

National Committee for Agriculture, Fisheries and Food

A committee of the Australian Academy of Science

Response to the Agricultural Competitiveness Issues Paper

Background

The National Committee for Agriculture, Fisheries and Food, which is convened by the Australian Academy of Science, welcomes the opportunity to provide a response to the Agricultural Competitiveness Issues Paper. This submission focuses on the need for the White Paper to consider more deeply the role that agricultural research, development and extension (R,D&E) will play in enhancing the future competitiveness and profitability of Australian agriculture. Harnessing emerging scientific opportunities will help Australian agriculture to develop new practices, improved crops and livestock, and sustainable resources. Gains in these areas will increase the competitiveness of the industry, and allow it to meet the challenges it will face in the coming decades.

Between 1953 and 1980, growth in agricultural R&D in Australia averaged 6.5% per year (DAFF 2010), and this increase in investment led to increases in agricultural productivity (Mullen 2010). Since that time expenditure has essentially been static (Mullen 2010), growing by just 0.6% per year since 1980 (DAFF 2010). Agricultural research intensity, which measures the investment in agricultural R&D as a percentage of GDP, grew strongly in the 1950s and 1960s to about 4-5% of agricultural GDP, but has fallen to about 3% in recent years. The lag time between research investment and realising productivity gains initially meant that this decline in agricultural R&D investment had little impact on productivity and competitiveness. This is because there was a pipeline of new practices and varieties, arising from previous investments, that sustained innovation for a significant period (Nossal *et al* 2009). However, declines in productivity have occurred since the 2000s. This is likely to be the result of earlier declining levels of investment in agricultural R&D impacting on the innovation chain for agriculture (as noted in the Issues Paper, p. 11-12; Mullen 2010; DAFF 2010). This relative decline should be seen in the context that the governments of most other OECD member countries increased their expenditure on agricultural R&D by about 1% per year in real terms over the last ten years (OECD 2013).

Although the Issues Paper acknowledges that *'it is important to consider how to boost productivity growth, including through research, development and extension'* (p. 12) and that *'investment in research and development (R&D) and its adoption on-farm through extension.....are integral to the future competitiveness of Australian agriculture'* (p. 25), no suggestions are made within the Issues Paper about the size of any future R&D investment and how it might be deployed for maximum effectiveness. The National Committee contends that the White Paper should give serious consideration to the current state of agricultural R&D with a view to strengthening its ability to take advantage of scientific opportunities that will improve productivity, profitability and competitiveness of agriculture well into the future. This requires a long-term commitment to investing in agricultural science, and dedicating part of that investment for mission-oriented strategic research that will help develop the scientific knowledge to underpin Australian agriculture in the decades to come.

The Government's acknowledgement of the importance of agricultural research through its election commitment to provide an additional \$100m to the Rural Research and Development Corporations (RDCs) is welcomed by the National Committee because it supports a funding system that is highly regarded. However this additional investment will only partially offset the successive and significant



funding cuts made by both State and Federal governments to agricultural R&D, and the negative impact incurred by the abolition of Land and Water Australia. The Prime Minister's Science Engineering and Innovation Council noted that *'The decrease in real investment in R&D has led to the substantive decline in underlying productivity growth in the Australian agricultural sector'* (PMSEIC 2010).

Compounding the problems facing the competitiveness of Australian agriculture through ongoing underinvestment in agricultural R&D, has been the lack of a coherent overarching policy and research investment framework. This has meant that best value is not necessarily being delivered by the existing (public and private) investment in agricultural R&D. The White Paper needs to provide guidance in this area, and assess what an optimal level of investment in Australian agricultural R&D should be, and to do this in the context of future challenges facing agricultural competitiveness. The White Paper should provide guidance on how such an investment can be most effectively utilised. It should also recommend developing a strategic research plan for Australian agriculture.

Ensuring effective agricultural R&D in Australia

Effective and efficient agricultural research depends on a healthy balance between novel discovery and effective deployment of scientific knowledge to develop new innovations. Australia's agricultural research efforts are funded across different levels of government and across multiple agencies, with no single agency providing strategic direction or driving innovation efforts. This can result in inefficiencies, with research providers competing or duplicating research efforts. The National Primary Industries R,D&E Framework provides a good example of where developing a more collaborative and strategic approach to research investment can potentially reduce inefficiencies, ensure research is collaborative and is undertaken in the national interest.

The National Primary Industries R,D&E Framework met these aims through the development of R,D&E Strategies for 17 product sectors and six cross-cutting topics (NPIRDEF 2014). The R,D&E Framework has facilitated increased collaboration between states, universities, CSIRO and industry, and those working in the sector believe it has led to a more effective use of resources (Allen Consulting Group 2012). However there is still room for further improvement in how the Strategies are used. A review has found that the performance of some Strategies has been disappointing and needs to be improved, and that there are insufficient mechanisms to ensure that all Parties contributing to the Strategies are acting as agreed (Allen Consulting Group 2012). Another weakness is that the R,D&E Framework divided agriculture into sectors or issues so there was no comprehensive oversight of the whole of agricultural R&D. Hence future scientific opportunities of widespread benefit may have been missed.

Whilst the increased focus and better use of limited resources is to be championed, this must be seen in the context of a relative decline in investment in agricultural R&D, particularly at the state government level. For example, the share of state government investment in agricultural R&D has fallen from 52% in 1996-97 to 37% in 2006-07 (DAFF 2010), and there are concerns within the sector that changes of government both federally, and at the state and territory level, might impact on the future direction and success of agricultural R,D&E (Allen Consulting Group 2012).

Reform of how agricultural R&D is undertaken will help deliver focus and efficiency to Australia's research effort, and secure long-term productivity gains for the industry. Such an approach will need to find the balance between short-term *ad hoc* actions and longer-term game-changing research that is appropriately embedded in delivery mechanisms. A salutary lesson in terms of effective research planning in this regard is seen in the National Action Plan for Salinity and Water Quality which, with

some exceptions, generated few worthwhile enduring mitigation benefits despite the expenditure of \$1.7 billion over 7 years (Pannell & Roberts 2010; Auditor General 2008).

The challenges facing Australian agriculture, arising from various factors such as its soils, water resources, disease profiles, and biosecurity needs, cannot be resolved by relying on the outcomes of research undertaken overseas. Australia's challenges are unique and place-specific so research, and the solutions it provides, need to be sensitive to the local context. This requires relevant agricultural science to be undertaken and applied here in Australia. Only this will give farmers the improved practices, crops and livestock they need to achieve competitiveness and profitability. Part of developing such outcomes will involve Australia undertaking international research collaborations to ensure that it has timely access to the latest break-through science and technology. Improvements relevant to our major crop, livestock and fibre industries will depend upon strong research links with leading research institutes in Europe, North America, Asia and South America, and our participation in leading international consortia. Such participation generates quick access to new ideas and ensures "early adopter" advantages for Australia's agricultural industry.

Powering to the future – principles to guide future investment

To maintain the vibrancy and competitiveness of Australian agriculture, it is essential to commit to developing a long-term investment strategy for agricultural R&D. The following broad principles should be considered in developing such a strategy:

- Provide over-arching (rather than product sector-specific) strategic direction to Australia's agricultural research effort to ensure effective delivery of on-ground impacts that will drive productivity and competitiveness for Australian farmers.
- Recognise the broad thrust of the National Strategic R&D Investment Plan developed by the former Rural R&D Council but seek to place a more focused and targeted approach to future research developments.
- Ensure that a significant tranche of new research funding is targeted at a limited number of specific areas to ensure that 'high science' break-throughs are converted to effective on-farm changes through a strong applications-based focus. A proportion of RDC research should look at longer-term, mission-oriented strategic research that will provide outcomes that will benefit Australian agriculture well into the future. If RDC levy payers are not willing to fund this, the Federal government's contributions should be ear-marked, wholly or in part, for this purpose.
- Ensure that investment by the RDCs is only made in the highest quality science (whether long-term or short-term in focus) by subjecting project proposals to independent peer-review rather than internal assessment by managers. The peer-review should involve expert, practicing researchers who have no link with the project. These experts would judge the proposed research for novelty, relevance, probability of success, and pathway to adoption. This is international best-practice and helps to target limited R&D funds to areas where they will be most effective. Such an approach is embraced by the ARC and NH&MRC where it ensures the best science, done by the most competent scientists, is supported.
- Investigate whether a new mechanism for extension of research outcomes to farmers based on the successful Land Grant University system in the USA could be introduced to Australia. This embeds extension within universities supported by Federal and state funding. Adoption

of a similar model in Australia would overcome a current problem whereby once a research project has been completed university researchers have no incentive, other than goodwill, to report their results to farmers. As universities are major players in the agricultural R&D system this is a significant barrier to on-farm application of research outcomes because universities presently have neither the remit nor the resources to undertake extension. Relying on the goodwill of researchers to voluntarily undertake extension is not a guaranteed formula for success.

- Promote and support international science linkages and ensure Australia's involvement in significant international consortia and partnerships that will benefit national agricultural research. The recommendations in the White Paper should align with the government's plans to develop an international science strategy.

To provide strategic direction to Australia's fragmented research effort in other scientific disciplines (for example astronomy, earth sciences, physics, and nanotechnology) strategic research plans have been produced under the auspices of the Australian Academy of Science (sometimes referred to as decadal plans, for examples see Australian Academy of Science 2014). These strategic research plans have had a major influence in identifying important new scientific directions, better targeting research funding, and enhancing the value of Australia's investment in science.

A strategic research plan for Australian Agricultural Sciences would be timely and beneficial and would help address the longer-term opportunities and needs that will ensure a vibrant agricultural R&D sector for the future. The outcome will be an over-arching foresight exercise that will analyse where agricultural R&D investment can be most effectively made and where the best opportunities for future innovation are likely to arise, irrespective of agricultural product sector.

Typically the development of such strategic research plans involves all stakeholders relevant to the topic (government agencies, researchers, funding bodies, industry and regulators) and the completed plan provides a coherent, agreed strategy for how the research in an area should develop in order to capitalise on new opportunities and knowledge to deliver future innovations.

A strategic research plan for Australian Agricultural Science could be prepared under the auspices of the Australian Academy of Science. This would ensure the development of an objective and well-informed plan focused on national capability and opportunities. The preparation of the plan would involve widespread consultation with the sector, but would be independent in its analysis and reporting.

In conclusion, the National Committee for Agriculture, Fisheries and Food strongly recommends that the White Paper recognises the key strategic role for R,D&E in enhancing agricultural productivity and ensuring the future competitiveness of Australian agriculture. The size and scope of investment in agricultural R&D should reflect the scale of the challenges facing the sector, and the productivity improvements that such investment can bring. Management and application of these investments need to be undertaken strategically to avoid ineffective research and duplication of effort. A strategic research plan developed by the Australian Academy of Science would give guidance for agricultural R&D, and ensure the multiple research agencies, funders and organisations are working towards the most effective goals for the future profitability of Australian agriculture.

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