Submission to the Productivity Commission Rural Research and Development Corporations Enquiry

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As a retired agricultural scientist and an honorary visiting scientist at CSIRO, I feel compelled to make a brief individual submission to your enquiry. For my whole career I have worked as an agricultural researcher and research administrator in Australia (NSW Agriculture, ANU, CSIRO, GRDC Board) and overseas (CIMMYT in Mexico, ACIAR through managing many projects largely in Asia, ICARDA and IRRI Boards). I have travelled very widely in the developing world dealing with agricultural research, and I have been widely recognized for this professionally over the last decade or so. In addition I was involved in a sheep wheat-sheep farm in the Riverina for 50 years.

Rationale for public investment in agricultural research

New ideas (largely imported, we do < 2% of the world's research), adapted and applied through local R and D to Australian agriculture, have driven farmer innovation and a large proportion (maybe two thirds) of the well-recognized, vital and substantial increase in total factor productivity in agriculture over the last 50 years. To date the Australian research has been largely publically-funded, although grower levies represent a fairly unique and significant private contribution; funding levels have been generous by world standards but lately appear to be declining in real terms. Only in USA and Europe, and somewhat in Brazil and Argentina, has the private sector (apart from farmers) recently become a significant contributor to research, and only in areas where substantial returns through proprietary variety and chemical sales are possible. What does this all mean for future funding in Australia?

The rationale for investing in research is indisputable. That for public investment in Australia is also strong:

1. Thinking firstly of the farmer clients of agricultural research, there is market failure due to the non-excludable (cannot be patented easily) and non-rival (cannot be used up) nature of many research products, and also due to the small potential market size in Australia. For example, you cannot patent new research knowledge about agronomic practices for managing crops and pastures, or animal husbandry, and it's not worth the private industry investing in breeding, say, chickpeas for the Australian environment. The private sector likes F1 hybrid crop varieties and has operated in Australia in the few cases where these fit (e.g., canola, sorghum), but most of our crops are not suitable for hybrid varieties. However, in the case of our major crop, wheat, the breeding has in fact been privatized in the last decade, a major achievement, thanks to its large size (20 M t) and the unique end point royalty system which was put in place, all driven by GRDC, and against farmer resistance initially. GRDC has rationalized the breeding of all other field crops, but full privatization is probably not appropriate because of the scale issue (e.g., we produce less than 1 M t of any legume species, Argentina produces 50 M t of soybeans!!). It goes without saying that improved varieties rarely can be

directly imported from overseas, and it also needs to be recognized that the interests of private breeders (especially those linked to chemical companies) may not always coincide with that of farmers or the public (e.g., why put a lot of effort into breeding for durable disease resistance?). Another aspect of research has been largely privatized over the last 20 years and I refer to agricultural extension, now the province mainly of contracted private advisers, although input suppliers also operate in this area more so than before. Free market advocates might suggest that the levies paid by farmers be increased several fold to cover the costs of all research not handled by the private sector; however this is a model not pursued anywhere amongst OECD nations, would probably be unworkable, and does not account for points 2 to 5 below.

2. Many of the benefits of agricultural research extend beyond the farm gate, to the environment, to the value chain and processing industry, and especially to the consumer. In all cases market failure is difficult to overcome. Reduced and zero tillage, spreading in the last 20 years to more than 80% of our crop land has brought huge environmental benefits off farm (as well as on farm). Maintaining animal health and product hygiene benefits farmers and consumers alike (e.g., controlling zoonoses). Premiums and penalties can spread the benefits and costs, respectively, in this field, but are hardly likely to drive or reward relevant research. The ultimate benefit of all of this is lower real prices to consumers for products which generally have become safer and more nutritious: there is little doubt that through this mechanism, consumers globally have reaped at least a third, maybe more, of the productivity gains from agricultural research. Sure, not just Australian consumers benefit from Australian research, and they will benefit from research elsewhere even if we did no agricultural research here, but is that a case for less public investment in agricultural research? No, not while there is market failure, nor while cheap food is such a key factor in our development and that of the world. It's not like PCs or mobile phones, driven by private sector research funded from profits and getting cheaper ever day; I believe it's more like medical research with its strong public good component.

3. Publically-funded agricultural research also brings a level of investment in strategic and basic research that is not of direct interest to the private sector, but is an essential underpinning of the more applied and adaptive research in which they engage. Admittedly the benefits can tend to flow globally rather than uniquely to Australia, but measures such as partnerships with the local private plant breeders and plant and animal health providers, help focus such research and gives them early access to the results. The GRDC-facilitated national pre-breeding alliance is an excellent example of this, another relatively unique Australian development. More generally, Australia has excelled over the last century in the area of strategic publically-funded agricultural research, as seen in our international publication record, punching well above it weight globally. A strong cadre of such researchers serve another function, and that is one of monitoring private sector research to avoid situations where the profit motive overcomes honesty in presentation and promotion of products. The National Variety Trial (NVT) network refined by

GRDC over the last 10 years is an outstanding example, driving objective testing and farmer-accessible reporting of all public and private advanced lines and varieties in major crops: USA, home of the free, has nothing like it, and as a farmer, I was very happy to see this research product!! There are many unscrupulous or ignorant operators in the private sector (and the NGO one) pedalling unproven products to farmers; only the public research sector can provide objective answers. Part of the difficulty that GMOs are facing is that there were insufficient funds for the public sector here, and even in North America, to get involved in their delivery (as distinct from the underlying strategic research) of these innovations: public sector debate would have been much more rational, and acceptance more readily forthcoming, I believe, if the public sector had produced the farmer-ready products, with Frankel; Peacock and Nossal eating them in front of TV cameras, just as Clunies Ross and colleagues publically injected themselves with the myxoma virus some 60 years ago.

4. The cadre of high quality agricultural researchers, derived from publically-funded research (much coming nowadays via RDCs), places Australia in a strong position to contribute to agricultural research and development in developing countries, desperately in need of and responsive to agricultural R and D. ACIAR and Ausaid have taken great advantage of this in the last 20 years. As a result, our standing is very high in international agricultural R and D fora and initiatives, extending to issues as far afield as climate change, and reflecting very well on the nation as a whole. Without a decent agricultural research foundation in Australia, the "Emperor would have no clothes". I believe this aspect of the contribution to the developing world of Australia's agricultural research is at least as important as that deriving from the agricultural surpluses that our research here has produced and which we export, thereby helping directly to reduce world food insecurity.

5. In addition to all of the above, a remaining powerful argument for public agricultural research is that it is a significant part of the OECD-calculated government support to agriculture here. While this remains in aggregate currently as low as around 7% of Gross Agricultural Product in Australia (and mostly comprises emergency relief funding) compared to more than 20% in most other major agricultural nations (except for NZ and Argentina), there is a strong case to maintain public funding for agricultural research as a non-distorting and WTO-compliant form of subsidy to at least partly offset the much larger subsidies of our competitors.

Funding model, funding level and possible improvements.

The RDC funding model is unique, and I believe has been relatively successful. One dubious mark of its success is the extent to which it has permitted the States to gradually withdraw from agricultural R and D. Beyond this point, however, I can really only comment on the GRDC which I know reasonably well, although I am sure there is a great deal to be learnt by the Commission through comparing and contrasting the various RDCs (including also the terminated L and W in this sample)

Notwithstanding pressures from the west, east and north, the GRDC has generally stood above destructive State and farmer politics, and looked to the national good. Indeed it brings an element of continuity in the face of fluctuating federal political attitudes, noting that lack of continuity and assurance of long term funding is anathema to productive agricultural research given the nature of most agricultural problems. Much research has been sensibly coordinated and indeed rationalized between States, as is appropriate for most of the problems faced by the grains industry given our limited research resources. The GRDC has wisely stood well clear of marketing issues, except when the issues involve researchable problems (e.g. on market quality needs, and on rationalization of grain transport) or when an honest broker is needed to resolve issues. Funding levels are barely enough and have retreated from the days when the research intensity was higher than 4% in Australia. Obviously the States are gradually withdrawing, while we cannot expect the multinational private sector, the biggest player globally these days, to pick up much of the slack since we produce less than 2% of the world's grain (and less than 4% of that grown in the developed world). The GRDC (and other RDCs) have introduced an adequate degree of competition between research providers, and this has had generally beneficial effects on research quality. The priority setting mechanism is consultative with industry, government and scientists, and effective, mostly avoiding the headlong rush of funding into the latest "cancer cure" announced by the media. Without the GRDC I hate to think how much more funding the genetic engineers, with their exaggerated promises, would have won!

How might the system be improved? I would like to see more funding and more longer-term funding. I would also favour efforts over the long term to move the centre of gravity of the agricultural research more to regional centres, recognizing that it is difficult (e.g., you cannot now move Uni of Sydney's Cobbity operation, the national wheat rust facility, nor the research facilities of the Waite Campus in Adelaide, both of which have received much GRDC funding). The move to fund farmer groups and their involvement in applied research has been a good one in this direction, provided research quality is not neglected, for example by linking them to researchers elsewhere. Monitoring research benefit/cost is a difficult business given the length of the lags (recent research by Pardey suggests this could be more like 30 years rather than the commonly held 10 years), given the problems of attribution, and given the role of spill-ins and spill-overs. If all else fails, it is the quality of the researchers and their immediate outputs that is the safest guide, and this is reflected in the quality of reports and especially scientific publications. It has always been so, and I don't see this changing. Reviewers however must have the skills and take the time to study these outputs thoroughly, for it is no easy task. More thorough reviews, held less frequently would be my suggestion.

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