



National Farmers' Federation

Submission to the Australian Government

Capturing Value from Science in Agriculture

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Prepared by
Christine Kershaw PhD

NFF Member Organisations



Australian Chicken Growers' Council Ltd





The National Farmers' Federation (NFF) was established in 1979 and is the peak national body representing farmers, and more broadly, agriculture across Australia. The NFF's membership comprises all of Australia's major agricultural commodities.

Operating under a federated structure, individual farmers join their respective state farm organisation and/or national commodity council. These organisations form the NFF.

Following a restructure of the organisation in 2009, a broader cross section of the agricultural sector has been enabled to become members of the NFF, including the breadth and the length of the supply chain.

While our members address state-based 'grass roots' or commodity specific issues, the NFF's focus is representing the interests of agriculture and progressing our national and international priorities.

The NFF has for 36 years consistently engaged in policy interaction with government regarding a range of issues of importance to the sector including trade, education, environment, innovation to name a few.

The NFF is committed to advancing Australian agriculture by developing and advocating for policies that support the profitability and productivity of Australian farmers.

Statistics on Australian Agriculture

Australian agriculture makes an important contribution to Australia's social, economic and environmental sustainability.

Social >

There are approximately 135,000 farm businesses in Australia, 99 percent of which are family owned and operated.

Each Australian farmer produces enough food each year to feed 600 people, 150 at home and 450 overseas. Australian farms produce around 93 percent of the total volume of food consumed in Australia.

Economic >

The agricultural sector, at farm-gate, contributes 2.4 percent to Australia's total Gross Domestic Product (GDP) and 15 percent of our merchandise exports. The gross value of Australian farm production in 2013-14 was \$51 billion – a 6 percent increase from the previous financial year. That makes agriculture one of Australia's biggest export-earning industries.

Yet this is only part of the picture. When the vital value-adding processes that food and fibre go through once they leave the farm are added in, along with the value of all economic activities supporting farm production through farm inputs, agriculture's contribution to GDP averages out at around 12 percent (over \$155 billion).

Asia's middle class now comprises around 500 million people. It is expected to increase more than six-fold in the next 15 years. This will translate into food being a big part of the story of Australia's future opportunities.

The National Farmers Federation has estimated that for Australian agriculture to reach the capacity which will be needed to meet rising demand will require investment of between \$1.2 and \$1.5 trillion over the next 35 years.

Environmental >

Australian farmers are environmental stewards, owning, managing and caring for 52 percent of Australia's land mass.

Farmers are at the frontline of delivering environmental outcomes on behalf of the Australian community, with 94 percent of Australian farmers actively undertaking natural resource management. The NFF was a founding partner of the Landcare movement, which in 2014, celebrated its 25th anniversary.

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1. Introduction

The National Farmers' Federation (NFF) welcomes the opportunity to provide comment on the Australian Government's Vision for a Science Nation consultation paper. The NFF supports the Government's efforts to develop a national vision and to shape the future of Australian research and science, technology, engineering and mathematics (STEM) education.

The NFF notes and commends the efforts of the Chief Scientist in collaboration with the Commonwealth Science Council to sponsor a roundtable – the Vision for a Science Nation. The NFF strongly supports this approach as an ongoing process where representative groups engage in wide ranging discussions about the future of science in Australia and the role of government and other organisations in developing a shared vision for a science nation.

The NFF recognises the critical role of research and development in reaching our potential to meet future food demands and the need for a sustainable agricultural sector. Australian agriculture faces enormous opportunities as the Asian region rapidly grows in population and economic prosperity. The global population is expected to reach 9 billion by 2050 and food demand is expected to increase by 77 percent over the same period – with much of this demand stemming from Asia. A wealthier, hungrier region presents significant opportunities for Australia as a provider of high value produce, as more informed consumers demand specific provenance, sustainability or health attributes from their food.

Overall, the NFF welcomes many of the initiatives outlined in the consultation paper but does not feel the consultation paper has fairly represented or satisfactorily emphasised the importance of the agricultural sector to Australia's economy. We believe that Australia should have a pro-growth position on the role of the agricultural industries included and specifically stated in any national science policy.

The commitment to develop a 'vision for a science nation' must also be undertaken in collaboration with the number of other government policy processes including the Northern Australia White Paper, the review of Competition Legislation (Harper Review) and specifically, the Agriculture Competitiveness White Paper. The NFF is of the view that collectively these key initiatives should help shape a national science policy that will underpin the future of the agriculture, and other key sectors in Australia.

2. Summary of recommendations

Recommendation 1:

Australia should have a pro-growth position on the role of the agricultural industries included and specifically stated in any national science policy.

Recommendation 2:

The National Science, Technology and Research Committee to include the Deputy Secretary of the Department of Agriculture.

Recommendation 3:

Government to develop a whole-of-government Investment Framework for the allocation of national science funding.

Recommendation 4:

Government to establish a long-term science investment strategy that spans 20 years, with a recurrent budget that is protected in real terms.

Recommendation 5:

Government to support a more collaborative approach between universities and industry employers that provides a better transition from university / academia to industry.

Recommendation 6:

Government to support a comprehensive system of STEM education and training and engagement with agriculture throughout the education system.

Recommendation 7:

Government to undertake a more concerted public awareness strategy to address negative perceptions of STEM education.

Recommendation 8:

Government to more fully utilise industry groups to facilitate industry / academia collaboration.

4. NFF response to consultation paper

The NFF are prepared to step up their efforts to maximise the value from science for our agriculture sector. This will be achieved in part, by working more closely with government, industry and academia to contribute meaningfully towards the development of a national science policy.

We offer the following comments in response to the consultation paper:

Prioritise agricultural science efforts

Prioritising funding for science is one of the pillars of a strong economy. Government should focus its science investment and resources on strategic opportunities that are founded in our competitive advantages. The NFF supports the government's initiatives in targeting innovation efforts and acknowledges the government's identification of food and agribusiness as one of the five most important growth sectors in Australia. It is the view of NFF, however, that current science investment is spread too wide and needs to be concentrated on agriculture and other key areas in the economy with the strongest social, environmental and economic advantage.

One key feature of the science policies of countries with fast-growing agricultural industries for example, like Brazil and Chile is that there is an agreed position on the role of agricultural sectors in the national economy, and policy explicitly aims for a growing industry. Australia too should have an agreed, pro-growth position on the role of agricultural industries included and specifically stated in national science policies.

Successful policies typically include a willingness to selectively intervene to support investment in productive capacity as well as human resources and innovative technology, and also a commitment to researchers/business collaboration. Australia should adopt a similarly pragmatic and strategic approach to its national science policy.

Australia should consider how, against the strategies of its overseas competitors, STEM education, R&D, innovation, and specialised agri-food innovation initiatives could be better integrated. This should be the focus of the national science, technology and research committee, which should be expanded to include the Deputy Secretary of the Department of Agriculture.

Recommendation 1: Australia should have a pro-growth position on the role of the agricultural industries included and specifically stated in any national science policy.

Recommendation 2: The National Science, Technology and Research Committee to include the Deputy Secretary of the Department of Agriculture.

In the market pricing system, consumers signal suppliers and businessmen on which innovations are mostly urgently needed, therefore creating an efficient economy. Government and academics on the other hand, often ignore market pricing with long-term research planning that can lose relevance in a fast changing market. This highlights the need to ensure research funding is efficiently and effectively allocated to where it is needed most.

Improving how research funding is used is critical, which has driven an increasing need for government to link future funding to evidence-based research prioritisation and outcome performance. A whole-of-government Investment Framework for the allocation of national science funding is needed. This should be undertaken in close consultation with key stakeholders and industry. The ‘allocation mix’ should reflect priority research activities that are aligned with Australia’s strengths and can demonstrate clear social, environmental and economic outcomes. The government should ensure that public science institutions agendas are aligned with government and industry research priorities.

Recommendation 3: Government to develop a whole-of-government Investment Framework for the allocation of national science funding.

Need for secure, long term investment in science infrastructure

Investment must be targeted toward developing infrastructure that represents the future progression of Australia’s agricultural industry. Public investment in research underpins and attracts private investment in R&D. A strong public research base supported by stable, long-term investment therefore is a key foundation for private investment and creates maximum long term benefits from overlapping budget investments.

Cuts in research/science funding are a threat to the stability of Australian research institutions and will reduce their capacity to fully exploit the funding provided by the private sector. Unstable funding environments also risk driving research overseas, which over time will erode our capacity and expertise to conduct research in Australia.

Australia’s investment in science and innovation contrasts from our international competitors such as the US, Germany and Korea where investments have been steadily increasing since 2000. To keep pace with other competing and leading scientific nations, investment in research must continue to ensure funds are available for a long-term science investment strategy that spans not 10, but 20 years, with a recurrent budget that is protected in real terms.

Recommendation 4: Government to establish a long-term science investment strategy that spans 20 years, with a recurrent budget that is protected in real terms.

Market pull forces to enhance innovation and encourage commercialisation

NFF agrees that government can play an important role in ‘pulling innovation through the system’ by identifying and championing investment opportunities and developing valuable market data. NFF would go further and also encourage a stronger focus on the use of market pull mechanisms rather than following technology ‘push’ signals that seem currently more prevalent.

Following a market pull strategy is more likely to encourage industry to be involved from an earlier stage in the research path. Once engaged, industry are more likely to continue to drive research in the direction they want, so that once an innovation is achieved, industry actually want it.

A renewed ‘market pull’ approach to research investment – led by industry - will reduce the risk of disconnect between the researchers and the needs of industry.

Addressing early-mid career researchers concerns

Early- and mid-career researchers are a critical part of science infrastructure. An investment in this group, which are different from those of students and established researchers, is important. Job security is a particular concern for this group, particularly for academics whose jobs are tied to grant cycles. One way to retain researchers is to enable longer term contracts and a clearer pathways to success and promotion.

Opportunities to connect researchers to business and industry – either in Australia or internationally - at each stage of their career is another mechanism that can facilitate a greater appreciation of opportunities for commercialisation within research communities. While this mechanism is currently in place for PhD students, there is an opportunity to extend this model for post-doctoral researchers to enable them to gain first-hand experience and build productive links for future collaborative research.

As we look to commercialise research, academics with business skills become key to identifying and driving opportunities to translate research. It is important that we improve pathways for researchers to move between academia and industry, ensuring that gaps in their publication record which arise from time in industry are not a disincentive.

Overhaul of education and training system needed

NFF strongly supports the need for a whole of government approach investment in STEM education and highlights the critical importance of STEM graduates to the agricultural sector. The agricultural workforce needs to have the skills to conduct research and take up new innovations at a national level, working through partnerships with industry and academia.

With most scientists coming from the public education system, the entire philosophy of Australian public education needs an overhaul. The consultation paper outlines welcome initiatives but does not go far enough.

Regionally, partnerships need to be established in order to facilitate a more collaborative approach to education and training between universities and industry employers that provides a better transition from university / academia to industry. Secondary students should be provided with improved access to career advice with insights into agricultural science as a career with clear career pathways able to be mapped out and described.

A robust and interactive educational experience is needed as an integral part of the degree program. Tacit knowledge is acquired mostly through learning by doing, which means there needs to be a much stronger focus on work-based learning experiences. Business-focused initiatives and work-based learning should be integrated into agricultural science courses, including innovation clusters that broker relationships between students, researchers and industry.

Recommendation 5: Government to support a more collaborative approach between universities and industry employers that provide a better transition from university / academia to industry.

It is vital to the future of agriculture to expose a wide range of young potential research scientists to the exciting and fundamentally important world of agricultural science and to become more fully aware of career choices in agricultural industries. STEM disciplines and science awareness must be embedded into courses from school through to postgraduate education.

Robust policy solutions are needed for public universities and colleges to expand their training capacity for agricultural career pathways and to provide more interactive educational experience as an integral part of the degree program. Government also needs to commit to long term investment in already successful programs between schools and universities, such as the Primary Industry Centre for Science Education (PICSE).

Recommendation 6: Government to support a comprehensive system of STEM education and training and engagement with agriculture throughout the education system.

The public's perception of agricultural science and research is central to increasing participation in science generally, and agricultural science education in particular. A positive public perception of science related disciplines and agricultural innovation would contribute to making science and agriculture an attractive career goal and underpin public enthusiasm for science. A more concerted public awareness strategy is needed to address negative perceptions of STEM education, with a particular focus on attracting students to agricultural science. This could be achieved by providing funding for agricultural science outreach programs.

Recommendation 7: Government to undertake a more concerted public awareness strategy to address negative perceptions of STEM education.

Increasing private sector investment

Australia's internationally respected research base is attractive to funders but government action is needed to increase the level of private sector investment and to maintain and build upon our dwindling research infrastructure. The government needs to invest in creating a high quality research environment with low-risk, high-return opportunities for investors.

The Australian government could increase its support of industry funded research by covering the costs of overheads and infrastructure for industry-researcher collaborative projects to ensure that industry partners pay only the direct research costs associated with research projects.

As research becomes more interdisciplinary, the boundaries between research investment by industry and government are likely to become ever more permeable. There is a need for government to facilitate a greater cross-disciplinary approach to research investment by supporting research capital investments that are useful across a range of disciplines for projects that may not be sufficiently prioritised for one discipline.

Boosting commercial returns from research

Recent ABARES evidence points to a slowdown in the rate of productivity growth within agriculture, as a result of adverse seasonal conditions such as drought and a less than optimal intensity of public and private investment into RD&E.

Significant challenges exist for Australian agriculture and one way of responding to these challenges is to encourage investment in R&D and the associated extension or application of the outcomes from the research. Delivering better quality and more competitively priced food and fibre; improving environmental and animal welfare outcomes; responding to climate variability and climate change; dealing with emerging biosecurity threats; and adapting to energy and resource scarcity mean that there will be greater demands for innovation in agriculture.

The capacity for rural research and development to make a significant contribution to these challenges, which have far reaching implications for all Australians, is evident from the high returns identified from past research through the various published studies on returns on investment from rural research and development.

NFF welcomes the Government's recognition of the Rural Research and Development Corporations (RDCs) as an effective mechanism to facilitate research and industry collaboration and commercialisation. The compulsory levies that underpin the work of the RDCs connect most of Australia's 135,000 farm businesses to a research, development and commercialisation pathway that would otherwise be impossible for small businesses.

The connection between research and commercial outcomes is highlighted by the estimated returns to productivity of \$12.00 for every \$1.00 of Government investment within 10 years. The RDC model has undergone frequent reviews and inquiries in the past 5 years.

The RDC model has universal support from agricultural advocacy organisations, however, continual questioning of government commitment to co-funding the model does not facilitate the long term certainty required to invest for commercial outcomes over the longer term.

Incentivising investment in R&D

NFF is of the view there is a need to further incentivise investment into agricultural R&D and this could occur through the tax system. Companies have access to the R&D offset mechanism but as these legal structures cover just 8% of agriculture, additional incentives for non-incorporated entities would be valuable. Tax incentives should be available for developers and primary producers to invest in efficient input use technology, such as for precision farming, digital technology, telemetry, drones, etc. However, this must not come at the expense of Australian agricultures world class levy funded R&D system.

Further Government action could include exploration of changes that encourage market responsiveness and collaboration along the supply chain, including through improving intellectual property protection and access to proven technologies (such as genetically modified crops).

The globalization of agricultural science

International collaboration should be embedded in the national science vision. Engagement with the Indo-Asia-Pacific rim should be explicit. Australia is uniquely placed to drive cooperative research with international partners in the Indo-Asia-

Pacific region, due to our existing infrastructure and national research-levy schemes to support agricultural collaborations (e.g., through RIRDC).

The government should recognise the international nature of science and research and ensure our immigration laws better facilitate the movement of skilled individuals in and out of Australia, and deliver a clear message that scientists and agriculturalists are valued. Sharing expertise globally will help us to remain competitive. It is essential to minimise perceived or real barriers to the flow of talented people by supporting the inward migration of talented individuals and research teams by ensuring migration and visa regulations are tailored. For example, this could include visa extensions for international students and researchers to continue working in Australia once graduated or at the end of a research project.

Globalisation offers significant investment attraction opportunities but, at the same time, stronger competition. This means we need to partner with the world's best and be clear about the most powerful levers to attract investment and scientists into Australia's science and technology industries. This could be achieved by strengthening and broadening existing strategic relationships and highlighting Australia's strategic science capabilities and opportunities at national and international forums. This should be pursued at a leadership level, and through government participation in research and other initiatives.

Increasing collaboration between industry and academia

Opportunities for industry to collaborate with researchers have often proven difficult to achieve in Australia. The role that industry groups can play in bridging the gap between industry and researchers to work more collaboratively has been underestimated.

Better use of industry groups as brokering agents could provide a simple and cost effective way to increase collaboration between industry and academia. Simple incentives tied to collaborative research projects could be brokered through industry groups who have the networks to help individual businesses or sectors to understand and take advantage of government initiatives. Explaining and expanding tax incentives is also important.

In the agriculture sector, it must be remembered that Australia does not have large scale multinational businesses that are Australian focused when they invest in research such as plant biotechnology, breeding and crop protection. Incentives are required to encourage these companies to conduct in-house research in Australia for Australian conditions. As already emphasised, the most effective incentive is to attract them by maintaining a high quality R&D system that makes Australian researchers and research institutions an attractive partner. This requires long term funding support to maintain, if not lift, the level of excellence of Australia's research capacity.

Recommendation 8: Government to more fully utilise industry groups to facilitate industry / academia collaboration.

In short, not many of the proposals in the consultation paper enable NFF to effectively contribute to Australia's STEM performance. The government needs to make better use of NFF and other industry organisations to strengthen relationships between private industry and universities in order to foster innovation. Industry groups can assist with locating businesses to invest or otherwise participate in collaborative projects and to help focus science investment into issues with real world innovation potential. Industry groups can also play a crucial role in organising industrial internships and scholarships.

The NFF therefore invites the federal government to support our efforts in this area by pursuing opportunities for greater industry-academic collaboration facilitated through industry organisations, such as NFF and our member organisations.