



Sugar Research  
Australia

# SUGAR RESEARCH AUSTRALIA

## DISTRICT PRODUCTIVITY PLAN – HERBERT

## Brief Introduction

The District Productivity Plans have been developed through consultation and engagement undertaken through the Industry Services SRA team, across the sugar industry supply chain to identify constraints. Different sources of data have been used as inputs including grower ideas and contributions from past strategic workshops held with SRA, the recent ABARES survey, mill data, impact assessments where applicable and a variety of survey results.

The plans highlight these issues with proposed solutions and actions to address them and will be updated and reviewed annually to drive investment at a local, applied level. Reporting on progress will occur six monthly. The key to success will be implementation which will require leadership, change and focus.

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## 1 Australian Sugar Industry Productivity Goal

The strategic intent for the Australian sugarcane industry is to; utilise the current area under cane to increase productivity by 10% which equates to a 3 million tonne increase in production across Qld and NSW by 2026.

At a sugar price of \$500 and 13.5 CCS each tonne of cane has a gross value of \$70 per tonne (sugar and molasses). By achieving this productivity improvement goal, the industry will generate an additional \$210m in gross revenue.

## 2 Herbert Overview

Sugarcane is grown in the Herbert region on an average of 55,000 hectares. Sugarcane is crushed through two mills in the region (Victoria and Macknade). Victoria mill crushes an average three million tonnes of cane per year to manufacture approximately 400,000 tonnes of raw sugar. Macknade mill crushes an average 1.5 million tonnes of cane per year, to manufacture approximately 191,000 tonnes of raw sugar. Victoria and Macknade's optimal crushing capacity is 1,080 tonnes and 490 tonnes of cane per hour respectively. The Herbert district has the potential to crush 5 million tonnes of cane per season.

## 3 Productivity Constraints

SRA conducted an intensive stakeholder engagement process in the Herbert region commencing on the 25th of May 2021 until the 26<sup>th</sup> of November 2021. In order of importance industry constraints include:

- Variety development and adoption (including adoption of clean seed material).
- RSD measurement and management.
- Improving adoption of new technologies.
- Sound farming practices (fallow management, pest weeds and diseases and nutrient management).
  - o Nutrient management tools.
  - o Soil health tools.
  - o Validation of SIX EASY STEPS in the dry zone.

In collaboration with industry representatives SRA has now assembled targeted campaigns to address these constraints whilst working alongside industry stakeholders to achieve an improvement in productivity.

## 4 Productivity data

HERBERT	2017	2018	2019	2020	2021
T Cane harvested	5,033,396	4,718,178	4,055,702	4,250,399	3,797,257
Ha Harvested	57,119.70	57,043.20	56,365.70	55,224.,40	54,985.47
Average T cane/ Ha	88.1	82.7	72.0	77.0	69.0
Farming entities	558	553	548	535	535
Average CCS	12.95	14.24	13.89	13.19	12.73
Average sugar yield	11.4	11.8	10.0	10.2	8.8

PRODUCTIVITY SNAPSHOT	5 YEAR AVERAGE	What is the target for the district to increase productivity?
<b>District - HERBERT</b>		
T Cane harvested	4,370,987	4,814,000
Ha harvested	56,148	56,148
Average T cane / ha	78	85
Average Yield ratoon T cane/ha	3	4
5 year average T cane / ha	78	85
Average CCS	13.4	13.3
Average sugar yield	10.4	11.3
Varieties Top 5 Total Tonnes / %	Q208 (30.2%, 75 t/ha) Q253 (15.2%, 85 t/ha) Q232 (9.5%, 75 t/ha) Q240 (8.2%, 85 t/ha) Q200 (7.6%, 80 t/ha)	Suite of varieties for growers to choose for a range of production environments.
# farming entities	535	535
# mills	2	2
Clean seed uptake (percent mill area planted to clean seed (%))	0.5%	1%
Tissue culture uptake (seedlings) annually	17,000 seedlings	50,000 seedlings (5 hectares)
Major Disease (RSD)	Ratoon Stunting Disease (RSD) 15% infected Area affected 8,455 ha Tonnes 154,275	The target is 146,000 tonnes for the Herbert region (less than 2% infection rate).

## 5 Herbert productivity goal

It's critical the Herbert district plan contributes to Australia's targeted increase volume of cane to 34 million tonnes under current area. The Herbert region needs to improve productivity and target an average of 85 tonnes of sugarcane per hectare. The priorities for the Herbert region include variety development, selection, and adoption (including clean seed uptake), RSD measurement and management (measuring, adoption of clean seed material and improved farm hygiene), improving adoption of new technologies and sound agronomic practices. The split to achieve an additional 444,000 tonnes of cane per year in the Herbert region includes:

- 180,000 tonnes through sound agronomic practices and variety development, selection & adoption.
- 146,000 tonnes RSD measurement and management.
- 118,000 tonnes improved adoption of new technologies.

Through the entire program it's essential SRA is transparent and updates the Herbert region stakeholders regularly on progress of the program. Stakeholders include:

- Monthly Herbert River CANEGROWERS, Ag Force and Australian Cane Farmers Association (ACFA) meetings.

- Quarterly Herbert Region Advisor Group (RAG) meetings.
- Bi-yearly HCPSL director's update.
- Scheduled field days, open days and workshops for growers and millers (see events calendar).

## 5.1 Current program

### Plant Breeding

The SRA Herbert Plant Breeding Program targets the needs of the local sugarcane industry through the optimised selection and release of more productive and disease-resistant varieties. Two programs are delivered within the Herbert region program including core plant breeding and Introgression.

#### 1. Core plant breeding

The Herbert core plant breeding program includes:

- Stage 1 Accessing progeny material from Meringa
- Stage 2 Clonal Assessment Trials (CATs)
- Stage 3 Final Assessment Trials (FATs)

#### 2. Introgression Program

Introgression introduces new traits from wild sugarcane relatives. The three-stage process includes:

- Stage 1 Introgression Progeny Assessment Trials (IPATs)
- Stage 2 Introgression Clonal Assessment Trials (ICATs)
- Stage 3 Introgression Final Assessment Trials (IFATs)

## 6 District Priorities

The following constraints have been identified as productivity gaps for the Herbert region that are not addressed within current programs.

PRIORITY	OBJECTIVES
Variety development, selection, and adoption	<ul style="list-style-type: none"> <li>- Improving dissemination of research knowledge through the delivery of targeted and timely communication products, training packages and demonstration activities for growers, advisors, and planting contractors to enhance decisions influencing variety selection and adoption.</li> <li>- Implementation of variety demonstration plots throughout the district.</li> <li>- Open day of variety demonstration plot walk through in collaboration with release of variety guide (see events calendar).</li> <li>- Development of CCS maturity curves for all varieties released.</li> </ul>
RSD measurement and management	<ul style="list-style-type: none"> <li>- Improving dissemination of research knowledge through the delivery of targeted and timely communication products, training packages and demonstration activities for growers, advisors, and planting contractors to enhance decisions influencing RSD management.</li> <li>- RSD mill assessment at a district level utilising the Lamp Test.                             <ul style="list-style-type: none"> <li>○ SRA to assist in automation and implementation of the Lamp test in the Herbert region.</li> </ul> </li> <li>- Development of sterilisation tools for harvesting and planting.</li> </ul>

Improved adoption of new technologies	<ul style="list-style-type: none"> <li>- Improving dissemination of research knowledge through the delivery of targeted and timely communication products, training packages and demonstration activities for growers, advisors, and contractors to enhance decisions influencing adoption of new technologies.</li> <li>- Development and release of SRA DAF harvesting decision support tool.</li> <li>- Field days to increase adoption of yield and cane loss monitors in the Herbert region.</li> <li>- Review of harvester front end to improve ratoonability.</li> </ul>
Sound agronomic practices	<ul style="list-style-type: none"> <li>- Improving dissemination of research knowledge through the delivery of targeted and timely communication products, training packages and demonstration activities for growers, advisors, and contractors to enhance decisions influencing farming practices.</li> <li>- Continuation of nitrogen product formulation demonstration trial.</li> <li>- Continuation of SIX EASY STEPS validation trial in the drier climate zone.</li> <li>- Development of nutrient management and soil health tools.</li> <li>- Strategy based on targeting mid-range productivity groups                             <ul style="list-style-type: none"> <li>o 75-85 t/ha target group</li> <li>o 34% of area (based on 2014 – 2019 season).</li> </ul> </li> </ul>

### 6.1 District Stakeholder Analysis

Snapshot of the growers in the region based on t/ha and mills, grower organisations and productivity companies that SRA works with to improve productivity for the region.

Stakeholder type	Number/ key stakeholders	Herbert (tonnes)	Total % of tonnes
X Large growers – over 100,000 T cane			
Very large growers – over 50,000T cane	4	247,373	5.9
Large grower – over 20,000T cane	18	482,041	11.4
Medium grower – between 8,000T cane – 20,000T cane	100	1,141,724	27.0
Other growers < 8,000T	704	2,354,758	55.7
Milling companies	Wilmar	<b>Total Growers</b> 948  <b>Average Farm Size</b> 117ha  <b>Total Tonnes</b> 4,225,897	
Grower representative organisations	Herbert River CANEGROWERS, AgForce, ACFA, HQCR		
Productivity companies	Herbert Cane Productivity Services Limited (HCPSL)		
Regional variety committees	Herbert district regional variety committee		

## 7 Events scheduled

Quarter 1	Target constraint	Quarter 2	Target constraint	Quarter 3	Target constraint	Quarter 4	Target constraint
February – Legume Biomass Sampling (Video)	4	April – SRA RVC Meeting	1	August – Temporal N Field walk Presentation by agronomist Danielle Skocaj) Date to be confirmed	4	October – SIX EASY STEPS Toolbox (Fertilising late & last ratoons)	4
March – Herbert Walk and Talk <ul style="list-style-type: none"> <li>Variety selection and management</li> <li>Adoption of new technologies</li> </ul>	1,2,3,4	April – Shed meetings <ul style="list-style-type: none"> <li>Improved agronomic practices</li> </ul>	1 & 3	August – Harvesting demonstration day (SRA, DAF & Herbert River CANEGROWERS collaborative event) (dates to be confirmed)	3	November – Farming Systems Projects	4
March – Soil Health Project Update (closed group) and Collaborative event with SRA, HCPSSL and DAF	4	April – Rotary Nth QLD Field Day (SRA Burdekin and Herbert region collaborative program)	3	September – Harvesting demonstration day (SRA, DAF & Herbert River CANEGROWERS collaborative event) (dates to be confirmed)	3	December – Biosecurity Workshop	
March – FEAT Workshop	3 & 4	April – RSD workshop (growers and contractors) <ul style="list-style-type: none"> <li>Launch of Herbert RSD workbook and extension package for growers and contractors (Collaborative event with SRA &amp; HCPSSL). Two workshops 8am - 12pm Planting contractors, 1pm - 5pm growers. (Presentation by pathologist Rob Magarey)</li> </ul>	2				
March – FEAT Workshop	3 & 4	May – SRA Herbert station open day <ul style="list-style-type: none"> <li>SRA variety demo plot/ juice lab tour (variety guide launch).</li> <li>RSD LAMP test/ Pachy workshop.</li> <li>Improved agronomic practice workshop.</li> <li>Imidacloprid project.</li> <li>Cane ripener workshop</li> <li>New technologies for improved harvesting</li> </ul> Presentation by specialists; Rob Magarey, Danielle Skocaj, Steve Staunton, Kevin Powell, Fengduo Hu & Phil Patane. <ul style="list-style-type: none"> <li>Three major releases at this event including Herbert Region variety guide, harvesting predictive tool &amp; RSD Lamp test.</li> </ul>	1,2,3,4				
March – Fallow management workshop	4	May – 6 Easy Steps demo workshop - Easy Steps validation in the dry zone demo plot field walk. Presentation by Industry services agronomist Danielle Skocaj) Date to be confirmed.	4				

March – FAT walkthrough	1	June – Virtual demonstration of harvesting decision support tool (launch) (date to be confirmed) collaborative event with SRA and DAF	3				
		June – Ingham show (SRA and HCPSL combined information stand - varieties.	1				

## 8 Implementation strategy and actions

The table below presents activities and their corresponding strategic targets for the Herbert region. It summarises key activities with supporting detailed documents to be produced for each program.

All activities address the four priority areas:

- Variety development, selection, and adoption (including adoption of clean seed material).
- RSD measurement and management
- Improved adoption of new technologies.
- Sound agronomic practices.

Reporting on progress regularly with key stakeholders (as highlighted in section 3 *Herbert productivity goal*).

SRA will update this document to reflect current activity delivered through SRA, including in collaboration with other delivery partners, which will deliver impactful research and contribute towards achieving the district productivity goal.

### 8.1 Improving productivity and profitability through RSD measurement and management

From recent research approximately 15% of the cane in the Herbert is infected with RSD, across an area of 8,455 hectares. The target is to reduce RSD infection by 2% or 1,127 hectares. Controlling RSD can increase yield by approximately 2.6 tonnes per hectare.

Activities will be delivered in collaboration with growers, Wilmar Sugar and grower representatives over the period of February 2022 to June 2026.

The strategy is to increase awareness of RSD infection rates on impacted farms through mill monitoring. Coupled with increased awareness training will be provided on the use of clean seed, improving farm hygiene and sterilisation of harvesting equipment.

#### Targets:

##### Clean seed adoption

- Increase to 1% planted area to clean seed by 2026
- Increase adoption of tissue culture to plant an average area of 5 ha per annum (approximately 50,000 seedlings) by 2026
- Information captured of variety performance on different production environments by 2026

##### RSD measurement and management

- Automation and implementation of RSD LAMP test in mills – assess proportion of RSD in the region
  - Once severely affected areas are identified a targeted strategy will be implemented
- Survey identifying attendance to RSD workshops and demonstration tours.
  - Target to have 50% of cane delivered to the mill by growers attending RSD events.

Table 1 Actions, outcomes and measures for the priority 'Reducing losses from RSD'

Targeted practices (Details of required action)	How will we do it? Measurement of the issue; Education and knowledge transfer; Planning, Industry engagement, New practices; Product; or Service	What is the activity?	What outputs will be produced? (include targets)	Which MEE outcomes are most relevant?	What does the MEE outcome mean for this investment?	Investment outcome/s	Investment measures
Assessment of RSD at a mill level	Measurement of the issue	Pre-commercial development, testing and validation of RSD LAMP assay for sugar mill roll-out. This will test the hypothesis that increased mill and grower awareness of RSD which will motivate behaviour changes to reduce losses. Assist the mill in automating the RSD Lamp assay.	Grower-scale RSD infection reports with the aim to target severely infected areas.	Improved problem definition	Gain data, increase transparency of the problem and its costs.	Increased awareness of RSD issue and associated costs. Increased demand for clean seed	RSD infection at a region level.
				Improved solution design	The technology will be refined to improve technology acceptance by mills (ease of use, value etc). Grower response to the output of grower level reports will be tested, and feedback gathered to improve the delivery of data, and key messages to maximise the influence on behaviour change.	Ongoing investment by mills in monitoring and reporting RSD to growers.	Generic permission for SRA to observe all data to allow for targeted strategies.
				Increased solution uptake	Mills taking up RSD detection technology with ongoing investment by the mills involved in the project and additional mills seeking to also adopt the technology.	Minimising of RSD associated losses.	
Development of rapid testing of planting material for advisors	Measurement of the issue	Pre-commercial development, testing and validation of RSD LAMP assay for advisors.	Rapid and cost-effective analysis of planting material.	Improved problem definition	Gain data, increase transparency of the problem and improve planting material assessment. Decrease turn around time of results.	Increase awareness of RSD issue and improve adoption of clean seed material.	Reduce cost of RSD testing for the SRA and the productivity services. Increase the number of plant source inspection to 70% of farming entities.
Use of clean seed and improved farm hygiene	Education and knowledge transfer	Facilitated training workshops with growers and extension providers.	Bi-yearly workshops attended by 50% of area supplied to the mill by	Improved solution packaging	Workshops will be facilitated to enhance peer to peer learning. Extension packages will be tailored to deliver useful information and	Increased knowledge and skills in variety management	Attendance to workshops.

Targeted practices (Details of required action)	How will we do it? <i>Measurement of the issue; Education and knowledge transfer; Planning, Industry engagement, New practices; Product; or Service</i>	What is the activity?	What outputs will be produced? (include targets)	Which MEE outcomes are most relevant?	What does the MEE outcome mean for this investment?	Investment outcome/s	Investment measures
			growers and 50% of harvest contractors collectively responsible for 30,000 hectares.		practical advice. Education includes: <ul style="list-style-type: none"> <li>- Extension packages for growers and planting contractors.</li> <li>- Facilitated workshops and demonstrations.</li> </ul>		
				Increased solution uptake		Minimising of RSD associated losses.	Increased clean seed and tissue culture sales.
Sterilisation of machinery prior to harvesting farms and blocks infected by RSD	Engineering development of harvester sterilisation system.	Engineering development of harvester sterilisation system.	Design improvements that make it cheaper/easier to sterilise harvesting equipment	Improved solution design	Growers and harvest contractors collaborate with engineers to develop a solution with high technology acceptance. Motivations and incentives for use of sterilisation are understood and incorporated into the solution design. Barriers to use are acknowledge and resolved.	Minimising of RSD associated losses.	Reduction in RSD spread throughout the region.
				Increased solution uptake	Growers and harvest contractors invest in new sterilisation systems and regularly use them between blocks and farms.	Increase awareness of RSD issue and improve adoption of sterilisation of machinery.	Increased purchase of sterilisation systems for harvesters.

## 8.2 Improving productivity through variety development, selection, and adoption

Investments in this priority will increase development, selection, and adoption of improved varieties. This will be achieved by:

- Improving dissemination of research knowledge through the delivery of targeted and timely communication products, training packages and demonstration activities for growers, advisors, and planting contractors to enhance decisions influencing variety selection and adoption.
- Implementing variety demonstration plots throughout the district.
  - o Open day of variety demonstration plot walk through in collaboration with release of variety guide (see events calendar).
- Developing CCS maturity curves for released standards and accelerated varieties.
- Increase area planted to clean seed to 1% by 2026.
- Increase adoption of tissue culture to plant an average area of 5 ha per annum (approximately 50,000 seedlings) by 2026.
- Portfolio of information captured on variety performance on different production environments by 2026.

Activities will be delivered in collaboration with growers, Wilmar Sugar and industry representatives between February 2022 June 2026.

Table 2 Actions, outcomes and measures for the priority 'increasing yield through better variety management'

Targeted practices (Details of required action)	How will we do it? Measurement of the issue; Education and knowledge transfer; Planning, Industry engagement, New practices; Product; or Service	What is the activity?	What outputs will be produced? (include targets)	Which MEE outcomes are most relevant?	What does the MEE outcome mean for this investment?	Investment outcome/s	Investment measure
Planting improved varieties	Education and knowledge transfer	Implement demonstration plots of new varieties and older more common varieties throughout the region.	Four demonstration plots established with the aim of 50% of cane supplied to the mill by growers attending the plots.	Improved solution packaging	Local demonstration plots on different production environments highlighting the benefits of planting improved varieties. Improvements in solution packaging that will be trialled include: <ul style="list-style-type: none"> <li>- Showcasing demonstration plots then discussing data performance.</li> <li>- Improved extension packages.</li> </ul>	Increased knowledge and skills in variety management	Database capturing number of attendees to demonstration plots.
				Increased solution uptake	As a result of the demonstration sites, more growers plant clean seed.		Increased clean seed sales.
Establishment of CCS maturity curves for optimum harvesting	Education and knowledge transfer	Facilitated workshops and demonstrations showcasing the benefits of optimum harvest time.	SRA industry services team with assistance of SRA variety development team to produce CCS maturity curves for newly released varieties and accelerated clones. Data will be captured from the FATs.	Improved solution packaging	The development of the CCS maturity curve for each variety will allow growers to harvest varieties at an optimum time to improve CCS and ultimately tonnes of sugar per hectare. Improvements in solution packaging that will be trialled include: <ul style="list-style-type: none"> <li>- Presentation of maturity curves in revamped information sheets and variety guide.</li> </ul>	Increased knowledge and skills in variety management	Additional data in QCane select and Herbert region variety guide
				Increased solution uptake	As a result of the workshops and demonstrations more growers' plant new varieties.		Increased new variety sales
Improved marketing of varieties	Product	Improved packaging of information	SRA Industry Services Team to assist SRA Variety Development team on improving marketing strategy.	Improved solution packaging	Improved information packaging will present data in a practical way to assist growers in adopting improved varieties. Improvements in solution packaging that will be trialled include:	Improvements in presentation of variety guides and information sheets.	Increased adoption of improved varieties measured through clean

Targeted practices (Details of required action)	How will we do it? <i>Measurement of the issue; Education and knowledge transfer; Planning, Industry engagement, New practices; Product; or Service</i>	What is the activity?	What outputs will be produced? (include targets)	Which MEE outcomes are most relevant?	What does the MEE outcome mean for this investment?	Investment outcome/s	Investment measure
					<ul style="list-style-type: none"> <li>- Updating and improving presentation of variety guide and information sheets.</li> <li>- Facilitated workshops, variety demonstration walkthroughs.</li> </ul>		seed purchase.
Increase in adoption of planting clean seed material	Education and knowledge transfer	Sweet of information collected with variety performance on different productivity environments.	SRA industry services team to collect data on commercial variety performance on different productivity environments. Information to be reported back to SRA variety development team.	Improved solution packaging	Data collected will compliment current variety trial data which ultimately will highlight the benefits of selecting improved varieties on a range of productivity environments.	Additional data to incorporate into information packages and increase adoption of improved varieties.	Increased adoption of improved varieties measured through clean seed purchase.

### **8.3 Increasing profitability through increased uptake of sound agronomic practices**

This investment will increase yield and profitability through adoption of improved agronomic practices. This will be achieved by:

- Improving dissemination of research knowledge through the delivery of targeted and timely communication products, training packages and demonstration activities for growers, advisors, and contractors to enhance decisions influencing farming practices.
- Developing nutrient management and soil health tools for the region.
- Facilitated program to target 75-85t/ha sector to increase by 2.5t/ha by 2026

Activities will be developed and delivered in collaboration with growers and industry partners from December 2021 onwards.

Table 3 Actions, outcomes and measures for the priority 'improving profitability through increased uptake of targeted practices.'

Targeted practices (Details of required action)	How will we do it? Measurement of the issue; Education and knowledge transfer; Planning, Industry engagement, New practices; Product; or Service	What is the activity?	What outputs will be produced? (include targets)	Which MEE outcomes are most relevant?	What does the MEE outcome mean for this investment?	Investment outcome/s (additional outcomes not captured by MEE)	Investment measure
Improved timing of pest weeds and disease control	Education and knowledge transfer	Facilitated workshops showcasing effective timing of applications for pest, weeds, and diseases.	Four workshops per annum attended by 50% of area supplied to the mill	Improved solution packaging	Workshops will be conducted in collaboration with industry partners. Workshops will include improved marketing strategy with targeted information packages (understanding how the change in practice relates to other farming practices).	Increased knowledge on the economics of optimal application timing	Potential cost savings and productivity gain from optimum practice
				Increased solution uptake	Growers are adjusting the timing of key applications, increasing profitability and or yield.	Increased industry knowledge of good farming practice including timing of application.	Event attendance and reported intention to change
Improved fallow management	Education and knowledge transfer	Knowledge transfer between growers and SRA researchers including grower peer to peer information exchange.	Four facilitated workshops showcasing important fallow management principles. Workshops attended by 50% of area supplied to the mill.	Increased solution uptake	Workshops will be facilitated to enhance peer to peer learning. Extension packages will be tailored to deliver useful information and practical advice.	Increased industry knowledge of good farming principles.	Event attendance and reported intention to change
Improved nutrient management	Education and knowledge transfer	Knowledge transfer between growers and SRA researchers including grower peer to peer information exchange.	Two workshops and established demonstration trials attended by 50% of area supplied to the mill. - SIX EASY STEPS validation demonstration trial	Improved solution packaging	Workshops will be facilitated to enhance peer to peer learning. Extension packages will be tailored to deliver useful information and practical advice.	Increased industry knowledge of good farming principles.	Event attendance and reported intention to change.
				Increased solution uptake	Growers are adopting optimum practice for nutrient management to increase yield.	Improved industry attendance to workshops, shed meetings and field days.	Event attendance and reported intention to change

Targeted practices (Details of required action)	How will we do it? <i>Measurement of the issue; Education and knowledge transfer; Planning, Industry engagement, New practices; Product; or Service</i>	What is the activity?	What outputs will be produced? (include targets)	Which MEE outcomes are most relevant?	What does the MEE outcome mean for this investment?	Investment outcome/s (additional outcomes not captured by MEE)	Investment measure
			- Nitrogen product formulation demonstration trials				
Growers are assessing and monitoring their farm economics	Product	Actively promote FEAT online.	Communication materials	Increased solution uptake	Increased promotion of FEAT encourages growers to use the tool. No additional support or training in using the tool, or refinement to the tool is required.	Improved industry uptake of FEAT online.	Number of times website is accessed and source of access (link, etc)
Increasing advisor knowledge of nutrient management	Product	Develop training programs with complementary demonstration sites for advisors	100% attendance by advisors in the district.	Improved solution packaging	The training package provides technical information and practical experience supported by local research/ demonstration sites.	Advisors are more confident in providing advice on nutrient management including tailored strategies for specific circumstances.	Advisor feedback
Development of decision support tools to improve nutrient management and soil health.	Product	Develop decision support tools for soil health and nutrient management.	Decision support tool that is relevant for the Herbert soil types and environmental conditions	Improved solution packaging	The decision support tools bring together trusted information and evidence, are easy to use and the results make a significant difference to grower lifestyle (time), profitability and/or productivity.	Improved industry uptake of decision support tools. Benefits gained by growers from using the decision support tools	Monitoring the use of decision support tools.

#### **8.4 Improving profitability and productivity through adoption of new technologies**

Investments in this priority will increase yield and ratoonability through adoption of new technologies. This will be achieved by:

- Improving dissemination of research knowledge through the delivery of targeted and timely communication products, training packages and demonstration activities for growers, advisors, and contractors to enhance decisions influencing adoption of new technologies.
- Developed and release of SRA DAF harvesting decision support tool.
- Conducting field days to increase adoption of yield and cane loss monitors in the Herbert region.
- Reviewing harvester front end to improve ratoonability

Activities will be delivered in collaboration with growers, harvesting contractors and industry representatives from February 2022 to June 2023.

Table 4 Actions, outcomes and measures for the priority 'improving profitability and productivity through improved harvesting practices.'

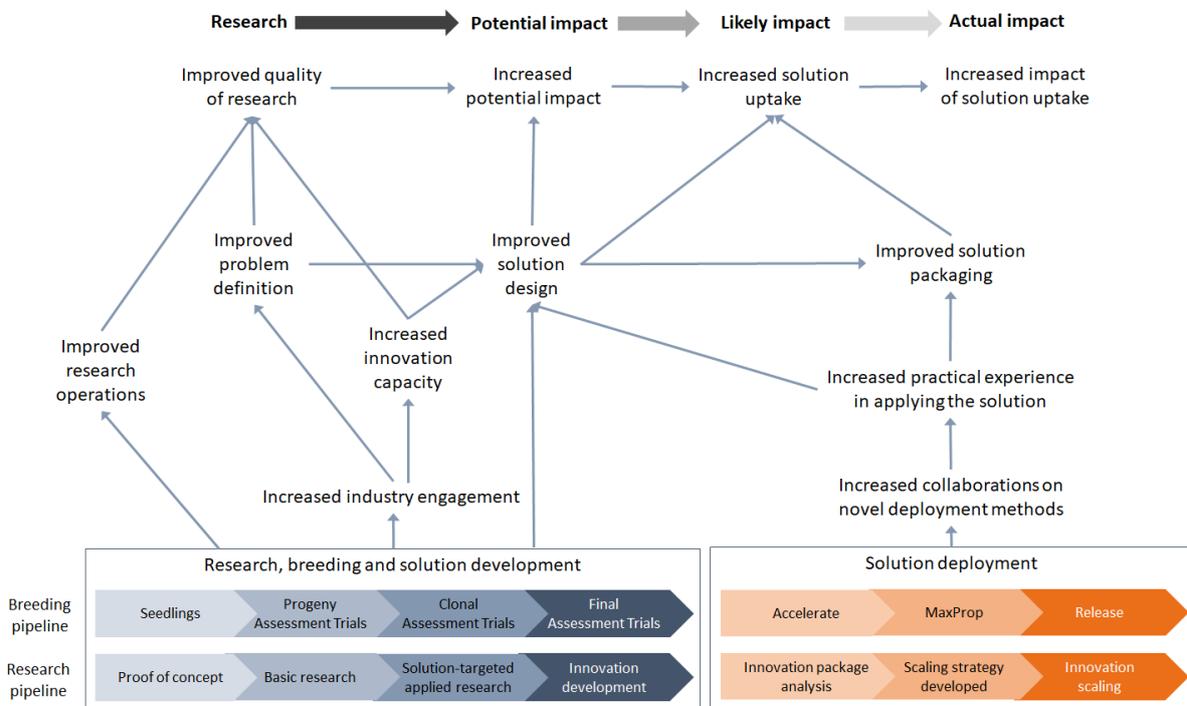
Targeted practices (Details of required action)	How will we do it? <i>Measurement of the issue; Education and knowledge transfer; Planning, Industry engagement, New practices; Product; or Service</i>	What is the activity?	What outputs will be produced? (include targets)	Which MEE outcomes are most relevant?	What does the MEE outcome mean for this investment?	Investment specific outcome/s (additional outcomes not captured by MEE)	Investment specific measure
Increased adoption of yield and cane loss monitors.	Education and knowledge transfer	Develop workshops for growers and harvesting contractors.	Four workshops attended by 50% of area supplied by growers to the mill and 50% of harvest contractors, collectively responsible for 30,000 hectares.	Improved solution packaging	Improvement in yield due to decrease harvesting and ratoon loss.	Increased industry knowledge of improved harvesting practice.	Event attendance and reported intention to change
				Increased solution uptake	More growers and harvest contractors are actively using yield/cane loss monitors and adjusting harvesting variables in real time to maximise yield and profit	Adoption of yield/ cane loss monitors and improved harvesting practice. Measurement of cane loss savings through cane loss/ yield monitors.	Monitoring adoption of harvester yield and cane loss monitors.
Increase uptake of growers incentivising harvester contractors.	Product	Development of decision support tool.	Development of harvesting decision support tool with corresponding demonstration days.	Improved solution packaging	Feedback on the tool is gained during demonstration days and used to further refine the tool, making sure it meets user needs.	Improvement in economic benefit to growers and harvesting contractors.	Estimated economic benefits
				Increased solution uptake	Growers and contractors use the tool to inform changes to operations.	Increased understanding of harvesting economics	Monitoring the use of the decision support tool.
Change in machinery to reduce damage to stools during harvesting and increase ratoonability	Product	Development in improvement of front-end of harvester to reduce impact to ratoonability.	Improved harvester front-end design	Improved solution design	The cost of modification is returned in one season		
				Increased potential impact	Harvester design reduces losses associated with poor ratooning by 50%	Harvest contractors and growers increase understanding of stool damage and adopt improvements	Adoption of front-end harvester modifications.

## 9 Monitoring, evaluation and economics (MEE)

The intention with impact framework is that best practice MEE informs decision making and drives learning and improvement and enables SRA to demonstrate the value provided from investments to industry and its investment partners.

Cascading through from district productivity plans to the research investment plans and linking to the strategic plan, indicators will be commonly applied and focused on outcomes. Monitoring, evaluation and economics serves different functions and provides accountability, demonstrates worthiness or merit of an investment or action, identifies improvements and informs decision-making to deliver greater value from investments.

It is focused on delivery to impact and the following outcomes map has been developed to show how the different investments and activities contribute to achieving the endpoints of productivity, profitability and sustainability and progress towards these points. It is aimed on the end desired outcomes as shown by the top line charting from 'Research' to 'Potential Impact' to 'Likely Impact' to Actual Impact.



The district productivity plans will be updated every 6 months with progress reports and reviewed annually to then determine the next plan, track progress and measure impact.



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