



GRDC[™]

GRAINS RESEARCH &
DEVELOPMENT CORPORATION

Australian Grain Industry Conference

Steve Jefferies, Managing Director

Thursday 1st August



Two contrasting droughts in the SA Malee

	1982	2018
Growing Season Rainfall	110mm	106mm
Previous summer rainfall	25mm	27mm
Wheat yield	0.0 tn/ha	1.3 tn/ha

February 1983



February 2019



3.00pm, 8th February 1983, Melbourne



Wheat yields adjusted for climate

FIGURE 24 Average climate-adjusted wheat yields, 1977-78 to 2014-15

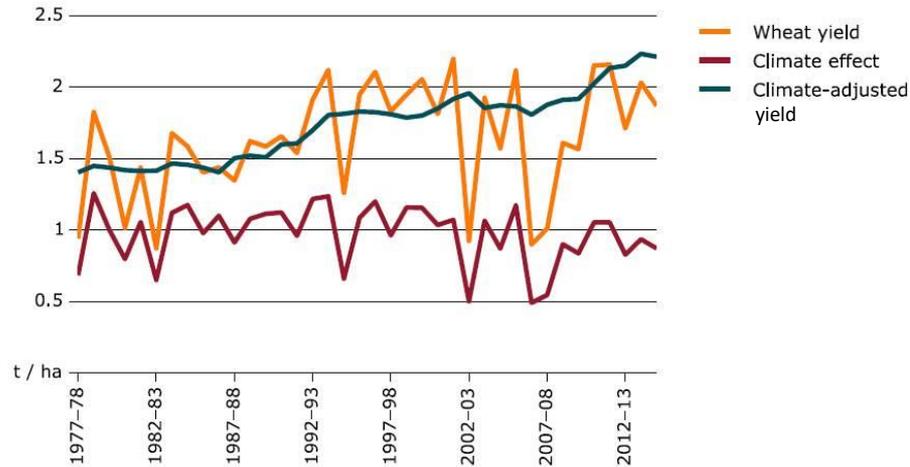
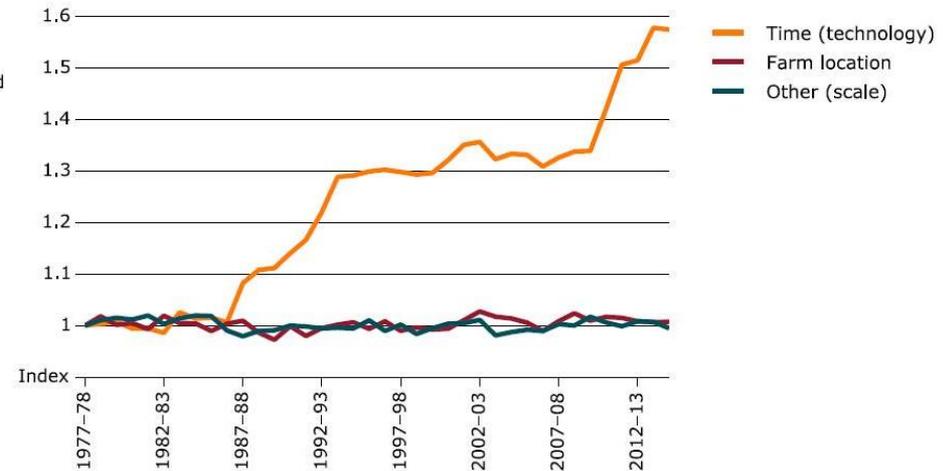


FIGURE 27 Decomposition of climate adjusted wheat yield, 1977-78 to 2014-15

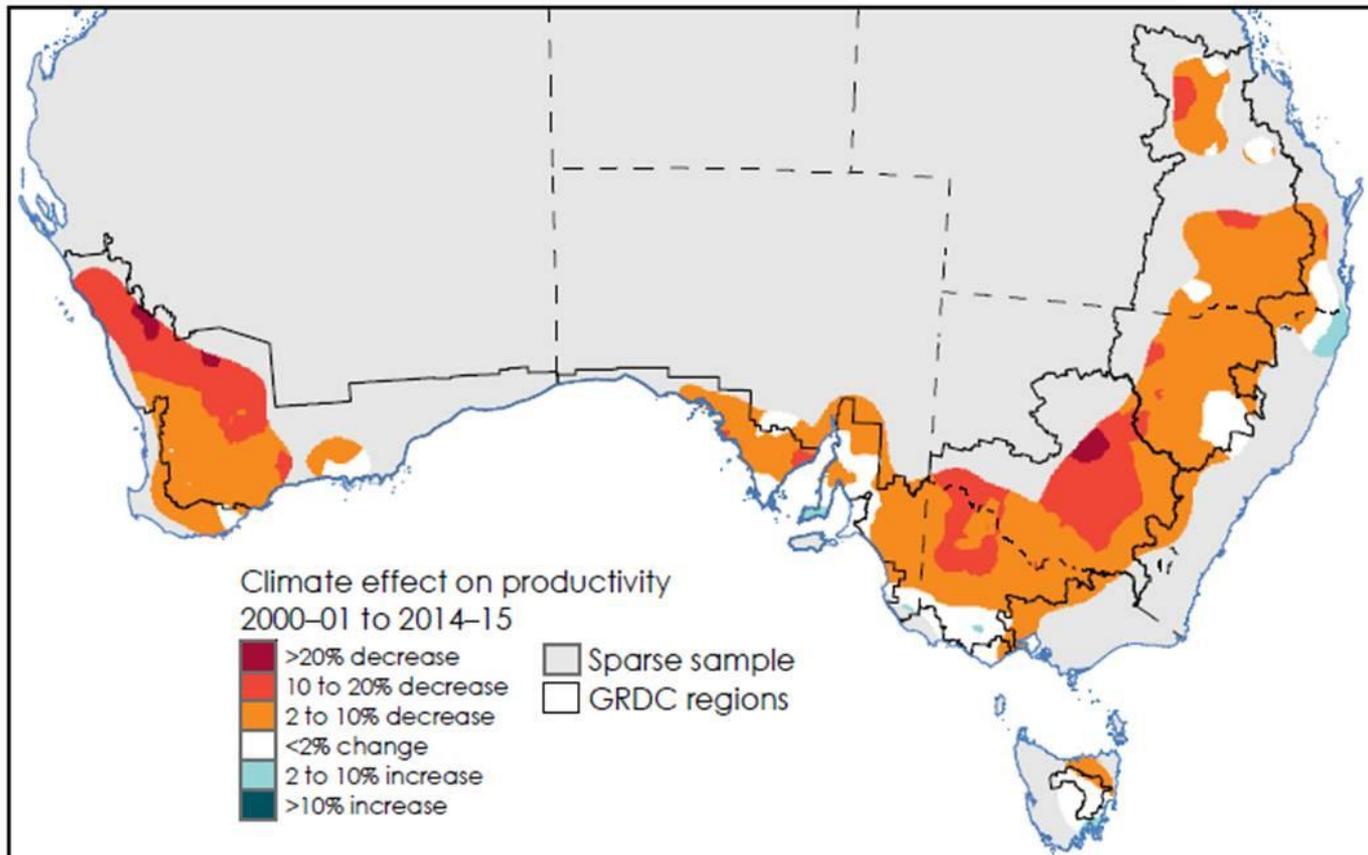


Source: Hughes et al (2017) Farm performance and climate, ABARES Report 17.4



BUT

Impact of Climate on Productivity



Global trends impacting on the Australian Grains Industry

- Food safety and health
 - Pesticide residues in grain
 - Pollutants
- Sustainability of production and social license
 - Emissions
 - Carbon footprint
 - Nutrients in water systems
 - Pesticides



Redesign and realign GRDC ready to deliver innovation to the Australian grains industry for the next 20 years in a highly and increasingly volatile environment

More of the same won't be good enough in the future



Redesigning and realigning GRDC ready for the next 20 years

Purpose

**Culture
and
Skills**

Structure

Process

Strategy



GRDC PURPOSE

Invest in RD&E to create enduring profitability for Australian grain growers

What does the Australian Grains Industry need from R&D

- Crops with improved adaptation
 - CO₂
 - Heat and frost
 - Drought
- Enduring farming systems
 - Weeds, pests and diseases
 - Nutrition, particularly nitrogen



Redesigning and realigning GRDC ready for the next 20 years

Purpose

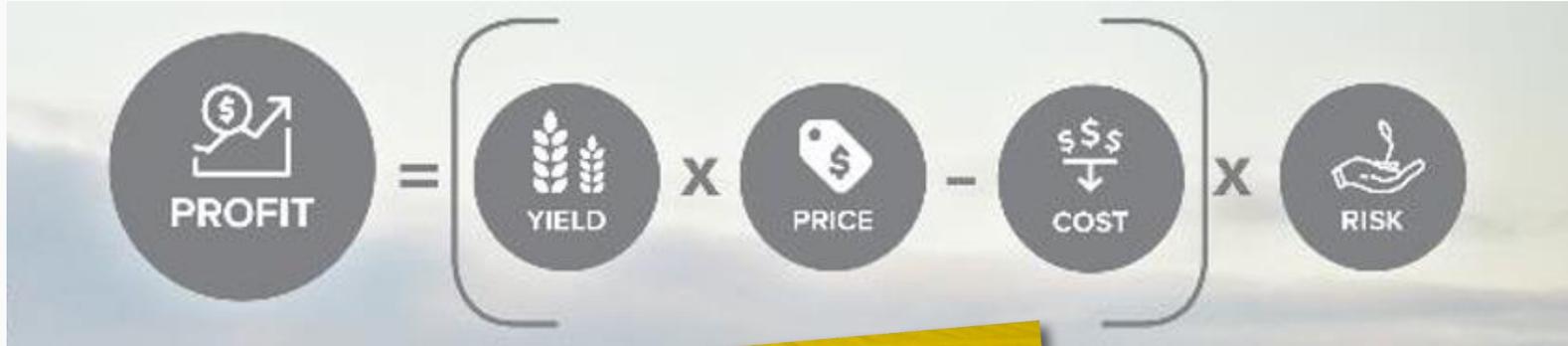
**Culture
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The New 5 Year RD&E Plan



OBJECTIVE 1: Improve yield and yield stability

1.1 Impact of high temperature.	1.6 Capture and storage of water in soils.	1.8 Impacts of low pH, and nutrient toxicities.
1.2 Impact of spring radiation frost.		
1.3 Water-limited yield potential.	1.7 Reduce the impacts of soil salinity and sodicity.	1.9 Impact of waterlogging.
1.4 Yields of pulses, oilseeds and oats.		
1.5 Reduce the yield gap.		

OBJECTIVE 4: Reduce post-farmgate costs

4.1 RD&E to advise policy.
4.2 RD&E relevant to trade and market access.
4.3 Reliability and cost of on-farm storage.
4.4 Automation of transport and handling.

OBJECTIVE 2: Maintain and improve price

2.1 Expand area of high-value crops.	2.3 Wheat grain protein.	2.5 Processing efficiencies.
2.2 Improvement of price.	2.4 Novel, high-value uses of products.	2.6 Novel grain functionality.

OBJECTIVE 5: Manage risk

5.1 Accuracy of weather forecasting.	5.2 Grower decision-making.	5.3 Growers' business management.
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OBJECTIVE 3: Optimise input costs

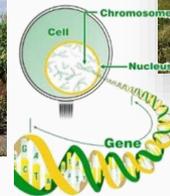
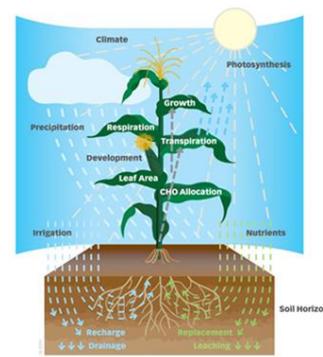
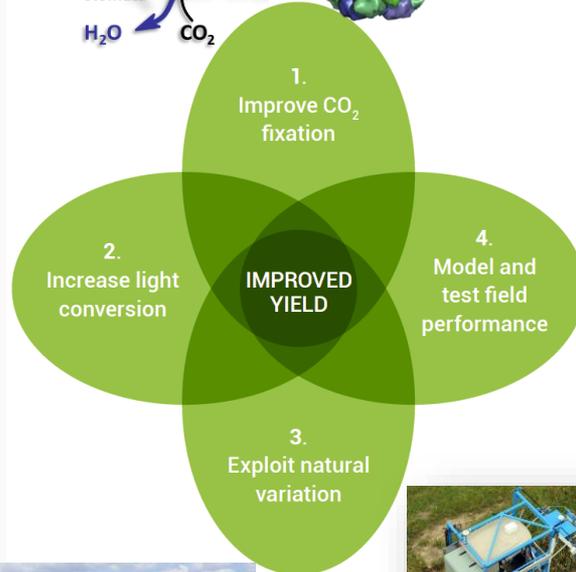
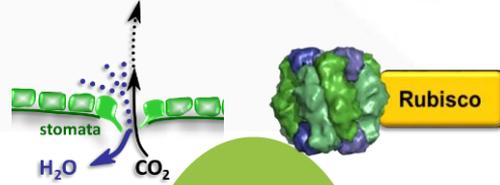
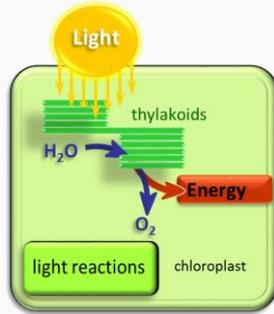
3.1 Cost of weeds.	3.3 Cost of diseases.	3.8 Solutions to reduce capital/running costs.
	3.4 Cost of vertebrate and invertebrate pests.	
3.2 More accurate and timely decision-making.	3.5 Technology to reduce fertiliser costs.	
	3.6 Nitrogen and phosphorus availability.	
	3.7 Engineering solutions to reduce labour costs.	

KIT 1.2

Minimise the impact of spring radiation frost on yield and yield stability



Change fundamental plant architecture, physiology and/or biochemistry to maximise water-limited yield potential



Why worry about nitrogen?

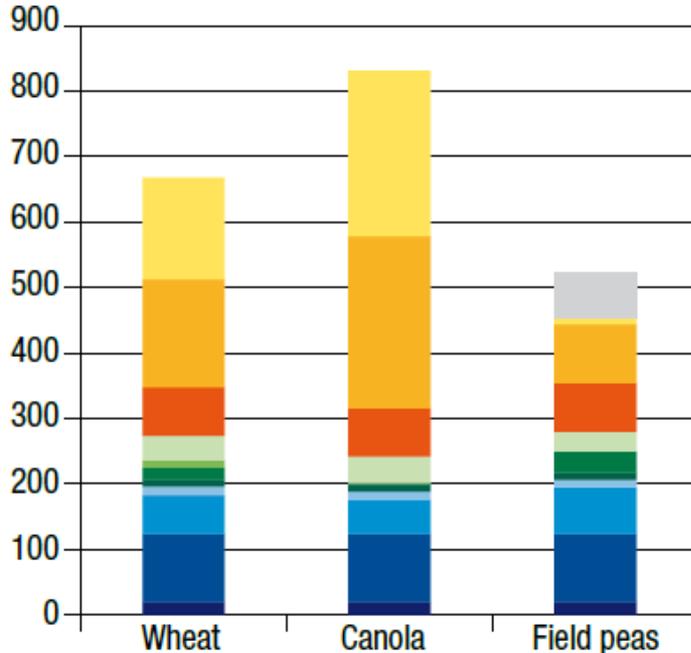
- Often the largest grain production input cost and driver of grower profitability
- The largest source of greenhouse gas emissions in Australian grain production
- Significant impact on marketability of Australian wheat (low protein)



Greenhouse gas emissions in wheat/canola/field peas rotation (Wagga Wagga)

Note: wheat and canola use nitrogen fertilizer, field peas fixed naturally

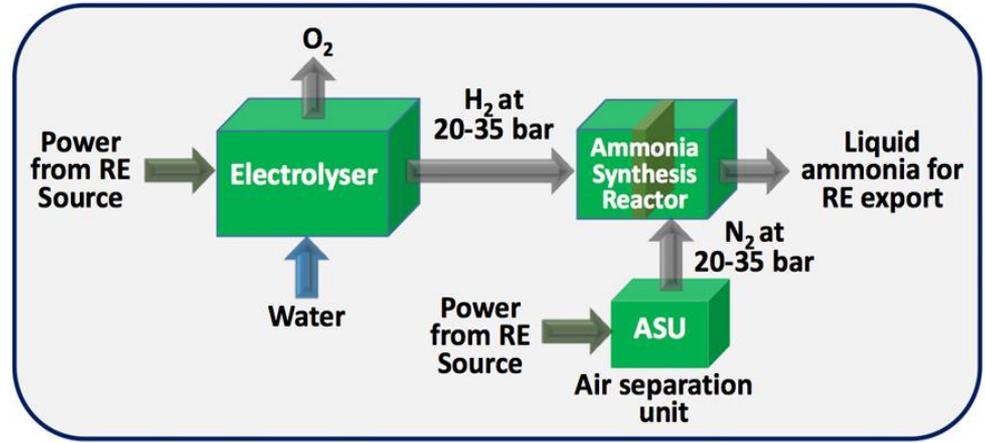
Greenhouse gas emissions (CO₂-e/ha)



- Pea residue N
- Fertiliser on-farm
- Fertiliser pre-farm
- Soil N₂O emissions
- Diesel (sowing, harvesting)
- Crop residue burning
- Seed
- Embodied energy
- Diesel (production, transport)
- Herbicides and pesticides
- Lime on-farm
- Lime pre-farm

Source: ????????????

Distributed Ammonia as a Nitrogen Fertiliser Source



Three-tiered approach

1. Protect the chemistry we have already
 - Responsible label use of chemistry
 - Spray-drift management
2. Identify new safe chemistry
 - Bayer - Herbicide Improvement Program
3. Non-chemical weed control
 - Micro waves, lasers and robots
 - Weed suppression through competition
 - Harvest weed seed control



THANK YOU

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