Sugar Research Australia

SUGAR RESEARCH AUSTRALIA DISTRICT PRODUCTIVITY PLAN – TULLY 2024

Brief Introduction

This ***District Productivity Plan – Tully 2024*** has 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 industry ABARES survey, through the Local Expert Analysis (LEA) project, mill data, impact assessments where applicable and a range of targeted interviews and survey results.

The plan identifies constraints and proposes solutions and actions to address them. The key to success will be implementation which will require leadership, change, and focus. Reporting on progress will occur six monthly.

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Contents

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 three million tonne increase in production across Queensland (QLD) and New South Wales (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 $210 million in gross revenue.

2 Tully Overview

Sugarcane is grown in the Tully region on approximately 34,500 hectares. The Tully region carried out expansion programs in 2012-17 to increase from 24,500 to 30,500 ha. Further expansion took place in 2021-23 to reach full capacity at 34,500 ha. This was achieved in part through Tully Sugar Limited employing a full time Extension Agronomist who continues to work closely with local industry including SRA, Tully Cane Productivity Services Limited, CANEGROWERS TULLY and local agribusinesses. Sugarcane is crushed through one mill in the region (COFCO Tully Sugar Limited). TSL mill crushes an average of 2.50 million tonnes of cane per year to manufacture approximately 310,000 tonnes of raw sugar.

3 Productivity Opportunities and Constraints

In mid-2021 a Local Expert Analysis (LEA) was initiated in the Tully Mill area. A general LEA industry reference group was formed for the area which included local industry scientists from agronomy, pathology, machinery and near infrared (NIR). The group objectively considered local constraints influencing yield, CCS and milling operations. The reference group included staff from Tully Sugar Limited, Tully Cane Productivity Services Limited (TCPSL), Tully CANEGROWERS, SRA and the Queensland Department of Agriculture and Fisheries (DAF).

In collaboration with industry representatives the *District Productivity Plan* which encompasses the LEA has now assembled targeted campaigns to address the known constraints whilst working alongside stakeholders to maintain productivity and seek continuous improvement in profitability.

The Tully industry is in the unique situation where the mill is at full capacity because of the mill and growerled expansion in 2012-23. The emphasis is on maintaining area under cane and yield (tonnes per hectare) for industry throughput however, opportunity to target lower yielding farms in certain subdistricts is a priority.

4 Productivity data

TULLY	2017	2018	2019	2020	2021	2022
T Cane harvested	2,496,485	2,575,142	2,179,083	2,463,558	2,513,827	2,879,289
Ha Harvested	29,844	29,698	29,248	28,210	28,863	29,377
Average T cane/ Ha	83.65	86.7	74.5	87	87	98
Average CCS	12.93	14.45	13.56	12.96	12.36	12.28
Average tonnes CCS/ ha	11.07	12.80	10.31	11.57	10.99	12.03

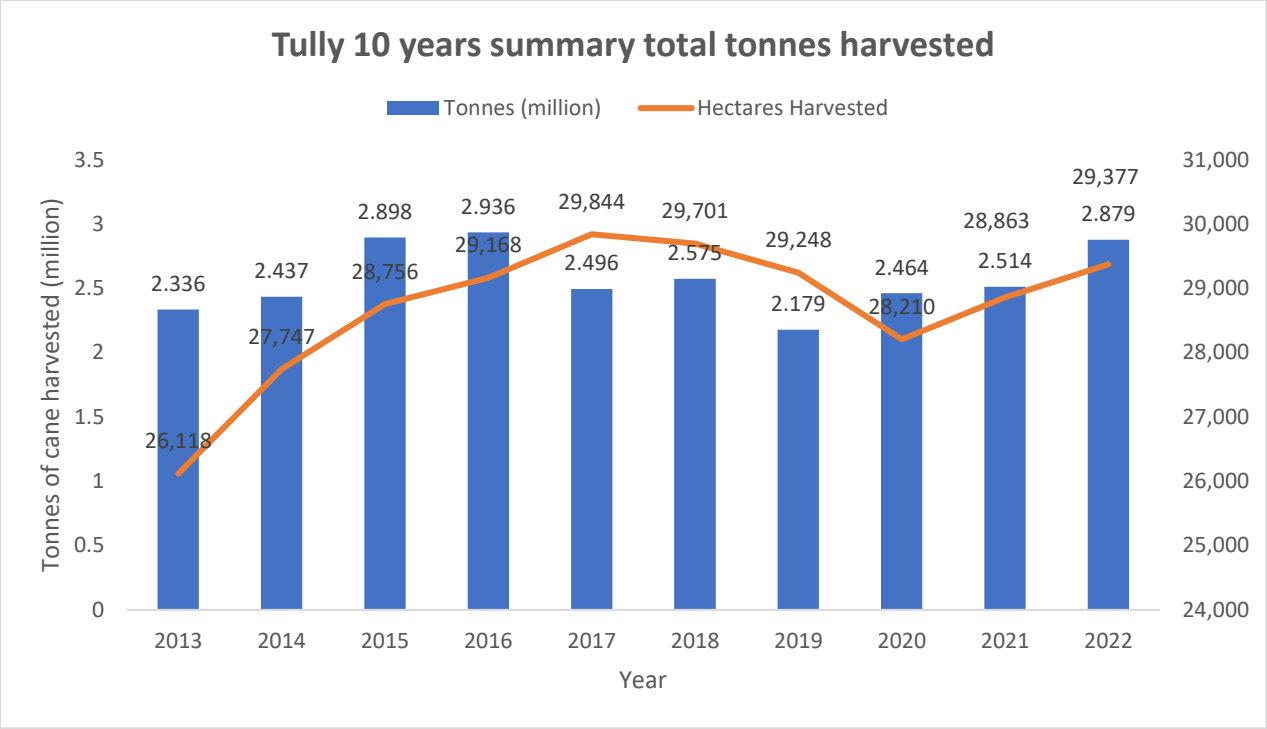

Figure 1: 10-year summary of total tonnes crushed compared to the hectares harvested for Tully

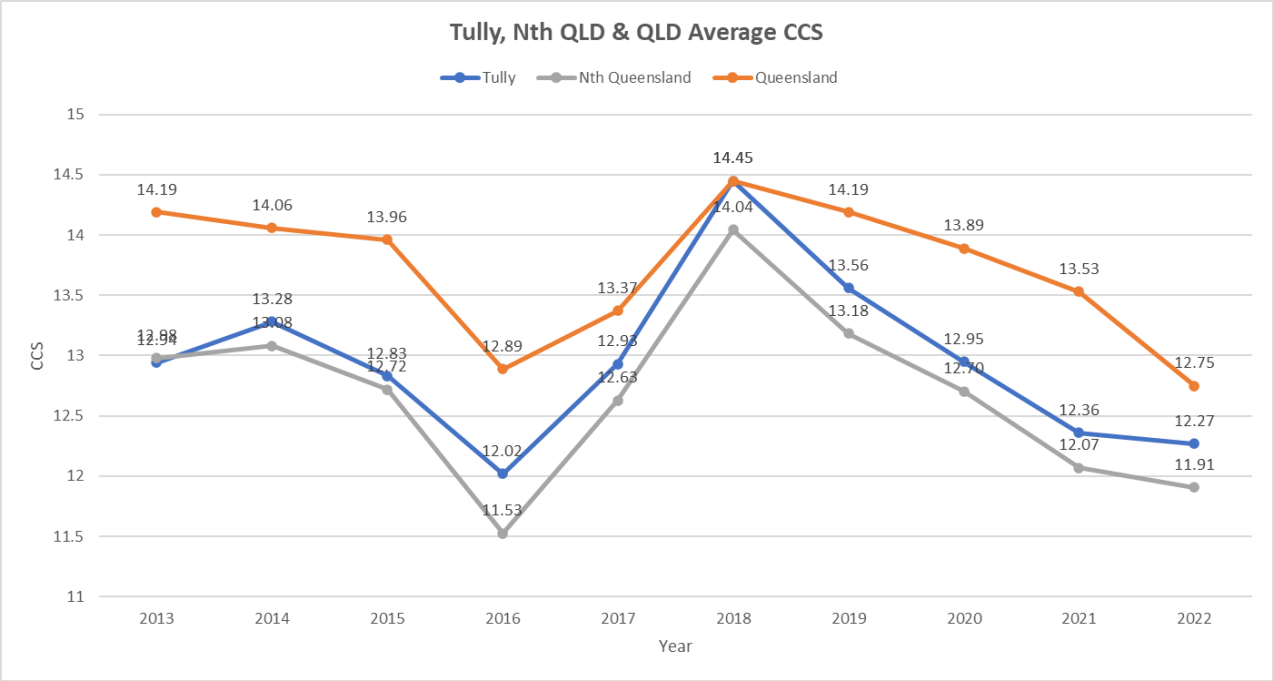

Figure 2: 10-year summary of CCS for Tully, North Queensland, and Queensland

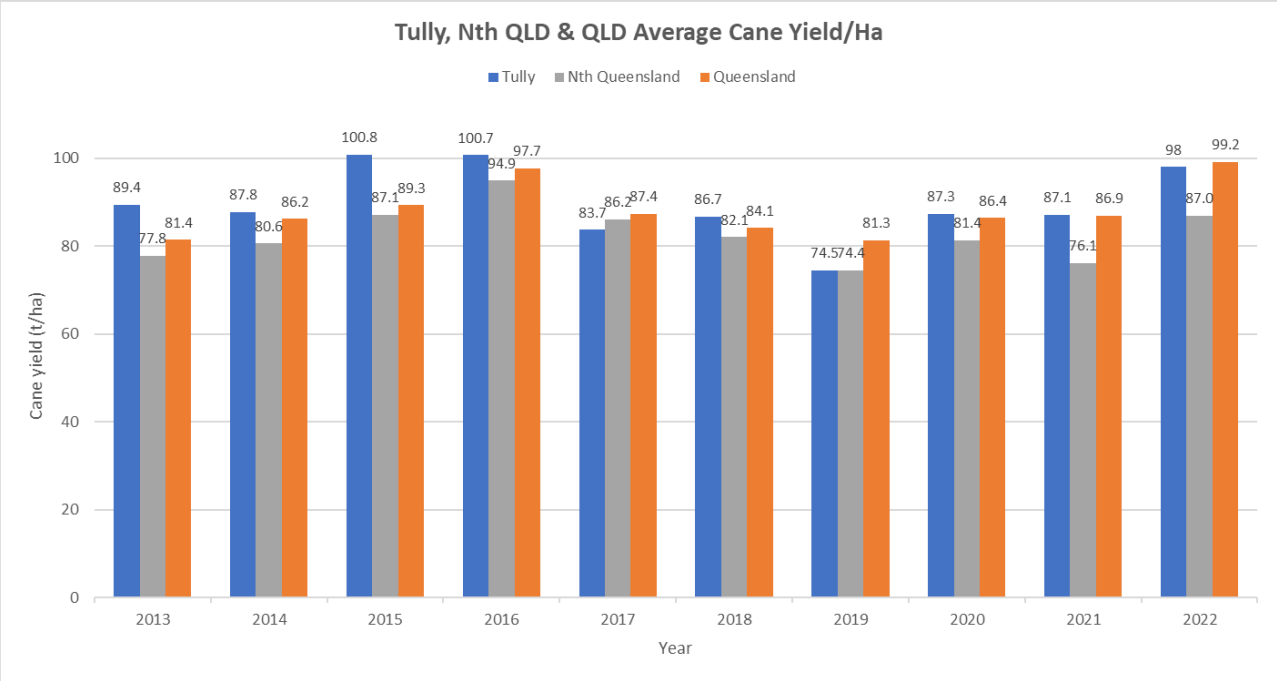

Figure 3: 10-year summary of Tully, North Queensland, and Queensland cane yield (tonnes per hectare)

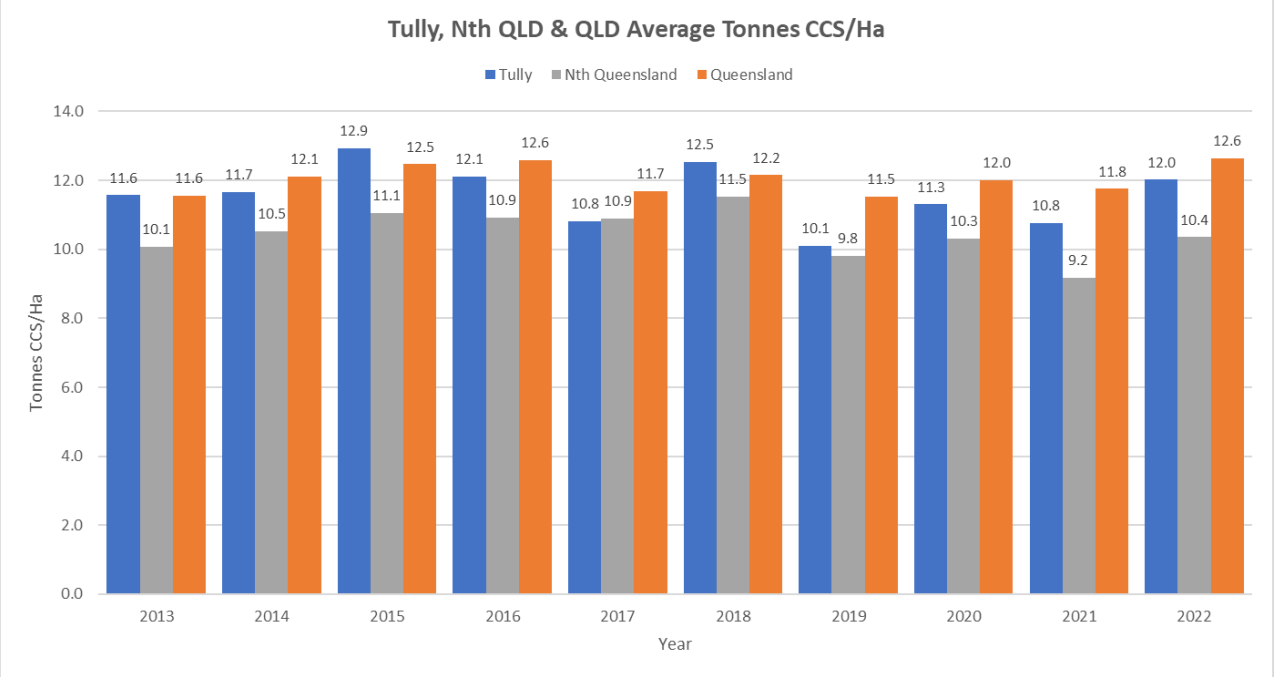

Figure 4: 10-year summary of Tully, North Queensland, and Queensland tonnes CCS (per hectare)

PRODUCTIVITY SNAPSHOT	5 YEAR AVERAGE	What is the target for the district to increase productivity?
District – Tully		
T Cane harvested	2,444,266	2,508,878
Ha harvested	29,076	29,500
Average T cane / ha	83.8	86
Average Yield ratoon T cane/ha		
Average CCS	13.3	13.3
Average sugar yield	11.3	11.4
Varieties Top 5 Total Tonnes / %	- Q208 (40.1%, 83.9 t/ha) - Q200 (17.2%, 82.8 t/ha) - Q250 (8.2%, 85.5 t/ha) - KQ228 (5.9%, 86.8) - Q253 (5.1%, 91.2 t/ha)	Suite of varieties for growers to choose for a range of production environments.
# mills	1	1
Clean seed uptake (percent mill area planted to clean seed (%)	0.56%	1%
Tissue culture uptake (seedlings) annually		50,000 seedings (5 hectares)
Major Disease (RSD)	Ratoon stunting disease (RSD) ○ 9% infected ○ Area affected 2,632 ha. Tonnes affected: 31,340	The target is 30,713 tonnes for the Tully region (less than 2% RSD infection rate).

5 Tully productivity goal

It is critical that the Tully district plan contributes to Australia's targeted increase in volume of cane to 34 million tonnes under current area. The Tully district is in a unique position as the region is not targeting a significant increase in yield. However continuous improvement in tonnes of sugar per hectare along with an increase in certain subdistricts aims to target an average of 85 t/ha. The average of 85 t/ha will allow the district to produce just over 2.5 million tonnes of cane per annum.

The Table below highlights the long-term average of the nine subdistricts in the Tully region. As shown in the Table below there is potential to improve cane yield in the El Arish and Feluga sub-districts. However, two additional constrains in these areas include climatic issues and off-farm income. The climatic issues include the percentage of overcast days, reduced solar radiation and a topography which impacts sunlight interception at certain times of the day, all affecting yield. The two subdistricts also include growers who work off-farm (affecting time of operation) and the physical attributes of the land i.e. smaller farms and land-locked farms. There is also opportunity to increase yield in the Lower Tully region due to the high proportion of alluvial soils.

Subdistrict	Name	Cane yield (t/ha)	CCS	Sugar Yield (t/ha)
1	El Arish	76.4	12.2	9.3
2	Murray	97.9	13.0	12.7
3	Feluga	73.9	11.9	8.8
4	Kennedy	87.9	13.3	11.7
5	Lower Tully	89.4	12.7	11.3
7	Euramo	94.2	12.9	12.1
8	Riversdale	92.9	12.3	11.3
9	Syndicate	89.4	12.5	11.2
Mill average		87.1	12.6	11.0

The initial LEA analysis suggested that the most significant constraints/opportunities for the Tully district included disease monitoring and management, balanced nutrition in older ratoons, improving the use and application of mill by-products, making better use of industry datasets and adoption of new technologies.

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

- General industry productivity plan annual meeting (review plan)
- Quarterly working group meetings.
- Scheduled field days, open days and workshops for growers and millers (see events calendar).

6 District Priorities

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

PRIORITY	OBJECTIVES

RSD measurement and management	- Improve 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 RSD management.
	- Development of two research projects:
	  o Delivery of a pest and disease diagnostic step change for the sugarcane industry (NIR)
	  o Delivery of a pest and disease diagnostic step change for the sugarcane industry (LAMP).
	- Development of sterilisation tools for harvesting and planting.

Disease monitoring and management	- 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 disease monitoring and management.
	- Excessive smut in some crops of intermediate varieties; consider how to reduce smut infection levels (discuss at RVC)
	  o Work in conjunction with the Tully Variety Management Group (TVMG) for tracking alternatives (newly released varieties).
	- Monitor smut levels in commercial crops.
	- Yield losses from chlorotic streak susceptible varieties growing in flood-prone areas (poor drainage). Need for varietal resistance ratings.
	- Work in collaboration with TSL and TVMG regarding Pachymetra.
	  o TSL and Tully Variety Management Group (TVMG) 5-year surveys conducted to build upon this work.

Sound agronomic practices	- 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 on-farm nutrient management. - Improved nutrient management and soil health tools for the region. - Understanding of crop nutritional status through a soil and leaf survey. - Refining nutrient recommendations following application of subsurface banded mill by-products to manage the effect on yield and CCS.
Improved adoption of new technologies	- 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.

Continued…	- Continuous development and improved adoption of Harvest Mate. - Review of harvester front end to improve ratoonability.
Mill Data monitoring and analysis	- 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 improve understanding of mill data monitoring and analysis. - Develop protocols and decision support tools to analyse data to identify productivity constraintsopportunities. - Soil levels at mill monitored closely and reported back to industry weekly by TSL. - Understand costs/requirements to upgrade existing/purchase new. - Review NIR mill mud data to highlight if/how growers can be provided with improved information on nutrient composition.

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	Tully (tonnes)	Total % of tonnes
X Large growers – over 100,000 T cane	2	369 000	13.5
Very large growers – over 50,000T cane	12	792 000	29.0
Large grower – over 20,000T cane	21	641 000	23.5
Medium grower – between 8,000T cane – 20,000T cane	39	505 000	18.5
Other growers < 8,000T	110	407 000	15.0
Milling companies	Tully Sugar Limited	**Total Growers** **Average Farm Size** **Total Tonnes**	
Grower representative organisations	Tully CANEGROWERS		
Productivity companies	Tully Cane Productivity Services Limited		
Regional variety committees	Northern Regional Variety Committee		

7 Events Schedule

Quarter 1	Target constraint	Quarter 2	Target constraint	Quarter 3	Target constraint	Quarter 4	Target constraint
15 March – Post emergent workshop	3	RSD detection update (Morning with industry and afternoon with project partners) (link in with shed meetings)	1	TBA - Bus tour of Meringa Plant Breeding (Crossing)		Disease workshop (Yellow spot, chlorotic streak, top rot)/ exotic plant diseases and biosecurity	2
Update on development of a resistance screening method for chlorotic streak	2	Beyond Imidacloprid Project Update	2				
Weed management workshop for advisors	3	SRA FAT Tully Walkthrough (TVMG)					
Harvest Mate workshop	4						

8 Implementation strategy and actions

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

All activities address the five priority areas:

- RSD measurement and management
- Disease monitoring and management
- Sound agronomic practices (older ratoons & application of mill by-products)
- Improved adoption of new technologies
- Mill data monitoring and analysis

Reporting on progress regularly with key stakeholders (as highlighted in section *3 Tully 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 conducted by Magarey et al (2021) approximately nine per cent of the cane in the Tully region is infected with RSD, across an area of 2,632 hectares. The target is to reduce RSD infection to two per cent 2% or 580 hectares. Controlling RSD can increase yields across the area by approximately 1.8 tonnes per hectare.

Activities will be delivered in collaboration with growers, TSL, CANEGROWERS Tully and TCPSL over the period of March 2024 to June 2026.

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

Targets:

Clean seed adoption

- Increase to one per cent of planted area to clean seed by 2026.
- Increase adoption of tissue culture to plant an average area of fiveha per annum (approximately 50,000 seedlings) by 2026.

RSD measurement and management

- RSD assessment through the mill – assess the incidence of RSD in commercial crops across the mill area.
    - Once severely affected areas are identified, a targeted extension strategy will be developed for local implementation.
- 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 'RSD measurement and management'

INVESTMENT RATIONALE	ACTIVITY/ PROJECT	OUTPUT/ SOLUTION	SHORT-TERM OUTCOMES	MEDIUM-TERM OUTCOMES	LONG-TERM OUTCOMES
RSD is estimated to cost the Tully region $1.1 million (9.0% infected area in 2020) Magarey et al. (2021). Reducing RSD infection to 4% of the area is the target.	Two research projects: Delivery of a pest and disease diagnostic step change for the sugarcane industry (NIR) Delivery of a pest and disease diagnostic step change for the sugarcane industry (LAMP)	Research completed and adopted by mill to allow for specific farm and district-wide RSD crop reports. This will provide for greater awareness of RSD and targeted extension for better disease management.	Research completed to utilise novel technology to identify RSD at the mill.	Increased adoption of the novel technology by mills. Increased awareness of RSD on-farm and the associated negative productivity and profitability outcomes. Improved RSD management by growers in response to specific RSD crop reports.	Increased adoption of approved seed by growers. Reduced prevalence of RSD at a regional level. RSD-associated production losses avoided, resulting in increased productivity (tonnes cane/ha; tonnes sugar/ha).
	In collaboration with TCPSL develop rapid and cost-effective RSD assay of planting material.	Novel technology for advisors that produces rapid and cost-effective RSD diagnostics.	Increase awareness of RSD in planting material and improved adoption of approved seed material.	Improved and timely RSD diagnosis of planting material.	Effective RSD assay of planting material resulting in reduced costs for the local industry. Increased proportion of farming entities requesting a plant source inspection – target is 70%.
	In collaboration with TCPSL and TSL, increase adoption of approved seed and improved farm hygiene.	Facilitated training workshops with growers and extension providers.	Increase awareness of RSD and improved adoption of approved seed.	Annual workshops attended by farmers representing 50% of the Tully area and 50% of harvest contractors, collectively responsible for 14,000 hectares.	RSD-associated production losses avoided leading to increased productivity (tonnes cane/ha; tonnes sugar/ha).
	Engineering development of harvester sterilisation system.	Prototype sterilisation unit installed on Tully commercial sugarcane	Installation of the prototype sterilisation unit to a commercial harvester.	Growers and harvest contractors invest in the new sterilisation system with routine application	Motivation and incentives for use of sterilisation are understood and incorporated into grower

Continued…		harvester. Testing to follow.	Increase awareness of harvester RSD transmission with improved adoption of general machinery sterilisation.	between blocks and farms. Increased purchase of sterilisation systems for harvesters.	and contractor businesses.

8.2 Improving productivity through disease monitoring and management

Investments in this priority will increase the awareness and provide tools to monitor and manage key diseases in the Tully district. This will be achieved by:

- Considering how to reduce smut incidence (discuss at RVC) with major varieties such as Q208 and Q200 which are showing an increase in smut.
- Monitoring smut levels in commercial crops.
- Investigating the development and supply of chlorotic streak varietal resistance ratings for chlorotic streak to minimise yield losses arising from the growth of susceptible varieties in prone areas (poor drainage).
- Capturing a portfolio of information on smut incidence in commercial crops under different production environments by 2026.

Activities will be delivered in collaboration with growers, TSL, CANEGROWERS Tully and TCPSL over the period of March 2024 to June 2026.

Table 2 Actions, outcomes and measures for the priority 'Improving productivity through disease monitoring and management'.

INVESTMENT RATIONALE	ACTIVITY/ PROJECT	OUTPUT/ SOLUTION	SHORT-TERM OUTCOMES	MEDIUM-TERM OUTCOMES	LONG-TERM OUTCOMES
Management of sugarcane diseases is an important factor in maintaining the competitive advantage of the Australian sugarcane industry. Diseases have generally been restricted to low levels, assisting the industry in maintaining higher yields of high-quality sugar.	Managing smut in intermediate older varieties made possible through the monitoring of smut incidence in commercial crops.	Consider how to reduce smut incidence in major varieties such as Q200 and Q208. Monitor smut incidence in commercial crops by: - Basin constraints mapping. - Enterprise specific constraints identification.	Knowledge of smut incidence at a district level.	Better advice to farmers on maintaining low disease levels. Minimise tonnes lost and economic cost.	Suite of improved varieties that are smut resistant
	Research Project: Development of a resistance screening method for chlorotic streak (CS)	To build on previous work to better understand relationships between clones, symptoms and pathogen load. To develop an effective method of screening new and commercial clones for CS disease. To determine if xylem samples can be reliably used for CS ratings and diagnostics.	Identify the most suitable inoculation method, in terms of symptom development and ease of operation.	Develop a rating method based on symptom assessment, qPCR quantification, and percentage of plant height compared to healthy control plants. Relate resistance screening data to field reaction, in terms of symptoms development and yield loss.	Suite of information on CS ratings. CS resistance information will be extended through variety guides, new variety fact sheets and other extension mechanisms.
	Limited data available on the incidence of pests, weeds and diseases – making economic	Identification of emerging pest, disease and weed issues conducted by:	Understand the effect of pests, weeds and diseases in the local	Improvement in productivity due to optimal timing of operation.	Reduced crop losses associated with pests, weeds, and diseases.

Continued…	assessment/ prioritisation difficult.	- Enterprise profiling. - Enterprise specific constraints identification. Better understanding of yield constraints.	district and the impact on economics.		

8.3 Increasing profitability through increased uptake of sound agronomic practices

This investment will contribute towards increasing 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.
- Improving nutrient management and soil health tools for the region.

Activities will be delivered in collaboration with growers, TSL, CANEGROWERS Tully and TCPSL over the period of March 2024 to June 2026.

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

INVESTMENT RATIONALE	ACTIVITY/ PROJECT	OUTPUT/ SOLUTION	SHORT-TERM OUTCOMES	MEDIUM-TERM OUTCOMES	LONG-TERM OUTCOMES
On-farm nutrient management has a key role in farm and industry sustainability, and in ensuring minimal off-site impacts occur. The SIX EASY STEPS® nutrient management program is recognised as industry best practice. The key to sustainable sugarcane nutrition is the application of the correct nutrients in the recommended quantities at the right time to the right place (according to spatial and placement needs) (Calcino et al. 2018).	Review Calcium (and Magnesium) deficiency in older ratoons.	Demonstration strip trials to showcase yield improvements and importance of assessing soil nutrient status in older ratoons; three sites throughout the district. Collect additional data (e.g., detailed data mining, soil survey of older ratoon crops under CCRSF). Develop useful extension messages and resources.	Improve (or maintain) the performance of older ratoon crops. Increased industry knowledge of good fallow management principles.	Reduce replanting frequency and help improve profitability. Improvement in productivity due to improved soil fertility and optimal timing of operation.	Increased adoption of full SIX EASY STEPS. Increased knowledge on the economics of optimal operation timing.
	Assessment of crop nutrient status.	Leaf survey: Sample 100 crops (target 1R crops vs ≥4R crops) with corresponding soil test results and nutrient application records. Analyse results and identify required follow up activities. Assess leaf disease severity at the same time.	Check on the adequacy of nutrient inputs, identify nutrient deficiencies and/or hidden hunger occurring at different spatial scales. Identify opportunities to improve balanced nutrition for enhanced productivity and profitability.	Refined nutrient management. Grower and advisor upskilling. Better focused, targeted extension efforts and/or identify future research activities.	Increased knowledge on the economics of balanced nutrition. Advisors are more confident in providing advice on nutrient management including tailored strategies for specific circumstances.
	Improved soil testing to determine crop nutrient requirements.	Inter-laboratory soil exchange program. Investigate the establishment of a local	Balanced nutrition = improved productivity/ profitability through:	Growers are adopting optimum practice for nutrient management to	Increased adoption of full SIX EASY STEPS.

Continued…		industry hosted soil testing results database. Demonstrate correct soil sampling practices and support growers to develop farm-specific soil sampling strategies.	• Greater confidence in soil laboratory performance. • Increased soil testing (# blocks and frequency of sampling). • More efficient nutrient management planning. • Ongoing monitoring of soil nutrient status and chemical constraints.	achieve balanced nutrition and increase yield.	Increased knowledge on the economics of balanced nutrition.
	Improving the use and application of mill by-products.	Understand costs/ requirements to upgrade existing/purchase new equipment for improved placement and rate control. Review NIR mill mud data to highlight if/how growers can be provided with improved information on nutrient composition to support further refinements to nutrient inputs.	Establish project grower groups. Develop extension tools/ materials for growers.	Increase grower confidence in adopting full SIX EASY STEPS nutrient discounts following the application of mill mud.	Increase distribution footprint of mill by-products (lower rates over more area and ability to distribute mill mud further distances from the mill).
	Refining nutrient recommendations following application of subsurface banded mill	To test and refine the SIX EASY STEPS recommendations for modifications to nitrogen	Increased industry knowledge of balanced nutrition.	Improvement in productivity, profitability,	Increased knowledge on the economics of balanced nutrition.

Continued…	by-products to manage the effect on yield and CCS.	application rates where the mill by-product mud is surface applied in ratoon crops. To develop a better understanding of the long-term impacts of surface applied mud at a rate of 80 wet t/ha on CCS for ratoon crops.		and sustainability due to balanced nutrition.	
	Optimising CCS	Investigate and demonstrate ripeners for improving CCS (current work). Assess natural ripening prediction. Investigate and evaluate crop finishers (desiccants).	Maintain/improve CCS (build on current work and link in with NIR). Optimised varieties (TVMG current work). Improved late season CCS (crop finishers).	Suite of information provided to growers to optimise CCS.	Increased adoption of crop ripeners, crop finishes and optimised varieties.
	Information transfer	Closer industry contact with all researchers – Teams meeting twice annually. Training for growers to get the most out of current and future technology investments. Continuation of working groups to further explore future industry opportunities and assist with translation research activities	Better understanding of the latest developments in each discipline.	Communications, products, and tools better tailored to user requirements coupled with peer-to-peer learning.	Build grower capability and capacity

8.4 Improving profitability and productivity through adoption of new technologies

Investments in this priority will increase yield and ratoonability through the 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.
- Development and release of Harvest Mate.
- Reviewing harvester front end to improve ratoonability

Activities will be delivered in collaboration with growers, TSL, Tully CANEGROWERS and TCPSL over the period of March 2024 to June 2026.

Table 4 Actions, outcomes and measures for the priority 'Improving profitability and productivity through adoption of new technologies'

INVESTMENT RATIONALE	ACTIVITY/ PROJECT	OUTPUT/ SOLUTION	SHORT-TERM OUTCOMES	MEDIUM-TERM OUTCOMES	LONG-TERM OUTCOMES
Significant opportunities to capture additional sugar yield from the paddock are available to the Tully region. The work of producing the best crop prior to harvest has already been done by the grower – however, adopting an improved harvesting practice can: • Increase cane yield by fivetonnes per hectare and 700 kg of sugar per hectare. • Increase in productivity per hectare by approximately 5%, contributing to improved supply of cane to mills and improved mill viability.	Develop workshops for growers and harvesting contractors promoting the adoption of new technologies to improve productivity.	Increased adoption of new technologies to improve productivity.	One workshop attended by 50% of area supplied by growers to the mill and 50% of harvest contractors.	Growers and harvest contractors are actively adopting and using new technologies to maximise yield and profitability.	Improvement in yield due to decrease harvesting and ratoon loss.
	Development of a harvesting decision support tool (Harvest Mate) to improve harvesting contractors' and growers' profitability.	Release of Harvest Mate with corresponding demonstration days.	30% of area farmed in the Tully region attending the workshops. Increased understanding of harvesting economics.	Growers and contractors use the tool to inform changes to operations which improve, productivity, profitability and cane supply.	Increase uptake of growers incentivising harvester contractors. Improvement in economic benefit to growers and harvesting contractors.
	Change in machinery to reduce damage to stools during harvesting and increase ratoonability.	Developimprovementsof front-end of harvester to reduce impact to ratoonability.	Industry gains an understanding of the impact of the front-end of the harvester to ratoonability.	Improved harvester front-end design.	Harvester design reduces losses associated with poor ratooning by 50%

8.5 Mill Data monitoring and analysis

This investment will contribute towards increasing yield and profitability through mill data monitoring and analysis. This will be achieved by:

- Developing protocols and decision support tools to analyse data to identify productivity constraints/ opportunities.
- Monitoring closely soil levels at mill and reporting back to industry weekly by TSL.
- Understanding costs/requirements to upgrade existing/purchase new.
- Review NIR mill mud data to highlight if/how growers can be provided with improved information on nutrient composition.

Activities will be delivered in collaboration with growers, TSL, CANEGROWERS Tully and TCPSL over the period of March 2024 to June 2026.

Table 5 Actions, outcomes and measures for the priority 'Mill Data monitoring and analysis.'

INVESTMENT RATIONALE	ACTIVITY/ PROJECT	OUTPUT/ SOLUTION	SHORT-TERM OUTCOMES	MEDIUM-TERM OUTCOMES	LONG-TERM OUTCOMES
	In collaboration with TSL utilise NIR data to identify productivity constraints/ opportunities.	Live (real time) flagging of crops yielding lower than expected; develop flags for potential yield constraints such as RSD, Pachymetra, systemic pests, crop damage (EtOH). Explore the use of NIR nutrient data to flag crops with poor nutrient content (e.g., highlighting relatively low Ca levels). Provision of NIR moisture data to improve understanding of CCS performance and assist with identifying crop ripening opportunities	Extension information for growers guiding improved management, yield and CCS	Grower capability building and developing of decision support tools.	Suite of decision support tools complemented by information packages/ workshops to improve management, yield and CCS.
	In collaboration with TSL, automate data outputs.	Automate mill data to indicate proportion of crops P, 1R, 2R etc; weighted resistance to disease x farm; poor performing crops vs mean farm yields; productivity clustering	Better farmer understanding of individual crops. Flagging of poor crops to facilitate close attention/better management.	Grower capability building and developing of decision support tools to improve productivity on the lower producing fields/sub-districts.	Suite of decision support tools complemented by information packages/ workshops to improve management, yield, and CCS.
	In collaboration with TSL, CANEGROWERS Tully	Agreed data collection and reporting protocols to permit individual crop/	Improved ability to link datasets generated by different organisations.	Development of tools that can better identify productivity constraints.	Improved integration with on farm technology (e.g., yield monitors, GPS etc).

Continued…	and TCPSL agree on data protocols	block data to be easily linked with the block fields in the TSL system (noting block numbers can change between seasons). Agreement on quantitative vs qualitative data and how different datasets can be used/ limitations.			
	In collaboration with TSL, Tully CANEGROWERS and TCPSL develop an industry portal	A single, consistent, and reliable source of data that can be imported into tools/ programs (e.g., NMP's, Harvest Mate, soil test database, GPS) or used for various analyses (e.g., constraints identification, productivity clustering).	Improved ability to link datasets generated by different organisations.	Development of tools that can better identify productivity constraints.	Platform for the future (commence with key industry datasets but allows for expansion including grower datasets). Add value to the excellent TSL resources

9 Current SRA funded research projects

Production Focus

- Implementing and validating genomic selection in SRA breeding programs to accelerate improvements in yield, commercial cane sugarand other key traits (01.10.23).
- Moth borers - how are we going to manage them when they arrive? (01.06.25)
- Development of a resistance screening method for chlorotic streak (21.03.24)
- Delivery of a pest and disease diagnostic step change for the sugarcane industry (RSD - NIR) (01.12.25)
- Delivery of a pest and disease diagnostic step change for the sugarcane industry (RSD-LAMP) (01.05.26)
- Beyond imidacloprid – Chemical and biorational alternatives for managing canegrubs (31.01.24)
- Developing an integrated device for on-farm detection of sugarcane diseases (21.03.24)
- Environmental DNA Technologies and Predictive Modelling for Rapid Detection and Identification of Sugarcane Priority Pests and Diseases (01.06.24)
- Transformational crop protection – Innovative RNAi biopesticides for management of sugarcane root feeding pests (30.06.24)
- Updating the Sugarcane Industry Biosecurity Plan (01.06.27)
- Soldier fly diagnostics, distribution, and development of an artificial diet (01.05.25)
- Viruses to aid biological control of major root-feeding pests of sugarcane (01.08.27)
- Soil specific management for sugarcane production in the Wet Tropics (23.04.24)
- Industry-wide leaf and soil survey to detect hidden macro and micronutrient constraints (31.03.24)

Milling focus:

- Australian Sugar Industry – Development of factory training modules – Phase 3 (01.03.27)
- Use of machine learning to determine the extraneous matter and billet length in cane consignments (01.02.27)
- Bagasse fly ash system performance benchmarking (30.06.24)
- Billet Quality Assessment (30.06.24)

For further information on the above listed projects select the link **https://sugarresearch.com.au/current-research-projects/**

10 Review to measure impacts

This District Productivity Plan will be updated every sixmonths with progress reports and reviewed annually to determine the next plan, track progress and measure impacts.

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