The Practice of Agricultural Science and Innovation
Policy Paper

Introduction / Background

Advances in agriculture depend on innovation underpinned by science. These advances lead to improved productivity as well as improved outcomes of the natural resource base, animal welfare, plant and animal quarantine and health, and food safety. They also lead to the development of adaptive management approaches that ensure increased resilience for the agriculture sector in response to system changes including climate change and variability. There are many examples of science-based improvements in agriculture and animal production systems and increasingly these are being enhanced by advances in information technology and data management that enable sophisticated monitoring and evaluation of systems that improve decision making, financial outcome and risk management.

Problem Statement

The importance of innovation and the science-based underpinning of advancements in agriculture must be recognised to ensure sufficient ongoing investment in, and support of innovation to support agriculture in Australia. The role of extension and science education at all levels in meeting these ends is equally essential. Ag Institute Australia believes that failures in these areas would lead to lost agricultural opportunities and inabilities of Australian agriculture to compete internationally and, in some zones and industries, to remain sustainable.

Objectives

Ag Institute Australia consider that science must continue to underpin advancements in agriculture and its role needs to be promoted and enhanced to ensure productivity gains and efficiencies are achieved. As such, Ag Institute Australia's policies on the role of science in agriculture include the following:

1. National Primary Industries RD&E Framework
2. Continued funding and support for the Research and Development Corporation (RDC) model
3. Establishment of a Land, Water and Climate RDC
4. Strategic versus prescriptive research
5. Promotion of science education
6. Metrics for university performance

Analysis of Options and Policy Recommendations

<u>National Primary Industries RD&E Framework</u>

The continuing use of the National RD&E Framework to facilitate greater coordination among the different Commonwealth, State governments, CSIRO, RDCs, industry and university sectors to better

harmonise their roles and assure that they work together effectively to maximise net benefits to Australia. The framework will ensure that RD&E resources are used more effectively, efficiently and collaboratively, thereby reducing capability gaps, fragmentation and unnecessary duplication. Our observation is that after the initial enthusiasm, the adoption of the framework has stalled, and there are examples where States have either ignored the framework or used it to justify cuts in R&D to meet budget imperatives. There appears to have been little monitoring by the Ministerial Council on the adoption of the framework. It is important for the primacy of the National RD&E Framework to be recognised in the planning for expenditure on Agricultural Science and Innovation.

Continued funding and support for the RDC model

The continued support for the industry Research and Development Corporation (RDC) collaborative development model which has fostered a science-based approach for innovation in the primary industries that has resulted in excellent returns on investment. A 2016 independent review of Meat & Livestock Australia's (MLA) investment found an average $6 return for every dollar spent. Reviews of other RDCs have shown similar success.

Ag Institute Australia encourages RDCs to continuously review their operations in accordance with the requirements of their stakeholders to ensure that investments are being efficiently and effectively spent on all facets of the RD&E continuum.

Establishment of a Land, Water and Climate RDC

The various RDCs have a range of common interest issues that impact on more than one industry. Irrigation, pastures, land use, and integrated farming systems are just some of these. An end result of this broad relevance is that no single RDC takes responsibility for these common interests and there is gross under investment in RD&E in these essential areas.

To correct this situation and avoid duplication of activities Ag Institute Australia recommends the re-establishment of a Land, Water and Climate RDC. Amongst other activities, this RDC could provide the necessary scientific rigour into the means of adapting to the challenges faced by the agricultural industries with respect to land and water resources, including responses to better manage the risks of drought, flood, frost, fire and other impacts.

Strategic versus prescriptive research

Because innovation from research is difficult to predict it is important to ensure investments are strategic rather than prescriptive. The continuation of science-based "blue sky" research is essential because of the possibility of discovery of novel processes that result in "disruptive" technologies with improved outcomes.

Blue sky research is essential because it informs us of the processes and causal factors behind a question, on which applied research and extension outcomes can be developed. It can also lead directly or indirectly to serendipitous or unexpected/intended outcomes.

One of the outcomes of the change in balance between government and industry investment in R&D has been the reduction in "blue sky or basic" research. Given the increased dependence on "outside" funds, RDC priorities in fact largely set the research directions and investment. Understandably grower

levy payers want a return on investment in the shorter rather than longer term. That is not to say that RDCs don't fund some blue sky research but normally see this traditionally as the province of Universities, CSIRO or government. Private companies do invest in this area but usually where it has a high chance of commercial payoff.

All research needs commence with identifying the issue and the essential research questions - only then can we decide the nature of investigation required and the "path to market" for the outcomes. In the case of basic research these may be long. We can no longer get away with people pursuing their preferred areas of work to the exclusion of real outcomes.

Promotion of science education

In order to achieve the various scientific advancements in agriculture outlined above it is essential to continually foster the education of science so that the appropriate scientific skills are available for the future. The scientific disciplines that support agriculture are many and varied and include those that are not necessarily derived from the traditional agriculture courses. There needs to be promotion of all facets of science education, commencing at the school levels, to demonstrate the variety of careers available to all students.

Metrics for research performance

Over the past twenty years there has been an increased use of publication in refereed journals as a performance yardstick on which is based the standing or ranking of the organisation and its potential to attract funding.

Metrics, especially for university performance, must be reset to focus more on industry impact and benefits to farming communities, the economy and the environment. While universities have a crucial role in education they also have an essential role in research and they should be provided with incentives to deliver outcomes for industry in addition to incentives to deliver scientific findings. This will require a change in the current metrics of university performance that is currently too focussed on publications and citations. Major funding bodies such as ARC and NHMRC are now demanding a more balanced approach with what they call more "translational" research.

Recommended Readings

- Nil for this Policy Paper

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