SECTION 1
OVERVIEW
4 Foreword
8 Sugar: The year in review
10 World sugar outlook 2016–17

SECTION 2
AREA ROUNDUP
19 Mossman/Tableland
22 South Johnstone/Mulgrave/Tully
24 Herbert
26 Burdekin
26 Central Region
28 Southern Region
30 New South Wales

SECTION 3
THE FUTURE
31 The big six: CSIRO’s plans for our future
33 What is the future for world-wide crop genetic diversity?

SECTION 4
INDUSTRY IN FIGURES
43 Australian production
44 Australian cane production
44 Australian sugar production
46 Australian sugarcane area
46 Australian yields over time
48 World production
48 World sugar supply and use
49 Major sugar producers
49 The international scene
49 Major importers of Australian sugar
49 World raw sugar price
50 Sugar exports by major producers
50 Sugar imports by major consumers

SECTION 5
Australians Cane Farmers 2016
51 The Australian Cane Farmers Association
54 Chairman’s comment

SECTION 6
MILLING & MARKETING
57 Milling in the Australian sugar industry
62 QSL Marketing: Focus not on fighting the old but building on the new
66 Milling and refining organisations
66 Marketing organisations and sugar terminals

SECTION 7
RESEARCH & EXTENSION
67 What’s ahead for Sugar Research Australia?
72 Driverless tractors – the future of agriculture
73 R&D organisations

SECTION 8
INDUSTRY ORGANISATIONS
74 Peak bodies
75 Government bodies

SECTION 9
TRADE DIRECTORY
76

COVER: The ongoing success of the Australian sugarcane industry is largely dependent on the resilience of the growers, the innovativeness of the researchers and the efficiency of the millers and marketers. (Images courtesy of WeedSmart, QSL and CanStockPhoto)
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WELCOME to the 2016 Australian Sugarcane Annual. And joy of joys – who’d have ‘thunk’ it! As I write prices are up around the $600 per tonne mark and have been hanging in there – which is good because the protracted Grower Economic Interest (GEI) sugar marketing negotiations are still crawling along for many growers.

We all trust that this version of the ‘Australian Crawl’ will see all involved not only hold their heads above water but also be able to stand together on the winner’s podium – an industry united!

The ‘Real Choice in Marketing’ Bill introduced by Katter Australian Party MP Shane Knuth passed through the Queensland Parliament on Wednesday, December 2, 2015 – a day that the industry may well remember for sometime – some very fondly, others less so.

And along with prices at their highest for around four to five years it’s also nice to be able to say that the 2015 harvest was back to something like the 10 year average and this coming season is heading towards something a little better.

And again being average is not so bad when we consider some of the extremes we have seen with weather and prices over the past few years.

In the last Annual I observed that although the Trans-Pacific Partnership (TPP) free trade agreement (an agreement which took six years to reach) was not so good for sugar, at least it was not too bad. I note with interest but not necessarily with surprise that one year on we are being advised that the Federal Parliament’s Treaties Committee will hear from Government witnesses at the final hearing into the TPP in early November 2016 – seems time doesn’t fly Canberra.

For the first time in over 20 years, Australian sugar has been granted guaranteed new access into the US (although still only for a limited tonnage); we now have tariff elimination and levy reduction for high polarity sugar into Japan; and there is elimination of the tariff on refined sugar into Canada. You will note in our ‘Industry in Figures’ section that our exports to the US rose, they fell to Japan and they were non existent to Canada.
Knockdown and residual weed control from a herbicide that stays where you put it

VALOR® 500WG is the new herbicide for cane growers that stays where you put it. It can either be used with knockdown herbicides to improve broadleaved weed control, or at higher rates for residual control.
YCS (whatever it is) is still with us

As you would expect in an ‘Annual’ we take a look at the year that’s just past. In many ways it’s déjà vu all over again – particularly when it comes to YCS (Yellow Canopy Syndrome as if you weren’t all too aware).

And if you think that there’s also a bit of déjà vu about the above paragraph you’re right – it was in the 2015 Annual.

In 2015 we noted that the search for the cause of YCS – first recognised in early 2012 near Cairns – was still ongoing. It has now been found in all sugarcane growing areas from Maryborough in the south to far north Queensland.

Depending on the degree of YCS symptoms experienced, crop growth can be compromised with potential impacts on final yields – significant losses have been experienced in some impacted areas.

A number of factors have been ruled out by SRA as potential causes of YCS and we now know that YCS is associated with a problem in translocation of sugars out of the leaf and water movement within the sugarcane plant. In combination, these factors reduce photosynthesis, movement of photosynthate and crop performance.

With YCS expanding in its geographical distribution and the subsequent impact the condition is having on crop yield, SRA is continuing to give YCS related research an extremely high priority in 2016–17.

There will be a strong emphasis on water and nutrient translocation, development of a diagnostic test, identification of the causal agent of YCS, genetic variability for YCS impact, abiotic/environmental factors that trigger symptom expression, and potential management strategies. I’m sure you will join with me in wishing them good luck with all of that!

I’m sure you will find further examples of ‘more of the same’ as you take a short trip down memory lane with a few of the ‘industry’ significant issue of the past 12 months.

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November 2015
Sugar giant Wilmar – Australia’s largest sugar producer – says securing an interim agreement with 22 individual growers is a ‘breakthrough’ to the current impasse about how export sugar is marketed.

The Australian Sugar Milling Council (ASMC) puts forward a compromise deal aimed at avoiding what they feels is unnecessary and damaging marketing re-regulation.

Rats reportedly cause $5 million damage in north Queensland’s Herbert cane district this season

December 2015
The Sugar Industry (Real Choice in Marketing) Amendment Bill 2015, passed through the Queensland Parliament on Wednesday 2 December 2015. The Bill was introduced into the Queensland Parliament by Katter Australian Party member Mr Shane Knuth.

Liquid Fuel Supply (Ethanol and Other Biofuels Mandate) Amendment Act 2015 assented to in State Parliament

At the Paris climate summit, a commitment of $58 million in funding from the Reef Trust spearheaded a suite of measures by the Federal Government to continue to build the health and resilience of the Great Barrier Reef.

A growing number of cane farmers are going off Ergon Energy’s electricity grid and going completely solar because of high electricity prices.

Queensland Government's Rural Debt and Drought Taskforce calls for public submissions.

January 2016
ASMC announces January 6 that processing of the Queensland sugarcane crop has been completed with the Tully sugar mill in Far North Queensland completing its record crush of 2.898 million tonnes.

The first commercial crop of sunflowers in the Mackay region harvested. Simon Mattsson – a cane farmer and a Nuffield Scholar investigating soil health – believes the process will improve soil quality on his property.

Harvesting begins on the Mackay region’s second ever commercial rice crop. Agronomy business Farmacist says rice was an ideal cash crop to be grown on cane farms in between cane crops.

February 2016
Sugar values set to rise as global production goes into deficit for first time in five years.

Mackay growers are ‘anxiously’ waiting to sign next year’s contracts with milling company Wilmar. Wilmar spokesperson says the company wouldn’t sign contracts with growers until it understood the implications of the Real Choice in Marketing bill.

Premier Annastacia Palaszczuk announces the government to develop a new biofuel industry.

March 2016
Sugar prices top the 16 cents a pound for the second time in a week reflecting a worldwide shortage of sugar – analysts are confident the price rise will continue.

SRA reports a sugarcane crop near Bundaberg is displaying symptoms of YCS – this follows a recent report of the syndrome in the Maryborough mill area.

Queensland’s agricultural industries, Natural Resource Management bodies and conservation groups sign a Memorandum of Understanding to work together to help protect Great Barrier Reef.

Farmers meet with key Australian Government Ministers as part of the review of the proposed ‘backpacker tax’.

April 2016
A project team headed by Scott Williams of Scott Williams Consulting has been appointed to undertake the first performance review for SRA

Emerging Technologies in a Global Industry was the theme at the annual Australian Society of Sugar Cane Technologists conference in Mackay.

Coral bleaching on the Great Barrier Reef is ‘major and significant’, federal Environment Minister Greg Hunt says.

May 2016
ACFA Annual General Meeting in Cairns

Growing more with less – Federal Government funds improved nitrogen efficiency R&D in sugar industry.

Sugar Research Australia (SRA) has announced its research investment agenda for 2016–17 which is designed to deliver R&D outcomes that benefit to growers and millers.

June 2016
Tweed cane growers face a lengthy wait before the true cost of the damage done by recent wild weather is revealed. The start of the region’s cane harvest has also been delayed.

SRA announces new cane varieties releases and Sensors for improved harvesting feedback feasibility study:

New economic report says Genetically Modified crops have increased farmer incomes by $1.37 billion in Australia since 1996 while drastically cutting greenhouse gas emissions,
Queensland Government buys Cape York cattle station in a bid to stem sediment pollution flowing into the Great Barrier Reef.

**July 2016**

Wilmar Sugar outlines proposed 2017 agreements and associated arrangements for growers supplying its Plane Creek, Proserpine, Burdekin and Herbert mills.

High world sugar prices are resulting in a revival of cane farming on Queensland’s fast-growing Sunshine Coast.

National Farmers’ Federation welcomed the appointment of the new Turnbull Ministry – in particular welcoming back Deputy Leader Barnaby Joyce and his Assistant Ministers Anne Ruston and Luke Hartsuyker.

**August 2016**

Crushing again halted due to widespread rain.

Maryborough region is the first cane growing district in Queensland to reach agreement on a new cane supply agreement since the change in sugar industry legislation.

SRA research program looking to reduce losses associated with mechanical harvesting estimated to cost the Australian sugarcane industry $150 million per year.

Negotiations between Wilmar and QSL break down reportedly because conflicts over the storage and handling of sugar could not be resolved.

**September 2016**

Nine hundred millimetres of rain falling in three months has caused havoc for the cane harvest in Tully and there have been similar problems for most other cane growing regions in Queensland.

BOM reports Queensland has experienced its second wettest winter on record, and almost broke the record for warm overnight temperatures.

Queensland farmers have welcomed the board appointments of the eight local management irrigation schemes by the State Government.

**October 2016**

National Farmers’ Federation file its submission to the Senate inquiry into the ‘backpacker tax’ bills.

The Federal and Queensland Governments’ 2015 report card on the health of the Great Barrier Reef (GBR) shows many positive long term improvements for our agricultural industries right along the Queensland coast.
Higher demand to support world sugar prices in 2016–17

The world indicator price for raw sugar (Intercontinental Exchange, nearby futures, no. 11 contract) in 2016–17 (October to September) is forecast to increase by 19 per cent to average US19 cents a pound. This forecast price increase mainly reflects a significant decline in world sugar stocks. World sugar consumption growth is expected to be faster than production growth for the second year in a row. This is expected to further reduce world sugar stocks to their lowest since 2011–12. The world stocks-to-use ratio for sugar is expected to decline by 5 percentage points in 2016–17 to 36 per cent.

In 2015–16 the world indicator price of raw sugar is estimated to average US16 cents a pound, compared with US13.4 cents a pound in 2014–15. The increase in world sugar prices in 2015–16 reflects an estimated 8 per cent fall in world stocks because of reduced production in all major producing countries except Australia.

World sugar production to rise in 2016–17

World sugar production is forecast to increase to around 177 million tonnes in 2016–17, from an estimated 174 million tonnes in 2015–16. Area harvested for both cane and beet is expected to increase in response to relatively high sugar prices. Increased yields are also expected, assuming a return to average seasonal conditions following adverse seasonal conditions in some major producing countries in 2015–16.

Forecast higher sugar production in Brazil, Europe, China and Australia is expected to more than offset forecast declines in India, Thailand and the US.

In 2015–16 world sugar production fell by 4 per cent to an estimated 174.2 million tonnes. This was the lowest since 2010–11, when around 166 million tonnes of sugar was produced. Reduced beet planting in the European Union because of relatively low sugar prices at the time of planting and adverse seasonal conditions in India, China and Thailand largely contributed to lower production in 2015–16.

Brazil to increase cane allocation for sugar production

In 2016–17 (April to March) sugarcane crush in Brazil is forecast to increase by 3 per cent to 687 million tonnes, reflecting an expected increase in area harvested and assumed higher cane yields. Harvested area is expected to
increase by 2 per cent in 2016–17 to around 11.1 million hectares because of a large carryover of uncut cane from the 2015–16 season. Cane harvest in 2015–16 ended earlier than expected because cutting was disrupted by heavy rains towards the end of the season. Cane yields are assumed to be 1 per cent higher because dry weather during harvesting in 2016–17 is expected to improve yield potential.

Brazilian sugar production is forecast to be 39.6 million tonnes in 2016–17, up from 38.1 million tonnes in 2015–16. This forecast increase is based on higher cane production and increased cane allocation to sugar production encouraged by an expected increase in the relative price of sugar to ethanol.

As at 1 August 2016, sugar mills in Brazil’s south-central region (which produces around 90 per cent of the country’s sugar cane) allocated around 45 per cent of the already crushed cane in 2016–17 to sugar production, compared with 41 per cent by the same date in 2015.

In 2013 the Brazilian Government raised the mandatory blending ratio of anhydrous ethanol with gasoline from 20 per cent to 25 per cent in response to a request from the ethanol industry. This request followed two years of continuous decline in domestic ethanol consumption and relatively low ethanol prices.

Amid falling world crude oil prices, the government raised the blend ratio by a further 2 per cent to 27 per cent in 2015 to encourage the consumption of ethanol. Sugar mills in Brazil responded to these increases by raising the share of cane allocated to ethanol production from 50 per cent in 2012–13 to 59 per cent in 2015–16.

Production to increase in China and Europe in response to higher prices

Chinese sugar production is forecast to rise by 11 per cent in 2016–17 (June to May) to 10.5 million tonnes. Cane production is

FIGURE 3: Cane and sugar production and allocation, Brazil, 2004–05 to 2016–17
forecast to be 87 million tonnes, up from 82 million tonnes in 2015–16. This reflects an estimated 2 per cent increase in cane and beet area to around 1.44 million hectares. Increased plantings were in response to higher sugar prices. In 2015–16 the purchase price for cane was set at 440 yuan a tonne, up from 400 yuan a tonne in 2014–15. Average cane yields are assumed to be 4 per cent higher in 2016–17 as a result of a shift by growers to planting genetically modified crops that have higher cane yields.

EU sugar production is forecast to increase by 13 per cent in 2016–17 to 17 million tonnes, driven mainly by an expected 9 per cent rise in beet production to around 103 million tonnes. The expected increase in beet production is based largely on an estimated 8 per cent rise in area to 1.4 million hectares and an assumed 1 per cent increase in average beet yields. In 2015–16 beet planting declined by 15 per cent to around 1.3 million hectares in response to relatively low prices at the beginning of the season.

Sugar production in Eastern Europe is forecast to reach a record 12 million tonnes in 2016–17, up from 10.5 million tonnes in 2015–16. This forecast reflects an increase in beet planting and an assumed rise in average beet yield, following dry weather in 2015–16.

In the Russian Federation, sugar production is forecast to rise by 7 per cent in 2016–17 to a record 6 million tonnes, driven mainly by an estimated 3 per cent increase in beet planting. Average beet yields are assumed to be lower after record yields were achieved in 2015–16. Sugar production in Ukraine is forecast to increase by 32 per cent in 2016–17 to 2.1 million tonnes. Sugarbeet plantings are estimated to increase by 20 per cent and the average beet yield is assumed to recover by 6 per cent in 2016–17.

Decreased production expected in Thailand, India and the US

In Thailand, sugarcane crush is forecast to be 90.3 million tonnes in 2016–17, down from 94 million tonnes in 2015–16. Cane area harvested is expected to remain largely unchanged at 1.77 million hectares. But average cane yield is assumed to be slightly lower. Based on lower cane production, Thai sugar production is forecast to fall by 3 per cent in 2016–17 to 9.8 million tonnes.

In 2016–17 sugar production in India is forecast to fall by 8 per cent to around 25.1 million tonnes, reflecting an expected 5 per cent fall in cane production.

Cane crush in India is forecast to be 328 million tonnes in 2016–17, down from around 346 million tonnes in 2015–16. This is the result of an estimated 4 per cent decline in the expected area harvested and a 1 per cent decline in assumed average cane yield. Reduced monsoon rains in 2015 negatively affected yield potential in the 2015–16 season.

Sugar production in the US is forecast to decline by 2 per cent in 2016–17 to around 8 million tonnes. Area planted to cane and beet is estimated to remain largely unchanged at 830,000 hectares. Beet sugar production is forecast to increase slightly to a record 4.6 million tonnes, but cane sugar production is forecast to fall by 6 per cent to 3.3 million tonnes, based on assumed lower cane yields.

World sugar consumption to grow in 2016–17

World sugar consumption is forecast to increase by 2 per cent in 2016–17 to around 184 million tonnes, reflecting world income and population growth. Rising demand from food processing industries in countries such as India, China and Indonesia is expected to support sugar consumption growth in 2016–17. Higher consumption is forecast for all the world’s major sugar-consuming countries except for Brazil.

World sugar exports to rise in 2016–17

World sugar exports are forecast to be 60 million tonnes in 2016–17, up from around 58 million tonnes in 2015–16. This is largely based on an expected increase in sugar production in Brazil and on Thailand’s carry-over stocks increasing exportable supplies.

Strong import demand from the US and Indonesia is expected to support higher exports from the major exporting countries. Brazilian sugar exports are forecast to increase by 9 per cent in 2016–17 to reach 30.5 million tonnes, reflecting an expected increase in Brazil’s sugar production and strong import demand from Indonesia.

Sugar exports from Thailand are forecast to reach a record of around 9 million tonnes in 2016–17, up from 8.6 million tonnes in 2015–16. This forecast is based on increased exportable supplies and higher import demand from the US and Indonesia. Although domestic production is forecast to decline, carry-over stocks from 2015–16 are expected to increase supply available for export.

EU sugar exports are forecast to remain at around 1.4 million tonnes in 2016–17, the maximum permitted under its World Trade Organization obligations. Sugar imports into the European Union are forecast to fall by 2 per cent to 3 million tonnes because of higher domestic production.

Sugar exports from India are forecast to almost halve in 2016–17 to 1.5 million tonnes, reflecting the forecast decline in domestic production and expected increase in domestic consumption.
Sugar imports into China are forecast to decline by 6 per cent in 2016–17 to 6.3 million tonnes, reflecting forecast higher domestic production. Sugar imports into Indonesia are forecast to increase by 10 per cent in 2016–17 to 4.3 million tonnes as domestic sugar consumption increases faster than production.

**World sugar stocks to decline in 2016–17**

World closing stocks of sugar are forecast to fall by 10 per cent in 2016–17 to 67 million tonnes, reflecting forecast world consumption exceeding production for the second consecutive year. If realised, forecast world stocks will be the lowest since 2011–12, when stocks were 64.4 million tonnes. The world stocks-to-use-ratio is expected to be 36 per cent in 2016–17, down from 41 per cent in 2015–16.

**Returns to Australian sugar growers to increase in 2016–17**

Australian sugar production is forecast to increase by 4 per cent in 2016–17 to 5.1 million tonnes. This forecast is largely based on an expected 2 per cent rise in cane production to around 36 million tonnes. Area planted to cane is estimated to increase by 3 per cent to 393,000 hectares, driven by favourable sugar prices. Average cane yields are assumed to be 1 per cent lower, with hot and dry conditions from the El Niño weather pattern in 2015–16 negatively affecting yield potential.

In 2016–17 Queensland Sugar Limited, a major marketer of Australia’s raw sugar exports, forecasts its gross harvest pool return to be $509 a tonne (International Polarity Scale), a 33 per cent increase from $383 a tonne in 2015–16. At this forecast value, the pool return is expected to be the highest since 2009–10.
When Australian cane growers received $511 a tonne.

Based on the current forecast price, the average mill-gate return to Australian cane growers is expected to increase by 19 per cent in 2016–17 to around $50 a tonne of cane cut for crushing.

Reflecting higher production, Australian sugar exports are forecast to be around 4.1 million tonnes in 2016–17, 3 per cent higher than the volume shipped in 2015–16.

Based on a forecast increase in world sugar prices and export volume, the value of Australian sugar exports is forecast to increase by 21 per cent in 2016–17 to $2.3 billion.

Drawn from World Sugar Outlook ABARES Agricultural commodities - September quarter 2016.
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Despite the challenges for Australian manufacturing, Big Tyre has been breaking new ground. This includes the design and manufacture of solid mining wheels for domestic and international clients with exports currently going into China and South Africa. With the success in this area, Big Tyre is the preferred supplier to large multinationals including Caterpillar Global Mining and other major mining equipment manufacturers.

Since the company’s inception in 1954, when it was known as Vacu-lug, Big Tyre has maintained a strong focus on the agricultural sector. This began with repairing and retreading tyres and to this day it still remains an economic solution for some tyre types and sizes. For those tyres, that are now best bought brand new, the Big Tyre on-line store provides the most comprehensive catalogue of new tyres in Australia complete with prices, photos and tyre specifications. Even without car and 4WD tyres, which may be added once fitting and wheel balancing services have been arranged throughout the country, Big Tyre lists almost 4,000 different tyres that they can supply throughout the country on www.bigtyre.com.au

Over the last 20 years, Big Tyre’s main workload has shifted to the reconditioning of rubber tracks and the rebuilding of the undercarriage wheels. Big Tyre has reconditioned over 1,000 tracks and nearly 5,000 undercarriage wheels and it guarantees the results to ensure its clients get the most out of their products. In recent years, Big Tyre has led the
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Big Tyre’s expertise in the tyre and track industry hasn’t gone unnoticed by the leading manufacturers either. Both Continental and Firestone have awarded Big Tyre with the Australian distribution rights for their high quality agricultural tracks, which Big Tyre imports directly from the USA and Japan. Continental and Firestone represent two of the leading three brands and enable Big Tyre to be an effective one-stop shop for tracks and undercarriage wheels. Big Tyre holds new tracks in stock at its Toowoomba factory for Caterpillar, John Deere and Case tractors in all common sizes to ensure that wherever possible farmers can have their needs met without delay. This is backed up by a supply of service exchange mid-rollers and drive wheels to suit most models to enable a rapid turn around and to minimise down-time for farmers.

In an age of global economic uncertainty, it is refreshing to see an Australian manufacturer not only surviving, but leading the charge and seeking to provide the most economic and high quality solutions required to meet the needs of Australian farmers.

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OVERALL COMMENT

The Area Roundups are drawn from reports supplied by growers over the past year. As per usual the weather has been tough – but this time around they have had to also contend with the ‘Real Choice in Marketing’ negotiations.
Mossman/ Tableland

By Gerard Puglisi, Northern Director

Spring 2015

The Mossman Mill completed two crushing seasons within the same year. The 2014 crush finished in mid-January 2015 and the 2015 crush on November 26, 2015. The yields for the 2015 crush were pleasingly up by seven per cent with a Mill area average of 87.7 tonnes per hectare.

With Mossman having a November finish and some favourable weather, most farmers completed their fertiliser programs and were well over half way through their spraying programs.

Crops in the Mossman and Tablelands regions looked very good and if weather conditions remained favourable, the signs were there for another good season in 2016.

Summer 2016

2016 is shaping to be another good year and through January most of the northern region had ideal weather with good growing conditions. Most of the rain received was at night with very hot and very humid days. These favourable conditions also enabled farmers to continue with their weed management programs.

Autumn 2016

Mossman region had had a relatively dry start to the year with the first three months of this year receiving around 833 mm of rain. That has now changed with the close to 400 mm of rain falling in the region in late May. With the recent rain and at times wild winds, there are now large areas of lodged cane and the chance of finding straight plants has been severely reduced. These areas of lodged cane are wide spread and I expect it to have some effect on the harvestability of the 2016 crop. The rain event was a week before the scheduled start of Mossman Mill on May 30 which was delayed until June 6. Then from June 13 to 20 100 mm of rain fell and brought the crush to a standstill.

Winter 2016

The 2016 crush has been moving on and we don’t have a lot to show for it. Another wet period in July and continued mechanical issues have seriously affected the crush this year.

In regards to planting there has not been much done to date due to the unseasonal rain. If current weather predictions are correct there will likely be a decreased planting carried out in 2016 – which will have an effect on next year’s crop.

October/November 2016

After another wet period at the end of September and early October, we can only hope things will finally start settling down to allow the industry to have some sort of orderly finish.

At the end of week 16, Mossman Mill was at 64 per cent cut of the total 1,322,000 tonnes to be processed for the Mossman Mill. Overall the mill is now cutting 107.3 per cent of the original estimate.

Week 16 also saw a 15 year Mossman Mill record being broken with more than 52,000 tonnes passing through the rollers in a single week.

If dates/location do not suit please advise of your requirements to enable future planning. Courses can be arranged elsewhere if required.

Accreditation valid for five years • Please call or check web site for information on courses and schedules

Client feedback:

Excellent course. Easy to take in and understand – C Webster.

Very knowledgeable and well structured – C Lay.

Enjoyed presentation. Was engaged during the whole class – C Potter

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within the factory have reduced in recent weeks but the persistent rain events have added to our already high lost time.

The original forecast of planted area has been reduced. I feel that there may be a limited amount of weed control and final passes for closing in for a lot of the cane that has been planted. This could have an effect on next year’s crop.

With planting nearing completion in the region, some farmers are shifting focus to starting their fertiliser and spraying routines.

On September 20 Carla Keith from QSL gave a presentation to farmers at the Mossman Bowls Club as part of her Regional visit where Mossman farmers had a chance to receive an overview of QSL’s current activities.

I would like to personally thank Carla for taking the time to visit and talk to the local farmers in the Mossman region.

All in all, the Mossman and Tableland regions are not in bad shape for next year’s crop when compared to other regions. We are relying on weather conditions being favourable and mill reliability continuing to improve, for the Mossman Mill to finish in a reasonable timeframe and for a good chance of a decent crop through the rollers in 2017.

### NORTHERN REGION 2015 HARVEST SUMMARY

<table>
<thead>
<tr>
<th>Mill area</th>
<th>Tonnes</th>
<th>Tonnes per hectare</th>
<th>Average CCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tableland</td>
<td>382,000</td>
<td>88.9</td>
<td>14.36</td>
</tr>
<tr>
<td>Mossman</td>
<td>1,211,000</td>
<td>90.0</td>
<td>12.91</td>
</tr>
<tr>
<td>Mulgrave</td>
<td>1,067,000</td>
<td>87.4</td>
<td>12.77</td>
</tr>
<tr>
<td>South Johnstone</td>
<td>2,077,000</td>
<td>92.2</td>
<td>11.82</td>
</tr>
<tr>
<td>Tully</td>
<td>2,898,000</td>
<td>100.8</td>
<td>12.83</td>
</tr>
<tr>
<td><strong>Northern Region production:</strong> 7,635,000 tonnes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## South Johnstone/ Mulgrave/Tully

**By Michael Camilleri, Northern Director**

### Spring 2015

For me there were two memorable highlights for the sugar industry in spring 2015. Locally, South Johnstone mill had a record crush. The cane estimate started at 74 tonnes per hectare and increased to a whopping 92 tonnes per hectare with some showers to enable the extra growth for the 2015 crop. The showers were also good for the upcoming 2016 crop which was looking very promising.

Unfortunately, the wet weather interferences meant the mill had experienced minor crushing delays and this pushed the season into the Christmas period.

The other highlight, on a state-wide scale, was the passing of the Sugar Industry (Real Choice in Marketing) Amendment Bill 2015 through parliament. This was an encouraging step for growers looking to regain confidence in their industry. Unfortunately, the millers did not look upon the bill as favourably.

### Summer 2016

The crop appears to be in good shape except for the late-cut cane, due to the late 2015 harvest finish. Weather has been hot for much longer than usual but we have received just enough rain from the regular storms to keep things moist. All in all, the crop should be similar to last year’s record tonnage of 92 tonnes per hectare.

### Autumn 2016

The season in the north just got going when over 100 mm rainfall stopped the Mulgrave and Tully mills, with South Johnstone still to start on June 21. The 2016 estimated crush is 1.63 million tonnes of cane at 84 tch/h for South Johnstone 1.3 million tonnes of cane for Mulgrave mill. Substantial rainfall in the month of May was been good for the crop and good for the water table and it got all the springs.

### Winter 2016

It has been a slow start to the season with all this rain. In keeping with tradition, Innisfail had another wet show but it wasn’t enough to deter the crowds. There is a general feeling of disappointment across the district with such a promising crop and high sugar prices thwarted by rain. But we are still hopeful to remove the crop by early December.

Some angst has been expressed among growers. MSF Sugar and QSL have written an On-Supply Agreement which is ready to work but now the process is being held up because QSL needs approval from the BIM (Bundaberg Isis Mackay) millers. This delay is preventing growers from pricing and growers are keen to take advantage of the current high sugar prices.

### October/November 2016

The year started off positive with a good crop and a lot of positive events like the Innisfail Show and Field Day, QSL Breakfast and March of the Cane Beetles. It is fantastic to see the great involvement and participation of the cane-growing community.

We have had a lot of wet weather and that has hampered both harvesting and farming operations. It has also reduced the value of the crop, watering down the fabulous sugar prices which have been gradually but continuously rising. As we can’t predict the market, only time will tell where it heads next and all we can do is act accordingly.

This year the South Johnstone mill has seen a number of upgrades but there was still a major breakdown to the South Johnstone number-one
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mill. You can bypass the other mills but you can’t bypass number-one, so that was a major setback.

October/November 2016

The crop continues to grow and get bigger with all the moisture, which puts more pressure on the mill. There is also a heavy rat infestation in the area, further wreaking havoc with the CCS. Growers are still concerned that perhaps we won’t get the crop off in time.

After the introduction of the Sugar Industry (Real Choice in Marketing) Amendment Bill 2015, MSF Sugar and QSL have finally come to agreement with Grower Choice Marketing. It is exciting for us to have a working model of Grower Choice Marketing and it is a bit of a milestone because we haven’t seen this in the past. Growers will become more marketing savvy and will choose a marketer by performance, not by default. Another positive is that marketers are working closely with growers, marketing their product to the growers and not just to the mills.

This year has been filled with stops and starts but that is the life of a farmer.

Herbert River region

■ By Carol Mackee, Herbert Director

Spring 2015

Crushing ended in the Herbert with 4.49 million tonnes of cane crushed through Victoria and Macknade Mills. A lot of extra land went into production with cane being planted on the failed MIS Scheme land bought back by farmers and Wilmar.

Overall the district was suffering with extremely dry conditions with Stone River, Abergowrie and Long Pocket being the worst hit areas. There were one or two storms but unfortunately, you couldn’t see where the rain fell after a couple of days.

There were no ‘stand out’ highlights for 2015 apart from the Sugar bill passing through parliament – at least farmers will continue to have a choice as to who markets their sugar.

Summer 2016

It looks like the wet season has been delayed in the Herbert, or is it just that in previous years the wet season was at the end of February and all of March and April? There have been quite a lot of storms around the district where some areas have done well and other areas have missed out, receiving only one or two mm of rain. The Coastal strip is where the rain seems to be falling and in some of the areas, the cane in this belt has started to lodge.

Yellow Canopy Syndrome has started to flare up, impacting Hawkins Creek, Macknade, Forest Home and Abergowrie.

Autumn 2016

Having received late rains over the whole district with varying amounts of rainfall, the weather has now taken a turn for the better with a cold snap and drier conditions – let us hope it will last.

Rain stopped the crushing in the Burdekin and Mackay areas, and the Sarina and surrounding areas seems to have been the recipient of very strong winds as the cane looked like fiddlesticks, every which way. Planting has also stopped.

Winter 2016

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and dryer conditions. The crop looks like it is cutting well over estimate.

Owing to the prolonged rainfall, the season looks like going into December.

**October/November 2016**

Conditions in the Herbert mid-October were very dry and windy. The winds did bring in some much-needed rain; although it has been patchy with falls varying over the district. As always, rain is needed for the plant cane but it has also hampered the harvesting which had stopped in some areas and the crushing finish date has been put back to the end of November.

A Mapping project is being carried out in the district by University of NSW with ground breaking technology – Electro Magnetic 4-2-1 and Gamma Ray Spectrometer; which, amongst other things, has the capacity to measure radiation within the soil. This will be started in a few weeks’ time.

Nick Heath of WWF attended the HCPSL Annual General Meeting in Ingham. This meeting was quite heated as farmers feel that agriculture along the coast will be shut down over the reduction in nitrogen of up to 80 per cent. Some farmers walked out. Overall Nick said that he was impressed with the innovation that farmers are showing with water quality and precision agriculture in the Herbert.

The meeting reported the breadth of research being done in all areas of sugarcane: Plant breeding, pachymetra and harvesting to name some of the work in progress.

The Ingham area is cutting around 10 per cent above estimate, possibly due to the late rains and the delayed finishing date could be put back even further if the rain keeps coming. From Tully North, farmers are quite worried about getting their crop harvested. We all need good conditions to finish off the year.

Wilmar reported late October that the Herbert mills brought cleaning and maintenance days forward to take advantage of a forced wet weather stop.

The harvesting sector worked tirelessly to get cane supply back to normal levels after the rain event.

Average weekly CCS levels are sitting at 12.75 units.

**Burdekin region**

**Spring 2015**

Drought was declared in the Burdekin Shire – it joined much of the rest of the state. With no wet season for 2015, the declaration did not come as a surprise to anyone.

All four Burdekin mills have finished the 2015 season, crushing a total of 8,278,000 tonnes of cane in a 22 week season. Only 2.5 hours of time was lost to wet weather and the average seasonal ccs for the district was 14.92.

The 2016 crop is predicted to be down on the current crop due largely to an expected reduction in area under cane. As the water allocations are currently inadequate for the crop’s requirements, the hope is that there will be rainfall during the coming ‘wet season’ to provide inflows into the dam and underground supplies.

**Autumn 2016**

Some varieties have begun flowering and early ccs has proven to be patchy. The weather has continued to be hotter and more humid than we would expect for this time of year. The Burdekin crop estimate has been completed and looks to be higher than first anticipated, with early plant cane also looking promising.

**October/November 2016**

Wilmar reported on October 21, 2016 that field conditions in parts of the Burdekin region have been challenging due to heavy rain. Despite this, growers and harvesting contractors have done an excellent job of maintaining cane supply.

The Burdekin mills had crushed a total of 5.55 million tonnes of cane, putting the district at the 63 per cent mark. Unfortunately, CCS levels were down slightly due to the rain.

**Central Region**

**Spring 2015**

Mackay Sugar finished crushing November 27 processing five million tonnes with a PRS of 14.6 units – the season suffered from a failed wet season. October to November saw most...
areas receive some much needed rain. This helped in the short term but much more was needed to bring the crop on for 2016. Most of the cane area was under supplementary irrigation. There was no subsoil moisture and the ongoing dry was making efficient and effective irrigating very difficult – we don’t grow much cane under such adverse conditions.

**Summer 2016**

The New Year started off with varying amounts of rain fall. It was enough to help crops to keep going. The rain event of early February ranged from 100 to 350 mm. These events were storm rain and were not received uniformly across the area. Kinchant Dam is at 40 per cent and irrigators are looking for rain to have the storage full for the upcoming water year. Limitations have been placed on licences from creeks and tributaries in the area also.

**Autumn 2016**

During the first week of crushing, the area received falls of rain from 40–60 mm. Although it affected the start of harvesting, it was welcomed to help support the 5.4 million tonne estimate for this season. The weather has been very warm up to the start of June. A lot of early planting has taken place with good germination. The rain was very welcome on top of ideal planting conditions.

**Winter 2016**

Mackay Sugar has all mills operational after two wet weather interruptions. Over 120 mm in June and again in July stopped operations for almost four weeks. Sugar cane quality has been affected because of the wet conditions with high levels of dirt and extraneous matter.

The long term weather forecasters are predicting a wetter than average period coming into the last part of the year. All involved with the crushing are hoping that the late planting and the harvest can fit in around it all as well.

**October/November 2016**

In early October, Mackay Sugar approached the 60 per cent mark with 3.3 million tonnes of cane being processed. The PRS was 12.6 for the season which is well down on the usual average. Weekly average was above 13.5 PRS but it will eventually still leave the average quite low for the season. The tonnes of cane produced have improved. This is the effect of more than usual rainfall received during the season. This rainfall has impacted on the finishing date which will be in late December, should no adverse weather conditions effect harvesting. Farmers are identifying blocks for standover, but the improved price should be an incentive to try and take as much of the crop off as possible.

The mill estimate for the Mackay Area still stands at 5.6 million tonnes of cane. The
estimate has been steadily increasing, but has plateaued as conditions have dried out.

The incident involving the Marian Mill boiler initially effected the capacity of Mackay Sugar to crush the crop. But wet weather allowed the repair to fit in behind wet weather stoppages. The weather has eventually become a greater concern regarding the finishing date of crushing. The mill performance of Marian has been disappointing. Efforts have been made to overcome a lot of the issues and have eventually had some pleasing performances.

Racecourse has been operating well and Farleigh was the first mill to process a million tonnes some time ago.

Early this year Representatives from Mackay Sugar, Canegrowers Mackay Area Committee and the ACFA met to discuss going forward after the ‘Real Choice in Marketing’ legislation.

Mackay area growers are also committed to QSL through to the 2018 season via the rolling Cane Supply and Processing Agreement and the Raw Sugar Supply Agreement.

Mackay Sugar maintains its position of support for QSL and, accordingly, on 18 December 2015 committed to continue marketing its sugar through QSL in the 2018 season. Mackay Sugar intends to remain with QSL and, together with Canegrowers and ACFA, will work with QSL to address supply issues created by the changing conditions within our sugar industry.

QSL provides growers with security around the marketing of their sugar, which ultimately creates greater stability within their farm businesses.

It is expected that the legislation will have no immediate impact on Mackay Sugar and its growers; it will remain business as usual. There are no immediate plans to open the supply contract for renegotiation. Discussions regarding operational needs including any necessary annexure adjustments will continue to occur as needed and as has occurred in the past.

As this year has gone on it is becoming evident that the QSL and STL will be a greater concern than initially thought. The manner in which business has been conducted, seems to be under threat, going forward. At meetings early in the year, these issues made people realise that marketing has the potential to affect their businesses much more than the past year performances.

Blackriver continues to acquire further properties to invest in expanding their sugar cane growing operation in the Mackay Region. When their aggregation is fully developed it is anticipated that 550,000 tonnes of cane will be supplied to Mackay Sugar.

The weather has made this year difficult in the field sector. There hasn’t been a record wet, but the timing of rain has made harvesting and planting difficult. The late finish has the potential to affect the crop for next year.

The rule of management is that cane harvested after the second week of November is identified as plough-out for fallow. This year some of that area harvested will need to be considered for ratoons. A lot of growers have not ploughed out any area. If the season ends up been too wet and field damage occurs, their exposure to risk won’t be as great. With the price of sugar looking good for next year all efforts will be made to capture as much of it as possible.

As of October 21 Wilmar reported that Proserpine Mill has had a good week in terms of crushing rates and mill reliability, with average daily throughputs of 15,000 tonnes. The harvesting sector has also had a good run due to dry field conditions.

### CENTRAL REGION 2015 HARVEST SUMMARY

<table>
<thead>
<tr>
<th>Mill area</th>
<th>Tonnes</th>
<th>Tonnes per hectare</th>
<th>Average CCS</th>
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</thead>
<tbody>
<tr>
<td>Proserpine</td>
<td>1,671,000</td>
<td>77.8</td>
<td>14.4</td>
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<tr>
<td>Mackay Sugar Mills</td>
<td>5,056,000</td>
<td>73.2</td>
<td>14.14</td>
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<tr>
<td>Plane Creek</td>
<td>1,285,000</td>
<td>74.5</td>
<td>15.36</td>
</tr>
<tr>
<td><strong>Central Region production</strong></td>
<td><strong>8,012,000</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Southern Region

**Spring 2015**

Late November saw fantastically heavy rain and wind in thunderstorms which upended lateral moves, twisted low pressure booms and snapped of power poles in the Cordalba area. The region has seen runs of these weather events lasting about a week. The Maryborough harvest was also struck by these storms and a few unlucky people were stuck with wet paddocks and mills getting anxious to close.

Spring planted paddocks suffered much erosion due to the intensity of rainfall. Peanut and soybean planting was either done and dusted or being worked on flat-out. The growing conditions seem to be going to be good; a little dry but with reduced disease.

### Summer 2016

We have had some great rain for sugarcane with 300 mm over mid February and isolated damaging storms, localised twisters and hail – mainly coastal. This was in all areas as the system lasted over a week. It highlights the irrigation cost problem: only low pressure (read low pumping energy) systems are cost effective.

### Autumn 2016

Rain has delayed crushing – Bundy has stopped and ISIS did not start on Monday, June 20 as planned. The rainfall was 50 to 90 mm all over the region
across Wide Bay. Reports suggest that the Isis mill is going to the west to grow cane if they can find the water to produce up to 500,000 tonnes of sugar cane in the Gayndah area and transport it back to the mill.

**Winter 2016**

The harvest is going OK again now, after a couple of wet starts and stops. CCS is also OK and no irrigation for a while is a joy. ISIS Productivity Ltd has circulated a report on diesel versus electricity for pumping, so that shows a bit of a change in the wind for energy.

**October/November 2016**

A series of storms and good rain has resulted in bumper cane crops in the southern end of the Isis district, which is mostly on red soil. With intensive irrigation and considerable expense, the northern region of the district has also produced good crops.

A significant area of Isis cane land has migrated to avocados and macadamias.

The crush is proceeding well with and was at 77 per cent complete in late October.

“The base CCS has now been increased from 13.60 to 13.80 commencing October 24. This is good news for growers who will see an adjustment in their cane pay,” said Bundaberg Sugar grower services officer, Ron Crouch.

The four major varieties were Q208A with 20.1 per cent of supply and a CCS average of 15.20 units, followed by Q240A (18.2 per cent supply) at 15.13 units, KQ228A (17.0 per cent supply) at 14.63 units and Q238A (11.7 per cent supply) at 14.91 units (Bundaberg Sugar).

**Southern Region 2015 Harvest Summary**

<table>
<thead>
<tr>
<th>Mill area</th>
<th>Tonnes</th>
<th>Tonnes per hectare</th>
<th>Average CCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bundaberg Sugar South</td>
<td>1,741,000</td>
<td>87.3</td>
<td>14.71</td>
</tr>
<tr>
<td>Isis</td>
<td>1,285,000</td>
<td>87.5</td>
<td>14.31</td>
</tr>
<tr>
<td>Maryborough</td>
<td>861,000</td>
<td>76.1</td>
<td>13.58</td>
</tr>
<tr>
<td>Rocky Point</td>
<td>384,000</td>
<td>107.2</td>
<td>13.65</td>
</tr>
</tbody>
</table>

**Southern Region production: 4,271,000 tonnes**

**NSW**

By Robert Quirk,
NSW director and senior Vice Chair

**Spring 2015**

As we came to the end of another cane season most NSW growers were pleased with the results of the harvest which came in at over two million tonnes.

The predictions of a changing climate came true in 2015 with some growers having to...
harvest in very wet conditions while others experienced a very dry harvest. Some growers reported that they have had to stand two year old cane over to three year old as the field damage would have been too great to continue harvesting in the wet conditions. There was some good news for the Condong growers – as their seasonal CCS was above the five year average, they were going to receive around an extra one dollar a tonne.

**Summer 2016**

The weather has been kind to almost all of the NSW industry, with the crop progressing well. While we may not have a record crop it will most certainly be better than what we had a few years ago, when we harvested an unsustainable crop at each of the three mills.

The few varieties that continue to perform well are Q208, KQ228 and Q183. Q208 seems to perform well in most conditions as well as on most soil types. Let us hope that the weather delivers what we wish for – rain each night and sunshine each day – oh well it does not hurt to wish.

Soy beans are looking good once again and if the weather treats us well, this will put some dollars in growers’ pockets.

**Autumn 2016**

The NSW industry has had a nightmare start to the harvest season with two east coast lows delivering up to 500 mm between them over the last three weeks. Not the start we were looking for. Much of the cane has lodged. Any cane that would have harvested in excess of 70 tph is fairly well down with much of it needing to be harvested by cutting one-way.

**Winter 2016**

The NSW industry made a very wet start to the harvest in mid to late June. July gave us some good harvesting weather with sugar above or around budget, and the crops harvested a little above estimate.

August started badly with between three and six inches of rain in the first few days of the month, depending on where you are in the state.

Provided we do not get more cold weather, the crop should start to make cane again by the end of August. This could be a problem with a lot of the lodged cane suckering which could dilute our sugar content.

**October/November 2016**

The weather has been a very mixed bag for the NSW sugar cane industry. We have had no floods to date but continuing small events have put planting back to varying degrees on all rivers.

The old saying – do not plow out and replant in a La Niña year is true this year, with one of the Tweed’s largest planting contractors only planting 400 acres, instead of his usual 1000 to 1200 acres. Let us hope that next year is more conducive to planting.

Soy bean crops were good and harvested well, giving much needed dollars to growers. SRA in conjunction with the NSW Systems farming group purchase a bed renovator. This machine has been loaned to growers and the result is that around 20 per cent of all cane planted on the Tweed will be planted into beds renovated by this machine, following soy bean fallsows.

Rocky Point cane is still being delivered to Condong mill and, while it is only a token help for the growers at their mill, at least they will harvest most of their two-year-old cane. They are hoping to have their own mill up and running by the end of October.

There has been a much greater up take of clean seed this year. NSW Agricultural services subsidises clean seed to around 50 per cent of the cost and each mill now has its own harvester to harvest the seed for growers. This has to go well for increasing production with so much disease-free cane being planted. The three new varieties SRA 1, SRA 2, and Q252 all look good and are well sought after for planting.

All things being equal and weather permitting, NSW will harvest over 2.1 million tonnes of cane this year – a far cry from the flood years when we got down to 900,000 tonnes.

All in all the year has been OK, so far – let us hope that continues.

---

**NSW 2015 HARVEST SUMMARY**

<table>
<thead>
<tr>
<th>Mill area</th>
<th>Tonnes</th>
<th>Tonnes per hectare</th>
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<tr>
<td>Condong</td>
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<td>122.3</td>
<td>11.95</td>
</tr>
<tr>
<td>Broadwater</td>
<td>849,000</td>
<td>135.0</td>
<td>11.27</td>
</tr>
<tr>
<td>Harwood</td>
<td>773,000</td>
<td>150.5</td>
<td>11.43</td>
</tr>
</tbody>
</table>

**NSW production: 2,173,000 tonnes**
CSIRO will grow its investment in new areas of breakthrough science to over $52 million per year by 2020, helping to turn Australia's challenges into opportunities and invent a better future.

The creation of six Future Science Platforms (FSPs) which will underpin innovation in health and biology, resources, agriculture and manufacturing, have the potential to support the reinvention and creation of new industries and new jobs for Australia.

CSIRO Chief Executive, Dr Larry Marshall, believes investing in challenging and riskier science will ensure research continues to meet the needs of industry, community and the environment in a rapidly changing world.

“Exactly as planned in Strategy 2020, we’ve freed up resources to enable this initial $17 million investment in 2016–17 to launch the FSPs, growing to over $50 million per year by 2020,” Larry said.

“We’re seriously excited about CSIRO’s next chapter and how we’re investing in Australia’s science future.

“The platforms fuel deeper collaboration across disciplines as we tackle things that haven’t been done before, which is exactly what we need to stay ahead of accelerating global disruption of all kinds from economic to environmental.”

Some FSPs will draw on big data to make strides forward for health and environment, some use CSIRO’s precision science to transform biological systems and others focus on our deep knowledge of resources and manufacturing to create more sustainable industries to support the jobs of tomorrow.

Not only will the Future Science Platforms invest in research and delivery of solutions, they’re also an investment in the next crop of researchers.

“FSPs will attract a new generation of researchers to work collaboratively on genuinely challenging science and help invent Australia’s future,” Larry explained.

“The platforms empower CSIRO’s strategy of solving Australia's toughest challenges, and getting science off the lab bench and into people’s hands as quickly as possible to improve Australia’s sustainability and prosperity.”

The six Future Science Platforms are:

**Environomics**
Unlocking genetic and other knowledge from our vast species biodiversity so we can preserve and manage ecosystems under environmental change, better manage economically useful species, detect biosecurity threats and create new products based on previously unknown biological data.

**Synthetic biology**
The design, fabrication, and construction of new biological parts, devices, systems, and machines, as well as the re-design of existing biological systems for useful purposes. Synthetic biology enables revolutionary advances in cellular factories, designer organisms and biological devices.

**Deep earth imaging**
Discovering the previously undiscovered minerals, energy and water resources that lie deep under the earth or sea. The science of Deep Earth Imaging will help us more precisely image subsurface geology to unlock the potential of this vast and relatively under-explored area.

**Digiscape**
Helping agricultural industries to be more productive and providing more valuable knowledge to environmental policy makers through a new generation of decision tools. Using sensors, data visualisation, artificial intelligence and assisted decision making to generate timely and relevant advice and insights will allow better choices for more productive and sustainable outcomes.

**Probing biosystems**
A revolution in healthcare and agriculture through devices and systems to obtain real-time information from living organisms about their health and well-being. This will lead to the ability to provide health and medical interventions that are timely, customised and highly specific.

**Active integrated matter**
Reinventing fields as diverse as manufacturing, agriculture, emergency services, infrastructure and mining through combining advanced materials, robotics, sensing technologies, data processing and autonomous capabilities. New forms of autonomous robots will operate safely in dangerous environments while smart materials will enable new types of customised and personalised products and services.

Contact Future Science Platforms at www.csiro.au/FSP.
What is the future for world-wide crop genetic diversity?

Over a century ago, advances in botany, linguistics, phytogeography and genetics made it possible to begin to identify the geographical origins of food crops. Building on this work, and informed by extensive travels over five continents, the Russian scientist Nicolai Vavilov proposed a number of independent ‘centres of origin’ of cultivated food plants around the world, where he saw a diversity of traditional varieties of a wide range of crops, alongside their wild relatives.

Vavilov’s interest in the centres of origin of crops was practical, as these regions were postulated to hold tremendous genetic variation that could be useful to the improvement of agriculture. Such variation was the product of adaptation of plants over relatively long periods of time to diverse environments and cultural practices. In these regions, for example, he hoped to find early-maturing varieties suitable for northern latitudes, and disease-resistant forms providing a solution to the mass starvation caused by cyclical failures of the wheat crop.

**FIGURE 1: Primary regions of diversity of major agricultural crops worldwide**
Evidence has grown regarding the origins of food crops – where each was initially domesticated and diversified. But the importance of these geographic regions in the context of what we actually produce and consume now around the world has not been determined. A recent Royal Society paper ‘Origins of food crops connect countries worldwide’ by Colin Khoury and others analyzed how important each origin region is to agricultural production and diets in countries worldwide.

Countries produce and consume crops from diverse origins, mostly using plants of foreign origins (69 per cent of crops are foreign as a global average). Foreign crop usage has increased over the past 50 years, providing a novel perspective on the globalization of food systems.

The extensive connections between countries and regions with regard to the primary regions of diversity of crops provide a novel perspective on the ongoing globalization of food systems worldwide. The increasing use of foreign crops bolsters the rationale for considering the underlying genetic diversity of important food plants as a global public good.

International agreements are justified to appropriately recognize historical and current contributions to the generation of this diversity, protect farmers’ rights to choose what varieties they maintain and exchange, and promote the conservation and sustainable use of this crop genetic diversity. Given the ongoing evolution of the global food system due both to dietary change and increasing production challenges, a broadly inclusive effort to conserve and provide access to crop genetic diversity worldwide is prudent.

Contact: Dr Colin Khoury International Center for Tropical Agriculture (CIAT), c.khoury@cgiar.org
Visit: http://rspb.royalsocietypublishing.org

**FIGURE 2:** Circular plots linking the primary regions of diversity of food crops with their current importance in the context of calories in regional food supplies. Each region has a colour representing its own native crops and those colours are connected to other regions due the importance of those crops in the food supply in other regions. The direction of the contribution is indicated by both the primary region’s colour and a gap between the connecting line and the consuming region’s segment. The magnitude of contribution is indicated by the width of the connecting line.

(a) only the most significant linkages (i.e. 95th percentile) between regions are shown, for visibility, whereas (b) displays the full matrix of linkages. As an example, C America is represented in orange. The orange lines represent the amount of regional food supplies derived from crops native to the region – such as maize, beans and cassava – eaten in different regions of the world (see line connecting to Southern Africa owing to the high importance of these crops in that region). In turn, C America consumes crops native to other regions, for example, rice, coffee and sugarcane.
Improving nitrogen use efficiency: cane growers beating the odds in the face of some of the most unpredictable rainfall on the planet

In Australia’s cane belt – one of the toughest areas in the world to manage nitrogen – Enhanced Efficiency Fertilisers (EEFs) are beginning to gain a firm foothold among forward-thinking growers and the agronomists who advise them. This special edition of The Productivity Times focuses on the issues surrounding nitrogen use efficiency – the risks of nitrogen loss – and the gains being made with ENTEC Enhanced Efficiency Fertiliser.

“No matter what happens after you’ve applied your fertiliser, you’re better protected from the risk of leaching or denitrification with an ENTEC-treated fertiliser.”

- Rob Dwyer

Long spells of parching dry. Unpredictable deluges.
A climate with rainfall that’s 1½ to 2½ times more variable than the norm worldwide.
“...We’re pretty good at predicting a wetter or drier season on average,” IPF’s Rob Dwyer says. “But no-one can pinpoint exactly when individual rainfall events will occur – let alone how much will fall at any one time – but the reality is, that’s what it can come down to from a nitrogen use efficiency perspective”.

That’s the management dilemma cane growers have to resolve every time they decide to apply fertiliser.
“Getting nitrogen into the ground is one thing” Rob continues. “Getting it into the crop is another thing entirely. An extended dry stretch or a single rainfall event can potentially derail nitrogen uptake - and crop yield - for an entire season.”
And that’s not all that’s at stake.

Nitrogen loss to the environment is a worrying issue for growers and environmental stewards alike. So doing everything possible to prevent runoff, leaching and denitrification is rapidly becoming a top-of-mind concern.

Protection against the unknown and uncontrollable.
A growing body of evidence suggests that Enhanced Efficiency Fertilisers are one of the best available protections against rainfall uncertainties and extremes.

“No matter what happens after you’ve applied your fertiliser, you’re better protected from risk of leaching or denitrification with an ENTEC-treated fertiliser,” says Rob.
What can happen to nitrogen when conditions conspire against the grower?
Here’s just one example of how much difference the protection of ENTEC can make...
“

We’re under pressure and have to lift our game”

In The Productivity Times last year, veteran cane grower Graeme Blackburn shared his results with ENTEC over the five years he’d been using it.

We returned to Graeme this year to find out how he’s coming along – and get his take on the growing pressure to control nitrogen loss. Here’s what Graeme had to say…

IPF: How did it go last year?
Graeme: We had a very dry year. I had to do a lot of watering, working very hard to grow my crop. But even with only half the normal rainfall, I was at 95% of the previous year’s tonnes.

IPF: And how is it looking so far this season?
Graeme: This year’s a little different. We had no rain through Christmas. Then a few good downfalls with a lot of waterlogging – we got a lot of rain in one month. Then another dry month. With all of that, my crop is looking tremendous – pretty exciting for next year.

IPF: What role do you see ENTEC playing?
Graeme: In my eyes, it’s a clear choice. If you want to reduce the risk out of leaching and denitrification, this is the product to consider.

I’m getting a great response. Every year my crops are getting better, more consistent. I can’t say for certain that’s all due to ENTEC. But I can say this: I’m just not losing as much nitrogen. It’s a win-win – for me, and for the environment.
2013 Herbert Trial: Bracing against the ‘perfect storm’

In a soon-to-be-published trial of an ENTEC urea blend v. untreated urea blend in Herbert, the trial area received:

— No rain for two months after fertiliser was applied
— Then - a rainfall event, saturating everything

In short: the ‘perfect storm’ for denitrification in the area’s clay soils.

THE RESULTS:

— Untreated urea applied at typical district rates yielded little more than the control plots receiving no nitrogen at all. Virtually all the nitrogen applied appears to have been lost.
— In contrast, ENTEC applied at the same rate produced a better yield for the region despite the difficult season – 51.8% more than with untreated urea.

Though results can vary significantly depending on conditions, it’s ENTEC’s ability to reduce the risk of nitrogen losses in variable weather conditions that’s getting more growers and the agronomists who advise them talking.

(See what a few have to say below.)

### 2013 Herbert EEF Trial: Top line results*

<table>
<thead>
<tr>
<th></th>
<th>ZERO N (CONTROL)</th>
<th>UREA BLEND (150kgN/ha) as ‘Standard Practice’</th>
<th>ENTEC UREA BLEND (150kgN/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cane yield t/ha</td>
<td>51</td>
<td>54</td>
<td>82</td>
</tr>
<tr>
<td>Additional Return $/ha</td>
<td>$43</td>
<td>$0</td>
<td>$671</td>
</tr>
</tbody>
</table>

*relative to Standard Practice**

“**We wanted to see if ENTEC did anything different with the cane, and we like the idea that it reduces leaching and denitrification. It’s still too early to judge, as the crop is yet to be harvested. But we’ve had quite a bit of rain, and have been told by others that our cane is still holding its green, which is a sign that the fertiliser is still working despite the rainfall. I’ll definitely be using it again, as I think it is a good product.”**

Steven Gileppa Cane Farmer, Bamburgo

“**We’ve been using ENTEC for two years on all plant cane and increasingly in ratoon cane also. We wanted to increase N efficiency, and we are applying slightly less total N to our cane and still seeing yield increases.”**

Andrew Cross Manager - MH Premium Farms, Burdekin

### Graeme’s 2015 Top-up Trick

Graeme tells us that last season he added ENTEC to EASY N liquid fertiliser to top up an extra 40 kgN/ha with protection from leaching and denitrification in particularly wet irrigation areas. He reports that it was very cost effective (when compared to CalGran) to put on, in a ‘high analysis’ liquid form.

See more about EASY N liquid on page 8
With EEFs, farmers can happily stick to the 6 Easy Steps rate and maximise the potential for enough nitrogen to get into the crop

As Farmacist Director and consultant to both government and growers, Rob Sluggett knows better than most, the nitrogen issues facing the cane industry.

He’s also had significant experience with Enhanced Efficiency Fertilisers (EEFs) – with almost five years of nitrogen use efficiency research and a range of field trials under his belt. Rob gave us his perspective...

IPF: Tell us a bit about your experience with EEFs?
Rob: I’ve worked with EEFs for 4-5 years now as part of a broader nitrogen use efficiency program, including a couple of years looking at denitrification and nitrous oxide emissions for standard granular urea blends v. polymer coated controlled release urea blends v. ENTEC EEF blends.
I’ve also run a range of field trials looking at different rates of product, rates in relation to yield potential, and soil type influences.

IPF: Why the focus on nitrous oxide emissions in particular?
Rob: When farmers think about nitrogen loss, front of mind is usually run-off. Other pathways, like leaching and denitrification, can get secondary consideration.
But one of the things that surprised us from our denitrification and nitrous oxide work is the speed and quantity of emissions loss in response to opening rainfall or irrigation events. It does not just occur when it’s saturated, like you might expect, but with as little as 20 to 30 mm events.
So even in dry years, we need to look more seriously at denitrification risk.

IPF: What have you learned from the research so far?
Rob: We saw significant and consistent reduction in nitrogen loss with both polymer coated urea and ENTEC. But ENTEC has consistently been the best performer. Though the differences aren’t always statistically significant (it depends on factors including weather conditions), the means for ENTEC’s emissions data have mostly been on the lower side.

IPF: And the results from trials?
Rob: We found consistently that with EEFs, we got the same or better yield than with standard urea over a number of trial sites. Sometimes data is significant, sometimes not, depending on climatic conditions and rainfall events that drive leaching and/or denitrification. But EEFs tend to be skewed toward the upper end of yield performance in waterlogged situations.

IPF: What are you hearing from the growers you work with?
Rob: I’m seeing a lot more farmers looking at EEFs. There is a significant increase in their use in the market. And there seems to be general satisfaction among those who’ve tried and adopted them.

IPF: So where do you see EEFs fitting in future fertiliser plans?
Rob: I think farmers have a real opportunity to use EEFs to reduce nitrogen losses - not just from run-off, but from leaching and denitrification too.
With Enhanced Efficiency Fertilisers, farmers can happily stick to the 6 Easy Steps, the industry accepted Best Management Practice nitrogen rates, and be comfortable they’re going to maximise the potential for enough nitrogen to get into the crop.
The ABCs of nitrogen use efficiency

Farmacist’s Rob Sluggett is at pains to stress that fertiliser strategy isn’t just a simple A-B-C proposition. “It’s too easy to focus on just one factor or another,” Rob says, “when it really needs consideration of everything – timing, placement, crop potential, soil composition, seasonal outlook and more.”

IPF’s Rob Dwyer echoes that point. “What happens to nitrogen in the soil is a complex process, and numerous factors affect it.”

That said – a few fundamental processes are responsible for the lion’s share of nitrogen loss.

Nitrogen loss through leaching
Leaching occurs when water moving through the soil carries the nitrogen in the soil down with it – beyond the crop’s reach.

When nitrogen fertiliser goes into the soil, it starts out in ammonium form - which has a positive charge and locks onto the negatively-charged clay fraction or organic carbon in the soil. In this ammonium form, it’s both available to the plant - and more stable in the soil and less prone to leaching.

However, normally, bacteria in the soil quickly converts ammonium to the nitrate form of nitrogen, which has a negative charge. It’s plant-available - but no longer locked on - so it’s more likely to be carried down when water moves through.

A plant can only take up nitrogen when there’s moisture in the soil. But soil can only hold so much water. Too much water at the wrong time can leach out a large portion of the nitrate nitrogen.

The grower’s dilemma: making sure enough nutrient is there when the plant needs it – without over-applying - or losing too much of what’s been put on, to unpredictable rainfall events.

Nitrogen loss through denitrification
Denitrification takes place when naturally occurring soil microbes convert the nitrate form of nitrogen in soil to gasses - nitrous oxide (N₂O) and dinitrogen (N₂) - which are then lost from the soil, and hence the crop also, to the atmosphere. Nitrogen in ammonium form is not subject to this conversion and loss pathway in any way.

The factors affecting denitrification and the process itself are complex. But one factor is simple: when water replaces air in the soil, it speeds up the conversion process. So the wetter the soil (eg, anywhere between ‘moist’ to ‘saturated’) and the longer the saturation duration (both individual events and cumulatively) – the higher denitrification loss potential.

This form of nitrogen loss deserves a lot more attention for several reasons:

For the environment: 1 kilogram of N₂O released into the atmosphere has 298 times the impact on global warming as 1 kilogram of carbon dioxide (CO₂). And fertilised farming is the single largest source of N₂O in the atmosphere.¹

For the grower: N₂ loss can be many times higher than the loss from N₂O. Though N₂ doesn’t affect global warming it’s a big issue for growers. N₂ and N₂O loss combined can have a significant impact on farming productivity.


The ABCs of nitrogen use efficiency

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Beating the odds with ENTEC Enhanced Efficiency Fertiliser

ENTEC does one simple thing that can make a dramatic difference to nitrogen loss and nitrogen use efficiency:

It slows down the natural conversion of ammonium to nitrate and keeps nitrogen stable in the soil for longer. Unlike a polymer coated, controlled release urea, ENTEC doesn’t physically delay the release of nitrogen. Polymer coated fertiliser can seal nutrients off from the plant when it might need them most. Instead, ENTEC slows down (without harming them) the naturally occurring soil bacteria that convert ammonium to nitrate nitrogen—leaving nutrients available to the crop, throughout the entire process.

ENTEC v. untreated fertiliser

ENTEC provides a reassuring measure of ‘protection’ against the unpredictable weather the Aussie cane belt can throw at a grower:

— During long dry spells a plant loses its ability to take up nitrogen, but at the same time conventional urea is busy converting to nitrate. ENTEC however holds back more nitrogen, for longer, in the stable, plant-available ammonium form.

— When rain hits - often a deluge - and a significant portion of conventional urea’s nitrate nitrogen can be lost to leaching and/or denitrification. ENTEC’s ammonium nitrogen stays put and is available to get taken up by the plant.

— Throughout the entire, unpredictable and largely weather driven process - ENTEC helps more nitrogen get transferred efficiently from the soil and into the plant.

The ultimate payoff, supported by an increasing body of growers, trial and research evidence:

— Improved utilisation of nitrogen investments
— Less nitrogen lost to the environment
— A strategy to assist with BMP compliance
— Greater safety and flexibility around the timeliness of application
— Potential for improved crop yield and reserve.

Actual results may vary. Factors such as weather and environmental conditions, soil condition and other variables will impact the results growers obtain.
EXAMPLE #1
Reduction in ‘horizontal’ leaching

With nitrogen run-off also having a growing focus, data from this trial should be encouraging to anyone growing cane and subsurface applying nitrogen.

In the Burdekin, an ENTEC blend and standard urea blend was compared when applied into the centre of a 1.8m spaced ‘dual row’ bed - irrigated - and then loss of nitrogen measured in the irrigation tailwater.

The reduction in nitrogen lost with urea v. ENTEC - and the implications for water quality - were significant. (Refer graph below)

EXAMPLE #2
Comparative effectiveness of denitrification management options

Denitrification is a complex process, with a host of factors influencing it. What strategies have the best potential to help growers mitigate its effects?

In ‘Reducing emissions from northern agricultural soils’, Professor Peter Grace of Queensland University of Technology looked at results from studies and compared a range of denitrification management options.

He assessed their potential and summarised the findings in the following table. It singles out ammonium stabilisers as the most well-supported, promising and practical denitrification management options available.

### Is mitigation of N₂O possible?

<table>
<thead>
<tr>
<th>Management option</th>
<th># of Studies</th>
<th>Mitigation Potential</th>
<th>Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tailoring fertiliser application rate</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Type of N fertiliser used</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Placement of fertiliser</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Timing of application</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Precision Ag practices</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Organic</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Controlled release fertiliser</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Ammonium Stabilisers (nitrification inhibitor)</td>
<td>Medium/ high</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>


### ANALYTICAL METHODOLOGY:
how the trials comparing ENTEC urea with conventional urea were analysed

The data from a series of 6 trials (7 cuts) conducted from Ingham (FNQ) to Broadwater (Nth NSW) between 2008 and 2013 were analysed to assess the impact of ENTEC treatment of urea on cane yield, CCS and sugar yield. Mean raw sugar yield was 14.67t/ha for conventional urea and 15.26t/ha for ENTEC treated urea at equivalent nitrogen rates.

As this data set had a wide range of cane yields (48t/ha – 195t/ha), data was normalised to % yield vs urea treatment e.g. if cane yield was 100t/ha with urea and 108t/ha with ENTEC urea, then relative yields were 100 and 108% respectively.

Data from these trials was pooled and analysed using regression analysis (Genstat 16th edition). The data showed a statistically significant (P<0.05) increase in sugar yield of 7.7% and cane yield increase of 9.1%. While not significant – the data showed CCS levels were 1.2% (or 0.15 unit of CCS) lower where ENTEC was used.

Measuring the results: the potential yield upside for ENTEC Enhanced Efficiency Fertiliser

Anything that adds cost to what’s viewed as an already significant expenditure, is always a challenge for dollar-conscious growers. However when an additional investment can produce potential increases in nitrogen use efficiency, productivity, yield and potential return, it’s an investment worth considering.

Here is an updated calculation of the yield and returns possible with the use of ENTEC Enhanced Efficiency Fertiliser.

Analysis of pooled data from six trials (seven cuts) conducted over the course of six years (each of 1-2 years length) in areas ranging from Ingham in Far North QLD to Broadwater in Northern NSW predicts a statistically significant 9.1% average increase in cane yield and 7.7% average increase in sugar yield with the use of ENTEC over the conventional, untreated urea blends most commonly used by cane growers.

That data combined with stipulated assumptions about sugar price and fertiliser cost (and assuming no other costs) illustrate the positive return that a small additional investment in ENTEC can potentially produce.

Data suggests a potential increase in yield with use of ENTEC treated urea

| CANE YIELD | +9.1%  |
| SUGAR YIELD | +7.7%  |

And based on the assumptions about application rate, fertiliser cost and sugar price below

Additional fertiliser cost for ENTEC treatment | Potential additional gross revenue (less harvesting cost)

$77/ha | $226/ha

Based on a average Nitrogen rate of 180kg/ha over all trials (Note: some districts apply nitrogen at rates other than 180 g/kg/ha)

Price differential for ENTEC treatment at IPF retail price 29 April 2016

Potential payback with ENTEC treated urea based on the above gross revenue information

<table>
<thead>
<tr>
<th>SUGAR PRICE</th>
<th>Potential additional gross revenue with ENTEC ($/t)</th>
<th>Return on Investment (ROI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$400</td>
<td>$194.33</td>
<td>2.5</td>
</tr>
<tr>
<td>$425</td>
<td>$210.52</td>
<td>2.7</td>
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<tr>
<td>$450</td>
<td>$226.71</td>
<td>2.9</td>
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<tr>
<td>$475</td>
<td>$242.90</td>
<td>3.2</td>
</tr>
<tr>
<td>$500</td>
<td>$259.09</td>
<td>3.4</td>
</tr>
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</table>

Based on pooled analysis of data from six trials conducted from Ingham (FY10) to Broadwater (FY15) over 2008/2009 to 2013/2014 by Incitec Pivot Fertilisers, Burdekin Productivity Services, Sunshine Sugar, Famacist, DSITIA and SRA. Incitec Pivot Fertilisers makes no representations or warranties as to the reliability, completeness or suitability for any particular purpose of the information provided. Before using these products, users should consult their local agronomic advisor.

To illustrate the potential significance of the results certain assumptions were made about sugar price, harvesting and fertiliser costs to give an indicative revenue per hectare. There are obvious limitations to these assumptions since they do not reflect all labour, land holding costs or other expenses. Actual results may vary. Factors such as weather and environmental conditions, soil condition and other variables will impact the results growers obtain.

IPF dealers will be talking with growers about the possibilities for split treatment with EASY N in the season ahead. To find out more about the potential for use on your property, see your local dealer.

More cane more gain 2016

LEARN MORE ABOUT ENTEC VIA OUR VIMEO PAGE

More cane more gain 2016

How ENTEC works animation
ABOVE: The 2015 harvest continued the upward trend in Australian cane production of the past few years. The industry looks forward to a return to ‘normal’ harvest tonnages of a decade ago.

BELOW: Again another modest improvement on recent seasons saw our best sugar production result in a decade – just nudging the five million tonne mark.
Have you heard the latest intel?
We’ve set the bar even higher.

suSCon maxi Intel - longer control, same price.

- Provides up to 3 years protection against greyback, negatoria, consobrina and Bundaberg canegrub damage in sugarcane.
- Provides up to 4 years protection against Childers and southern one-year canegrub damage in sugarcane.
- Controlled release of active, imidacloprid, resulting in the most prolonged control of target pests in sugarcane on the market.

www.cropcare.com.au • Customer Service 1800 111 454

Crop Care Australasia Pty Ltd ACN 061 362 347

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ABOVE: The mills have maintained the push to bring more country into play after the harvested area sank to just over 300,000 hectares in 2010. Our harvested area in 2015 stood at over 380,000 hectares – a 25 per cent increase over the past five years.

BELOW: Cane yields were the best in a decade and sugar yields the best in two decades – a trend the industry would like to see maintained.
SINKER® fungicide from Crop Care controls primary infections of sugarcane smut and pineapple disease in sugarcane.

Developed in conjunction with industry research body, BSES Limited, SINKER contains flutriafol, a highly soluble and systemic active ingredient in an easy to use formulation, with excellent activity against these two diseases.

SINKER® is compatible with Chlorpyrifos 500EC, Shirtan®, Senator® 700WG and Astral® 250EC which provides flexibility with disease and insect pest management.

Reduce the detrimental impact on sugarcane yield from sugarcane smut and pineapple disease today.

For further information, contact your Crop Care sales representative or Crop Care Customer Service on 1800 111 454.

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World production

ABOVE: World sugar consumption trended up and production down in response to lower world sugar prices – higher prices now on offer should see world production increase in 2016–17.

BELOW: Amidst political and economic turmoil Brazil’s sugar production again fell slightly compared to last season but was still 25 per cent higher than that of their nearest rival, India. Brazil continues its production dominance.
The international scene

Major Importers: Our sugar shipment destinations again reflect our close proximity to the strong Asian market and our ongoing reputation for reliably producing and delivering high quality sugar.

World Sugar Price:
Joy of joys – after too many years of declining prices we have seemingly reached the bottom of this downhill run and we’re clawing our way back up the mountain! But as always it’s bound to be a slippery ascent.

Source: Australian Commodity Statistics 2015

World raw sugar price

*ABARES Forecast from Ag Commodities Sept Qtr 2016
ABOVE: Australia is yet again ranked third in the world behind Brazil and Thailand in terms of exports by major sugar producers in 2015–16.

BELOW: China is again the largest importer in the world sugar market with a level of demand around double that of any other nation.

SOURCE: USDA Sugar World Markets Trade May 2016
The Australian Cane Farmers Association

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The 2016 season has been framed by several tensions – all of which carry significant financial risk for growers. A wetter than usual season, combined with mill breakdowns has raised the prospect of stand-over cane.

This frustration, in the presence of soaring sugar prices, demonstrates the need for a timely harvest season which does not press the boundaries of economic viability.

Sugar marketing – grower choice

The Sugar Industry (Real Choice in Marketing) Amendment Bill 2015, passed through the Queensland Parliament on Wednesday December 2, 2015. The Bill was introduced into the Queensland Parliament by Mr Shane Knuth MP, member for Dalrymple and passed with amendments from Shane and Mrs Deb Frecklington, Member for Nanango (LNP) and Shadow Minister for Agriculture, Fisheries and Forestry. The supporting vote of Mr Billy Gordon, member for Cook was the critical vote to pass this essential legislation.

Greater than four thousand cane farmers in Queensland relied on the passage of this Bill in order to:

- Prevent farmers from being discriminated against by powerful global sugar millers and traders;
- Balance the regional monopoly power of sugar millers who dictate the terms of contract to farmers;
- Enable farmers to continue to have a choice of marketer for their share of the raw sugar (GEI sugar); and,
- Implement a dispute resolution system, which can be accessed by either party, in order to agree on fair terms and conditions for cane supply contracts.

The industry as we know it has been built on the foundation that farmers are paid for the sugar that is in their sugarcane; and which is marketed by the jointly-owned marketing company, Queensland Sugar Limited (QSL). This system of marketing gives farmers the confidence to continue to supply sugar mills with sugarcane.

The Bill is necessary and very fair because it:

- Allows choice, so that farmers can choose between their mill and the farmers’ marketer of choice;
- Freely allows farmers and millers to find agreement on matters of contention, without automatically needing to use the dispute resolution system; and,
- Takes effect, only if and when mills cannot effectively negotiate appropriate supply agreements with growers.

The job ahead is for farmers and millers to focus on putting fair and reasonable contracts in place in order to allow farmers to price their GEI sugar.

Four year high with future prices

Farmers in general are well aware that raw sugar futures have been trading at around US20¢ per lb – a four year high with future prices on offer at around $600 per tonne. Unfortunately the protracted On-Supply Agreement (OSA) negotiations has meant many farmers have been unable to access the good prices on offer.

Some contract negotiations have recently been referred to arbitration, under the act, and the industry eagerly awaits the outcome.

Meanwhile those mills which are outside of the QSL system are able to manage their price risk, while their growers are not – unless they give in and sign over their GEI sugar to their mill. This is neither a fair nor competitive arrangement.

QSL and MSF Sugar sign the first On Supply Agreement (OSA)

The recent signing of an On-Supply Agreement (OSA) between QSL and MSF Sugar has enabled growers with a Cane Supply Agreement with MSF Sugar to choose QSL as the marketer of their Grower Economic Interest in sugar (GEI Sugar) and access QSL’s pricing products for the 2017 Season and beyond.
Queensland biofuels mandate

On December 1, 2015, the Queensland Parliament passed legislation requiring fuel sellers to meet targets for the sale of ethanol blended petrol and bio-based diesel.

The Liquid Fuel Supply (Ethanol and Other Biofuels Mandate) Amendment Act 2015 is designed to help Queensland transition to a clean energy economy, grow the biofuels and bio-manufacturing sectors and boost jobs across the industry, especially in regional Queensland.

The Bill includes an initial three per cent ethanol mandate for petrol and a half a per cent bio-based diesel mandate with both due to start on January 1, 2017.

In practical terms, the mandate will require E10 to make up 30 per cent of regular petrol sales in Queensland in 2017. Regular unleaded petrol will still be available for those who can’t or don’t want to use ethanol fuels.

Great Barrier Reef water quality

Reef Water Quality Report Card 2015 assesses the reported results of Reef Water Quality Protection Plan actions up to June 2015. The report says that the results show the need to accelerate the rate of change and drive innovation to meet the ambitious targets. But not all activities undertaken during the reporting period are included so the results are considered a conservative estimate of progress.

Some of the noted points are:

- Half way to pesticide and sediment 2018 modelled pollutant load reduction targets;
- More efficient fertiliser use needed;
- Inshore marine condition remained in poor condition but coral improved from D -> C;
- In 2014–15, 402 graziers and 836 sugarcane growers engaged in industry Best Management Practice programs;
- $100s millions towards big targeted projects; and,
- Everyone not just farmers will need to make changes.

Queensland’s first reef water quality annual investment report was released on October 13, 2016 detailing how $35 million of Government funding has been spent improving the resilience of the Great Barrier Reef.

On October 18, 2016 the Queensland Government committed funding for $4 million project to help improve reef water quality

Practice change

Agriculture Minister Leanne Donaldson says more cane farmers are changing their practices to reduce impacts on the Great Barrier Reef.
“It is encouraging that an independent survey commissioned by the Palaszczuk Government shows more than two-thirds of cane farms have started, or are planning to start, changes to farm management practices that will enhance the health of the reef,” the Minister said.

“The industry is heading in the right direction and there are some great examples for others to follow.”

The survey involved 170 cane farmers from priority catchment areas (Wet Tropics, Burdekin and Mackay/Whitsundays) with around 36,000 hectares under production.

As of October 2016, 1435 farms representing 255,584 hectares have been benchmarked in Smartcane BMP, while 150 farms representing 42,908 hectares have been accredited.

Rural debt

On October 19, 2015 the Queensland Government announced the establishment of a Rural Debt and Drought Taskforce to help identify and recommend solutions to address the debt issues faced by Queensland’s primary producers. This follows a $52.1 million drought package announced in July 2015.

The Taskforce is chaired by the Member for Mount Isa, Rob Katter and includes an MP from the Government, Opposition, mayors, representatives from the agricultural sector and economists.

As part of this process Queensland Rural Adjustment Authority (QRAA) will undertake a new Rural Debt Survey similar to the survey they conducted in 2011, with the cooperation of financial institutions to identify areas of particular concern.

On November 18, 2015, Treasurer Curtis Pitt convened a State Government rural debt banking roundtable. Senior executives from Australia’s major banks were represented along with the Australian Bankers’ Association, the Queensland Rural Adjustment Authority (QRAA) and Queensland Treasury Corporation.

The Treasurer said that the banks indicated a willingness to share data to get a clearer picture on the size, scope and characteristics of debt in regional Queensland. This data would be incorporated into a rural debt survey to establish the extent of drought related rural debt in Queensland.

The Treasurer recognised that farming businesses are different to other commercial enterprises and had different financing requirements.

Curtis wrote to Australian Prudential Regulatory Authority (APRA) about the unique seasonal and intergenerational nature of farming, to argue the case for the unique requirements of farmers to be taken into account.

On December 9, 2015 the Palaszczuk Government’s Rural Debt and Drought Taskforce held its first public hearing, giving those most affected a chance to tell the Government firsthand the impact of the drought and their debt levels.

Meetings were held around Queensland through to the end of January, 2016. A closed session followed each public forum where people could talk about their submissions or other matters in private with members of the Taskforce.

The taskforce considered key issues and various policy options in the development of recommendations to the Queensland Government, including:

- The nature and extent of financial problems faced by agriculture associated enterprises, local government and supporting communities in Queensland;
- Identify the cause of problems and contribution of established policy to their magnitude;
- The extent of such problems and effect on regional stability;
- What strategies might be adopted and initiatives undertaken to rectify such problems;
- The impacts that such strategies and initiatives might have;
- Policy options available to the State Government to coordinate effective remediation;
- The nature and desirability of some select actions; and,
- The adequacy of existing financial system to fund policy solutions.

On May 26, 2016, Mr Robbie Katter MP, the Member for Mount Isa, introduced the Rural and Regional Adjustment (Development Assistance) Amendment Bill 2016 as a Private Member’s Bill.

The primary objective of the Bill is to amend the Rural and Regional Adjustment Act 1994 to include a capacity to raise money to provide financial assistance that will foster development of a more stable, productive and sustainable rural and regional sector in Queensland.

On August 30, 2016, Hon Leanne Donaldson MP, the Minister for Agriculture and Fisheries, introduced the Farm Business Debt Mediation Bill 2016.

The policy objectives of the Bill relating to rural debt are to:

- Establish a new Farm Business Debt Mediation Act which will provide a process for the efficient and equitable resolution of farm business debt matters between mortgagees and farmers; and,
- Replace QRAA (formerly the Queensland Rural Adjustment Authority) with the Queensland Rural and Industry Development Authority and expand its functions;
- The Committee is to report on both Bills by November 28, 2016.

Wishing you all a safe and profitable conclusion to the 2016 season.
In Australia there are approximately 4000 cane farming entities growing sugar cane on around 380,000 hectares annually, supplying 24 mills, owned by seven separate milling companies. The vast majority of cane farms are owned by sole proprietors or family partnerships. The mill ownership structures are a combination of publicly owned entities, privately held companies limited by guarantee, and co-operatives.

**Major products**

The industry's major product is raw crystal sugar, which is sold to refineries both domestically and abroad. Approximately 95 per cent of Australian sugar produced comes from Queensland with the balance from Northern New South Wales.

The Australian sugarcane industry is one of Australia's largest and most important rural industries with sugarcane being Queensland's largest agricultural crop. The industry directly employs about 16,000 people across the growing, harvesting, milling and transport sectors.

Up to 35 million tonnes of sugarcane is grown on about 380,000 hectares annually. This sugarcane crop can produce up to 4.5 million tonnes of raw sugar, 1 million tonnes of molasses and 10 million tonnes of bagasse annually. Approximately 85 per cent of the raw sugar produced in Queensland is exported, generating up to $2.0 billion in export earnings for Queensland. Production from the New South Wales sugar industry is refined and sold into the domestic market.

**Green energy**

Sugar mills are self-sufficient in energy, burning the sugar processing by-product bagasse, (which is a renewable fuel) to generate electricity and steam for factory operations. In addition, more than half of the electricity generated (around 500 GWh in 2014) is exported to the electricity network supporting electricity infrastructure and reducing greenhouse gas emissions from power generation. The use of renewable bagasse for the production of ‘green’ energy reduces the nation's greenhouse gas emissions by over 1.5 million tonnes annually.

**The Australian Sugar Milling Council**

The Milling Council's purpose is to drive a profitable and sustainable sugar industry through dynamic industry leadership, strong and effective advocacy and creating new opportunities for the sugar industry. Milling Council staff work with our members, other industry organisations and government to enhance the commercial development and build the value of the sugar industry in Australia.

**ASMC Board**

The Milling Council Board currently consists of nine directors. Board members are nominated by our represented member companies.
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Australian sugar industry welcomes TPP

In early February the Australian sugar industry welcomed the formal signing of the Trans-Pacific Partnership (TPP) Agreement between 12 countries of our region and looks forward to its smooth and quick formal ratification in Australia.

John Pratt, Chairman of the Australian Sugar Milling Council Chairman and of the Australian Sugar Industry Alliance, said it was an historic pact which would improve access for Australian agricultural produce into important regional markets, particularly the United States and Japan.

The gains for Australian sugar under the TPP include the first increase in Australian sugar’s access to the United States market for two decades. The increase of 65,000 tonnes to a total of 152,000 tonnes is worth around $13 million extra per year to Australia. “The negotiations also achieved the removal of the in-quota tariff, worth around $3 million, plus the potential for additional annual allocation of access based on US needs,” John said.

Projections for sales of high pol sugar to Japanese refineries are around 600,000 tonnes for this financial year, more than double the previous year’s sales and the TPP will deliver a reduction of costs for sugar going into that market of $25 per tonne. “There is no doubt this deal translates to dollars for the Australian industry and it is very much a step in the right direction as far as trade liberalisation goes,” John said. “Over time this will be a platform on which further trade opportunities for Australian sugar can be built.”

“We thank and congratulate the Australian negotiators and the Minister for Trade and Investment, Andrew Robb, for the work carried out over five years to bring us to this point,” John said. “We look forward to the speedy ratification of the Agreement in the Australian Parliament.”

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- USA: $22.1b
- Mexico: $634m
- Peru: $142m
- Chile: $492m
- Singapore: $11b
- New Zealand: $12.6b
- Malaysia: $8b
- Vietnam: $4.7b
- Brunei: $98m

For more information: dfat.gov.au/trade/agreements/tpp
The past year has proven to be a pivotal one for our business, with significant developments regarding Marketing Choice set to lay the foundations of a new era for QSL and the Queensland sugar industry as a whole.

In spite of challenging negotiations, the implementation of Marketing Choice provides a unique opportunity for industry to work together to shape the way forward.

As the saying goes, the secret of change is to focus all your energy, not on fighting the old, but on building the new. And QSL is well and truly focused on building the new.

As a fixture of the Queensland sugar industry for nearly a century, it may be tempting to dismiss QSL as a relic of the pre-deregulation era, somehow wedded to the ways of the past. But to do so fails to recognise our history of innovation. We are the masters of reinvention.

Since our origins as the Queensland Sugar Board back in 1923, through to our emergence as the Queensland Sugar Corporation in 1991, and subsequent evolution as QSL in 2000, we have been at the forefront of a raft of significant industry advancements for our state. From the first bulk sugar cargoes, to the Advance payments system and grower pricing options envied around the world, we look upon this new era of Marketing Choice as not only the next chapter in the history of our industry, but the next stage of our own corporate evolution.

Driven by our constitutional requirement to serve the interests of growers and millers for the long-term prosperity of the Queensland sugar industry, we see ourselves as our industry’s trusted partner, with this enduring focus also reflected in our corporate values:

- Build partnerships
- Be Real
- Aim High
- Be the Solution
- Believe T.E.A.M. (Trust, Empathy, Accountability, Morals) works

These values were created by our people and reflect not only their aspirations, but QSL’s wider business approach. And I am proud to say that the turmoil of the past few years has failed to dull our team’s efforts in this regard. They remain a key element of QSL’s success as well as a great source of support for the Board, and I thank them for their ongoing commitment and service.

So as the long-awaited global raw sugar deficit gathers momentum and our international competitors jockey for position, our industry must be at its best if we are to take the next step and capture the full potential of the opportunities at hand.

We are off to a positive start for the 2016 Season, with the QSL pricing team already securing impressive returns from the recent uplift in ICE 11 prices, despite the production risk considerations associated with the current wet harvest.

QSL continues to enjoy strong relationships with our Raw Sugar Supply Agreement (RSSA) signatories Bundaberg Sugar, Isis Central Mill and Mackay Sugar, and we look forward to working with them well into the future. We also remain committed to providing quality logistics, pricing and financing to our other miller members, with new On-Supply Agreements set to supplement our current contracted RSSA tonnages with Grower Economic Interest in sugar (GEI in sugar) nominations from next season.

I am also pleased to advise that we are having positive negotiations with Sugar Terminals Limited (STL) for an ongoing operating agreement for the six bulk sugar terminals. Such an arrangement would help to protect and maximise the immense strategic value of these important assets, as well as providing...
Your Trusted Partner

QSL MARKETING CHOICE FOR MSF SUGAR GROWERS

MSF Sugar Growers wanting to nominate QSL as their GEI Sugar Marketer for the 2017 Season and beyond can now do so. You have until 31 December 2016 to finalise QSL as your GEI Sugar Marketer of choice.

Growers wanting to participate in forward pricing are encouraged to contact QSL to discuss available products and deadlines.

Growers wanting to participate in the QSL Actively Managed Pool, QSL Harvest Pool and the QSL Guaranteed Floor Pool don’t need to finalise their pool choices until February 2017.

Remember, to access QSL products including the QSL Harvest Pool, you must nominate QSL as your GEI Sugar Marketer and complete your CSA, GPA and Pool Manager Nomination Form by 31 December, 2016.

Contact your QSL representatives
Daniel Messina p: 0429 660 238 e: daniel.messina@qsl.com.au
or Carla Keith p: 0409 372 305 e: carla.keith@qsl.com.au
for more information or to arrange an appointment.

Wilmar and Tully Sugar growers can register their interest for QSL Marketing Choice at www.qsl.com.au
our industry with stability regarding their future management and use.

We continue to innovate across our pricing, marketing, financing and logistics streams in response to the needs of our members and the industry we serve, with new products, services and contractual arrangements evidence of why we remain a leader in our field.

Our unique value proposition is unparalleled and at the industry’s disposal, so we ask you to consider how you can better tap in to our strengths and expertise to further your own business objectives.

QSL does not fear the future. To the contrary, we are eager to embrace it and we call upon the rest of the industry we serve to join our efforts to capitalise on the promise ahead.

**ABOUT QSL**

A leader in raw sugar marketing, QSL has built an excellent reputation for quality, service and innovation in the international sugar market.

QSL works on behalf of seven millers and around 4000 Australian sugar growers to build sustainable business partnerships with sugar refiners in the Asia-Pacific region and grow the value of the Australian sugar industry for our grower and miller members.

QSL manages the majority of Australia’s raw sugar exports through a unique and innovative pooling system and also operates six Bulk Sugar Terminals in Queensland. Our integrated marketing and export system delivers pricing transparency, stability and optimal returns for Australian sugar millers and cane growers.

For international customers, QSL offers a complete suite of end-to-end supply chain solutions with reliable and consistent supply of Australian premium raw sugar.

QSL’s ‘one-stop-shop’ for sugar exports includes:

- Expertise in Australian sugar quality and performance – providing security of supply and renowned expertise.
- Sophisticated risk and financial management – managing sugar price and foreign exchange exposure, and offering cost-effective financing through the Advances Program.
- Superior shipping and logistics services – providing a range of services in logistics, quality management systems and chartering for a range of supply-chain solutions.
- Product options – a range of products, including raw sugar from origins other than Australia.

To find out more about the advantages QSL offers as a supply partner, please contact http://www.qsl.com.au

**KEY ACHIEVEMENTS FOR 2015–16**

- Meeting our ‘5 for 5’ multi-year safety target, with a Total Recordable Injury Frequency Rate (TRIFR) of 5 as at June 30, 2016.
- Maximised returns through the strategic use of innovative price risk management products and tactical risk management, with 2015-Season QSL-managed pools outperforming the market benchmark on a weighted average basis by $19.61 per tonne IPS (International Polarisation Scale) net.
- Coordinated the successful receipt of $1.9 billion in customer payments, with 98 per cent of shipments delivered in full and on time.
- Secured enhanced marketing returns above the Free On Board (FOB) physical market premium average and maintained our position as the largest marketer of Queensland sugar.
- Reduced our funding costs by entering into a US$200 million syndicated inventory financing agreement and leveraging flexibility within our core $500 million syndicated credit agreement to reduce line fees.
- Expanded grower payment and pricing options via delivery of an accelerated Advance payments schedule for the Guaranteed Floor Pool, with plans to introduce 10-tonne minimum orders for our Target Price Contract product and a longer in-season Fixed Contract pricing window from the 2017 Season.
- Maintained our strong environmental record, with no reportable offences during the reporting period.
- Introduced use of Near Infrared Spectroscopy in export quality management.
- Received industry recognition for QSL’s commitment to youth training and noted improvements in QSL’s annual Women’s Gender Equality Agency compliance report.
- Delivered the Cairns Bulk Sugar Terminal Shed 2 re-roofing project safely, on time and under budget.
- Undertook our inaugural measurement of QSL’s organisational culture using the Human Synergistics Organisational Cultural Inventory.
- Implemented the use of advanced coatings to extend the life of the Bulk Sugar Terminals’ marine concrete structures to potentially 100 years.
- Successfully executed the second year of our Korean Long Term Contract.
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**Milling and Marketing**

This section brought to you in association with
SUGAR Research Australia (SRA) will invest $40.5 million in Research, Development and Extension (RD&E) activities during 2016–17.

SRA CEO Neil Fisher prefaced the SRA Annual Operational Plan saying that “the investment portfolio for 2016–17 reflects our ongoing commitment to delivering on the eight Key Focus Areas (KFAs) within our Strategic Plan and addressing the critical issues currently impacting industry productivity and profitability, specifically the four Impact Areas of: Yellow Canopy Syndrome (YCS); plant breeding (both conventional and genetically-modified (GM)); extension and adoption; and harvesting efficiency.”

Investment in 2016–17 comprises a suite of new projects that will deliver tangible outcomes on-farm and at the mill, including:

- Improving our sugarcane varieties through advanced introgression techniques and selections based on plant vigour;
- Improving industry productivity through the analysis of industry data and demonstration of best practices;
- Addressing new chemical approaches for canegrub control;
- Reducing sugarcane mill boiler maintenance costs and deferring capital expenditure through improved technology;
- Improving identification methods for exotic moth borers and soil-borne pathogens; and,
- Developing a remote sensing platform to assist with yield forecasting and nitrogen management.

SRA will be seeking to enhance their impact by strengthening linkages and collaboration with other rural Research and Development Corporations (RDCs) and research providers, both in Australia and internationally, as well as leveraging partnerships with industry service providers, government agencies and the private sector.

SRA will continue to be fully accountable to our investors through regular open and transparent communication of our performance and progress against the objectives and deliverables in this AOP. Our performance will be reported through our corporate publications, including regular electronic newsletters, quarterly editions of CaneConnection, SRA’s 2015–16 Performance Report and our 2015–16 Annual Report.

SRA’s performance will also be under the spotlight with the undertaking of the first three-yearly Independent Performance Review, which is a requirement of SRA’s Constitution and Statutory Funding Agreement with the Commonwealth Government.

SRA’s Board, researchers and support staff remain committed to delivering positive impacts for investors.

To ensure the company is best positioned to do so, we have endeavoured over the past 18 months to fully align our organisational structure, financial, operational and performance management frameworks with the KFAs outlined in this plan.

During 2016–17, SRA will further enhance this alignment and optimise organisational performance by undertaking the following initiatives:

- Succession and development planning for key research and leadership positions;
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Continued implementation of performance and values-based culture development programs;

- Internal audit reviews covering financial stewardship (budgeting, forecasting and performance monitoring processes and controls), core IT processes and research data management processes and controls; and,

- Establishment of an integrated Intellectual Property management system.

**Impact areas**

A number of issues and challenges were identified by the SRA Board in 2015–16 as requiring more immediate attention and/or greater investment. These were:

- Yellow Canopy Syndrome (YCS);
- Plant breeding (conventional and GM);
- Extension and adoption; and,
- Harvesting efficiency.

**Yellow Canopy Syndrome**

Since YCS was first recognised in early 2012 near Cairns, it has now been found in all sugarcane growing areas from Maryborough in the south to far north Queensland.

Depending on the degree of YCS symptoms experienced, crop growth can be compromised with potential impacts on final yields. Whilst it is difficult at this stage to accurately estimate the financial impact YCS has had on the industry to-date, it is acknowledged that significant losses have been experienced in some impacted areas.

In response to the threat that YCS poses to the industry, SRA (with co-investment from the Queensland Department of Agriculture and Fisheries) has established four substantial research projects since 2014–15. In response to recommendations from an international expert panel in November 2015, a fifth project aimed at potential biotic factors will be initiated in 2016–17.

A number of abiotic factors (water, macro and micronutrients, soil type, heavy metals and some agrochemicals) and biotic factors (known sugarcane pests and diseases, Nigrospora sp., crop age and seed source) have been ruled out as potential causes of YCS.

We now know that YCS is associated with a problem in translocation of sugars out of the leaf and water movement within the sugarcane plant. In combination, these factors reduce photosynthesis, movement of photosynthate and crop performance.

With YCS expanding in its geographical distribution and the subsequent impact the condition is having on crop yield, SRA is continuing to give YCS related research an extremely high priority in 2016–17.

There will be a strong emphasis on water and nutrient translocation, development of a diagnostic test, identification of the causal agent of YCS, genetic variability for YCS impact, abiotic/environmental factors that trigger symptom expression, and potential management strategies.

**Plant breeding (conventional and GM)**

Varieties are the cornerstone of productivity and profitability in the Australian sugarcane industry. Virtually every crop grown by Australian sugarcane farmers uses varieties released from the SRA breeding program.

SRA’s breeding program is recognised as world-class and is successfully delivering genetic gain and value to the industry. But sugarcane growers and millers continue to have high expectations that sugarcane varieties will deliver better ratoonability and productivity (tonnes of cane per hectare (TCH), commercial cane sugar (CCS) and tonnes of sugar per hectare (TSH)).

In 2016, the Variety Approval Committees decided to release five new varieties, SRA4 to SRA8.

Behind the scenes of the core breeding program are activities to broaden the genetic base of sugarcane by germplasm exchanges with international partners, and introgression from wild species. The potential benefits of exploiting foreign germplasm in the SRA breeding program include improvements in key traits such as yield and new sources of useful genes (e.g. disease and pest resistance).

Whilst SRA’s conventional breeding program optimises selection using sugarcane and its close relatives, SRA’s GM program is focussed on broadening the genetic base through the introduction of herbicide-tolerant (HT) traits and the development of high-sucrose sugarcane.

With yield loss attributed to weeds being as high as 13–15 per cent in the Australian sugarcane industry, SRA has been developing,
in collaboration with DuPont, GM HT sugarcane varieties. The current main activities in the GM program involve field evaluation including agronomy, disease and yield evaluation trials at multiple locations, with the majority of HT clones demonstrating high herbicide tolerance. Field assessment and further development of high-sucrose GM sugarcane is also ongoing involving field selection of transgenic clones.

Extension and adoption

Fundamental to obtaining the full value from SRAs investment in R&D is the broad adoption of the outcomes of this research. Current indications suggest that the rate and extent of adoption of new technologies and practice change are sub-optimal in the Australian sugarcane industry.

A number of factors contribute to this situation, including: variable resourcing and capabilities across the industry’s productivity services and broader extension sectors; low profitability; varying capacity and/or interest of growers to adopt new technology; and limited direct interaction between SRA and potential adopters.

To address these issues, SRA is working with industry to review the current extension model with a view to enhancing the transfer of research information and facilitating improved interactions and connections with industry extension providers, in particular productivity services.

Harvesting efficiency

Sugarcane production and profitability are affected by both harvesting and field issues. Research has demonstrated that mechanical harvesting typically results in direct in-field losses which include:

- Extractor losses of 5–25 per cent;
- Pick-up losses of 1–0 per cent; and,
- Chopper losses of 2–8 per cent.

Field conditions impact on extraneous matter (EM) and cane loss, crop presentation (row profile/width) impacts on stool damage and pickup losses, fan speed determines cane loss levels with limited impact on EM and lower pour rates equals lower EM, but this increases harvesting costs. High ground speeds and poor crop presentation/row profiles also result in stool damage that reduces yields in subsequent ratoons.

Cane cleaning greatly improves at lower pour rates, which are achieved by reducing ground speed. The lower ground speed allows a reduction in fan speed, which in turn lowers cane loss, stool damage and soil in cane, but significantly increases the cost of harvesting. High quality cane will have a higher CCS, improving grower returns.

But economic pressures on the harvesting sector drive practices that minimise costs rather than maximise sugar recovery. This then feeds through to the decisions harvester operators have to make to be viable under this scenario:

- Harvesting speed;
- Billet length;
- Fan speed; and,
- Haulout size etc.

To address this issue, a payment system that accounts for the extra cost to implement Harvesting Best Outcomes (HBO) is one way to encourage uptake. The benefits provided by HBO will flow to all sectors of the industry, in particular growers and millers through increased yields (due to reduced losses), increased CCS and improved ratoonability.

With harvesting impacting on raw sugar quality and crop yields, a broader adoption of HBO is an industry priority as it will contribute significantly to the ongoing profitability and sustainability of the entire sugarcane industry value chain. In an effort to increase the rate of adoption of HBO, SRA will focus in 2016–17 on increasing current on-farm applied HBO research activities and working with industry to establish additional regional trials to demonstrate the value of harvesting practice change.

A broad range of research activities will be conducted within the $5.5 million Rural Research and Development for Profit project on harvesting efficiency.

Some specific tasks will include: testing and validating physical cane cleaning systems; modifications to harvesters to improve in-field performance; value chain modelling and economic analysis; software tools to improve and block specific harvesting practices; and extensive trial work to confirm industry opinions. In undertaking these activities, SRA will continue to partner with Wilmar Sugar Australia Limited, MSF Sugar Limited, Isis Central Sugar Milling Company Limited, Bundaberg Sugar Limited, Tully Sugar Limited and Sunshine Sugar Limited.

Drawn from SRAs Annual Operation Plan.
Driverless tractors – the future of agriculture

UNVEILED on August 30 at the Farm Progress Show in the United States, the New Holland concept autonomous tractor is a driverless machine which can perform a wide range of farming tasks day and night. It is also able to reach the field autonomously via private on-farm tracks, to work together with other autonomous or traditional operator controlled machines and courtesy of the cab it can still be driven by an operator ensuring maximum flexibility.

At first glance, the T8 Blue Power tractor on display at the Farm Progress Show may have looked like any other standard tractor to the many visitors who packed New Holland's stand at the Show, the annual outdoor farming machinery show that is held in Boone, Iowa (USA).

But once the first images of the video dedicated to the tractor and its incredible operational capacities appeared on the screen, everyone understood that they were witnessing a glimpse into the future of farming – a future featuring fully autonomous machinery – machinery that could redefine the agriculture of tomorrow.

A further evolution based on efficiency and sustainability

Developed by CNH Industrial in collaboration with Autonomous Solutions Incorporated – an industry leader in off-road autonomous solutions – the autonomous tractor is an unmanned vehicle that is fully autonomous and can be monitored and controlled via a desktop computer or via a portable tablet interface.

This enables farmers to access tractor and implement data, wherever they are, from different locations, whilst checking fields from the comfort of their ute, whilst tending livestock or whilst at home, and always whenever they need. This facilitates right-time decision making to enhance operational efficiency and productivity. Furthermore, farmers will maintain full control and ownership of their data.

A path-plotting screen shows the tractor's progress, another screen shows its live camera feed, providing the user with up to four real time views (two front and two rear). A further screen enables monitoring and modification of key machine and implement parameters such as engine speed, fuel levels and implement settings, including seeding rate or coulter downforce. The route to the field can also be planned, should this involve private roads or tracks.

The concept tractor has been equipped with a seeder, and is able to autonomously seed the next crop straight behind the combine. Using an application installed on a portable device, perfect for supervised automation (such as an operator driving a combine) or on a desktop computer (ideal for the farmer working in his farm office) the tractor and implement parameters can be continually monitored and controlled, and changes can be made if necessary.

Able to work 24 hours a day, seven days a week, the tractor helps to reduce the risks associated with human error as it follows predetermined and optimised plans for all activities. It is able to reach higher levels of productivity and efficiency than traditional methods. It can make full use of the periods of favourable weather for farming operations by working day and night.

In the future, the tractor will be able to completely automate grain handling during the harvest when equipped with a trailer, including unloading, transport and offloading activities.

With regards to getting around the farm, the tractor can travel on pre-mapped private paths. Simply ‘tell it’ where to go and what it has to do once it has reached its destination via private tracks, and the tractor will get to work, either individually or in a convoy.

The concept tractor makes full use of the advanced PLM (Precision Land Management) technology for precision farming.

The tractor follows optimised in-field paths,
which are automatically generated by the software, after having taken into account the size and shape of the field, any pre-existing obstacles and the width of the implement to be used. Furthermore, it will be fully compatible with the full suite of PLM solutions. In the future this concept will be able to utilise previously collected yield data for the variable application of inputs and to carry out operations with maximum precision, year after year. The results are increased operating efficiency and the ability to make the most of short operating windows.

The tractor is able to work alongside other autonomous machines and can also work in tandem with machines driven by an operator.

Thanks to a combination of radar, LiDAR (range finding lasers) and RGB cameras, the tractor is able to detect a wide range of in-field obstacles. If an obstacle is detected, the tractor sends a message to the interactive interface and the person responsible for the farming operations will decide if and how the tractor can avoid or bypass the obstacle.

**Two tractors in one: Maximum flexibility**

The concept tractor is equipped with a cab that is completely identical to that of a standard T8. This means that it can also be used for those operations where complete autonomy is not yet possible, such as front end loader work and high speed road transport.

It is conceivable, that in the future the complete tractor range as well as other agricultural equipment could be equipped with this technology. Furthermore it is possible that the cab will be completely removed in future autonomous tractors.

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**R&D organisations contact details**

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<tr>
<th>Advertisement</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AgSafe</td>
<td>77</td>
</tr>
<tr>
<td>ACFA</td>
<td>IBC</td>
</tr>
<tr>
<td>Angus Flexible Pipes</td>
<td>21, 23, 80</td>
</tr>
<tr>
<td>Aon</td>
<td>18</td>
</tr>
<tr>
<td>Barcoo</td>
<td>14</td>
</tr>
<tr>
<td>Bayer</td>
<td>76</td>
</tr>
<tr>
<td>Big Tyre</td>
<td>7, 16, 17, 80</td>
</tr>
<tr>
<td>Bonfiglioli</td>
<td>59, 78</td>
</tr>
<tr>
<td>Case IH</td>
<td>OBC, 2, 78, 79</td>
</tr>
<tr>
<td>Charlton’s Fishing</td>
<td>49</td>
</tr>
<tr>
<td>Countryco Training</td>
<td>20, 77</td>
</tr>
<tr>
<td>Crop Care</td>
<td>45, 47, 76</td>
</tr>
<tr>
<td>Dinner Plain</td>
<td>60</td>
</tr>
<tr>
<td>Eco Catalysts</td>
<td>77</td>
</tr>
<tr>
<td>Ergon Energy</td>
<td>13, 77</td>
</tr>
<tr>
<td>Incitec Pivot</td>
<td>35-42, 76</td>
</tr>
<tr>
<td>John Deere</td>
<td>25</td>
</tr>
<tr>
<td>Lindsay Irrigation</td>
<td>9, 77</td>
</tr>
<tr>
<td>Lowes Petroleum</td>
<td>29, 80</td>
</tr>
<tr>
<td>McDonald Murphy Machinery</td>
<td>27, 79</td>
</tr>
<tr>
<td>Mojo Motorcycles</td>
<td>15, 80</td>
</tr>
<tr>
<td>New Holland</td>
<td>69, 79</td>
</tr>
<tr>
<td>Nutrifert</td>
<td>76</td>
</tr>
<tr>
<td>QSL</td>
<td>63, 79</td>
</tr>
<tr>
<td>Shute Upton Engineering</td>
<td>65, 78</td>
</tr>
<tr>
<td>Sumitomo</td>
<td>5, 77</td>
</tr>
<tr>
<td>The Gate</td>
<td>6</td>
</tr>
<tr>
<td>Trailco Irrigation</td>
<td>55, 77</td>
</tr>
<tr>
<td>Valmont</td>
<td>11, 78</td>
</tr>
</tbody>
</table>