



National Water Use in Agriculture Research, Development and Extension Strategy 2015



National Primary Industries Research, Development and Extension (RD&E) Framework

National Water Use in Agriculture RD&E Strategy

The Primary Industries Ministerial Council has initiated the development of a national strategic framework for primary industries research, development and extension (RD&E).

The aim of this initiative is to ensure Australia's RD&E capacities are aligned nationally with future industry and community needs, to initiate collaboration that strengthens Australia's position in international markets and to ensure that RD&E delivery is both more efficient and effective.

The National Research, Development and Extension Framework

The National Framework spans 14 primary industry sector strategies and 7 cross-industry sector strategies. These are:

- primary industry sectors: beef, cotton, dairy, fisheries and aquaculture, forests, grains, horticulture, pork, poultry, sheep meat, sugar, wine, wool, and new and emerging industries
- cross-industry sectors: animal biosecurity, animal welfare, biofuels and bioenergy, climate change and variability, food and nutrition, plant biosecurity, soils, and water use in agriculture.

Further information on the National Framework can be found at

<http://www.daff.gov.au/agriculture-food/innovation/national-primary-industries>

Expected outcomes from implementation of this National Framework include:

- a. Agencies would retain/build capability in fields strategically important to them and, at the same time, cooperate with others to build their capability to provide for a more comprehensive national research capability.
- b. Research capability will become more collaborative, specialised, have larger critical mass and perhaps be less distributed across the nation. Efficiency and effectiveness of RD&E will be markedly improved overall, although some additional costs would be incurred in providing national linkages and to support delivery of regional development and local extension.
- c. The national research capability would be the 'discovery' component of a wider innovation agenda that spans and supports development and extension. As a consequence, to facilitate rapid uptake of new technologies, research developed in one area of the country would be available in other regions where industry is located.

Challenges

Water scarcity is the major limiting factor to Australia's agricultural productivity. Droughts, water reforms such as the Murray Darling Basin Plan, competing water uses from mining and urban growth, and Australia's highly variable climate patterns are placing growing pressure on water use in agriculture.

Food security and production is now a key part of the national policy agenda and there is renewed interest in agricultural expansion (e.g. Northern Australia) and transformation of existing rainfed systems with irrigation (e.g. Tasmania).

There are complex interactions between water, energy costs, labour needs, nutrient use, crop agronomy, soils, salinity and the water balance that need to be better understood.

Infrastructure, technology and engineering solutions alone will not provide the outcomes required. New knowledge, farmer led learning sites, adaptation and adoption of current knowledge; and improvement in the skills and capabilities of water suppliers, farmers, advisors and students are crucial to achieving long-term continuing improvement.

Our Vision

Australia achieves world-leading farm water productivity whilst enhancing environmental and social sustainability through all stakeholders working together to maximise benefits from research, development and extension.

Aim

The aim of this Water Use in Agriculture RD&E strategy is to facilitate a RD&E model that will result in:

- more effective delivery of RD&E outcomes for agricultural industries (irrigated and rainfed) seeking to maximise water productivity and adapt to decreasing availability of water
- better utilisation of available RD&E funds, facilities and capabilities relevant to water use in agriculture, especially through enhanced collaboration between RD&E providers
- increased capability of water managers and users to help deliver transformations in the way that water is used in agriculture
- effective networks of RD&E provider groups which can retain and build capability and deliver leading-edge RD&E relevant to industry and community needs
- an effective organising framework for RD&E in water use in agriculture that provides greater national and regional coordination of investment and service delivery, enhanced cross-commodity coordination, and improved linkages to other water-using sectors.

Scope

The scope of this strategy encompasses RD&E directly addressing on-farm water management or agricultural water management at the farm level and up to sub-catchment or irrigation scheme level.

This strategy includes both rainfed and irrigated agriculture.

The emphasis is on RD&E to help achieve farming systems with high water use efficiency and productivity per unit of water used.

This strategy excludes RD&E focusing on the productivity of specific industries or commodities to avoid duplication of the 14 industry-specific RD&E strategies to which this strategy links.

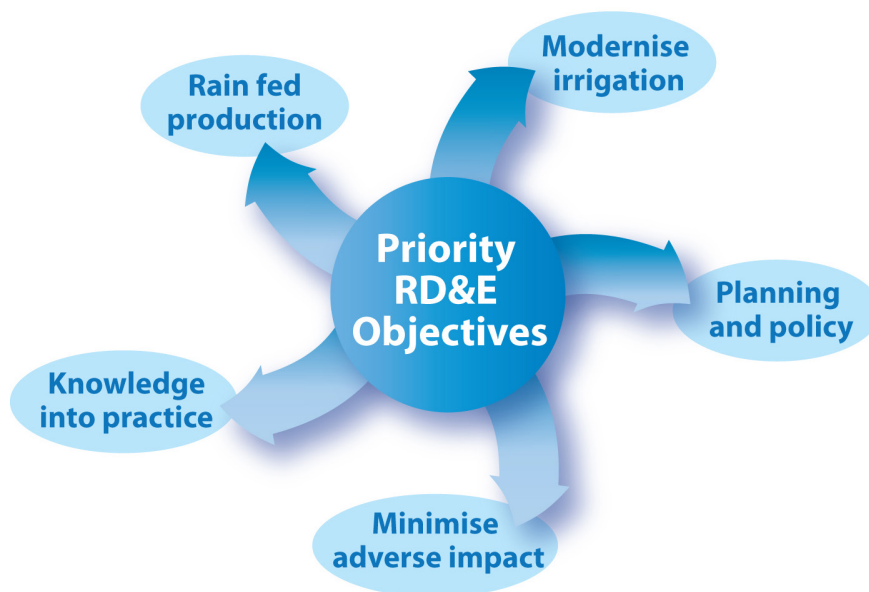
The strategy links with other cross sector National RD&E strategies such as climate and soils.

RD&E pertaining to basin and national scale water allocation, environmental flows, urban water issues, and the hydrological impacts of large scale plantation forestry are not considered here. However, there is recognition that this water use in agriculture strategy needs to be cognisant of broader water-related RD&E issues and coordinate and integrate with other activities at larger scales where necessary.

Priority RD&E objectives

The RD&E objectives are as follows:

1. Modernise irrigation systems and practices by developing flexible irrigation strategies that are designed around soil, crop, irrigation supply (quantity and quality) and management constraints
2. Increase the productivity of water in rain-fed agriculture by better adapting to seasonal variability in rainfall and maximising its use (also applies to irrigated systems)
3. Facilitate getting knowledge into practice and building human capacity by designing and implementing programs that reduce the cost and increase the rate of adoption of new technologies by farmers
4. Improve the capacity to inform planning and policy related to agricultural water use
5. Manage water use in agriculture to minimise adverse impacts.



RD&E priorities for water use in agriculture

RD&E Objective
1. Modernise irrigation systems and practices
<ul style="list-style-type: none"> • Optimise flexible irrigation systems and strategies designed around soil, nutrient, crop, irrigation supply and management constraints at the farm and scheme level. • Improve water or soil moisture monitoring and irrigation scheduling with current and new precision technologies and their integration with crop physiology. • Assess financial sustainability and water management options for the different irrigation application systems in terms of energy, labour, capital, nutrition and water efficiency interactions. • Evaluate opportunities and risks with farm water supply, capture, storage and recycling. • More efficient surface irrigation systems.
2. Increase the productivity of water in rainfed agriculture
<ul style="list-style-type: none"> • Develop integrated management approaches to better convert rainfall into better profits for crop and pasture systems. • Link with other programs to improve climate variability forecasts in relation to water management. • Make better use of water stored in differing soils through improved soil moisture monitoring and forecasting. • Encourage more efficient on-farm storage and reticulation systems for livestock and intensive industries. • Identify and assess opportunities to improve plant and system tolerance to periods of water stress and drought.

3. Facilitate getting knowledge into practice and building human capacity

- Provide knowledge synthesis on national contemporary issues.
- Establish a national network of on-ground (and virtual) regional research and learning sites, including on farm trials, demonstrations, across a range of topics, crops and regions.
- Encourage programs to improve the water management skills and decision making abilities of farmers, advisors and undergraduate students.
- Increase adoption of current best practice.
- Facilitate information exchange between and across regions, commodity groups, researchers and end-users.
- Identify key grower/adviser decisions and practices that will remove weakness in water-limited farming systems.

4. Improve capacity to inform planning and policy of agricultural water use

- Provide knowledge and data on energy-carbon-water-labour-nutrient interactions on-farm and quantify the related metrics on efficiency, productivity and profitability for alternative irrigation systems.
- Understand farming system resilience to climate impacts and land use changes on surface, soil and subsurface (groundwater) water availability and water markets.
- Provide knowledge and tools to assist whole-farm water allocation planning and accounting, as well as sustainability reporting of water use in Australian agriculture.
- Achieve improved synchronisation of water supply and demand by farmers.
- Investigate options for new irrigation areas, water re-use, alternative water supplies or better water storage mechanisms.
- Assess water use in agriculture RD&E capability, gaps and opportunities.

5. Manage water use in agriculture to minimise adverse impacts of water

- Develop strategies to maintain water supply from rainfed agricultural catchments.
- Monitor research on sustainable surface and groundwater extractions.
- Deliver technologies to improve salt balances, mitigate salinity and manage storage of salt within the soil.
- Provide knowledge and management strategies related to water quality and solutes.
- Understand interactions between land management systems, drainage systems and water quality.
- Understand interactions between on-farm water management (including retention systems) and hydrological processes.

Actions for increasing effectiveness

The strategies and associated actions for increasing the effectiveness of RD&E on water use in agriculture are described below:

1. Ensure an ongoing process of prioritisation of RD&E on water use in agriculture by end users and other stakeholders:
 - *Facilitate an ongoing process of formulation of national research priorities in water use in agriculture – this process should involve industry, multiple Research and Development Corporations, major research providers, government departments, the university sector, and the other major users of national water use in agriculture research.*
2. Improve coordination and collaboration in RD&E on water use in agriculture to improve effectiveness and economic efficiency:
 - *Provide forums to improve communication between RD&E investors and providers including a forum on pipeline ideas*
 - *Identify and lead the establishment of high priority cross-sector water use in agriculture RD&E projects and develop opportunities for funding*
 - *Facilitate research that comprises a national R component linked with multiple regional R&D projects and where regional priorities help shape the national program*
 - *Facilitate interaction and knowledge exchange across national, regional and local scales, and across R, D and E.*
3. Link and facilitate national R with regional R&D:
 - *Facilitate development and use of enabling technologies (e.g. collaboration tools and spaces) to link across national, regional and local scales*
 - *Establish better connection between the primary industries sector and other science research funding agencies and sectors*
 - *Scope international opportunities in a paper on water use in agriculture RD&E.*
4. Enhance knowledge transfer, extension and practice change:
 - *Establish a network of linked regional R&D sites*
 - *Support farmer-led innovation and practice change*
 - *Lead an annual research, extension and practice change forum*
 - *Improve capacity for private consultants/advisors to improve skill levels.*
5. Monitor the national RD&E capability and help facilitate its maintenance or development:
 - *A National Capability review was undertaken in 2011 and major variations will be monitored.*

Membership

The membership of the strategy is voluntary and includes the organisations shown in Table below. Dairy Australia is the lead Research and Development Corporation and CSIRO is the lead research provider for the strategy as per the National RD&E Committee agreements.

Members of the Water Use in Agriculture RD&E strategy	
Members	Rural Research and Development Corporations
Department of Agriculture, Australian Government	Australian Egg Corporation Limited
National Farmers Federation	Australian Grape and Wine Authority
CSIRO	Cotton Research and Development Corporation
Department of Primary Industries, New South Wales	Dairy Australia
Department of Economic Development, Transport, Jobs and Resources, Victoria	Grains Research and Development Corporation
Department of Agriculture, Fisheries and Forestry, Queensland	Horticulture Innovation Australia
South Australian Research and Development Institute	Meat and Livestock Australia
Department of Agriculture and Food, Western Australia	Rural Industries Research and Development Corporation
Department of Primary Industries, Parks, Water and Environment, Tasmania	Sugar Research Australia
Department of Primary Industries and Fisheries, Northern Territory	
Australian Council of the Deans for Agriculture	
University of Southern Queensland, NCEA	

This strategy has been developed through a working group involving representatives of the Agriculture Senior Officials Committee (AGSOC) agencies, Rural Research and Development Corporations, industry (through the NFF) and the university sector (as shown above). Development of the strategy involved a survey of capability, direct input from the working group, workshops to obtain input from a wider range of stakeholders and other opportunities for stakeholders to comment on draft versions of the strategy.

More Information

<http://www.agriculture.gov.au/ag-farm-food/innovation/national-primary-industries>

An example of action from the Strategy

Smarter Irrigation for Profit

A new project aimed at improving the profit of 3,000 cotton, dairy, rice and sugar irrigators was announced as one of 12 successful Rural R&D for Profit Programme projects by the Minister for Agriculture, the Hon. Barnaby Joyce MP in 2015.

The project aims to improve the profit of each individual irrigator enterprise across the four industries by \$20,000-40,000 per annum, with the support of 16 R&D partners and up to 19 farmer-managed learning sites.

The project consists of three components:

- Practical, reliable irrigation scheduling technologies
- Precise, low cost automated control systems for a range of irrigation systems
- A network of farmer managed learning sites located in major regions referred to as “optimised irrigation” farms.

The expected outcomes are:

- 10-20 percent improvement in water productivity, efficiency and farmer profitability
- Adoption of new irrigation technologies and science application by farmers and irrigation professionals to improve farm profits
- Improved cross-sector industry research collaboration with public and private sectors in four major irrigation industries providing a legacy platform for other sectors to also benefit.

Funding will see \$4 million directed from the Rural R&D for Profit programme to this project, which has been matched by \$3.2 million cash and \$3 million in-kind contributions from project partners.

The project, *Smarter irrigation for profit*, is a partnership between the major irrigation industries of cotton, dairy, rice and sugar, led by the Cotton Research and Development Corporation (CRDC) in conjunction with Dairy Australia, the Rural Industries Research and Development Corporation (RIRDC), Sugar Research Australia and research partners including; CSIRO, NSW DPI, USQ, TIA, SARDI, DEDTJR Victoria and other industry organisations.

