

SUBMISSION TO THE GREEN PAPER TO INFORM DEVELOPMENT OF A NATIONAL FOOD PLAN

From the Cooperative Research Centres Association, Canberra

Introduction

The purpose of this submission is to recommend that the Australian Government's successful and enduring Cooperative Research Centre (CRC) model is an appropriate economy-wide institutional form for initiating, managing and delivering collaborative research under the National Food Plan.

This submission:

1. Examines the implied strategic approach for Australian Government future investment in innovation, research and delivery under the National Food Plan – drawing on statements in the Green Paper and the contemporaneous Rural Research and Development Policy Statement;
2. Aligns the challenges in implementing this strategic approach with the unique characteristics and successful track record of CRCs; and
3. Assesses the potential for the CRC model to deliver the Green Paper's stated objective of increasing public investment and attracting private investment to cross-sector R&D, directed to productivity improvement and value adding in the food industry.

The Green Paper

The Green Paper invites consultation on the option of increasing public expenditure on rural R&D gradually over the next 10 years. These observations would indicate that not only is expenditure growth justified, but there needs to be a strategic shift in the way public investment is made if the full benefit of collaboration is to be seen under the National Food Plan. This submission contends that the CRC model would be an appropriate vehicle.

According to the Green Paper (p.154) "the Australian Government proposes to continue:

- Making economy-wide investment in innovation and R&D available to businesses across the food chain;
- Maintaining an ongoing focus on innovation investment on public good outcomes to create the maximum benefit for industry and the public from finite investment;
- Working with all parts of the food supply chain to identify ways to improve innovation in support of industry competitiveness and productivity; and
- Maintaining a world-leading rural R&D system."

In the earlier analysis of ways to achieve a competitive and productive food industry through innovation and R&D, the Green Paper states that:

- The Australian Government has a "limited range of policy tools and finite funding" to facilitate private innovation investment (p.149);
- It is looking "at ways to increase the proportion of investment that goes to cross-sector, high public good R&D" and better directing it to higher productivity returns (p.149);
- The food manufacturing sector "has a smaller range of dedicated research institutions" (p.151); and

- R&D in the food processing sector “is fractured as public research institutions are only working with a small number of ... business” (p.151).

Through the Green Paper the Australian Government invites feedback on improving the rural R&D model, increasing innovation in the food manufacturing sector, facilitating consistent application of biotechnology, and increasing public expenditure on rural R&D over the next 10 years (p.154).

The Cooperative Research Centres (CRCs) are familiar with these challenges; having worked across sectors and along the value chain in a range of industries, as will be explained and illustrated later in this submission.

Meanwhile, this submission characterizes the current state of play in the rural R&D system and the realities that must be faced if the Australian Government is to achieve innovation and R&D goals under the National Food Plan. The data and analysis comes largely from the Government's own work.

The Rural R&D System Today

There have been a myriad of studies and reviews of rural R&D in Australia in recent years, largely triggered by concern that agricultural productivity growth has slowed. Although the Green Paper acknowledges the relevance of the Rural R&D Council's *National Strategic Rural R&D Investment Plan*, the Productivity Commission's inquiry into the R&D corporation model, and the Prime Minister's Science Engineering and Innovation Council's report on food security (p.150), the analysis did not take full cognisance of the findings of this and other relevant work.

Summarised here are several important insights into the rural R&D system today and the opportunities and constraints to adapting it to the National Food Plan goals in the Green Paper.

First, the total investment in agricultural R&D has not grown for about 30 years, has declined in research intensity (R&D expenditure as a proportion of output value generated), and has more than halved as a share of total public research expenditure. This is almost certainly linked to the decline in productivity growth and because of time lags in the innovation system will take a long time to reverse (Mullen 2007; Mullen 2010). Presumably this is the context for the Australian Government's suggestion of a gradual increase in rural R&D investment over 10 years.

Second, there have been significant shifts in the distribution of investment in rural R&D. The historically largest contribution from State and Territory agencies has fallen since 2000-01; offset by increases in R&D expenditure by businesses, higher education and the Australian Government (Mallawaarachi et al. 2009). The reduced capacity of the States and Territories makes the National Primary Industries RD&E Framework development not only important but urgent. Yet progress outside of the single commodities is slow, and a draft strategy of most cross sector strategies including 'food and nutrition' is not yet available on the DAFF website. This is because the specific commodities have a dedicated “driver” with potential funding incentives, while the cross sector strategies are largely depending on good will. This problem has been recognised by the PISC R&D committee and the recent framework evaluation.

Another important but not well documented shift in rural R&D resourcing is the obvious reduction in core funding (parliamentary appropriations and block grants) to the national, state and tertiary sector R&D institutions and the rise of short-term, competitive grants. This has unleashed competitive behaviour among these

institutions with a destabilising effect on collaborative arrangements. Systemic changes in the rural R&D investment mix presents significant challenges to the Australian Government's intentions for innovation and R&D under the National Food Plan.

Third, business investment is highly targeted to industry development along the value chain and is a small share of other rural R&D investment. As shown in the following table, compiled by the Rural R&D Council for the 'rural R&D system', business investment is 70% of value chain R&D, 27% of agriculture, fisheries and forestry R&D, and 16% of 'related to rural' (including environmental) R&D. When broken down by research theme, business investment was 87% of industry development investment along the value chain compared to 28% of industry development investment in agriculture, fisheries and forestry, and 17% in sustainable production (RRDC 2011). As expected, business is highly focused on the sector where its investment in innovation returns a profit and away from sustainability, which is also an important consideration in the Green Paper. Engaging business under the National Food Plan is a considerable challenge.

Table: Rural R&D Expenditure in Australia, 2008-09

| | Government \$m | Higher Education \$m | Business \$m | Total \$m |
|-------------------------------------|-------------------|-------------------------|-----------------|--------------|
| <u>Overall</u> | | | | |
| Agriculture, fisheries, forestry | 480 | 302 | 295 | 1076 |
| Expanded along value chain | 181 | 110 | 689 | 980 |
| Related to rural | 458 | 237 | 130 | 825 |
| Total | 1118 | 649 | 1114 | 2881 |
| <u>Industry Development Theme</u> | | | | |
| Agriculture, fisheries, forestry | 417 | 284 | 279 | 980 |
| Expanded along value chain | 51 | 57 | 709 | 816 |
| <u>Sustainable Production Theme</u> | | | | |
| Agriculture, fisheries, forestry | 63 | 18 | 16 | 96 |
| Expanded along value chain | 135 | 50 | 0 | 185 |

Fourth, half of the productivity growth in Australian agriculture comes from innovation and technology development overseas. Of the recent total factor productivity growth of 1.96% per year, an estimated 0.63 percentage points are attributed to 'foreign public R&D knowledge stocks' and 0.6 percentage points to domestic research and extension (Sheng et al. 2011). While this is the case for agriculture, the importance of technologies and knowledge from overseas will no doubt apply to food processing and manufacturing as well, given the significant presence of multi-national firms and Australia's strong export orientation.

Strategic Investment in Food Industry Innovation and R&D

To achieve the Australian Government's stated intentions for facilitating cross-sector innovation and R&D in the food industry, it is suggested it follows an investment strategy for public funds that has the following characteristics:

- It facilitates collaboration along the value chain and across sectors;
- It engages the considerable resources that businesses are already investing on the value chain;
- It seeks to collaborate with multi-national and overseas businesses and publicly funded providers; and

- It embraces all parts of the innovation system – research, technology development, knowledge delivery, commercialisation and science skills development.

The CRC Association's submission recommends that such a strategy:

- Applies to sectors and interests outside of the scope of the Australian Government's current investment in rural R&D – through R&D corporations and through direct funding of programs; and
- Can be covered by applying the CRC model which is well grounded in rural R&D yet has achieved major innovation breakthrough in manufacturing and processing, domestically and overseas.

Rural Research and Development Corporations have been major investors in the CRCs. Their processes are complimentary and the CRC model would enable RDCs, other Government programs, industry and both State and federal agencies to optimise food plan R&D outcomes.

CRCs and the National Food Plan

Our case for recommending the CRC model is based on the strong overall performance of the CRC program and the track record of success with individual CRCs in primary industries, manufacturing and processing. Significantly, CRCs are the only institutional R&D model for collaborative innovation, research and delivery that reaches beyond the rural R&D system to economy-wide application which is what the Australian Government is seeking to do in the National Food Plan. A few examples include;

Education and human capacity development

CRCs have had a significant impact on agricultural education, training and university courses. Wherever, there is a CRC on a university campus its influence on students, staff & management, both teaching and their research is very evident. For example, at The University of New England where livestock CRCs (sheep, beef & poultry) have led the way. Their activities have transformed the way staff, students, management and industry collaborate. They have changed the culture which now has long lasting benefits. The CRC model could repeat this success in R&D human capital development in the food sector value chain.

Industry adoption for biotechnology

Biotechnology is an important platform of the food plan. The Cotton CRCs were instrumental in providing multi disciplinary research knowledge necessary to ensure sound stewardship and adoption by farmers of the first widespread use of transgenic crop traits in Australia.

Dairy Value Chain

The Dairy Futures CRC has delivered DNA-based technology such that it is now a routine part of measuring the genetic merit of dairy cattle. It has increased the value of genetic assessments of the current animals being traded, and has created a new market segment where young stock can now be traded with confidence, even though they have not yet had any progeny. For example, the current methods of breeding will increase the amount of protein produced in milk by 20kg/year (based on 10 years of breeding). Improved methods could double this increase to 40kg/year. This difference alone equates to the value of milk increasing by over \$100/cow/year. This project has worked with the entire supply chain for artificial breeding.

National Sheep Collaboration

National coordination by the Sheep CRC of the Information Nucleus Program delivered the capacity for the Australian sheep industry to use genomic predictions of breeding values within 5 years. The impact of the new technology is to increase rates of genetic gain by 10 to

35%. The new technology also allows, for the first time, genetic selection for sheep meat characteristics such as omega-3 and iron content that contribute human health benefits. The national collaboration, involving 17 organisations across Australia, developed these new genetic tools within five years of establishing the CRC and will deliver benefits that include increased sheep and labour productivity, enhanced animal welfare and improved quality of both meat and wool.

Delivering integrated outcomes

The development of integrated farming systems that deliver increased profit and improved environmental sustainability through the use of perennial plants is the underpinning principle of the Future Farm Industries CRC. The EverGraze project which has developed integrated farming systems for the high rainfall (>500mm) grazing zone of southern Australia has delivered a 50% greater productivity and profitability from livestock systems by increasing the perennality of production systems.

Timing in biosecurity: new collaborations

A new system linking field officers with international experts has enabled a dramatic speed-up in the identification of exotic insects and diseases which may pose a threat to crops and the environment in Australia. The Remote Microscope Network developed by the CRC for National Plant Biosecurity allows agricultural officers equipped with microscopes to link with experts, both national and international, over the internet.

Seafood

Australia's seafood industry is an example of an industry where there is significant market failure in the post-harvest and processing sectors. The Seafood Cooperative Research Centre has been active in all these areas, but will wind up in 2014 and effort is required to ensure continued development of the industry's capacity in this area. The Australian Seafood CRC has set the scene for growth of a sustainable tuna aquaculture industry. The breeding and rearing of the prized southern bluefin tuna in hatcheries will reduce or eliminate the dependence on fragile wild stocks.

Water for food productivity and sustainability

Irrigation produces 30% of all agricultural production, and almost all our fresh fruit and vegetables. The Irrigation Futures CRC and Cotton Catchment Communities CRC developed tools and technologies that have resulted in more crop per drop while at the same time reducing water and nutrient losses.

Raising public awareness

The Invasive Animals CRC public awareness programs work to alert the community to the dangers posed by rabbits, and provide resources to keep the rabbit population to a manageable number. feral.org.au is a key to the CRC's fight against the rabbit. It is an interactive, online resource providing a central reference point for pest animal research. People can search for maps, fact sheets, articles and photos, any information relevant to their own region.

Commercialisation - working with private sector

Vaxsafe® PM is a new vaccine to protect chickens against fowl cholera, saving the Australian chicken meat industry an estimated \$13M a year. It was developed by the Australian Poultry CRC working with Bioproperties Pty Ltd and The University of Melbourne. Vaxsafe® PM was released in mid 2011, generating sales of over one million doses within the first 5 months. Millions of hearing aid wearers around the world will benefit from technology developed jointly by the HEARing CRC, Siemens and the National Acoustic Laboratories. The technology uses new prescription software to tailor hearing aids to individual needs for sound quality and loudness. These are two recent examples of how the CRC model can work with the private sector.

The CRC Program was considered in the Productivity Commission review of R&D corporations and in the Rural R&D Policy Statement, with some observations that warrant further interpretation in this submission.

First, the Australian Government's statements acknowledge the presence and purpose of CRCs (Green Paper, p.148; Policy Statement, p.6) without, surprisingly, considering their future role under the National Food Plan.

Second and finally, the Productivity Commission considered the role of CRCs in its inquiry into R&D corporations. It observed that rural CRCs are finding it more difficult to secure funding under the CRC Program and that the number may continue to fall in the future. On the other hand, it acknowledged the strength of the CRC review process and suggested that such independent peer assessment be considered for improving the performance of R&D corporations (Productivity Commission 2011).

In the lead up to its final report the Productivity Commission was unable to differentiate R&D corporations and CRCs, considering them both as procurers of research. The CRC Association's response, acknowledged in the final report, not only explained the essential difference but identified those characteristics that are well aligned with what is being sought for economy-wide facilitation of innovation under the National Food Plan.

"CRCs are borne of the innovation needs of end-users and they do not simply purchase or sponsor research."

"CRCs are generally commissioned by their investors to achieve particular outcomes and are responsible for using their internal technical capacity to identify and develop a program of research, and then working with stakeholders directly to deliver these outcomes."

This submission contends that the CRC model is an excellent model for collaborative R & D, delivering proven excellence in research, adoption, education, training, independence and integrity with industry partners.

The CRC model leads to collaboration and synergies among research providers and with industry partners. The CRC model and investment by the Commonwealth provides the glue, which stimulates the synergistic benefits and accelerates innovation and adoption by a number of years. Extension has shifted from being solely a public sector role to a mix of public and private services. There is opportunity for these sectors to effectively partner rather than compete in the knowledge value chain using the CRC model.

In summary, the CRC model is the appropriate institutional form for initiating, managing and delivering collaborative research under the National Food Plan.

References

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