



Australian Government
Department of Agriculture,
Fisheries and Forestry

Rural Research and Development Priorities



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These priorities were published by the Australian Government Department of Agriculture, Fisheries and Forestry.
The Department wishes to acknowledge photographic contributions from the Bureau of Rural Sciences.

ISBN 978-0-9775830-9-6

Australian Rural Research and Development Priorities

Fostering skills and technological development is essential to underpin the achievement of the research and development priorities.

Rural Research and Development Priorities

Productivity and Adding Value

Improve the productivity and profitability of existing industries and support the development of viable new industries.

Supply Chain and Markets

Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.

Natural Resource Management

Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.

Climate Variability and Climate Change

Build resilience to climate variability and adapt to and mitigate the effects of climate change.

Biosecurity

Protect Australia's community, primary industries and environment from biosecurity threats.

Supporting the Rural Research and Development Priorities

Innovation Skills

Improve the skills to undertake research and apply its findings.

Technology

Promote the development of new and existing technologies.



Research and innovation are vital for Australia's primary production and food industries.

Continual investment in research and development (R&D) and innovation is vital for ongoing growth and improvement in the profitability and sustainability of Australia's agriculture, fisheries, forestry and food industries.

R&D embraced by rural industries delivers benefits to individual rural business operations, to the environment and the wider Australian community. Rural industries' and producers' commitment to R&D and innovation is demonstrated by the higher than two per cent a year average productivity growth maintained during the past thirty years. To sustain these productivity gains continual investment, coordination and linkage of R&D across rural sectors and through the food production processing and marketing system is critical.

To help guide investment in rural R&D, new priorities have been identified which map the challenges to be faced over the next five to ten years. The priorities focus on five challenges:

- boosting productivity and adding value to rural production
- effective operation of supply chains and markets for existing and new products
- supporting effective natural resource management
- building resilience to climate variability and climate change, and
- protecting Australia from biosecurity threats.

To meet these challenges and support the research effort, continued investment must also be made in building skills and advancing technology.



The new set of *Rural Research and Development Priorities* build on those first introduced by the Australian Government in 1994 and complement the Australian Government's National Research Priorities. They take into account the recommendations of several policy reviews, including the 2006 Agriculture and Food Policy Reference Group Report (better known as the Corish Report). That report emphasised innovation and leading edge R&D as a foundation for the long term success of agricultural and food industries.

The new *Rural Research and Development Priorities* aim to foster innovation and guide R&D effort in the face of continuing economic, environmental and social change. The rural sector needs to be well positioned to respond to and manage change to maintain and improve its long term profitability, competitiveness and sustainability. Climate variability and climate change have been included within these Priorities for the first time. This reflects the emphasis the Australian Government puts on the significant risk that climate change poses for the agricultural sector.

R&D effort and investment in the Australian rural sector is shared by many diverse players. The new *Rural Research and Development Priorities* were developed in consultation with state and territory governments, industry, research funders and providers. A shared approach to priority setting among the players helps focus R&D efforts on issues of major importance. The Priorities will enable issues of common concern to be explored in a coordinated and cost effective way. This R&D will also help inform future rural policy directions.



Productivity and Adding Value

Improve the productivity and profitability of existing industries¹ and support the development of viable new industries.

Ongoing research is required to improve the productivity and profitability of Australia's existing agriculture, fisheries, forestry and food industries and to support the establishment of viable new industries and products. This must be complemented by research to develop high value products which can better exploit Australia's comparative advantages.

This priority requires research, development and extension activities that will:

- enable commodities and food to be produced more efficiently and sustainably
- encourage emerging industries that have prospects of developing profitably and sustainably
- provide information and tools to help producers identify the best returns on investment, especially in pursuing new product opportunities, and
- add value through improved products and processes that focus on consumer needs and expectations, such as healthier foods, and capture market advantage.

Australian cotton growers produced the world's highest cotton yield per hectare in 2005-06; 245 per cent higher than the world average. It was Australia's second highest national average yield at 1873 kilograms per hectare.

Australian growers produce more cotton per unit of water than any of their major competitors. They have achieved substantial reductions in pesticide use, are producers of high quality, low contamination fibre and have one of the most effective environmental management programmes in the cotton world. These outcomes result from excellent research and its rapid adoption.

¹ For the purpose of these priorities, 'primary industries' include agriculture, fisheries and forestry; the 'food industry' specifically means the food processing industry. However, agricultural and fisheries industries are regarded as an integral part of the food supply chain, with many producing foods for consumption in a fresh or minimally-processed form. References to 'industry' or 'the sector' include both primary industries and the food industry unless otherwise stated.



Supply Chain and Markets

Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.

Providing markets and consumers with goods that are safe and meet customer requirements is essential to the long term competitiveness of Australia's agriculture, fisheries, forestry and food industries. High quality information regarding market and consumer requirements should be appropriately distributed through the supply chain to ensure producers can effectively respond to market requirements. Effectively servicing the information needs of consumers is also vital to gain and retain markets.

This priority requires research, development and extension activities that will:

- identify changes in national and international market and consumer requirements (including social and environmental concerns) regarding the integrity and safety of food and other products
- provide appropriate stages of the supply chain with timely and accurate information on market demands and consumer requirements
- effectively service the information needs of consumers
- support the achievement of animal welfare objectives in livestock production, transport and slaughter, the management of working animals and the control of animal pests
- establish cost-effective traceability, quality assurance and certification systems
- improve packaging, storage and transportation, business analysis and supply chain logistics to ensure customers receive high quality products in the shortest possible timeframe
- support the development of products that enhance consumer health and wellbeing, and
- underpin the safety of food throughout the production, processing and distribution chain.

Gathering evidence to test consumer requirements for new products is a valuable research investment. The Vital Vegetables project, managed by Horticulture Australia Limited, is aimed at delivering a sustained competitive advantage for Australian vegetable growers through the development of novel, functional vegetable products. The project also tests consumer responses to nutrient-enhanced vegetables, particularly the link between perceptions of health benefits and the willingness to pay a premium price.



Natural Resource Management

Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.

Australia's fragile environment and limited natural resources require innovation in primary industries to ensure natural resources are used sustainably. Land degradation, water management and biodiversity losses are significant challenges to current and future productivity.

This priority requires research, development and extension activities that will:

- effectively manage weeds, pests and diseases, soil health and fish stocks to underpin primary production, environmental sustainability and social needs
- improve our understanding of water resources and their productive and efficient use for commercial, environmental and social needs
- support the conservation of native vegetation, biodiversity and ecosystems and the provision of ecosystem services within primary production systems, and
- mitigate the damage to the natural resource base caused by previous production practices, drought and extreme weather events.

Bycatch has become one of the most significant issues affecting fisheries management nationally and globally. The bycatch of marine mammals, seabirds, turtles and some sharks in wild fisheries is particularly concerning because of declining numbers. Australian fishers, researchers and governments are working together to find ways to reduce bycatch by applying innovation, including changes to fishing gear and practices. Recent advances in improving the selectivity of target species have enhanced sustainability and, in turn, helped secure access to existing and new markets.

Skilled management of livestock grazing can increase production and native biodiversity in grasslands. Grazing trials in the mid-north of South Australia demonstrated that rotational grazing according to plant growth rates promotes healthier native perennial plants. It reduces bare ground and improves water infiltration while at the same time allowing stocking rates to double on some sites.

Climate Variability and Climate Change

Build resilience to climate variability and adapt to and mitigate the effects of climate change.

Climate variability and climate change pose significant challenges for Australia's primary industries and regional economies. The National Agriculture and Climate Change Action Plan² (2006–09), agreed to by Australian governments, highlights threats posed by increased climate variability and climate change and measures needed to mitigate and build resilience to this threat.

This priority requires research, development and extension activities that will:

- increase our understanding of climate variability and climate change to improve our ability to predict changes and to manage impacts on primary industries and regional economies
- develop and improve climate information tools, including forecasting models, to enable producers to make informed risk management decisions and build resilience to climate impacts
- help manage and further reduce greenhouse gas emissions from primary industries, and
- enable industries to respond and better adapt to climate change in a timely and sustainable manner and to capitalise on potential growth opportunities.

The Managing Climate Variability Programme is managed by Land and Water Australia, with contributions from eight government and industry funding partners. It invests in research to improve and create technologies for better decision making in a variable and changing climate.

Projects funded through the programme include increasing uptake of climate risk management tools such as AussieGRASS in the Northern Territory, as a tool for pasture management, and seasonal climate risk management tools such as Yield Prophet which provides a web-based user interface to the cropping system simulator APSIM.

² For further information about the National Agriculture and Climate Change Action Plan go to <http://www.daff.gov.au/natural-resources/climate>



Biosecurity

Protect Australia's community, primary industries and environment from biosecurity threats.

Effective prevention, control or eradication of pests and diseases of concern (including vertebrate pests and weeds) is vital to the security and health of the Australian community, the productivity and sustainability of primary industries and Australia's terrestrial, fresh water and marine environments. Pests and diseases also impede the access of Australian products to international markets. A number of countries are tightening their biosecurity requirements and requiring sophisticated technical justification for risk management measures.

This priority requires research, development and extension activities that will:

- assist in minimising the risk of entry, establishment or spread of identified target invasive pests and diseases that could have major economic, social, health or environmental impacts
- where practicable and cost-effective, assist to eradicate, contain, control or mitigate the impact of significant established invasive or endemic pests and diseases, and
- demonstrate and assure domestic and international trading partners of the efficacy of Australia's science-based pest and disease management measures and relative freedom from pests and diseases of concern, to facilitate trade in Australian agriculture, fisheries, forestry and food products.

Effective and efficient surveillance is vital to prevent the entry of pests and diseases of concern and to control or eradicate them. For example, the introduction of guava rust is a major concern as it affects Eucalypts and has the potential to threaten plantation and native forests. A revision of the ecology of guava rust has just been completed to help accurately identify the disease on imported materials and to develop targeted measures to prevent entry of the disease.

The Pest and Disease Image Library (PaDIL) gives a broad range of groups, from researchers to quarantine officers, rapid access to accurate, high quality, diagnostic images and information on pests and diseases. PaDIL is being used widely overseas and domestically to diagnose potential threats to Australia, strengthening our ability to minimise the impact of exotic pests and diseases. PaDIL is a collaboration between the Australian Government Department of Agriculture, Fisheries and Forestry, Museum Victoria, Plant Health Australia, the Department of Agriculture and Food Western Australia and Queensland University of Technology.

Supporting the Rural Research and Development Priorities

Fostering skills and technological development is essential to underpin the achievement of the research and development priorities.





Innovation Skills

Improve the skills to undertake research and apply its findings.

The skills of Australia's research providers and the ability of producers to innovate and adopt the products of research are fundamental to the profitability, competitiveness and sustainability of Australia's agriculture, fisheries, forestry and food industries. Strong collaboration between all players in the Australian research and innovation system is essential for the sector's effectiveness and efficiency. Improving skills to undertake research and to apply research findings is a critical element of the research and development effort.

Innovation is dependent on the availability of people who think creatively to solve problems and the ability of users to adapt and apply the resultant new products, technologies and information to their needs. Innovation in the agricultural and food sector is being challenged by competition from other sectors for skilled people and by the increasing level and diversity of skills needed for producers to operate effectively in the sector.

For the research and innovation system to work effectively, research funders, providers and end users need to collaborate to ensure research resources are used effectively and efficiently and are sustainable. Better understanding of human factors in the adoption of research in the agriculture and food industries is also important to ensure intended research and development outcomes are achieved. Effort is required to better understand and address:

- the constraints on availability and skills for research and innovation
- the skills needed by producers to make the best use of research and innovation
- the drivers and barriers to adoption of research and innovation by industries and in regional communities, and
- the impacts of research and innovation on industries and regional economies, including on the viability of businesses and communities.

Meat and Livestock Australia's 'EDGEnetwork' offers learning opportunities for livestock producers including in marketing, finance, human resources, natural resource management, pasture and livestock management. The structured workshops are aligned to the national educational training package competencies so participants can work towards gaining a nationally recognised qualification. More than 11,000 producers have attended at least one EDGEnetwork session since 2001. More workshops are now in development.

The grape and wine industry, through the Grape and Wine Research and Development Corporation, invests in its future through ten honours scholarships for students wanting to pursue interests in grape and wine research. The scholarships reward academic excellence and encourage applicants to pursue a career in the wine industry by providing opportunities to work at the forefront of the field.



Technology

Promote the development and application of new and existing technologies.

Advances in existing technologies and adoption of new technologies are important in addressing the challenges faced by agriculture, fisheries, forestry and food industries and regional communities. Continued investment in these areas is essential to the effectiveness of research and innovation for the sector.

Advances in technology arise from incremental improvements in existing technologies and from frontier research that has the potential to provide radical technological improvements. Ongoing investment in existing and frontier technologies is required to allow industries to develop and implement innovative solutions.

Biotechnology, nanotechnology, information and communications technology, remote sensing and precision agriculture all have the capacity to deliver further important technological advances and returns to industry and the Australian community.

To leverage the best returns from technological advances, cross-disciplinary and collaborative approaches are required where:

- critical points in the value chain that would benefit from a technological solution are identified
- international research and innovation are scanned so Australia can adopt and tailor technologies to our requirements, and
- systems approaches are used in addressing challenges faced by industries; for biological systems, for example, this means working from the genome through to the organism and ecosystem level.

Nanotechnology has the potential to permit a wide range of advances in agricultural research in coming years. Scientists are investigating the use of nanotube implants to measure the level of important reproductive hormones in female animals. These implants can transmit information about hormone levels to a central monitoring system where the information can be used to facilitate breeding.

The development of nanoscale identity preservation systems, consisting of biodegradable sensors that are linked to recording and tracking devices, will allow the history of an agricultural or food product to be continuously traced from the farm gate to the consumer ('paddock to plate'). This could lead to improvements in the quality assurance of the safety and security of agricultural and food products.



National Research Priorities

The new *Rural Research and Development Priorities* complement and are informed by the Australian Government's National Research Priorities³. The national priorities highlight areas of particular social, economic and environmental importance to Australia, and where a whole-of-government focus has the potential to improve research and broader policy outcomes. National research priorities address areas of strength, opportunity or need in Australian research. The *Rural Research and Development Priorities* and corresponding National Research Priorities are shown below:

Rural R&D Priorities	National Research Priorities
<p>Productivity and Adding Value Improve the productivity and profitability of existing industries and support the development of viable new industries.</p>	<p>Promoting and Maintaining Good Health through strengthening Australia's social and economic fabric and preventive healthcare (healthy food production).</p>
<p>Supply Chain and Markets Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.</p>	
<p>Natural Resource Management Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.</p>	<p>An Environmentally Sustainable Australia</p>
<p>Climate Variability and Climate Change Build resilience to climate variability and adapt to and mitigate the effects of climate change.</p>	
<p>Biosecurity Protect Australia's community, primary industries and environment from biosecurity threats.</p>	<p>Safeguarding Australia</p>
Supporting the Rural Research and Development Priorities	
<p>Innovation Skills Improve the skills to undertake research and apply its findings.</p>	<p>Frontier Technologies for Building and Transforming Australian Industries</p>
<p>Technology Promote the development of new and existing technologies.</p>	

³ Further information on the National Research Priorities is available at <http://www.dest.gov.au/priorities>

