessity for these organisations to guard against complacency. A related problem is that the RDCs are changing in the way they conduct and manage their business. As the workload and demands placed upon the RDCs have increased, so has the amount of time spent by the corporations on implementing systems and processes to deal with the pressures placed upon them. While it is understandable that such methods are used to deal with the volume of submissions received by the RDCs, there is an inherent danger that the corporations could become over-bureaucratised, with the process

becoming more important than the ends. This criticism was echoed by respondents who saw that the RDCs could quite easily become caught up in the 'endless red tape' that typified government.

Concern with the process rather than the outcomes has already become something of problem for the bigger corporations. In interviews conducted with RDC managers, it became apparent that, rather than being able to concentrate on the outcomes of investment, keeping up with submission processing, industry demands and government evaluation and accountability requirements led to an increased risk that the ends would, in some cases, become forgotten. This was exactly the sort of situation that the RDCs had been created to avoid, with Miller seeking to establish organisations concerned with outcomes rather than input accounting. If the RDCs are to avoid problems of this nature, stakeholder groups, in particular government, will need to work out what it is the RDCs have been established to achieve and what sort of conditions will help them to reach those goals. At present, many of the corporations appear to be running in order to stand still, with ever-increasing demands and pressures placed upon them.

Over-bureaucratisation could also cause the RDCs to lose touch with the industries they were designed to assist. One RDC manager said that maintaining the personal face of the corporation was the most important goal for his organisation. Another respondent believed that once industry thought the RDC had become just like any other government department, the relationship would end as quickly as it had begun. Industry, he said, was not interested in organisations that lost touch with their primary clients. These views highlight the problems faced by the RDCs as they become more successful and are placed under greater pressures. A final point made in this context was that if the RDCs became too big their corporate cultures might change, gradually moving them further and further away from the stakeholders who are supposed to define the direction and content of their activities.

In summary, the RDCs are currently facing some challenges in relation to their operational and managerial functioning. These challenges stem largely from the prevailing research environment and stakeholder demands. The final part of this chapter explores the general R&D environment, and the opportunities and threats it presents to the corporations in both the short and long terms.

The R&D Environment: Threats and Opportunities

The future of the RDCs will, in large part, be dependent upon their ability to deal with the demands placed upon them by the environment in which they operate. This environment is one characterised by complexity and unpredictability, with pressures deriving from international and domestic sources. To survive in this environment, the RDCs will need to be flexible, adaptable and innovative. To develop and foster such attributes will require conscious effort on the part of RDC managers to focus on the outcomes of their activities rather than the process.

The release of the Innovation Statement has, in part, provided some justification for adopting such a course, as the decline in government funding may reduce the demands it places upon the corporation. The task of the RDCs will be to find a way of balancing the relative contributions of its industry and government stakeholders to ensure that both groups remain satisfied their demands are being met. The RDCs must also take account of the broader context within which they are located, and ensure that public opinion, a powerful weapon, stays with them. The main 'environmental' pressures likely to impinge on the RDCs in the forthcoming years are outlined in the next section.

Securing Sustainability

Sustainability is the greatest single issue facing both the RDCs and the Australian nation in

general. The unrestrained exploitation of resources upon which rural industries in Australia have been founded has taken us to the point where severe degradation problems such as salinity, erosion and declining water quality are threatening the viability of some farming enterprises. The result of the long-term adoption of this farming approach has been that a number of Australia's rural industries, including cotton, sugar, rice and some other grains, and parts of the meat sector, currently face an unsustainable future. Many rural industries have paid insufficient attention to rehabilitation of the natural resources on which they have depended. This approach to farming is moribund, and its death will be hastened by a constituency increasingly aware of, and concerned about, the state of the environment and the need to conserve Australia's natural resources.

The pressure for responsible resource use is being applied to producers. The farming community's reaction to such pressure has been mixed, but two types of response predominate Some producers believe that, because they have been providing goods for the general community, the government should pay for the rehabilitation of their land. These farmers do not see it as their responsibility to manage their resources sustainably: rather, it is the purchasers of cheap commodities who have reaped the benefits of farming enterprises that should pick up the tab for conservation. The other type of response rests on the belief that, as farmers use and rely on the resources available to them, they should also ensure that they can manage those resources sustainably. Why should government be expected to look after those resources when it is the farmer who is making his or her livelihood from them?

These two conflicting perceptions about where the responsibility for sustainability lies currently divide opinion over what, if anything, government should do to help overcome the rural land resource degradation problem. The fact that government has been active in the development of policies and programs designed to address sustainability issues has meant that the main message going out to farmers is that the public sector is prepared to pay. For the RDCs, this has resulted in an increasingly significant proportion of their resources being invested in 'conservation' research. At the same time, producers have been exhorted to act responsibly and take account of the damage they might be inflicting on the environment. The suggestion has even been made that farmers should be licensed, and that to be so they must demonstrate that they recognise the need to farm sustainably, and have the ability to do so.

For the RDCs sustainability is, therefore, one of the biggest challenges facing the industries upon which they depend. As a result, most RDC managers regarded the development of research portfolios based upon responsible and sustainable management practices as a priority. Joint projects between corporations were also cited as a vehicle through which such issues could be addressed. One manager noted that attention needed to be paid to the development of industries that were better suited to the Australian environment, rather than continuing to produce crops that were grown more successfully overseas. This suggestion is tinged with irony because it has been R&D that has enabled crops not suited to the Australian environment to survive sufficiently well to reap export dollars. It is the continuing production of these same crops that is now creating degradation difficulties. Research will again be needed to provide answers to these problems, with the RDCs playing a key role in delivering the resources to support such work. A problem that remains is that so long as competitor nations continue to exploit their resources unsustainably, Australian attempts to reverse environmental problems will always be hampered. Sustainable farming will cost more, and the short-term economic success of lower-cost overseas producers will militate against our long-term planning for a sustainable future.

Although the reaction of most farmers to the matter of sustainability is ambivalent, primary producer and consultant Don Blesing points out that unless producers recognise it as a valid

concern they are likely to lose their market position. The average consumer has developed a heightened awareness about the environment, with the desire for 'clean, green products' evidenced by the increase in demand for organically grown, pesticide-free goods. This demand, argues Blesing, can only rise, making it imperative for producers to utilise the approach in their farming. The RDCs find Blesing's declining market/profitability argument more effective than the general issue of sustainability in convincing producers of the need to invest in sustainable farming practices. Whatever approach is adopted, producers must acknowledge and act on the issue of sustainability if Australian rural industries are to survive.

The Politics of It All

The RDCs work in an intensely political environment. When asked what the main catalysts for change were in this environment, all RDC managers said that government and the political process were the most significant influences upon their operations. This point has been demonstrated throughout this monograph, with the development of the RDCs resting upon government intervention at every step of the way. The recent release of the Innovation Statement has questioned this symbiotic relationship, with the implications of the statement yet to be fully appreciated by all parties concerned.

However, the political processes that affect the RDCs are not confined to the Federal level, with local, regional and State realms also important instigators of change. The RDCs must operate at each of these levels in order to bring together organisations and individuals that may not typically have worked together. It has been the success of the corporations in fulfilling this role that has, in large part, accounted for the strong producer support of the system. The RDCs have been able to gain access to producers who would generally never have moved beyond their particular region. Although the RDCs have been criticised for adopting such a local focus, it is certainly the case that producers report feeling more in touch with their corporation than most other agencies designed to represent their interests. The strength of this approach has, in fact, been boosted by the Innovation Statement which granted the development of more voluntary levies so that producers who wish to can invest in R&D specific to their region.

Industry adoption of the RDC model has, therefore, been in large part a result of a deliberate attempt by the corporations to engage local and regional producer input. However, at the more general level it is government that has the potential to maintain or suspend the operations of the RDCs. Nowhere has this been more apparent than in the debate over the adoption or otherwise of the IC recommendations. It has been the decisions made by government that effectively determine the future of the RDCs and which define the operational objectives and accountability requirements they have to comply with. The Innovation Statement has provided a new blueprint for the continued evolution of the RDCs. It remains to be seen how it will actually be put into effect.

For the RDCs, the ability to anticipate, prepare and advocate for their organisation is crucial within such an environment. This 'state of readiness' is one that the corporations must cultivate in order to meet the challenges constantly emanating from the stakeholders to which they are held accountable. Although such an ability is important, it could also be the case that, in endeavouring to satisfy such political pressures, the core business of the corporation may get left behind. The aim for the RDCs is to be able to balance the politics of their situation with a strong central core of their organisation totally committed to pursuing operational goals.

The Innovation System: the RDCs Placed in a New Context

The word 'innovation' has become the latest 'buzz word' in the R&D environment. With the eventual release of the 1995 Innovation

Statement, the then Labor Government took on the mantle of ensuring Australia was able to deal with the challenges of the future global and domestic environment. Globalisation, information technology, access to the information superhighway and the need for competitive industries were all highlighted in the statement as imperatives for the future. The implication of this for the RDCs was that they needed to be able to ready themselves and their stakeholders to deal with the effects of these challenges.

But what exactly does innovation mean? In many ways the term has come to represent a catch-all word for everything from new technologies, goods and services to creativity, cultural change and ideas. The government defines innovation as follows:

> Put simply, innovation is about new products and services and new and better ways of producing them.

By this definition, innovation is predominantly concerned with the production of goods and services in line with technological development and progress. The bottom line is essentially, therefore, an economic one, with the ability to 'innovate' considered vital for Australian industries to meet the challenges of global markets.

This new 'innovative' environment impels the RDCs to produce research portfolios concerned with value-adding, the use of new technologies, and the development of more effective and efficient ways of doing things. The overall thrust of the message sent to the RDCs through the Innovation Statement was that government was no longer prepared to carry the majority of costs for supporting industry investment in R&D. Primary industries need to recognise the value of research and allocate their resources accordingly. One of the main objectives for the RDCs in light of this must, therefore, be to continue to engage the rural sector in supporting their research effort, and to seek out other possible means of capturing research funds. This is where Newton's and Miller's calls for entrepreneurial activity need to be acted upon.

At a more general level, Blesing believes that the biggest challenge facing the RDCs in the 'innovative' environment in which they work, is the need to plan strategically. Instead of a reactive, narrow commodity focus, Blesing argues that it is time for the RDCs to move into the next stage of their development and consider broader national and international issues. This will be a difficult task for the RDCs, because the bulk of their success has come from their ability to stay in touch with producer groups. This capacity has required a specific, often local focus for R&D activity. However, Blesing argues that this specificity limits the operations of the RDC, as ultimately it serves to deflect attention from wider issues and concerns. There is a danger that, as RDCs continue to develop increasingly more complicated systems for managing commodity-specific research projects, they will also lose the ability to look over the fence and see what is happening in the wider world.

In order to avoid such a development, the ability to develop and maintain a vision, and plan for change, is one that the RDCs need to cultivate. At present, there are opportunities for the RDCs to meet this challenge by adopting a long-term strategic plans that should ensure the industries to which they are accountable do not lose sight of the international and national environment within which they operate. The real test of whether the RDCs can achieve this goal is one that depends upon their ability to persuade industry bodies that such an objective is a good one. This, in itself, could prove to be the biggest future challenge for the RDCs.

The Combined Effect: the Future of the RDCs

This chapter has raised a number of issues, problems and challenges that the RDCs must deal with in both the short- and long-term future. The nature of the relationship between stakeholder

groups looks set to change, with the rhetoric of government appearing to move the RDCs further away from public sector influence and control. It will be interesting to see whether reporting, evaluation, and accountability requirements fall in line with this rhetoric, although the propensity for government to seek more, rather than less, information from the RDCs is a habit that will be hard to break. Industry will also need to reassess its role in relation to the RDCs. With industry likely to become the primary stakeholder in some of these organisations, it could be that corporations will move to play a more overtly political role in the promotion of their commodity sector's interests. As for researchers, the ability to work within an increasingly industry-driven R&D environment will require the development of a capacity to ensure that the research they undertake is relevant and applicable. It is also clear that many of the ambiguities and anomalies that exist in the arrangements governing the RDCs need to be dealt with.

However, on the whole, the RDCs appear destined for a sustainable future. It will be the ability to plan a future in which industry, government, researcher and general community needs are satisfied that will be the key to their longevity. This will be no easy task, as the complexities and vested interests inherent within each of these stakeholder groups will require sophisticated handling. Significant threats and opportunities clearly exist for the RDCs. The capacity to be flexible, adaptable and professional in response to these challenges will secure the fate of these organisations. Ultimately, it will be up to each RDC to decide how to deal with the demands and pressures placed upon it. It will be interesting to see whether these organisations will be granted the freedom to operate commercially, as Miller and Kerin intended, and, if they are, whether they can handle that freedom.

5 EPILOGUE

Despite assurances made by DPIE that, following the release of the Industry Commission (1995) findings, no more evaluation of the RDCs would take place for another five years, two more reviews have since been undertaken which, potentially, impact on the RDCs. The Stocker and Mortimer reports were both released in June 1997 and came about as a result of the Howard Coalition Government wanting 'new' information about the Australian R&D environment and business sector.

Over the past decade, both sides of politics (including the National Party) have moved closer together on economic policies, including privatisation, corporatisation, reduced protection and a greater emphasis on user pays. Despite the similarities in approach, however, the Howard Coalition Government sought 'fresh' insight into R&D, with John Stocker, Chief Scientist, commissioned to report and make recommendations on any gaps and overlays in existing arrangements, as well as to identify ways of determining national priorities for science and technology.

Under these terms of reference, Stocker undertook a comprehensive analysis of all publicly funded science and technology in Australia. In his report, Stocker found that the RDCs were crucial elements in the rural R&D system that successfully integrated and delivered R&D outcomes to rural industries. He also stated that the RDCs had developed effective and efficient mechanisms to ensure that R&D investment was strategic and targeted, with problems of duplication and overlap of research activity largely resolved.

The support accorded to the RDCs by Stocker was in contrast to the findings of Mortimer, who proposed fundamental changes to the R&D system. Mortimer had been charged with investigating the efficiency and effectiveness of Commonwealth business programs in order to ensure that Australia had the 'right mix of business programs to assist industry to meet the challenges of an increasingly competitive global market'. These terms of reference provided broad scope for Mortimer and saw him include an examination of existing R&D arrangements.

Mortimer's approach was striking in its similarity to the ANAO review of the RDCs discussed previously. Both reviews adopted a narrow economic paradigm that demonstrated their lack of in-depth understanding about the nature of the rural, as opposed to industrial, sector. As a result of the adoption of this approach, Mortimer's recommendations, like the ANAO findings, were fundamentally flawed and made worse by the array of factual errors scattered throughout the review. These errors further undermined the credibility of his findings in relation to rural R&D.

Mortimer sought to treat rural R&D the same as R&D conducted by firms. The arguments that mitigate against such treatment have been outlined earlier in this monograph and will not be revisited here, suffice to say that the approach is inappropriate and unworkable given the differences in structure, size and nature of rural

versus other industry sectors. However, based on his assumption that rural R&D was the same as R&D conducted by firms, Mortimer recommended the introduction of an 'Innovation Rebate' which would see funds to the RDCs decline by as much as 40% because of the narrow definition of R&D which the 'Innovation Rebate' would employ.

It has been estimated by some of the RDCs that the introduction of the 'Innovation Rebate' would result in technology transfer and extension activities becoming ineligible for funding. To lose investment at this end of the R&D spectrum would be ironic, given that it is the dissemination and adoption of research findings that translates research into useable products and processes for industry and the public at large. Removing these activities from the auspices of the RDCs would, in all likelihood, jeopardise the high degree of ownership felt by rural industry over rural R&D and affect its willingness to pay.

Finally, Mortimer recommended that administrative and funding arrangements could be streamlined through the consolidation of the RDCs into one Rural RDC. The activities of the LWRRDC and RIRDC would be delivered through other programs and these corporations would cease to exist. If implemented, this recommendation would undo all that Kerin and Miller had attempted to achieve through the establishment of a network of RDCs. As has been discussed, Miller sought to 'free' R&D from the strictures of bureaucratic process to enable industry to identify and determine where R&D investment should occur. The introduction of a single RDC would not only re-create the problems of the past, but remove the key ingredient that has made the RDCs such a success—industry ownership of the system.

It is not known whether the recommendations made by Mortimer will be adopted, but the commissioning of the Stocker and Mortimer reviews by the Howard Coalition Government serves to validate the points made in the preceding chapter. The nature of the political process, the evaluation paradigm and the propensity for governments to seek 'new' information, are all features that have characterised the R&D environment in Australia since the introduction of the new arrangements in the late 1980s. It has been the demonstrated capacity of the RDCs to remain flexible and dynamic in the face of such pressures that has strengthened the validity of the corporation model.

On the whole, the model has continued to receive strong support from growers, although the Meat RDC, the first of the corporations to be created, has recently been subsumed into a larger organisation concerned with all aspects of the meat industry. This is not expected to occur in the other commodity-based corporations, but the future is always full of uncertainties.

For my part, I believe that the RDCs will continue to be a success, with this success measured by the support of the rural industries they have been created to serve. The high calibre of people that the RDCs have attracted is testimony to Miller and Kerin's commitment to a model that sought to merge and deliver both private and public good R&D outcomes within organisations staffed by motivated and expert professionals.

In conclusion, the following words of Machiavelli seem to me to epitomise the short history of the RDCs. They might also provide encouragement to those working for, and supportive of, the changes that have taken place in rural R&D over the past decade:

> There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things.

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