

SUSTAINING THE RESOURCE BASE

A submission to the

AGRICULTURE & FOOD POLICY
REFERENCE GROUP



Australian Government

Land & Water Australia

Introduction

Land & Water Australia welcomes the opportunity to contribute to the work of the Agriculture & Food Policy Reference Group, which is an excellent initiative on the part of the Australian Government. The Issues paper provides a good starting point for analysing the numerous factors placing increasing pressure on Australian primary producers and their resource base.

The management of Australia's natural resources has never been higher on the national agenda. Water resources - both surface water and groundwater - are under extreme pressure, with the majority of the Australian population now periodically experiencing water restrictions and producers reliant on irrigation facing reduced allocations.

Drought reminds us of the substantial influence climate variability has on agricultural production, and, although we have dealt with variability in the past, the evidence is mounting that each drought is hotter than the last and there is a more profound drying cycle influencing particularly south-western and south-eastern Australia.

Australia's unique biodiversity is under stress, with extinction rates increasing and ecological systems degrading. Appropriate management will be critical to their future survival. Further, vegetation, pastures and trees play an important role in achieving an appropriate hydrological balance, controlling salinity, reducing erosion, managing carbon emissions, and in sustaining many of our productive grazing systems.

Land & Water Australia has been investing in better understanding and generating new knowledge about our natural resource and ecological systems for 15 years. Our research has explored ecological and natural resource management imperatives, while considering the production needs of industry and the dynamics of rural communities. From this we have gained valuable insights into the drivers of sustainability from a triple bottom line perspective.

This submission considers a number of these influences on the sector in climate variability, water management, demographic change, competition for rural land, and changing community expectations of agriculture. We identify issues and make recommendations relevant to the regional NRM delivery model and its relationship with industry, the responsibility of farmers as environmental managers and the contribution made to sustainable agriculture by the rural research and development corporations.

The submission is structured around the following areas relevant to the Issues Paper:

1. *Competitiveness of Australian agriculture and food businesses:* in particular addressing research, development and innovation; investment in new knowledge and its adoption; water and energy.
2. *Using and managing natural resources - Industry:* in particular the role of farm businesses in environmental management, achieving NRM benefits and climate variability and change.
3. *Using and managing natural resources -Regions:* in particular the regional delivery model for government initiatives in NRM and knowledge needs.
4. *(Part D) Rural and regional communities:* in particular the implications of change for rural communities and role of governments in adjustment to change.

Summary of Recommendations

Issues Paper Part B - *Competitiveness of Australian agriculture and food businesses*

To foster R&D which delivers profitable and sustainable production systems as a strategy for supporting competitive agricultural businesses:

There should be continued support for rural research, development and extension in sustainable resource use, with a particular emphasis on collaborative investment on issues of generic importance such as water and nutrient management, climate variability and environmental services. The Rural RDC model provides an excellent framework for this investment.

There is a need to consider how some of the key knowledge adoption issues can be addressed in a coordinated and integrated manner, perhaps through a framework for rural extension that examines and establishes:

- differences and similarities in drivers between extension for commercial agriculture and for natural resource management;
- the role of governments in extension and responsibilities between levels of government;
- supporting development of appropriate skills and training and competency standards for NRM extension, including the use of new technologies;
- clarity and consistency in the role of universities and other training institutions and providers;
- career structures or other impediments to building and maintaining NRM extension capacity; and
- mechanisms to promote NRM delivery as part of commercial extension activities.

Issues Paper Part C - Using and managing natural resources - Industry

LWA believes that good progress is being made in industry and NRM investment. This needs to be supported in the future with specific emphasis on:

- Promoting the need for R&D to be supported that explores the interface between environment and industry; and productivity and sustainable natural resource management.
- The key principles governing the equity of resource management should be determined through a government, community and industry engagement process. The principles would clarify public benefit and guide regulation and necessary adjustment about resource access, use and management. They would also help to delineate the individual versus community roles in responding to exceptional circumstances and potentially the effectiveness of adjustment programs.

Issues Paper Part C - Using and managing natural resources - Regions

Additional aspects should be introduced to the NRM "regional delivery" model in order that it may fulfil its potential, and address some of the challenges identified, including:

- Integration of, or explicit consideration of the interaction of measures under Australian Government programs should be undertaken to ensure approaches are complementary rather than duplicative, in tension or fragmented.
- Strategies need to be established that ensure regional delivery is supported by better knowledge and access to technical capacity.

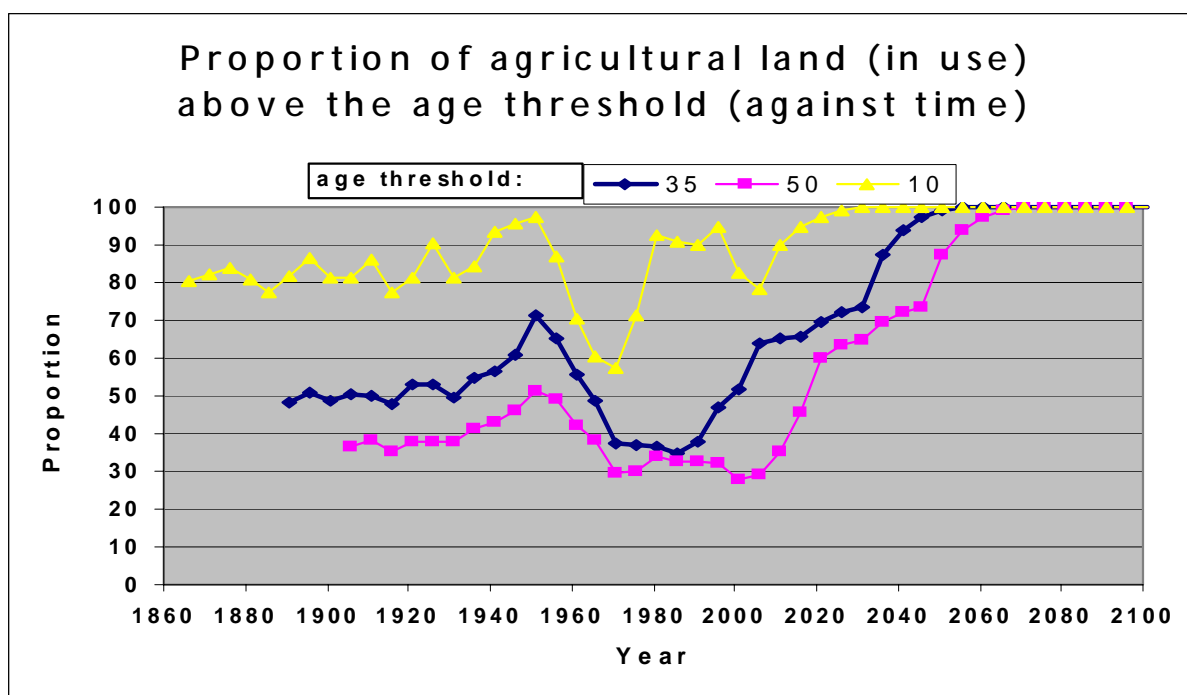
1. Competitiveness of Australian agriculture and food businesses

Australia's agriculture and food sectors depend on ongoing access to healthy and productive natural resources - land, soil, water and vegetation. The National Land & Water Resources Audit comprehensively documented the condition and extent of these resources, identifying and explaining those areas where past and/or current land uses and management practices have contributed to resource depletion, degradation and on-going stress - and also those areas where the environmental footprint of agriculture is impacting on other resources.

Pastoralism and agriculture occupies more than 60% of the Australian continent and accounts for almost 70% of consumptive water use. Accordingly, farming practices offer the single biggest opportunity to improve the sustainability of resource use and management in Australia. Against this background, LWA believes that the need is greater than ever to support carefully targeted and well-managed research, development and extension (R,D&E) which generates and extends Australian knowledge about improving the sustainability and profitability of farming systems.

Such knowledge is needed to support our global competitiveness. Many countries' producers benefit from policies of subsidisation and younger, richer, more forgiving soils, with more reliable climates than ours. Australian production systems must therefore be more resilient, smarter and sophisticated if we are to compete. This has driven a culture of innovation within the Australian rural sector and can be seen in industries' long term support for investment in research and development.

One piece of LWA-funded research, undertaken by the CSIRO (Dunlop & Turner 2003), that may interest the committee concerns the relative 'age' of Australian agriculture. We tend to assume that European farming has been around for a bit over two hundred years in Australia, but for most regions our farming systems are much younger than this in terms of the number of years since large scale clearing or irrigation.



The graph above shows that by the year 2000, only around half the agricultural land in Australia had been in use for more than 35 years and less than 30% of agricultural land had been in use for more than 50 years. The curves are similar for irrigation. This research predicts that on current trends, and analysing the remaining land available for agriculture in Australia, it will be about 2050 before the vast majority of agricultural land in Australia is more than 35 years 'old'. Given the long timeframes for issues like salinity, acidification and groundwater depletion to develop and fully express themselves in the landscape, this analysis suggests that land and water degradation issues - and the downstream impacts of agriculture on water quality, biodiversity and in-shore marine environments - will be with us for many decades yet and may even get worse before they get better.

This underlines the importance of R&D to back up and underwrite the work that thousands of farm businesses across Australia are doing to develop more sustainable and profitable farming systems. Research and development supports the generation and application of the best available knowledge about sustainable production systems. From this perspective LWA has identified the following key elements in R&D in production and NRM:

- Progress must be towards positive gains in environmental and production goals;
- Be applicable across scales (eg from farm to catchment);
- Be relevant in a variable climate (eg accommodating drought and floods);
- Build links in research, and learn from on-ground managers - especially farmers and catchment managers; and
- Research outputs need to be adoptable - whether in management or policy domains.

Land & Water Australia and the commodity-based Research and Development Corporations (RDCs) work collectively (with numerous research providers and collaborators) to meet sustainable production research needs. Investments such as the National Program for Sustainable Irrigation and the Managing Climate Variability Program bring together a range of different commodities to jointly invest in areas of common concern, and to do so in partnership with state and federal governments and private water authorities.

In terms of new knowledge generation which could support future competitiveness of the sector, we have identified the following key areas:

- **Integrating Environment and Production:** Environmental management must be recognised as a core element of sustainable business strategies. Australian R,D&E has been a world leader in this area and it must be maintained and enhanced in the future. Examples include:
 - the Cotton BMP program between the Cotton RDC and Land & Water Australia which led to substantially better pesticide management in the cotton industry and eliminated endosulphan contamination of rivers in cotton valleys; and
 - the Land, Water & Wool program between LWA and Australian Wool Innovation which seeks gains in environment and wool production, such as productive use of saline land and biodiversity conservation on commercial wool properties.

- **Designing Innovative Farming Systems:** Researchers need to work with producers to re-design farming systems to better meet economic, financial, environmental, and social issues of the future, for example:
 - Minimum till and controlled traffic systems were developed to reduce soil erosion, but have many production benefits, the grains industry have lead the way;
 - Dryland Salinity requires profitable alternative management responses - such as increasing incorporation of perennials into farming systems, farmers in WA are leading the development of productive alternative systems whose viability are being tested with the assistance of research;
 - Seasonal climate forecasting tools enable producers to make strategic responsive decisions for profit in good seasons and protection of resources in poor seasons.
 - Alternative farming systems developed by innovative farmers such as direct drilling of crops into pastures, benefiting crop, animal production, hydrological balance and soil health.

- **Working Across Scales; in Variable Environments:** Understanding how changes in a catchment (eg rising salinity) affect production and how production affects the catchment (eg nutrient contamination) is increasingly important. It requires researchers able to work across scales and practical input from producers to consider how interactions can vary in response to fluctuating seasons, and episodic events like flood and drought.

- **Supporting Adoption & Practice Change:** There is now a sound understanding of the factors influencing the adoption of sustainable management practices and the social context in which it occurs. The challenge is to use that understanding and better apply it. However, like other R&D funders and providers in Australia, Land & Water Australia can no longer assume that the outputs of its research investments will be picked up by a well-structured, well-organised, well-trained and resourced rural extension system.

In production agriculture, the decline in state-funded extension services has largely been offset by private advisory services through consultants and agribusiness firms. However in natural resource management, public funding remains dominant and there has not been a similar emergence of private service providers. There has been a marked shift in expenditure on extension (broadly defined) from the States to the Commonwealth over the last fifteen years, and from 'one on one' to group-based extension approaches. Since the Decade of Landcare and beyond the Commonwealth has made substantial investment in extension support for NRM facilitators and coordinators through Landcare, the Natural Heritage Trust and the National Action Plan. This national support has played an important role in facilitating community involvement and enabling on-ground activities.. However, there has been a gradual disinvestment by the States in the underlying extension profession, and the infrastructure that supports it:

- training
- centre(s) of excellence to learn the lessons
- sharing of innovative use of new technologies, and

- clear and supported roles of the different tiers of government, NGOs and industry.

In the absence of investment in the underlying infrastructure to build some memory into the system, the predominance of short-term contract work, high levels of staff turnover and loss of good people from the sector results in institutional amnesia. It is not easy to find out what is being done/has been done elsewhere, and what lessons have been learned. There is a dearth of expertise, training and institutional capacity to support whole farm system, multi-commodity and natural resource management advice to the rural sector. Australia lacks a world class centre of excellence for natural resource management research, extension and skills development within the tertiary education system. A centre of excellence does not have to be a centralised model - it could be a 'virtual centre' of distributed networks, linking up some of the very good work being done by small groups in regional universities, and better linking those into the policy, management and advisory audiences at catchment, state and national level. Land & Water Australia is developing these ideas and more.

Land & Water Australia remains of the view that the job of achieving landscape-scale adoption of more sustainable land management practices requires highly skilled intermediaries between science and practice.

Recommendations:

To foster R&D which delivers profitable and sustainable production systems, as a strategy for supporting competitive agricultural businesses, LWA makes the following recommendations:

- There should be continued support for rural R,D&E in sustainable resource use, emphasising collaborative investment on issues of generic importance such as water and nutrient management, climate variability and environmental services. The Rural RDC model provides an excellent framework for this investment.
- There is a need to consider how some of the key knowledge adoption issues can be addressed in a coordinated and integrated manner, perhaps through a framework for rural extension that examines and establishes:
 - differences and similarities in drivers between extension for commercial agriculture and for natural resource management;
 - the role of governments and responsibilities between levels of government;
 - supporting development of appropriate skills and training and competency standards for NRM extension, including the use of new technologies;
 - clarity and consistency in the role of universities and other training providers;
 - career structures or other impediments to building and maintaining NRM extension capacity; and
 - mechanisms to promote NRM delivery as part of commercial extension activities.

The objective of such a strategy may be to map out a long term plan for Australia to capitalise on the great work that is happening through industry programs, NAP, NHT and Landcare, and to reinvest in some of the underlying support measures for a viable extension system appropriate for the 21st century.

3. Using and managing natural resources - Industry

Soil, water and vegetation are the productive foundation for Australian agriculture. Factors such as declining terms of trade tend to influence farm business decisions to be more concerned about immediate (short term) prospects, rather than the longer term. This can lead to increased pressure on natural resources which threatens the longer term productive capacity of the resource base and consequently the productivity of enterprises and competitiveness of the sector.

Producers are also dealing with changing community expectations of agricultural and pastoral landscapes. Consumers demand healthy rivers and estuaries and viable populations of native animals and plants, in addition to cheap and clean food, fibre and water. Increasingly, the community wants a wider range of services from the countryside, such as attractive landscapes, tourism and heritage.

There is unresolved tension between the responsibility of land managers to deliver services versus community expectations and preparedness to pay for such services. There is also increasing acknowledgement that resolution of a number of biodiversity and natural resource issues will involve trade-offs within a community - with a strong likelihood of winners and losers. Government policy and within industry processes are yet to fully come to terms with the complexity of such issues.

Land & Water Australia believes that sound science must be incorporated when governments, communities and industries seek to address issues such as trade-offs, rights of land managers and appropriate recognition (payment) for services. The following key knowledge needs have been identified:

- **Ecosystem Services:** Understanding how different components of the landscape interact, the role of land managers and how their contribution should be valued in the delivery of services. For example, the role of different landuses in affecting the quality and quantity of water run-off into streams used for domestic consumption and the use of grey water for horticultural crop production.
- **Parameters Guiding Access to Resources:** Access to water and land are affected by policies and regulations such as COAG Water Reform, vegetation clearance controls and zoning or land development criteria. Different interests seek different outcomes in these matters. At times it is possible to establish mutually beneficial arrangements which enable production to take advantage of the natural wetting and drying cycle, while at other times an industry target for water use at a particular time may be in conflict with the environmental needs at that time.
- **Irrigation and Water Resources:** Collaborative irrigation research over the past decade has shown that efficiencies in irrigation can be generated at various scales (eg catchment, district irrigation area, farm and paddock); but trade-offs are required. For example, the National Program for Sustainable Irrigation is supporting the Goulburn-Broken Futures Project in a community-driven decision making process seeking to balance competing interests in the region.
- **Implications of Climate Variability:** Variable seasons and episodic events, like floods and drought, are significant drivers of landscape and ecosystem function. Most land and water degradation occurs during extreme events - not during the mythical 'average' season. Climate change *per se* is perhaps less of an issue for

Australian agriculture than the even more extreme variability that is predicted under most climate change scenarios. Access to tools which offer forecasting lead times and confidence in decision-making by resource managers, will be a key factor in how well rural Australia adapts to climate change. This must be accommodated at individual enterprise, catchment, community and continental scales.

- **Equity:** A stumbling block to the resolution of NRM issues like access to resources and payment for the delivery of environmental services comes from lack of agreement on where the balance of responsibilities should lie – or how to operationalise the concept of ‘duty of care’ or mutual obligation. Farmers strongly support a stewardship ethic and accept that it is not the right of landholders to knowingly degrade the resource base. But where society is demanding products and services of landholders over and above their normal responsibilities as land and water managers, it is reasonable to expect that the wider beneficiaries should pay for these services. The challenge is where and how to define the line between responsible land management and provision of environmental services over and above a normal duty of care.

Recommendations

LWA believes that there are structures and good progress made in industry and NRM investment. This needs to be supported in the future with specific emphasis on:

- Promoting the need for R&D that explores the interface between environment and industry; and productivity and sustainable natural resource management.
- The key principles governing the equity of resource management should be established through a government, community, industry and landholder engagement process. The principles would clarify public benefit and guide regulation and necessary adjustment about resource access, use and management. They would also help to delineate the individual versus community roles in responding to exceptional circumstances and potentially the effectiveness of adjustment programs.

4. Using and managing natural resources: Regions

The Australian Government, in collaboration with State and Territory Governments, has initiated major public investments in natural resource management exceeding \$5 billion over the next five years. Chief among these are the National Action Plan for Salinity and Water Quality (NAP), the Natural Heritage Trust (NHT) and more recently the National Water Initiative (NWI). These major government programs have drawn in part on research funded by Land & Water Australia and many of our research investments support delivery of the National Research priorities covering – *Water - a critical resource; Transforming existing industries; Overcoming soil loss, salinity and acidity; Sustainable use of Australia's biodiversity; Responding to climate change and variability.*

In response to the challenge of balancing the often competing demands on rural landscapes, governments across Australia have fostered the development of new organisations at catchment and regional scales. These 57 new catchment bodies and regional committees are charged with important planning and delivery responsibilities, often with the demanding task of prioritising and allocating public funding through large national funding programs.

The “regional delivery” model for NRM programs, upon which the successful implementation of major Australian government initiatives now relies, is still evolving and requires close monitoring and continuous improvement. Land & Water Australia has identified two core issues that require attention:

- There is an apparent lack of engagement between the Australian Government’s regional delivery model for the NAP and NHT, and local communities. Further, there is a disconnect between the delivery model and the majority of farmers who are the on-ground managers of the natural resources of concern, and thus expected to play a key role in the delivery of a number of regional environmental outcomes.
- A lack of science being incorporated into the planning and implementation activities of regional NRM bodies. Many regions lack technical/scientific capacity internally and do not have access to such capacity externally - or rather face a confusing array of information sources, providers and consultants pushing different products and approaches.

As drivers and funders of the regional delivery model, governments have a role in bridging those gaps. Land & Water Australia has examples of positive progress, such as the DAFF-funded project “National Knowledge Brokering for Regional NRM” which is trialling methods to improve the links between regional organisations and R&D outputs. This form of initiative should continue to be supported and, if proven, expanded.

Further challenges include:

- **Incorporating Cross-Regional Industry Programs and other Australian Government programs:** Many commodities are successfully involving producers in participative action learning through research programs. However, a given commodity may cross dozens of regional NRM structures and there is consequent difficulty in establishing suitable linkages. Large programs like Grain & Graze are tackling that issue but a more general solution is required. There is significant potential to more closely integrate program structures such as the Agriculture - Advancing Australia package (including FARMBIS and FarmHelp) with NRM programs to recognise the inter-relationship of sustainability and profitability and the need for significant industry adjustment in some areas before either can be achieved.
- **Incorporating a Sound Science Base:** Regional NRM bodies have had to make huge strides in their planning and program design; eg setting targets for environmental outcomes. A lack of good scientific information and of suitable methodologies, combined with that pace, has left some plans without a sound science base. Research like the National Dryland Salinity Program showed that not all resource degradation can be remedied - sometimes “live with it” is the best response. This sort of understanding needs reflection in regional plans to drive precisely targeted programs.
- **Building Regional Capacity and Sharing Knowledge:** The tasks before the regional NRM bodies are significant. Land & Water Australia is managing a “National Knowledge Broking for Regional NRM” project to determine how to best share knowledge and data and how to link people, (eg national researchers with regional NRM planners); building their capacity to access and use information.
- **Strategic Investment Planning:** Governments justifiably want confidence that their investments via regions and the NHT etc will deliver suitable outcomes and be administered with probity. However the detailed “investment strategies” required

from regions may be too rigid and at too fine a scale. Some commodities have found regions wanting to engage with them, but being unable to because of constraints from a predetermined investment plan.

- **Evaluating NRM Outcomes:** Attempts to assess the benefit/cost of NRM investments face two inherent difficulties. Firstly, being confident about outcomes in complex, variable and often inadequately understood cause and effect relationships. Secondly, being able to place a value on un-priced assets and outcomes. Land & Water Australia has undertaken a number of projects to develop better evaluation methodologies.

Recommendations

Additional aspects should be introduced to the “regional delivery” model in order that it may fulfil its potential, and address some of the challenges identified, including:

- Integration of Australian Government programs, or explicit consideration of the interaction of measures under them, should be undertaken to ensure approaches are complementary rather than duplicative, in tension or fragmented.
- Strategies need to be established which ensure regional delivery is supported by better knowledge and access to technical capacity.
- Further development of knowledge brokering approaches and their wider application, along with technology adoption programs that increase the use and value from available knowledge – along the lines of the earlier recommendation about extension.

5. Rural and regional communities

Research into the changing demographics of regional Australia suggests that there will be a mixture of alternative futures, ranging from consolidation of enterprises and population decline, to agricultural intensification and local value adding, and to greater diversification of property ownership and land use. Each will have its own environmental and social issues.

Land & Water Australia has invested in social and institutional R&D over many years, recognising that many production and NRM issues are influenced by cultural and social dynamics within communities. LWA has recently funded a new project on “Change and continuity in peri-urban Australia”, to map social, natural resource, agricultural, economic, land use and environmental trends in a number of peri-urban regions.

An interesting omission from the drivers of change identified by the Issues Paper is the changing rural demographics. Among the most pressing looming issues for Australian agriculture are the shortage of skilled people able to implement more sophisticated farming systems, and the loss of talented young people from rural Australia.

Dr Neil Barr of the Victorian Department of Primary Industries undertook a fascinating study funded by LWA into the changing demographic structure within Australian agriculture from 1976 to 2001. He found that the long term decline in farmer numbers throughout the 20th century appears to have stopped in the 1990s, but that there are marked on-going changes within the farming population that have major long term implications. From 1971 to 2001, the average farmer age has been steadily increasing

and the average age of new entrants to farming has risen from 34 to 39. Fewer young males are entering farming, more young men are leaving agriculture, and older farmers are delaying their retirement. There has been a marked drop off in young women (aged 20-34) entering agriculture. Neil Barr estimates that average farmer age will peak around 2011-2015 and suggests that *"We should not expect these trends in the shedding of young from agriculture to be reversed in the foreseeable future."*

Barr explains at some length the economic and social factors behind the changing demographic structure in farming, including on-going pressure on commercial farms to achieve greater productivity and the consequent need to increase business scale leading to farm aggregation; the relative attractiveness of other opportunities available for the young elsewhere in society and the economy; and the greater ease of finding a partner in cities compared with an isolated rural setting. Barr notes that the latter pressures are only likely to intensify with the aging of the workforce generally and the declining number of workforce entrants in the future likely to produce even more attractive opportunities in the non-farm economy for well-educated rural youth.

The Futures work of LWA has described and promoted tools that regions and industries can use to help assess future scenarios. A successful futuring exercise between Australian Wool Innovation and LWA (through the Land, Water and Wool program) is just concluding; showing the practical applicability within an industry context of mapping the impact of alternative futures on industry competitiveness and structure.

Conclusion

The productive capacity of the resource base is a fundamental platform for the future of the Australian agriculture and food sector. It is also one of the key measures by which the wider Australian society judges the performance of Australian agriculture.

The sustainable management of natural resources in Australia is particularly challenging due to their great age and inherent infertility, coupled with one of the most variable climates on earth - which seems likely to become even more extreme. It is critical that new knowledge is developed to inform more sustainable, profitable and practical farming systems. It is also critical that the best available knowledge is shared and applied widely if resource use and management is to improve. This demands a very strategic, effective and efficient research, development and extension system. The RDC model is a good framework for investment in knowledge generation, but there is considerable room for improvement in extension systems, and in the policy framework to support and reward more sustainable land use.

Land & Water Australia would be happy to provide more information on any of the themes raised in this submission, or to speak to this submission with the committee if requested.

References

- Dunlop, M. and Turner, G. (2003) Area of crop and sown pasture land older than 35 years. Advice to Land & Water Australia. Resource Futures Program, CSIRO Sustainable Ecosystems.
- Dunlop, M., Turner, G., Foran, B., and Poldy, F. (2002). *Decision Points for Land and Water Futures*, Resource Futures Program Working Document 2002/08, CSIRO Sustainable Ecosystems, Canberra, Australia. Final Report to Land & Water Australia.