

IRRIGATION PRICES IN THE QUEENSLAND SUGARCANE REGIONS

**AN ANALYSIS OF THE COMMUNITY BENEFITS
AND COSTS OF IMPROVED IRRIGATION PRICING**

WHO WE ARE

AUSTRALIAN SUGAR MILLING COUNCIL

The Australian Sugar Milling Council (ASMC) is the peak representative body for the sugar manufacturing sector, representing the five companies that collectively produce approximately 90% of Australia's raw sugar at 17 sugar mills across Queensland.

These mills also own and operate large sugarcane farms.

Sugar manufacturing generates around \$2 billion in revenue annually – 75% of which comes from global raw sugar sales.

The Australian sugar industry – including millers and growers – is responsible for \$4 billion in annual economic activity and underpinning 23,000 jobs in regional Queensland.

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EXECUTIVE SUMMARY

ASMC POLICY RECOMMENDATION

The Australian Sugar Milling Council (ASMC) is calling for a 15-25% reduction in the Queensland Competition Authority (QCA) proposed water tariffs between 2020/21 – 2023/24 for all Water Supply Schemes.

Key Points

- Total costs for sugarcane (cane) field irrigation would increase from around \$39 million in 2006/07 to \$79 million by 2023/24 on a constant consumption basis if the QCA's draft 2020/21 – 2023/24 irrigation price recommendations were adopted. This would represent a 4% per annum increase between 2006/07 and 2023/24.
- Water represents upwards of 15% of a cane irrigator's total farm costs. A significant increase in irrigation prices coupled with the current, persistently low sugar (and cane) prices would increase total cane costs above *long-run* revenues. This will exacerbate the current under-utilisation of water allocations and contribute to the flat lining of cane yields currently being observed in all irrigated cane areas. Stagnant and falling cane volumes and mill under-utilisation threatens the viability of mills because 70% of manufacturing costs are fixed and these costs are increasing.
- A 25% price decrease in the proposed 2020/21 – 2023/24 irrigation prices in the Mareeba-Dimbulah, Burdekin-Haughton, Pioneer River, Eton, Bundaberg and the Lower Mary River Water Supply Schemes (WSSs) (to various pre-2016 levels) could increase water usage by 130,400 ML or 4% over these four years.
- Cane production could also increase by 1.3 million tonnes which would deliver the following community benefits over the 2020/21 – 2023/24 period:

BENEFITS

1. Improved mill sustainability via the generation of an additional \$88.3 million in raw sugar, molasses and energy revenues (output).
2. Queensland regional development via the generation of an additional \$131.9 million in indirect output (\$220 million in total output). This \$220.3 million in total output generates \$41.7 million in incomes, an additional 140 direct and indirect jobs throughout sugar communities and \$87.9 million in value add (Gross State Product).
3. Lower risk of stranded water assets via an increase in the utilisation of water allocations, which lowers the socialisation of costs from non-users on to users, making Water Supply Schemes (WSS) more affordable and viable.
4. Environmental gains via reduced losses of nitrogen and herbicides.

COSTS

- (1) SunWater's revenues would fall by \$68 million as a result of the lower water prices (but increasing consumption).

1

INTRODUCTION

Approximately two-thirds of the state's sugarcane (cane) production requires affordable and reliable water supply. The combined impacts of sustained, low global sugar and cane prices, and increasing cane production costs is resulting in flat lining cane yields and reductions in the area of cane under cultivation. Falling cane volumes threatens the viability of certain Australian sugar mills because of the high percentage (70%) of fixed costs. A significant source of increasing costs in irrigated cane farming is regulated irrigation (water) charges.

This paper examines the increase in these charges since 2006/07 and assesses the increasingly negative impact on cane farming and sugar milling operations. The economic and environmental benefits of achieving more prudent and economically efficient water pricing are also outlined.

2

BACKGROUND

The Queensland Competition Authority (QCA) delivered its report '*Rural irrigation price review 2020-24*' to the Deputy Premier and the Minister for Natural Resources, Mines and Energy on 31 January 2020.

Like numerous reports before it, this report recommends to the Queensland Government further substantive increases in irrigated water prices between 2020/21 and 2023/24 (and beyond).

The government will now consider the QCA's findings, and the views of stakeholders, and make a decision on future prices. This decision comes at a critical time – with sugar and cane prices at decade low levels and the industry financially impaired, regional economies hurting, utilisation of water allocations falling and stranded asset risk now emerging.

In guiding its decision, government will need to consider a variety of objectives including the price levels that will promote economic efficiency and outcomes that are in the broader public interest. In keeping with the original regional development objectives of the state's water supply schemes (WSSs), the question then becomes, at what price levels are allocation holders incentivised to better utilise their allocations and irrigate optimally to maximise regional development and environmental outcomes?

2.1 DETERMINATION OF IRRIGATION PRICES

The Queensland Government sets the price of irrigation water supplied by SeqWater in South-East Queensland and SunWater elsewhere in Queensland to recover the associated costs of the infrastructure.

Of relevance to the sugar industry are SunWater's bulk and distribution water charges, proposed by SunWater but ultimately subject to QCA scrutiny and determination.

Prices are set following a QCA review process generally covering a 4–5 year period. The QCA recommends prices to government, which makes the final decision. Government has a number of regulatory pricing principles¹ for the water sector to guide its decision making. These principles include, inter alia, economic efficiency and the public interest.

1 <https://www.qca.org.au/project/queensland-wide-issues/water-pricing-principles/>

THE INCREASE IN IRRIGATION PRICES SINCE 2006/07

Sugarcane growers in the drier areas of the state consume water from a variety of sources including dams, groundwater and rivers, creeks with water pumped or gravity fed into irrigation channels and irrigation pipelines.

These sources are grouped into WSSs including the Mareeba-Dimbulah, Burdekin-Haughton, Pioneer River, Eton, Bundaberg and the Lower Mary River. With the exception of Pioneer River and now Eton who have water boards in place to manage distribution, all schemes are owned and operated by SunWater with all bulk water and distribution prices determined through QCA regulatory price determinations.

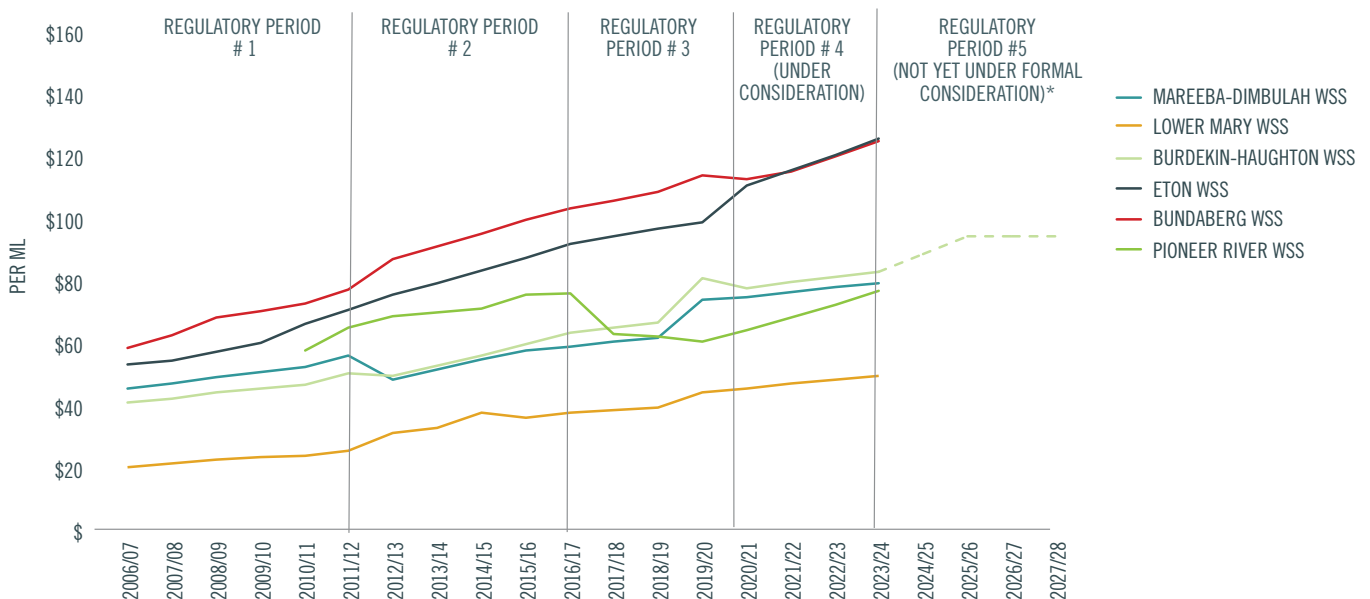
Chart 1 shows the total fixed and variable charges (per ML or megalitre) for water and distribution in these WSSs between 2006/07 and the current 2020/21-2023/24 regulatory period. The anticipated increases in the Burdekin-Haughton beyond the current regulatory period (from 2025) is also provided. Between 2006/07 and 2023/24 irrigation charges would have increased 75% for the Mareeba-Dimbulah, 104% for the Burdekin-Haughton, 115% for the Bundaberg, 149% for the Lower Mary and 138% for the Eton. For the period, 2010/11-2023/24, prices would have increased 33% in the Pioneer River WSS (all values are expressed in nominal dollars).

Chart 2 converts these per ML charges to an estimated total spend amount per WSS over the same period given estimated and fixed levels of consumption to work out an 'all industry' impact. Of note is that in 2006/07 irrigators in the cane WSSs would have spent approximately \$39 million on water (in nominal dollars). By 2023/24, irrigators in the same cane WSSs would have spent approximately \$79 million on water (assuming constant levels of consumption). This represents a 104% increase, or more than a doubling of total costs across six WSSs.

Chart 3 converts these per annum increases in bulk and distribution irrigation charges into CAGRs (compound average growth rate) estimates. Of note is that the price increases are in 'distribution' (as opposed to the 'bulk water'), with increases of between 4-6.5% per annum recorded (much higher than CPI at 1.8% per annum over this period).

Chart 4 examines which cost factors are driving the increase in distribution costs in particular, and the percentage contribution of each factor to these higher prices. Of note are the significant contributions of higher electricity and local area support cost allocations to the increases in distribution costs. Electricity in this context refers to the regulated electricity prices that SunWater are compelled to pay and local area support refers to scheme resources (be that bulk water or distribution related) as opposed to corporate resources.

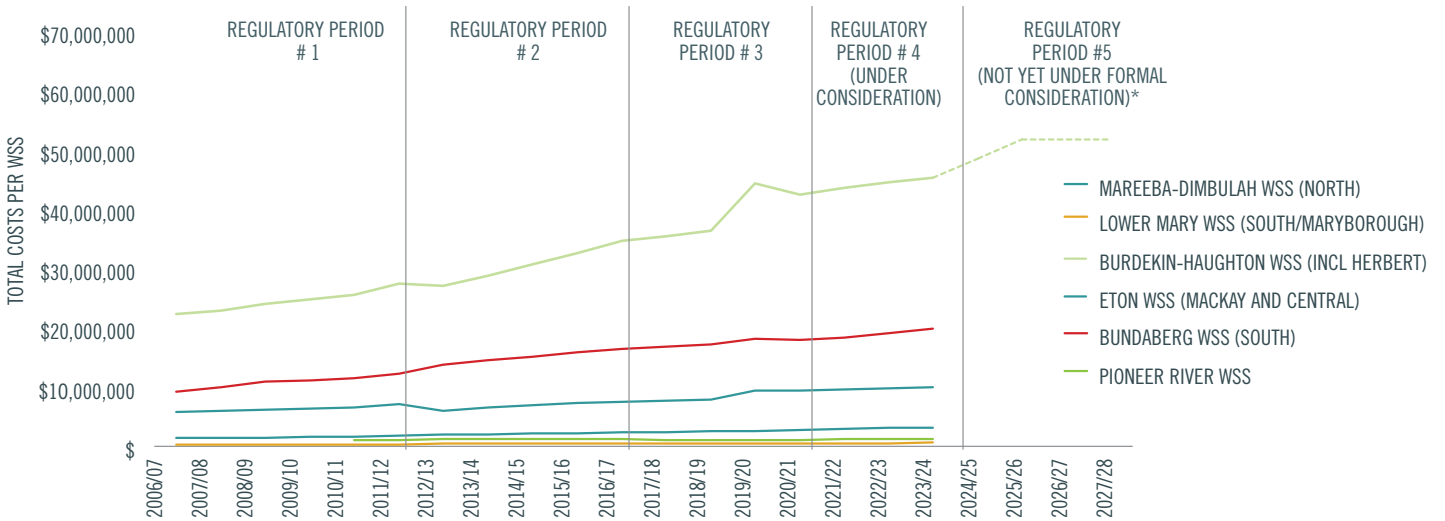
CHART 1: QUEENSLAND SUGAR INDUSTRY WATER COSTS BY WATER SUPPLY SCHEME (PER ML)



Source: QCA, SunWater

Assumptions: * As outlined by the QCA in the Burdekin-Haughton Feb 2020 fact sheet (\$11.57/ML increase on the 2023/24 price)

CHART 2: TOTAL QUEENSLAND SUGAR INDUSTRY WATER COSTS BY WATER SUPPLY SCHEME



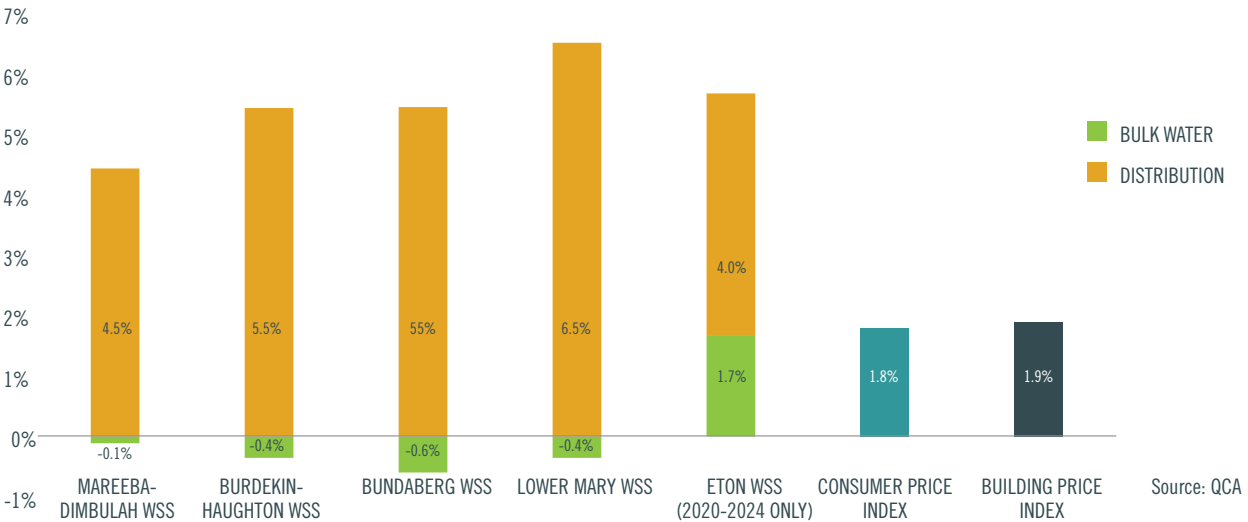
Source: QCA, SunWater

Assumptions:

The following consumption in each WSS in each year: B-H 538,771 ML, Eton 24,767 ML, M-D 123,753 ML, Pioneer River 16,101, Bundaberg 155,785 ML, LM River 10,768 ML

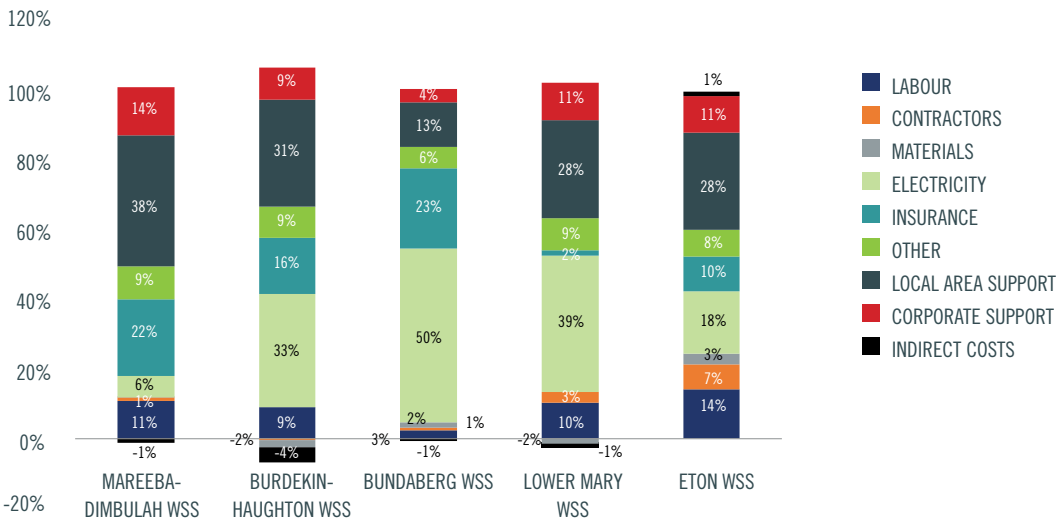
* As discussed by the QCA in the Burdekin-Haughton fact sheet (\$11.57/ML increase on the 2023/24 price)

CHART 3: COMPOUND AVERAGE GROWTH RATE INCREASES IN QCA REGULATED BULK WATER AND DISTRIBUTION CHARGES (2006/07-2024/25)



Source: QCA

CHART 4: PERCENTAGE CONTRIBUTION OF EACH COST DRIVER TO THE INCREASES IN DISTRIBUTION CHARGES BETWEEN 2006/07 AND 2024/25



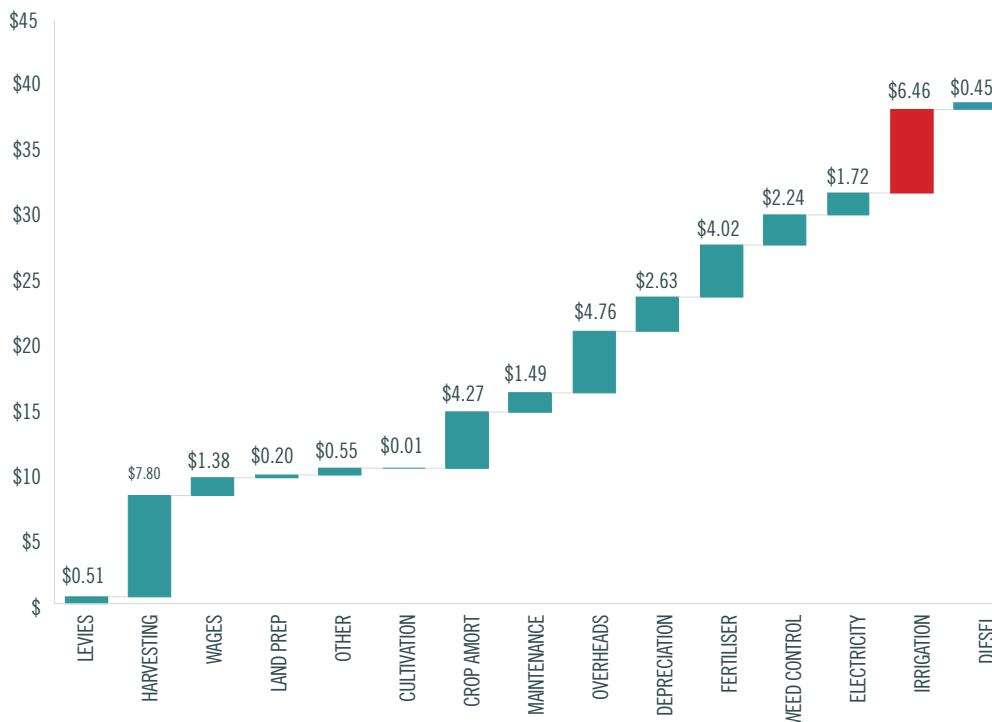
Source: QCA, SunWater

THE IMPACT ON GROWERS AND MILLERS

4.1 SUGARCANE GROWERS

It is estimated that water costs (bulk and distribution) on irrigated cane land can represent at least 15 percent (and up to 25%) of all operating costs (**Chart 5**).

CHART 5: IRRIGATION COSTS AS A PERCENTAGE OF ALL IRRIGATED CANE FARM COSTS



Source: ASMC member company

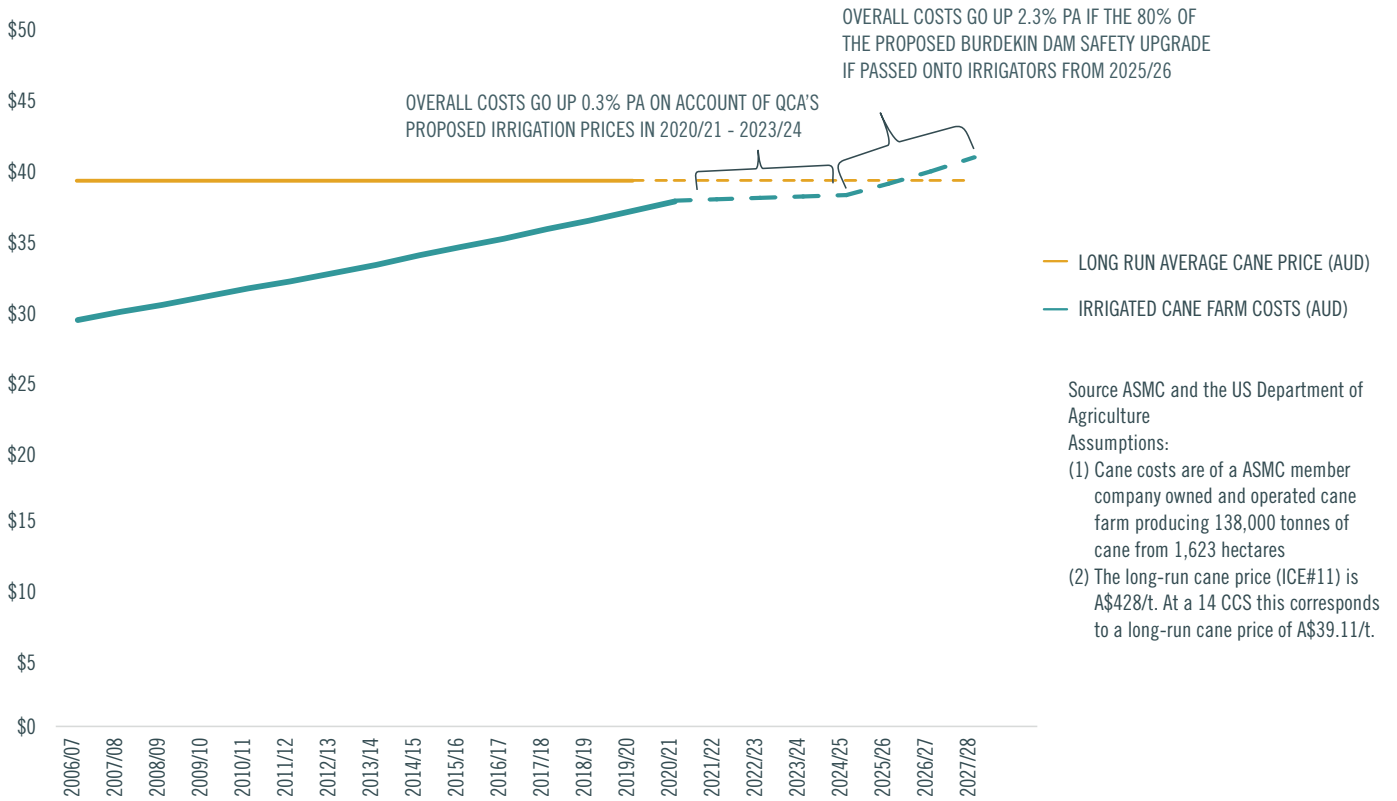
The significant increases in water costs and subsequent large water bills that are typically payable outside of the cane payment periods are having a significant impact on grower behaviour – including cash flow concerns and in the absence of informed and accurate assessments, a reticence to irrigate especially during low sugar (and cane) price periods such as that being experienced currently.

A WSS of particular concern is the Burdekin-Haughton – being the largest WSS by volume irrigated. An ASMC member's operated cane farm in the Burdekin, **Chart 6** shows the impact of the proposed \$11.57/ML increase² in water prices from 2025/26 onwards on account of the proposed \$300 million+ Burdekin dam safety upgrade and compares that to the long run cane price to assess affordability.

Between 2006/07 and today it is estimated that cane farming costs have increased 1.8% per annum (in line with CPI). If the QCA's 2020/21 – 2023/24 recommendations were to be adopted total farming costs would go up 0.3% per annum alone during the 2020/21-2023/24 regulatory period and up 2.3% per annum once the anticipated \$11.57/ML increase is passed on from 2025/26. These increases do not include other potential cost increases from fuel, fertiliser etc. Of significance also is that at likely costs exceeding \$41/tonne cane from 2025/26, growing cane is not commercial at long run prices of \$39.11/tonne cane.

² ASMC believes that the costs of this proposed upgrade should not be considered an improvement cost that provides benefits to the growers but a statutory cost imposed by government for the benefit of local communities. It therefore should not be a grower water price cost but a Community Service Obligation.

CHART 6: IMPACT OF INCREASING IRRIGATION CHARGES IN THE BURDEKIN



Sufficient volumes of water applied at appropriate times can significantly improve the amount of cane that is grown and, by inference, the volume of sugar extracted from the cane. A common and unhelpful characterisation of cane irrigation is that it is derived – meaning it is highly variable according to changes in commodity prices, on-farm costs and rainfall conditions. The reality is that 67% of the state's cane production is either totally, extensively or moderately dependent on irrigation (Table 1) meaning that water needs to be applied consistently season-to-season for optimal growth and yield. This in turn requires appropriate pricing that ensures the water is affordable across the commodity cycle and the utilisation of allocations is maintained if not increased given the strong linear relationship between water application and cane growth during the growing season.

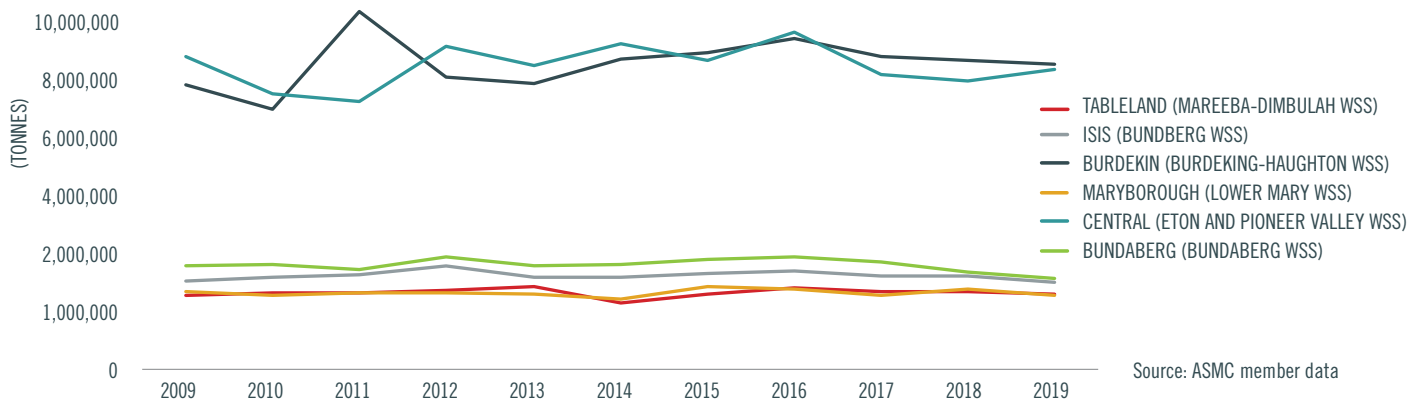
TABLE 1: IRRIGATION REQUIREMENTS OF THE QUEENSLAND CANE FIELDS

WATER SUPPLY SCHEME	MILL AREA	IRRIGATION REQUIREMENTS	2019 CANE PRODUCTION	% THAT IS TOTAL, EXTENSIVE OR MODERATE
Mareeba-Dimbulah	North (1 mill)	Total	619,769	
Burdekin-Haughton	Burdekin (4 mills)	Total	7,909,070	
Bundaberg	South (3 mills)	Extensive supplementary	2,067,712	
Lower Mary	South (1 mill)	Extensive supplementary	592,216	67%
Pioneer River	Central (1 mill, 2 x 0.5 mills)	Moderate supplementary	3,098,844	
Eton	Central (1 mill, 2 x 0.5 mills)	Moderate supplementary	3,098,844	
Not considered	Central (1 mill)	Moderate supplementary	1,546,803	
Not considered	North (4 mills)	Limited supplementary	5,261,968	33%
Not considered	Herbert (2 mills)	Limited supplementary	4,055,702	
	20 mills	Total	28,250,928	100%

Sources: ASMC member statistics and Sugar Research Australia publication, Manual of Cane growing

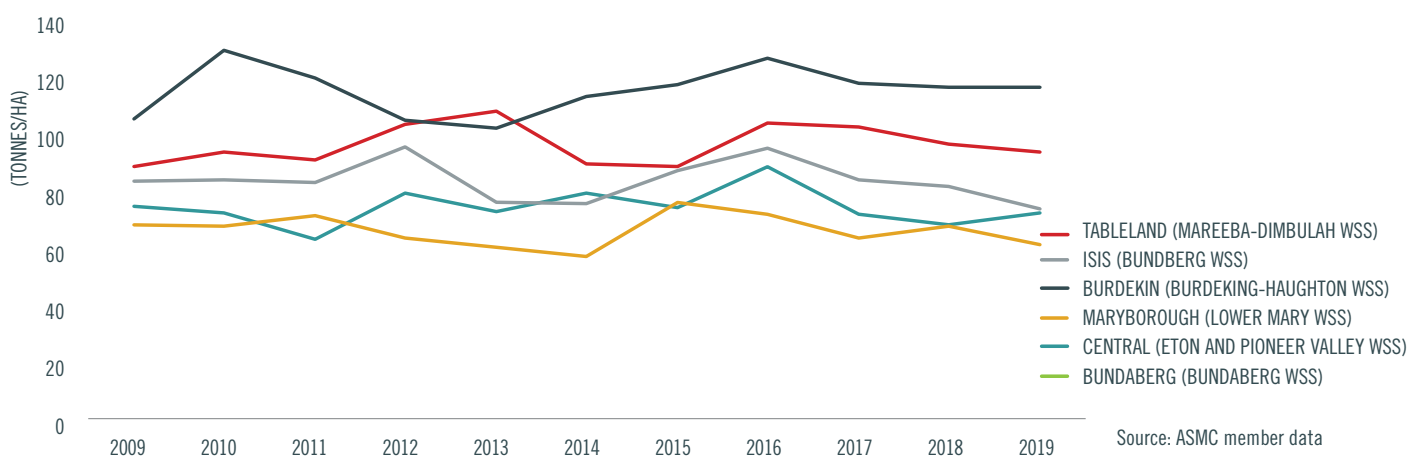
Whilst a number of factors can influence cane yield and production, including genetics (e.g. cane variety and disease resistance), environmental (e.g. optimal sunshine, temperature and rainfall), and farming practices (e.g. rate of nitrogen application), the efficient application of water is a highly significant variable that can be controlled with the appropriate price incentives. To date, cane yield and production performance in the state's irrigation areas have been poor, with no discernible improvements recorded over the last decade (Charts 7 and 8).

CHART 7: CANE PRODUCTION BY MILL AREA (AND WATER SUPPLY SCHEME)



Source: ASMC member data

CHART 8: CANE YIELD BY MILL AREA (AND WATER SUPPLY SCHEME)



Source: ASMC member data

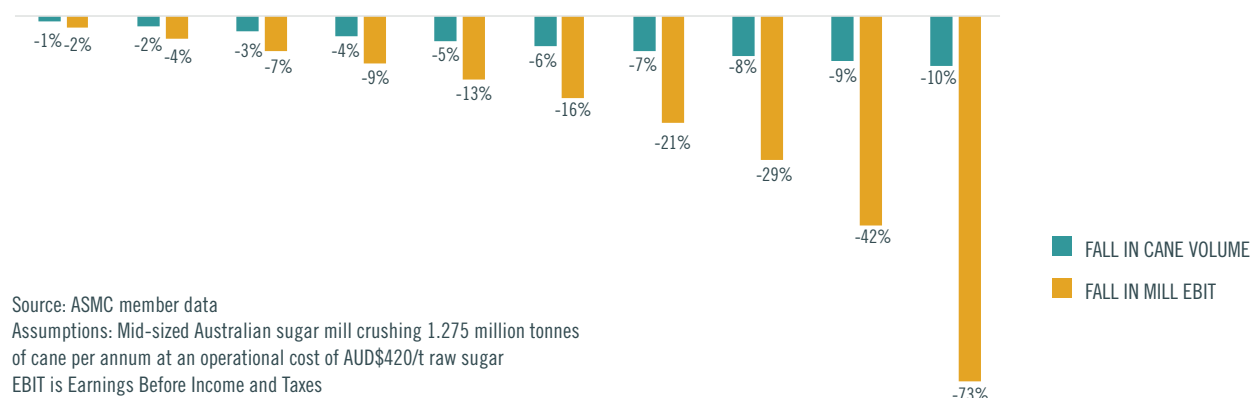
4.2 SUGAR MILLERS

In 2019, Queensland’s 20 sugar mills manufactured around 4 million tonnes of raw sugar from around 28 million tonnes of cane. All of the state’s sugar mills, with the exception of Tully, has ample manufacturing capacity and consistent with ASMC’s Revitalisation Strategy, requires improvements in cane volume (through yield or maintaining or increasing area under) to maintain viability.

Advice from ASMC members is that because almost 70 percent of all mill costs are fixed (e.g. maintenance, overheads and depreciation) small reductions in cane volume and increasing under-utilisation of the mill can have significant impacts on earnings (EBIT).

For example, **Chart 9** shows that a five percent decrease in cane volume can decrease milling EBIT by 13 percent. ASMC estimates that with average costs in the vicinity of A\$420/ tonne of raw sugar, all Queensland mills are losing money at today’s price of A\$413/t.

CHART 9: IMPACT ON MILL EBIT FROM VARIOUS DECREASES IN CANE SUPPLY



Source: ASMC member data
 Assumptions: Mid-sized Australian sugar mill crushing 1.275 million tonnes of cane per annum at an operational cost of AUD\$420/t raw sugar
 EBIT is Earnings Before Income and Taxes

5.1 REDUCED STRANDED ASSET RISK

Table 2 from the QCA's Final Report (Part B: SunWater) outlines the QCA's recommended water usages (as a percentage of water allocation entitlements [WAEs]) for the current 2020/21 – 2023/24 regulatory period. Of note is that when compared to the 2012 forecasts, there is significant under-utilisation (values significantly less than 100%) of WAEs across all of the cane irrigation WSSs and falling utilisation in a number of WSSs (Burdekin-Haughton, Eton, Mareeba and Pioneer namely). Falling usage is a significant issue as higher costs are often placed on a smaller pool of irrigators thereby leading to the so-called 'death spiral' of higher prices/increasing unaffordability/lower usage and stranded assets.

TABLE 2: QCA AND SUNWATER ESTIMATES OF WATER USAGE IN QUEENSLAND WATER SUPPLY SCHEMES

WSS	QCA 2012 REVIEW (FORECAST) (%)	SUNWATER PROPOSED (SIMPLE 15-YEAR AVERAGE) (%)	QCA RECOMMENDED (SIMPLE 20-YEAR AVERAGE) (%)
Barker Barambah	55	38	42
Bowen Broken Rivers	43	39	37
Boyne River and Tarong	54	50	56
Bundaberg	47	44	47
Burdekin-Haughton	56	55	55
Callide Valley	52	58	62
Chinchilla Weir	61	54	58
Cunnamulla	74	61	59
Dawson Valley	71	57	62
Eton	54	39	42
Lower Fitzroy	70	66	66
Lower Mary	33	28	33
Macintyre Brook	81	64	63
Maranoa River	6	3	3
Mareeba-Dimbulah	69	65	65
Nogoa-Mackenzie	83	70	73
Pioneer River	62	43	42
Prosperpine River	62	43	42
St George	94	84	89
Three Moon Creek	51	38	42
Upper Burnett	66	53	57
Upper Condamine	54	45	45

Source: SunWater, sub. 45, SunWater, 2000-01 Annual Report, 2001, pp. 42-43; SunWater, 2001-02 Annual Report, 2002, p. 54-55; DNR Annual Water Statistics 1999-2000; QCA analysis

5.2 SHORING UP MILL VIABILITY THROUGH GENERATION OF ADDITIONAL REVENUES AND EARNINGS

Additional cane volumes generate significant revenue benefits for mills not only because of the additional sugar produced. Revenue can also be generated from molasses and co-generated power sales. **Chart 9** shows that additional cane supply assists earnings (profits) and mill viability by improving mill utilisation and amortising the high fixed costs over greater tonnes of sugar.

5.3 REGIONAL DEVELOPMENT

With the assistance of Lawrence Consulting³, ASMC has assessed the socio-economic benefits of improved irrigation water price incentives to Queensland. That is, compared to the 'baseline' (the scenario whereby the QCA's 2020-21 -2023/24 prices are adopted) what would be the potential increase in cane, sugar, molasses and energy production and more broadly, community output, incomes, employment and Gross State Product (i.e. value add) if irrigation prices were affordable over this four year period.

In undertaking this analysis, a number of assumptions have been made, including the responsiveness of cane growers to lower costs.

Economic modelling under two scenarios was undertaken:

- (1) A 15% reduction in the QCA proposed prices between 2020/21 – 2023/24 in the six WSSs, and
- (2) A 25% reduction in QCA proposed prices between 2020/21 – 2023/24 in the six WSSs.

The assumptions are outlined at **Attachment 1**.

The scenarios are compared to the baseline of:

- The QCA's proposed 2020/21 – 2023/24 irrigation prices are adopted.
- Consuming 3,479,782 ML of water, the industry produces 69,545,821 tonnes of cane in the mill areas serviced by the Mareeba-Dimbulah, Burdekin-Haughton, Pioneer River, Eton, Bundaberg and the Lower Mary River WSSs over the period 2020/21 – 2023/24.
- SunWater generates \$307.2 million in revenue from this consumption between 2020/21 – 2023/24.

5.3.1 Findings of economic modelling

Scenario 1: Irrigation prices between 2020/21-2023/24 are 15% lower than that proposed by the QCA (refer Table 5 for ML prices)

Results:

- Cane farmer earnings increase in the six WSSs by 2.25% per annum.
- Cane production in the six WSSs increases 1.125% per annum or 782,390 tonnes to 70,328,212 tonnes between 2020/21-2023/24.
- Water consumption in the six WSSs increases by 78,239 ML to 3,558,021 ML between 2020/21-2023/24 (all savings are used to purchase more water).
- SunWater's revenues fall by \$40.1 million between 2020/21-2023/24 at the lower prices, but higher levels of consumption.
- The increased water consumption and cane production generates \$53 million in additional sugar, molasses and energy production between 2020/21-2023/24 and another \$79.2 million in indirect output (refer **Table 3**).
- This \$132.2 million in total output generates \$25 million in incomes and an additional 84 direct and indirect jobs throughout sugar communities (refer **Table 3**).
- This 132.2 million in total output is the equivalent of \$52.8 million in value add (Gross State Product) (refer **Table 4**).

³ Full report can be found at: <https://asmc.com.au/wp-content/uploads/2020/04/Economic-Impact-of-Improved-Irrigation-Pricing-on-Qld-Sugar-Manufacturing-Industry.pdf>

TABLE 3: ECONOMIC BENEFITS OF A 15% REDUCTION IN WATER PRICES BY MILL AREA AND WSS

MILL AREAS AND MILLS	NORTH (TABLELAND)	BURDEKIN (PIONEER, INKERMANN, INVICTA, KALAMIA)	SOUTH (BUNDABERG AND ISIS)	SOUTH (MARYBOROUGH)	CENTRAL (FARLEIGH, 0.5X RACECOURSE, 0.5X MARIAN)	CENTRAL (PLACE CREEK, 0.5X RACECOURSE, 0.5X MARIAN)	TOTAL QLD
WATER SUPPLY SCHEME	MAREEBA-DIMBULAH	BURDEKIN-HAUGHTON	BUNDABERG	LOWER MARY	PIONEER RIVER	ETON	
Direct	1.6	25.2	6.4	1.7	9.0	9.0	53.0
Indirect	1.4	22.7	5.8	1.6	8.2	8.2	47.9
Consumption	0.9	14.8	3.8	1.0	5.4	5.4	31.2
Total	3.9	62.7	16.0	4.4	22.6	22.6	132.2
Income (\$m)							
Direct	0.2	3.3	0.9	0.2	1.2	1.2	7.1
Indirect	0.3	4.7	1.2	0.3	1.7	1.7	9.9
Consumption	0.2	3.8	1.0	0.3	1.4	1.4	8.0
Total	0.7	11.8	3.0	0.8	4.3	4.3	25.0
Employment (fte persons)							
Direct	1	9	2	1	3	3	19
Indirect	1	17	4	1	6	6	35
Consumption	1	14	4	1	5	5	29
Total	2	40	10	3	14	14	84
Value added (\$m)							
Direct	0.4	6.2	1.6	0.4	2.2	2.2	13.0
Indirect	0.7	10.7	2.7	0.7	3.9	3.9	22.6
Consumption	0.5	8.1	2.1	0.6	2.9	2.9	17.2
Total	1.6	25.1	6.4	1.7	9.0	9.0	52.8

Scenario 2: Irrigation prices between 2020/21-2023/24 are 25% lower than that proposed by the QCA (refer Table 5 for ML prices).

Results:

- Cane farmer earnings increase in the six WSSs by 3.75% per annum.
- Cane production in the six WSSs increases 1.88% per annum or 1,303,984 tonnes to 70,849,806 tonnes between 2020/21-2023/24.
- Water consumption in the six WSSs increases by 130,398 ML to 3,610,180 ML between 2020/21-2023/24 (all savings are used to purchase more water).
- SunWater's revenues fall by \$68 million between 2020/21-2023/24 at the lower prices, but higher levels of consumption
- The increased water consumption and cane production generates \$88.3 million in additional sugar, molasses and energy production between 2020/21-2023/24 and another \$131.9 million in indirect output (refer **Table 4**).
- This \$220.3 million in total output generates \$41.7 million in incomes and an additional 140 direct and indirect jobs throughout sugar communities (refer **Table 4**).
- This \$220.3 million in total output is the equivalent of \$87.9 million in value add (Gross State Product) (refer **Table 4**).

TABLE 4: ECONOMIC BENEFITS OF A 25% REDUCTION IN WATER PRICES BY MILL AREA AND WSS

MILL AREAS AND MILLS	NORTH (TABLELAND)	BURDEKIN (PIONEER, INKERMAN, INVICTA, KALAMIA)	SOUTH (BUNDABERG AND ISIS)	SOUTH (MARYBOROUGH)	CENTRAL (FARLEIGH, 0.5X RACECOURSE, 0.5X MARIAN)	CENTRAL (PLACE CREEK, 0.5X RACECOURSE, 0.5X MARIAN)	TOTAL QLD
WATER SUPPLY SCHEME	MAREEBA-DIMBULAH	BURDEKIN-HAUGHTON	BUNDABERG	LOWER MARY	PIONEER RIVER	ETON	
Output (\$m)							
Direct	2.6	42.0	10.7	2.9	15.1	15.1	88.3
Indirect	2.4	37.9	9.6	2.6	13.7	13.7	79.9
Consumption	1.5	24.6	6.3	1.7	8.9	8.9	52.0
Total	6.5	104.6	26.6	7.3	37.7	37.7	220.3
Income (\$m)							
Direct	0.3	5.6	1.4	0.4	2.0	2.0	11.8
Indirect	0.5	7.8	2.0	0.5	2.8	2.8	16.5
Consumption	0.4	6.3	1.6	0.4	2.3	2.3	13.4
Total	1.2	19.7	5.0	1.4	7.1	7.1	41.7
Employment (fte persons)							
Direct	1	15	4	1	5	5	32
Indirect	2	28	7	2	10	10	59
Consumption	1	23	6	2	8	8	49
Total	4	66	17	5	24	24	140
Value added (\$m)							
Direct	0.7	10.4	2.6	0.7	3.6	3.6	21.6
Indirect	1.1	17.9	4.6	1.2	6.4	6.4	37.7
Consumption	0.8	13.6	3.5	0.9	4.9	4.9	28.6
Total	2.6	41.8	10.6	2.9	15.0	15.0	87.9

5.4 ENVIRONMENTAL

Table 1 demonstrated that 67% of the state's cane production is either totally, extensively or moderately dependent on irrigation. This reflects the gap between 'potential crop water use' and 'effective rainfall' that needs to be filled. 'Potential crop water use' is the amount of water required to grow a stress-free crop, so that it reaches its potential yield and 'effective rainfall' is the total rainfall less the losses to both runoff and deep drainage. A lack of effective rain has a significant influence on the potential yield, nitrogen use efficiency and levels of herbicides needed.

Nitrogen (N) fertilisers are applied when the cane crop is young and small. Water-stressed crops grow more slowly i.e. they develop at a slower rate (accumulate less biomass) and therefore take up lower amounts of N than a well-watered crop. Organic nitrogen stored in soil is at risk of being lost to the environment in the form of nitrites or nitrates. Irrigated crops therefore assist in maximising crop biomass development and nitrogen uptake during the early growth periods which are considered the risk periods for N losses.

The same logic applies to herbicide use. Weed problems are higher risk when the crop is small and developing and are exaggerated in water-stressed crops which are not growing. As weeds tend to out compete water-stressed cane and need to be actively growing (not stressed) for the herbicide to have maximum efficacy, actively-growing, well-watered crops require the minimum amount of herbicide (and likely a different suite of products which are usually considered 'softer on the environment' due to its chemistry and/or the timing of application compared to the onset of the wet season).

Growers also utilise a number of techniques to minimise run-off and to ensure the optimal amount of water is applied to the crop. For example, there is greater conversion to increased precision and control through winches that allow Lateral Move and Centre Pivot irrigators and increasing automation and recycle pits in furrow irrigation management.

ATTACHMENT 1: ECONOMIC MODELLING ASSUMPTIONS

- In 2018, Lawrence Economic Consulting for the ASMC developed a full input-output economic model of the Queensland sugar industry. This model estimates Gross State Product, income, outputs and employment at various regional levels (e.g. Local Government Areas) from either mill value of production estimates or mill expenditure estimates (i.e. wages and other purchases etc.) Estimates of the sugar industry's full socio-economic contribution in 2017/18 were published at <https://asmc.com.au/wp-content/uploads/2019/01/Economic-Impact-of-Qld-Sugar-Manufacturing-Industry-2017-18-Report.pdf>
- The same economic model was utilised to estimate the full socio-economic benefits to Queensland of two sets of reductions in irrigation prices. That is, for the Mareeba-Dimbulah, Burdekin-Haughton, Pioneer River, Eton, Bundaberg and the Lower Mary River WSS's, all of the water and distribution (fixed and variable) charges proposed by the QCA for 2020/21 – 2023/24 are reduced by 15% and 25% (Table 5). These reduced prices are equivalent to numerous pre-2019 prices. For example, a 15% reduction in the Mareeba-Dimbulah irrigation price in 2020/21 to \$64 ML is generally equivalent to the 2018/19 price whilst a 25% reduction in the Bundaberg irrigation price in 2020/21 to \$86 ML is generally equivalent to the 2012/13 price.

TABLE 5: QCA PROPOSED PRICES AND 15% AND 25% DECREASES

	Year	Mareeba-Dimbulah WSS	Burdekin-Haughton WSS	Bundaberg WSS	Pioneer River WSS	Lower Mary WSS	Eton WSS
Reg period 1	2006/07	\$46	\$41	\$59		\$20	\$54
	2007/08	\$47	\$42	\$63		\$21	\$55
	2008/09	\$50	\$44	\$69		\$23	\$58
	2009/10	\$51	\$46	\$71		\$23	\$61
	2010/11	\$53	\$47	\$74	\$58	\$24	\$67
	2011/12	\$57	\$51	\$78	\$66	\$26	\$72
Reg period 2	2012/13	\$49	\$50	\$88	\$70	\$31	\$76
	2013/14	\$52	\$53	\$92	\$71	\$33	\$80
	2014/15	\$55	\$57	\$97	\$72	\$38	\$85
	2015/16	\$58	\$60	\$101	\$77	\$36	\$89
	2016/17	\$60	\$64	\$105	\$77	\$38	\$93
Deferral	2017/18	\$61	\$66	\$107	\$63	\$39	\$96
	2018/19	\$63	\$67	\$110	\$63	\$40	\$98
	2019/20	\$75	\$82	\$116	\$61	\$45	\$100
Reg period 4	2020/21	\$76	\$78	\$115	\$65	\$46	\$112
	2021/22	\$77	\$81	\$117	\$69	\$48	\$117
	2022/23	\$79	\$82	\$122	\$73	\$49	\$122
	2023/24	\$80	\$84	\$127	\$78	\$50	\$128
Reg period 5	2024/25		\$90				
	2025/26*		\$96				
	2026/27		\$96				
	2027/28		\$96				

Year	Mareeba-Dimbulah WSS	Burdekin-Haughton WSS	Bundaberg WSS	Pioneer River WSS	Lower Mary WSS	Eton WSS
Reduced by 15%						
2020/21	\$64	\$67	\$97	\$55	\$39	\$95
2021/22	\$66	\$69	\$99	\$59	\$40	\$100
2022/23	\$67	\$70	\$104	\$62	\$42	\$104
2023/24	\$68	\$71	\$108	\$66	\$42	\$108
Reduced by 25%						
2020/21	\$57	\$59	\$86	\$49	\$34	\$84
2021/22	\$58	\$61	\$88	\$52	\$36	\$88
2022/23	\$59	\$62	\$91	\$55	\$37	\$92
2023/24	\$60	\$63	\$95	\$58	\$37	\$96

- It is assumed that irrigation water makes up 15% of total irrigated cane farm costs. Hence when water prices decrease by 15% for example, cane farm earnings increase 2.25%. It is also assumed that the price elasticity of (cane) supply is inelastic and -0.5. This means that for every one percentage increase in revenues, cane production increases by 0.5%. Hence, if cane revenues/cane costs increase/decrease by 2.25%, cane production will increase 1.125%. For every additional tonne of cane that is grown, an additional 0.1 ML (100,000 tonnes) of water is consumed. For every additional tonne of cane that is grown it is assumed that 140 kg of raw sugar is manufactured and for every tonne of sugar manufactured 220 kg of molasses is made and 230 MW/hrs of electricity is generated.

