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1 March 2019

Queensland Competition Authority
145 Ann Street
BRISBANE CITY QLD 4000

Re: Submission to the QCA on the Draft Report For SunWater Irrigation Price Review:2020-24 Eton and Pioneer Water Supply Schemes March 2019 (Bulk and Distribution)

Please find attached a written submission from Mackay Canegrowers Limited, which focuses on the plight of irrigators in the central region, specifically those customers affected by Sunwater and customers in the Eton and Pioneer Schemes.

Yours faithfully

Kevin Borg
CHAIRMAN
Ph: 0429 876 441

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Submission to the QCA on the Draft Report For SunWater Irrigation Price Review:2020-24 Eton and Pioneer Water Supply Schemes March 2019 (Bulk and Distribution)

This submission by Mackay Canegrowers Limited (MCL) is to focus on the plight of irrigators in the central region but more specifically those customers affected by Sunwater. This includes customers in the Eton and Pioneer Schemes.

MCL has made submissions to the QCA in the past and has always attempted to highlight the economic, social and environmental impact of increasing water prices on the communities within these supply schemes, as well as the broader impacts on mill viability and regional impacts. MCL represents the interests of 82% of sugarcane producers supplying sugarcane to four mills. Three of which are owned by Mackay Sugar Limited and one owned by Wilmar. As a consequence we have a vested interest in our growers who are shareholders in the milling operations (except Wilmar) and are also irrigators. What is of grave concern to us is that we have never been questioned by QCA as to the impact of increasing water prices to the TBL (triple bottom line) of the communities in our region. There is a broader aspect to increasing water prices as this not only affects the viability of growers and millers but affects the whole community at large due to decreasing production, a reduction in GRP, with a resultant decrease in disposable income which impacts on businesses who service the agriculture sector. There are enormous environmental impacts not often communicated. This has been sorely overlooked during the previous price paths.

Overall a myopic approach by successive Queensland Governments and water suppliers has provided no encouragement to operators and customers to take a strategic view of increasing water demand and supply, nor the implementation of water use efficiency measures. The central region is in a precarious situation as far as water use to meet crop demand is concerned, especially in light of the changes occurring to rainfall distribution as a direct consequence of climate change. The region has built infrastructure and put in place irrigation systems based on supplementary irrigation. To increase production and profitability for the region as a whole requires increased water storage, and the implementation of irrigation efficiencies. This cannot be achieved due to the higher cost of more efficient systems if the water is not available or comes at a higher cost. Where is the focus on regional development, economic, social and environmental issues? Coupled to this argument is the fact that the PVWRP (although environmentally sound) has reduced entitlements and allocations to groundwater users, exacerbating the problem of meeting crop demand. While compensation for lost allocations were never sought (not that there could be) there has never been an acknowledgement of the stress that this caused to individuals trying to maintain viability, or even an attempt to replace that water by augmenting supplies.

Efficient irrigation systems and water use has the capacity to reduce pollutants that run into the GBRMP. Successive governments have spent billions of dollars on water quality but have ignored the fact that irrigation as a management tool would provide far greater benefits to water quality than any initiative thus far.

Government and by implication QCA and SunWater have done very little to engage with customers in an attempt to seek strategic opportunities, or effectively manage water resources. It has for as long as I can remember been a case of "make do with less" and by the way here is some more red tape to go with it, compounded by a focus on cost recovery at all costs since 2008 onwards. The Eton water scheme was completed in 1986 and the Pioneer scheme was completed in 1997 with no major development in water infrastructure since then. Agriculture has been sidelined for more lucrative industries, at our peril, and TBL issues have not been focused on to ensure effective and sustainable water resource management.

In light of the above issues to be considered in more depth, I would like to highlight the fact that the referral notice from the Queensland Government (QG) is certainly specific about what can and can't be included within the scope of QCA's determination on pricing for the future price path. While the QCA has to the best of its ability attempted to summarise this guidance it falls short in it's determination of what should be included. The referral notice from the QG cites the Water Act of 2000 which by the way binds all persons. Below is an excerpt of the purpose of the Act. It clearly contains instruction on sustainability, effective management and use of water resources, economic, social and environmental outcomes, water quality etc. I am concerned that the QCA refers only to:-
"economic factors, including the cost of providing the need for efficient allocation of resources and the protection of consumers from abuses of monopoly power. The non-economic factors, including social welfare and equity considerations (such as the availability of goods and services to consumers and the social impact of pricing practices), and economic and regional development issues."
While it may be the QCA's intention to consider all of the implications in determining water prices it's scope for it's review process does not. If electricity prices are anything to go by then Lord help us. It is not my intention to complicate this review process merely to ensure that prices are determined fairly and considers social, economic and environmental outcomes to the best of our ability.

Purposes of Act and their achievement (Water Act 2000)

(1) The main purposes of this Act are to provide a framework for the following—
(a)the sustainable management of Queensland's water resources and quarry material by establishing a system for—
(i) the planning, allocation and use of water; and
(ii) the allocation of quarry material and riverine protection;
(b)the sustainable and secure water supply and demand management for the south-east Queensland region and other designated regions;
(c) the management of impacts on underground water caused by the exercise of underground water rights by the resource sector;
(d) the effective operation of water authorities.
(2) For subsection (1)(a), *sustainable management* is management that—
(a) incorporates the principles of ecologically sustainable development; and
(b) allows for the allocation and use of water resources and quarry material for the economic, physical and social wellbeing of the people of Queensland, within limits that can be sustained indefinitely; and
(c) sustains the health of ecosystems, water quality, water-dependent ecological processes and biological diversity associated with watercourses, lakes, springs, aquifers and other natural water systems, including, where practicable, reversing degradation that has occurred; and
(d) recognises the interests of Aboriginal people and Torres Strait Islanders and their connection with water resources; and

(e) enables water resources and quarry material to be obtained through fair, transparent and orderly processes to support the economic development of Queensland; and
(f) builds confidence regarding the availability, security and value of water entitlements and other authorisations; and
(g) promotes the efficient use of water through—
(i) the establishment and operation of water markets; or
(ii) the initial allocation of water; or
(iii) the regulation of water use if there is a risk of land or water degradation; or
(iv) increasing community understanding of the need to use and manage water in a sustainable way; and
(h) facilitates the community taking an active part in planning for the management and allocation of water.
(3) For subsection (2)(g), *the efficient use of water*—
(a)incorporates water demand management and water conservation measures; or
(b)considers the volume and quality of water required for particular circumstances, including release into the environment.

MCL is grateful however that there appears to be a much more consultative approach to setting prices for the next price path and that there is scope to provide less than cost-reflective volumetric prices to moderate bill impacts for customers.
It seems strange however that the review considers:
"*having regard to agreements where it can be demonstrated that customers have agreed on costs or prices with the business for irrigation services, and they are in line with the requirements set out in the referral "*
In other words consultation is ok but as long as you agree with the findings as per the requirements set out in the referral.

The Water Act proposes not only efficient use of water but includes "*effective operation of water authorities."* This is where we are missing the mark, whilst efficiencies are important the ***effective*** use of water is particularly critical in consideration of a holistic approach to water resource management.

It is my intention to focus on the demand and supply of water resources and how the effect of increasing water prices not only affect effective management of this vital resource but how it affects the economic, social and environmental impact on irrigators and the region as a whole. Having said that as per QCA's directive it is important to consider the sustainability of water providers and whether or not these businesses are efficient and whether their costs are prudent and fair.

Stakeholder concerns in the setting of cost reflective prices by QCA

Allowable costs:

This should not include the QCA's regulatory fees up to a cap of $2.5 million. Customers are expected to pay for a service provided to Government in a process which excludes the consumer from deciding on the TOR.

Inspector-general Emergency Management (IGEM) costs

This is an obvious regulatory cost that should be borne by Government and not the consumer. Risk mitigation would still have to be in place whether the dams were there or not, and cannot be isolated to water users.

Immediate cost reflective pricing for distribution tariffs

The cost increases across SunWater irrigation schemes in the first year of the price path will be 12% if QCA does not consider and recommend under (1.4) (a) of the referral notice "balancing the legitimate commercial interests of the businesses with the businesses of the customers, including considering less than cost reflective volumetric prices which are necessary to moderate bill impacts for customers" whether or not the latter is considered there needs to be a transition to cost recovery/escalation as per bulk charges.

Non- Routine expenditure

There needs to be a major review of SunWater's Asset Management System (AMS). The failure of the AMS to deliver is driving the costs of the Non-Routine expenditure. This is due to the cost of running the AMS and the inefficiencies of the approach. The asset condition assessments have and are continuing to push the asset replacements into the future but at the same time are consuming the annuity balances set aside to replace them through very expensive asset condition reporting.

Routine expenditure.

QCA needs to establish the efficient cost of overheads and the allocation of those costs. The marked step increases in the past two seasons look flagrantly suspect and has escalated forward predictions.

Insurance

If the full cost of insurance is to be passed on to water users, QCA needs to ensure all works that are relating to possible claims are removed from the Non-routine costs.

Bulk water costs for distribution losses

Water uses should only be costed the prudent efficient requirement for losses allocation as SunWater has the ability now to seasonally trade the unused component. A major review of the requirements of distribution losses allocations needs to be done to maximise the allocation availability for productive use as well as ensuring efficient water charges for distribution customers.

Dam Safety (please refer to the QFF submission)

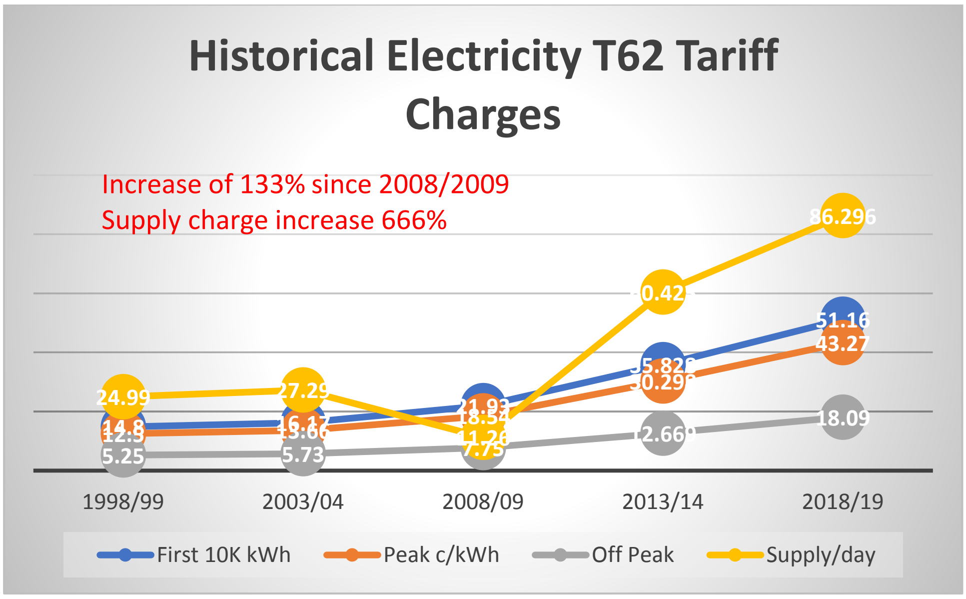
"QFF will submit that these costs are a community wide responsibility and the investigations proposed by the QCA to examine cost recovery are not adequate and therefore cannot be supported."

Electricity costs

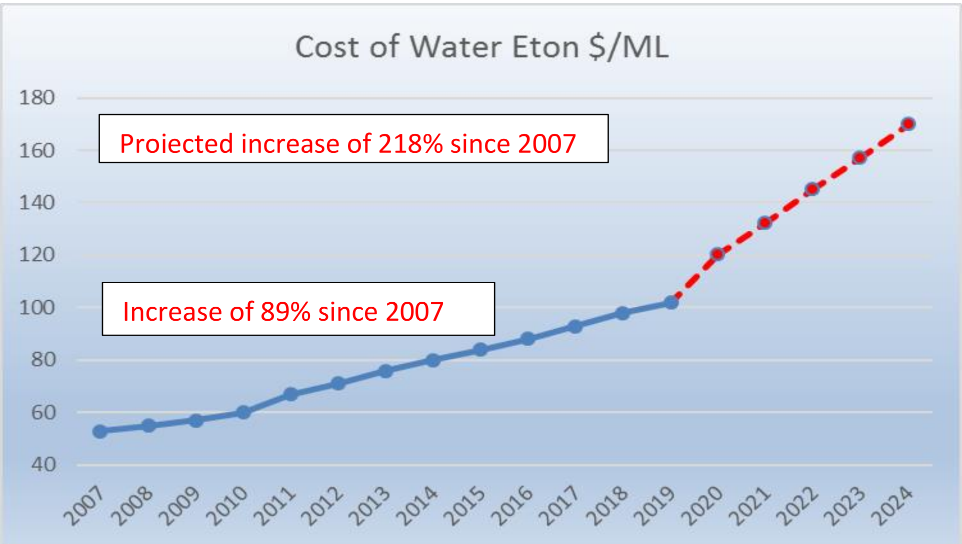
The issue of escalating electricity costs has been the major driver on the escalating cost of water supply to consumers but more specifically on irrigators who rely heavily on water for their livelihood.

Escalating electricity costs are even more debilitating in the Eton scheme where bulk water infrastructure was built off-stream to appease green groups. Water harvesting adds a second layer of costs to the water price. The argument can be made that for the sake of political correctness growers are now asked to pay more than double what they should be paying for water which could have an enormous benefit for the environment especially in this region where we have short river systems, and dams acting as sediment traps are more beneficial than not. This is another argument often swept under the carpet for the sake of political expediency, but it impacts on the viability of our region. The argument can be made that irrigators did not make this decision, and the onus should be on Government to wear these costs in the same vain as Dam Safety Issues. Irresponsible effective water resource management should not be borne by irrigators alone.

<u>The issues faced by sugarcane producers as a direct consequence of increasing electricity and water prices in the central region</u>



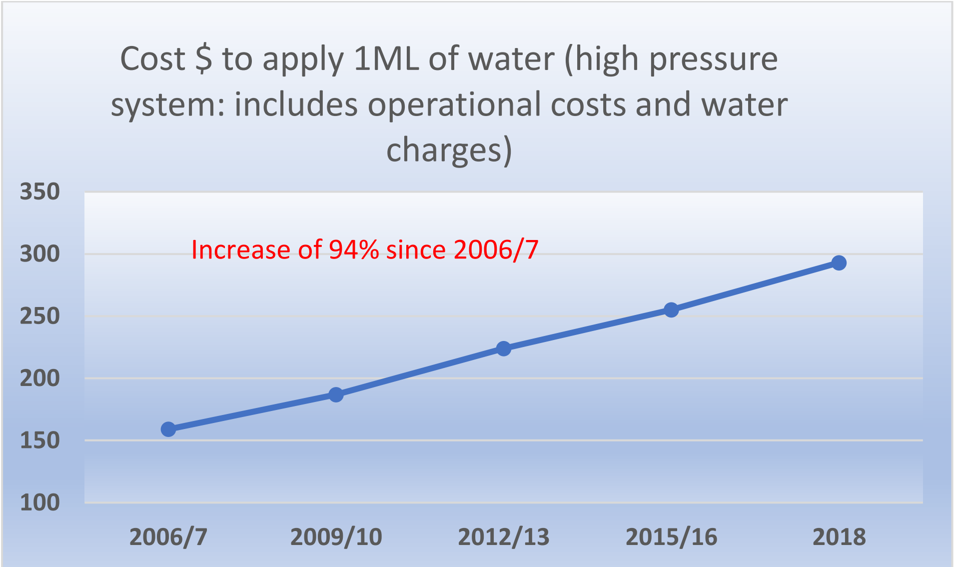
Majority of growers are on the TOU Ergon tariff 62



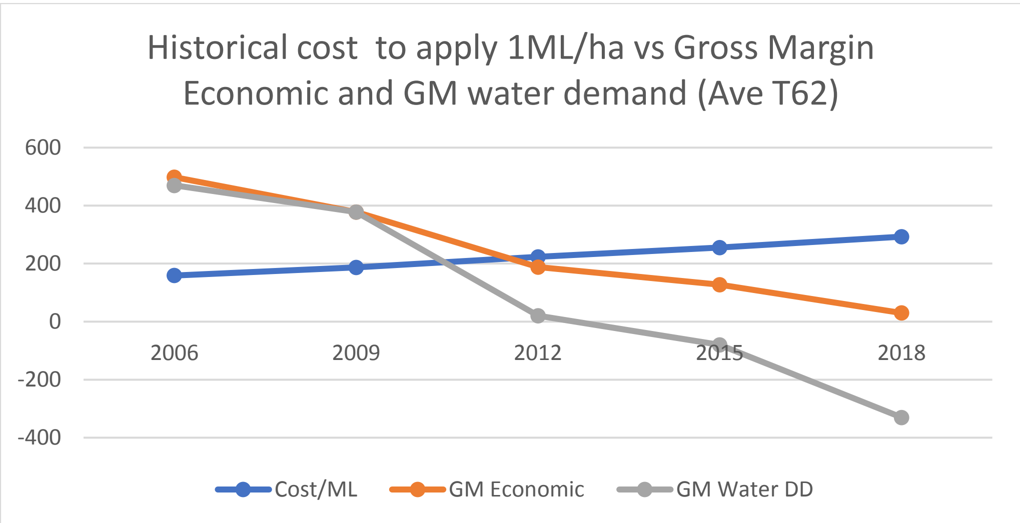
A major component of supplying water to agriculture are pumping costs of water. Electricity charges are therefore the major contributor to increasing water prices, but there are a host of other issues which have contributed to rising costs of scheme water, many of which are not fair and or could have been averted. These were discussed earlier in the submission.

Graph below is the increase in operational costs in $/hectare of applying 1 megalitre of water per hectare and includes water costs, labour, R&M and electricity charges. The major contributor to these increased costs is the increase in pumping costs and water charges.

Graph 1



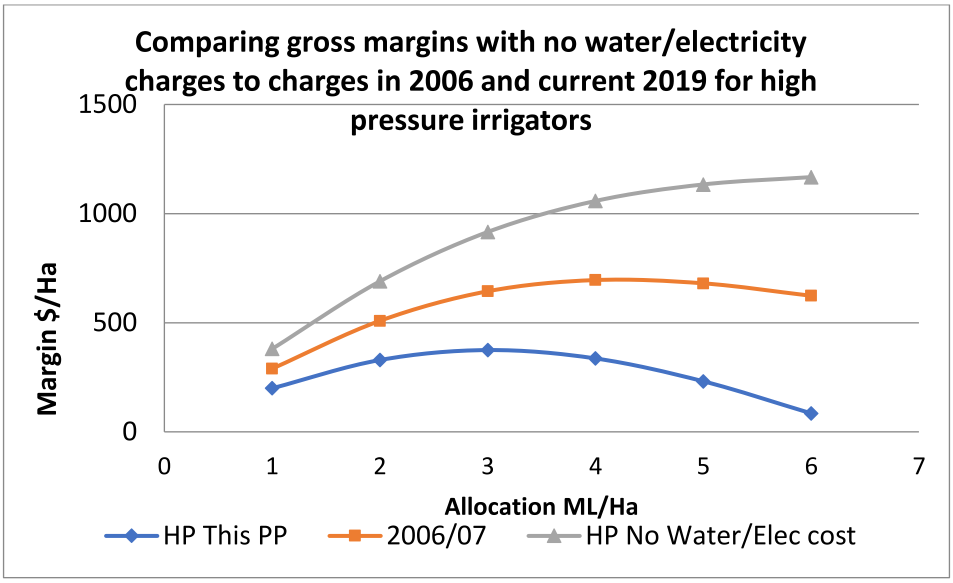
The majority of systems are either high pressure (gun)70% of irrigable area or flood (furrow) 20% in the Mackay region due to initial water allocations and design of systems for supplementary irrigation. Investment in more efficient systems require much greater capital investment in excess of an extra $1000/ha. This type of investment is not economically viable when the individual grower cannot meet crop demand at an average of 5ML/ha above effective rainfall.

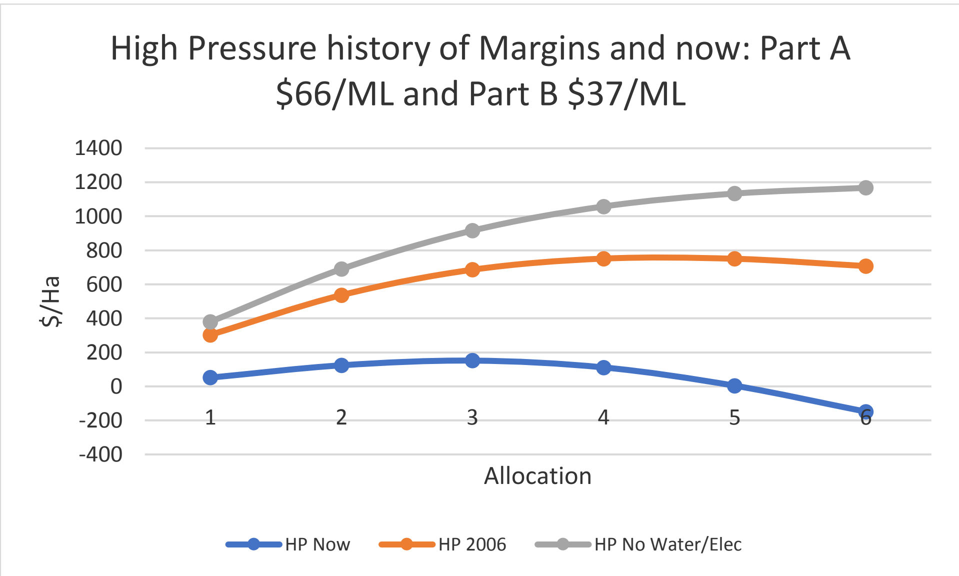


When the schemes were built economic studies indicated that the intersection of marginal returns and marginal cost curves were $ 180/ML (break-even). This figure remains relevant today, as the cost to apply a ML/ha of water vs the gross margin returns indicate. However for high pressure systems the cost as defined in Graph 1 and above is now approaching $300/ML (operational costs + Part A + Part B). For this exercise Part A cost of water is included as a cost to obtain the gross margins. Part A can no longer be apportioned to fixed costs as that cost has too big an impact on margins. The economic margin above depicts the maximum amount of water that can be applied economically and cuts off in 2011 where crop demand can no longer be met economically. When crop water demand is met gross margins turn negative in 2010. Constant sugar price of $30/tc applied and an average of T62 high and low prices.

At that time the cost to apply 1ML/ha was approximately $140

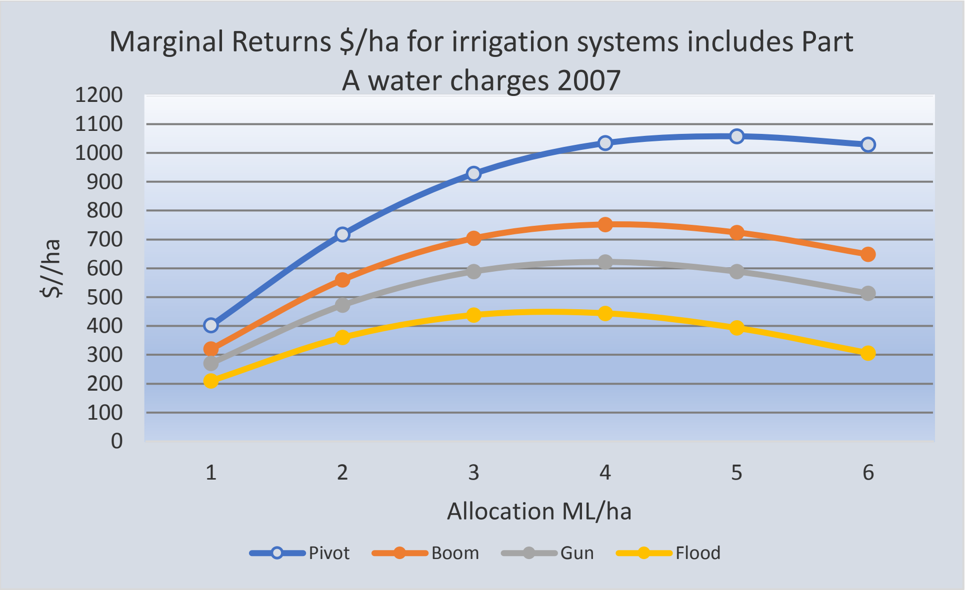
The long-term sugar price was and still is US 14.5c/lb

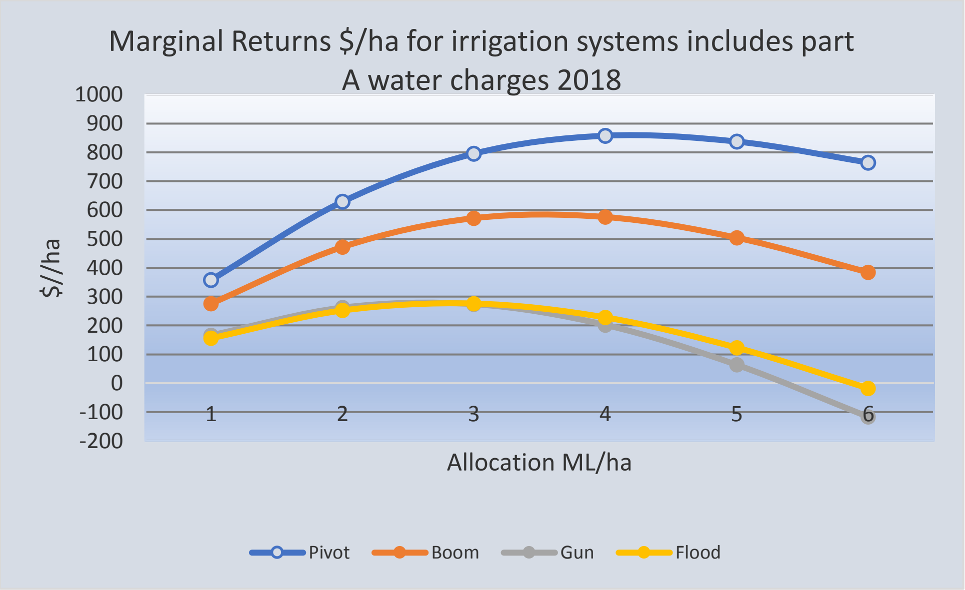




Graph above is indicative of the declining returns in $/ha to growers. The most perverse outcome is that in any given year the average amount of irrigation water that needs to be applied to maximise crop production is 5ML/ha. The marginal returns for high pressure systems at the present cost of water and electricity charges turns negative at 3ML/ha of applied irrigation. Therefore irrigators cannot meet crop water demand economically and hence a decline in productivity as we have already witnessed. These returns are based on a sugar cane price of $40/tonne and does not include the cost of harvesting, nor part A water charges, nor capital costs. Expected price of cane this year is well below that figure.

Recent years indicate a decline in water use from storages. From the 3 schemes in the central region water use has declined from 48% to 20% in 2017 and yet crop water requirement for that year was 6ML/ha -way more than the total storage availability. (see Table 2 page 17)

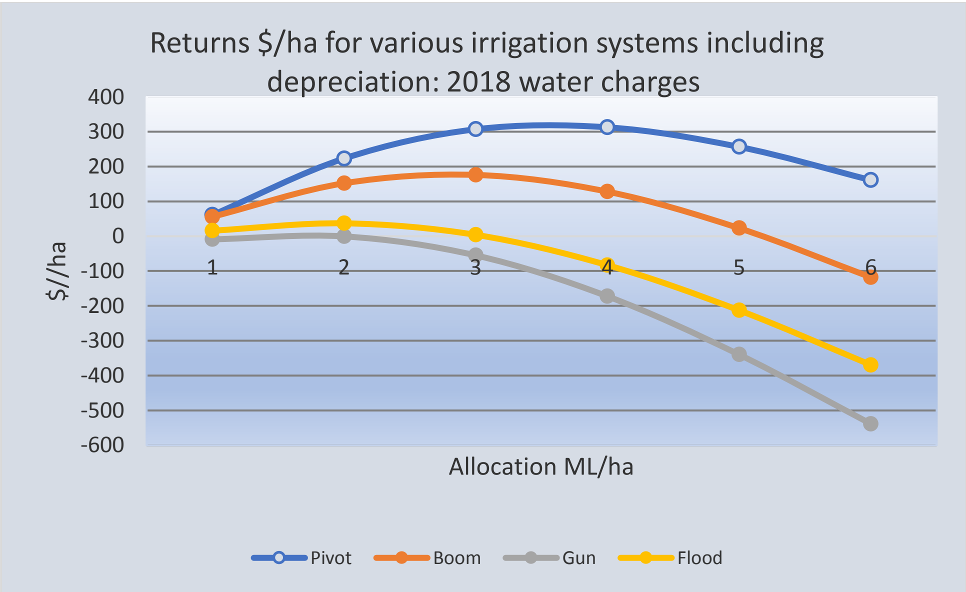




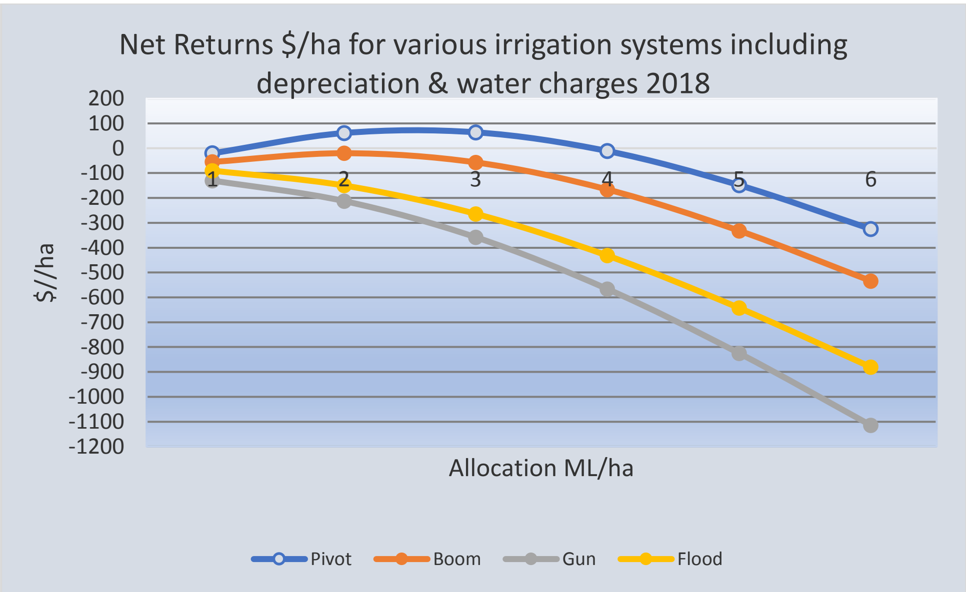
<u>Graph below – assumptions current situation</u>

Cane price -$40/t
Water price includes part A & B-(**Fixed $65.79 & variable $36.76/ML (Eton)**
Depreciate equipment over 15 years
Harvesting cost of - $10/t
Generic costs of labour, pumping costs and R&M for each system

Graphed below is revenue less costs indicating that on some irrigation systems when water costs are at the upper bound (Eton) it is un economical to irrigate. This would also indicate that to put in new infrastructure for irrigation would also be un economical. This scenario even makes the most efficient systems a risky investment.



Graph below is net returns on irrigation systems for Eton scheme with a predicted cost reflective water charge of $172/ML (A&B supposedly the cost reflective price for 2020 to 2024)



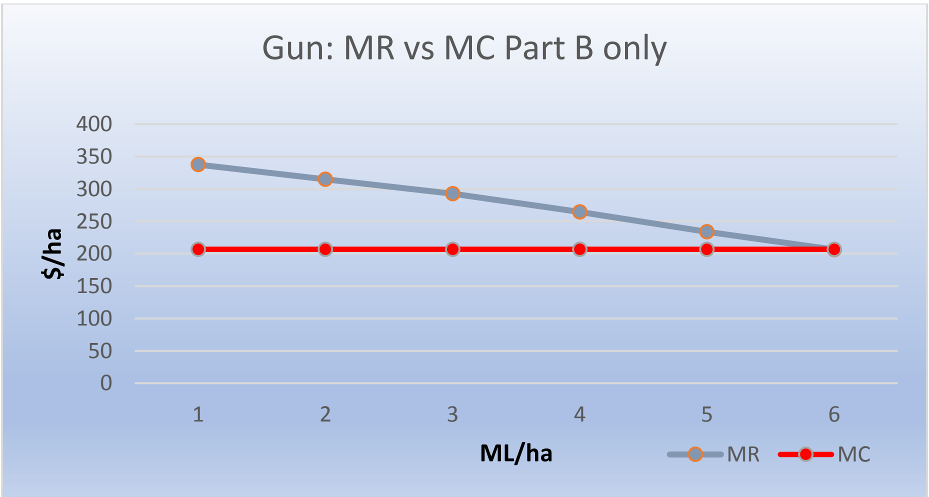
Marginal returns have been in decline due directly to increasing electricity/water prices. Water use has declined as a direct consequence of this (other factors considered later) and therefore a decline in productivity, putting enormous pressure on farm and mill viability. I have focused on the Eton scheme due to that scheme having only one distribution cost whereas Pioneer Valley (PVWB) has differing prices on all outlets. Some of the outlets on the PVWB distribution system has both higher and lower costs than the Eton scheme.

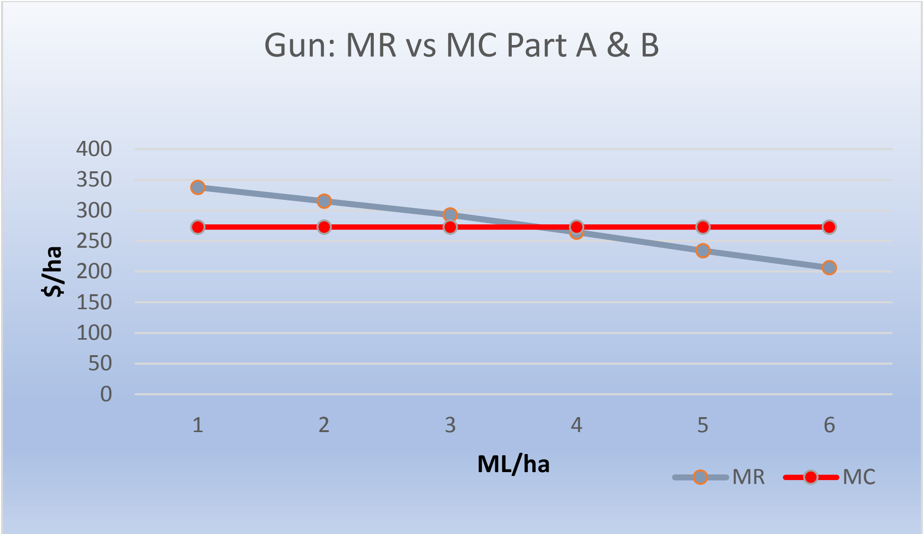
An important aspect of the graphs above is that with the ever-increasing price of electricity and water the marginal returns gap between high pressure systems and flood or furrow systems creates an adverse situation on three fronts.

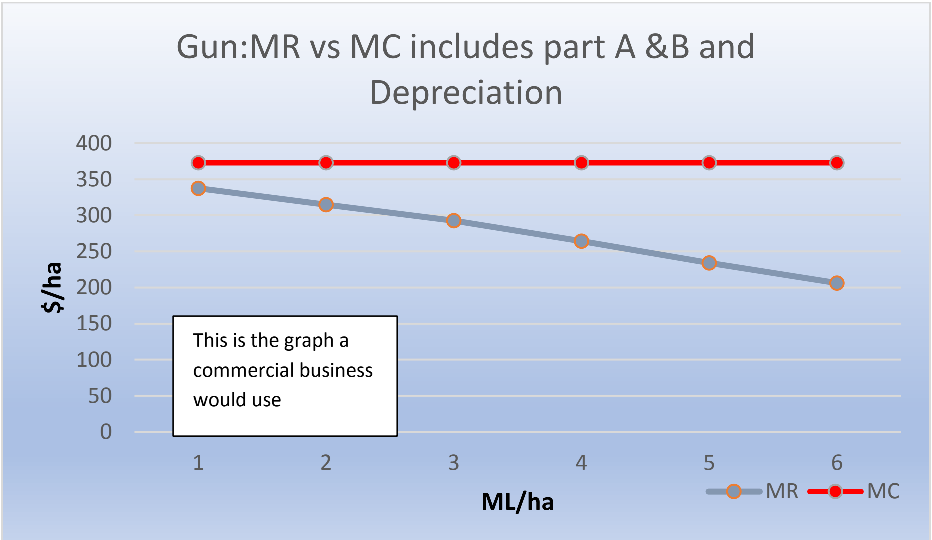
It is forcing growers to use less efficient systems ie furrow irrigation which results in reduced productivity. The power bill for high pressure is approximately 2x higher than for furrow irrigators. The productivity graphs above are based on maintaining crop demand for water. As most systems are designed for supplementary irrigation and hence erratic supply of water to the crop the indicative returns above are not met and hence growers are forced to look directly at the expenditure item on electricity.

Secondly furrow systems are renowned for not only inefficiency but contribute to environmental problems. It is difficult to control the exact amount of water required to meet PAWC (plant available water content) and more importantly RAW (readily available water). Over application is an inherent problem with furrow irrigation which results in deep drainage or excessive run-off. Other detrimental issues include silting, ponding and waterlogging. Some of these issues can be mitigated but is also expensive. It is also very difficult to control or increase the efficacy of nutrients and chemicals with this type of system.

Thirdly even at existing prices growers are unable to renew or invest in irrigation. Any increase in charges will see dis-investment, productivity decline (already witnessed), and exacerbate farm and mill viability, as well as a possible closure of distribution systems.

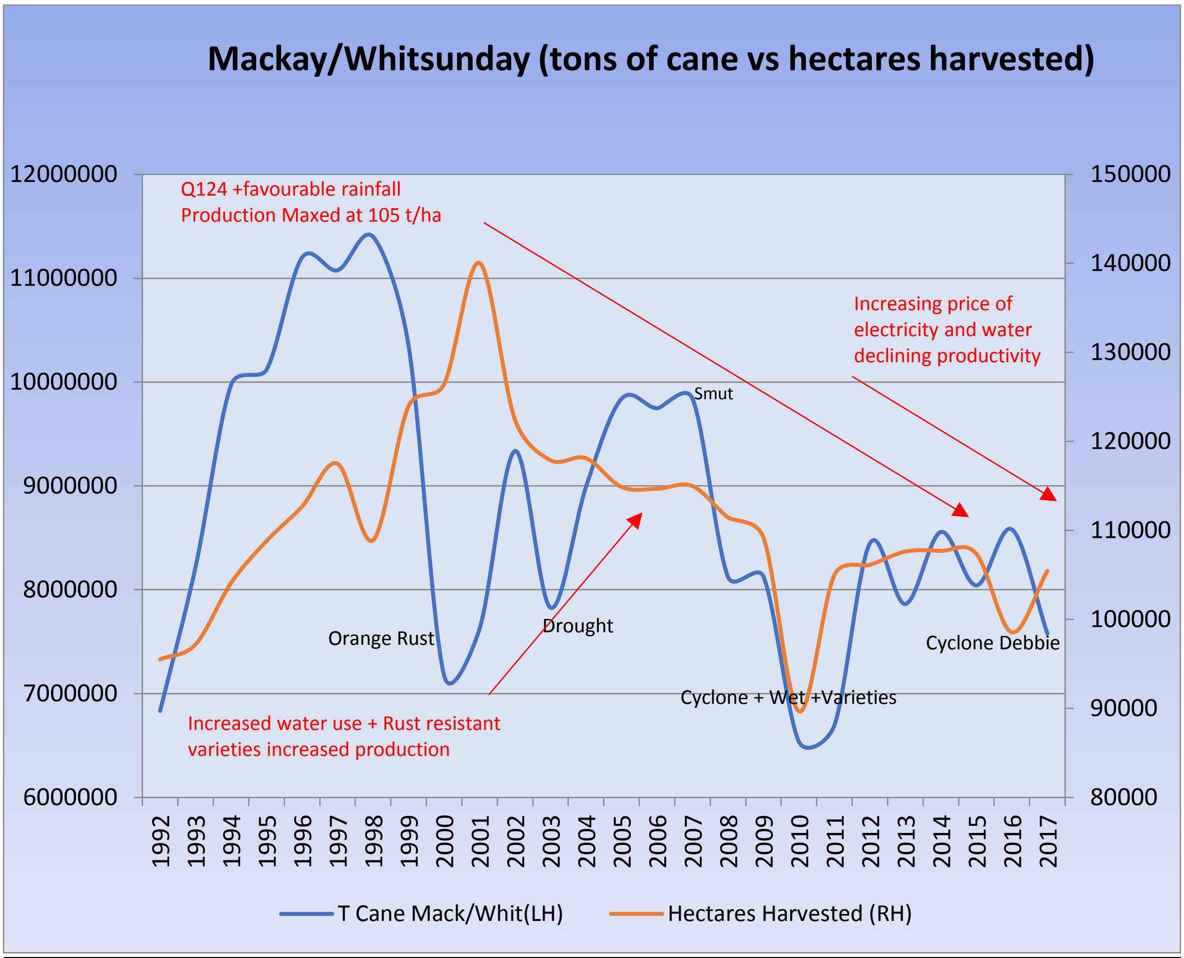






Cost of water at 2018/19 prices is unsustainable: does not meet crop water demand and no re-investment.
But can still convince growers to undertake efficiency measures such as installing VSD's, installing solar etc.
When growers on higher water prices heard that the price of water could go up further they stopped installing solar.
There is no room to move as graphs above are using 80% off-peak tariff of 18c/kWh

Sugarcane Production and Economics



The graph depicts weather and disease issues faced within the industry since the crash from orange rust in 1999/2000. Q124 was an extremely successful commercial variety which could handle most situations and was a top yielder. During that time weather conditions were extremely favourable and although there were dry and wet years extremes were not as distinct as they have been over the last 18 years (Graphs 4&5&6). More importantly rainfall distribution was much better with enough rainfall to maintain good growth in the early and late parts of the season. *Since orange rust, smut, droughts, waterlogging, and rainfall distribution patterns coupled with declining water use as a result of increasing electricity and water charges have all played a role in yield decline*. The fact that the industry had to come up with new varieties to replace orange rust susceptible varieties and again in 2008 to replace smut susceptible varieties have left an indelible mark on industry productivity. The newer varieties are not as robust and require more attention with regards to management, especially water management. This also reduced the range of varieties that could be planted to negate pachymetra and other sugarcane diseases. Recent advent of the disease YCS has been found to proliferate when the crop is under water stress. A perfect storm.

Because of the issues faced above and the fact that world sugar prices were depressed for most of the 2000's, created financial stress on farming businesses and these businesses found themselves in a margin squeeze situation. Many businesses' during this period had to take out higher levels of debt and reduce inputs which put greater pressure on yield decline.

Climate change.ppt

Climate change/variability is increasing the need for water:

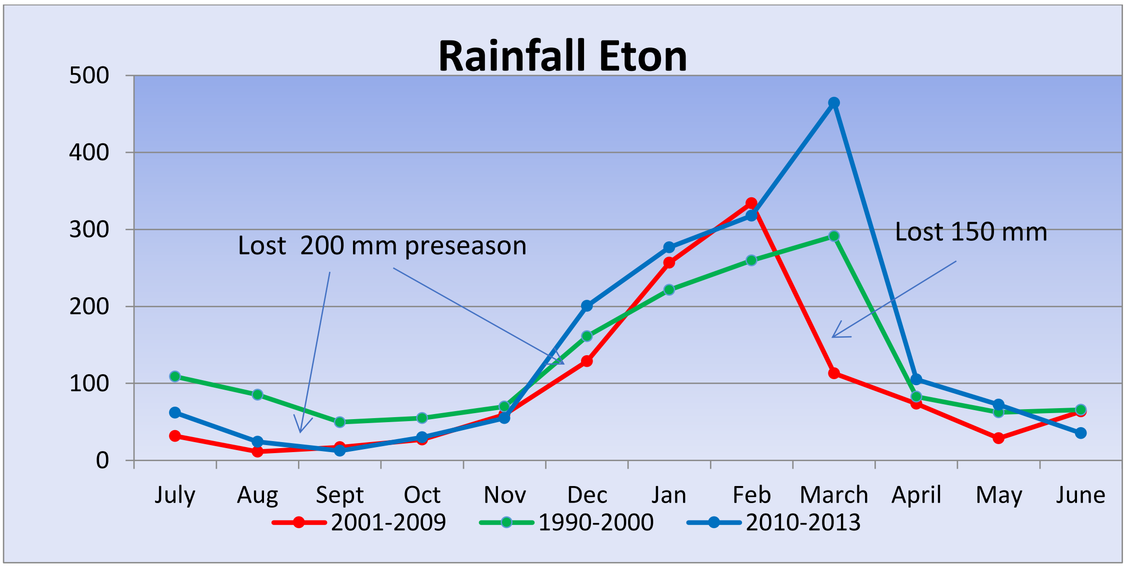
- Rainfall distribution patterns are changing
- Temperatures are increasing which increases crop water demand.
- The cost of electricity and water is putting huge pressure on farmer and miller viability
- We are becoming uncompetitive on the world market
- Market share is in decline
- Water quality issues will be exacerbated- Declining crop yields will reduce NUE (nitrogen use efficiency). Reduced irrigation will result in reduced efficacy of nutrients and chemicals, and the use of more chemicals as a result of reduced crop biomass and hence trash retention. Resulting in increased run-off to the reef.
- As a consequence of declining farm productivity, mill viability in Mackay has resulted in the shutdown of a mill with an extended harvesting season. This has resulted in the harvesting season ending in December or the beginning of January. Nutrients and chemicals applied at this late stage in the growing season means greater losses to the environment as the crop has not had the opportunity to utilise the nutrients applied (obviously dependant on rainfall intensity).
- Viability of water storage and distribution schemes are in jeopardy with declining usage making at least $100,000,000 worth of infrastructure “white elephants”. 60% of the irrigable area in Mackay is supplied by the Eton and Pioneer schemes, their imminent collapse and reduced on farm productivity will put greater strain on the central region sugar industry which is already teetering. Production (2018) is down to 4.6 MT of cane and mill viability requires 5.8 MT.

Drastic action is required.

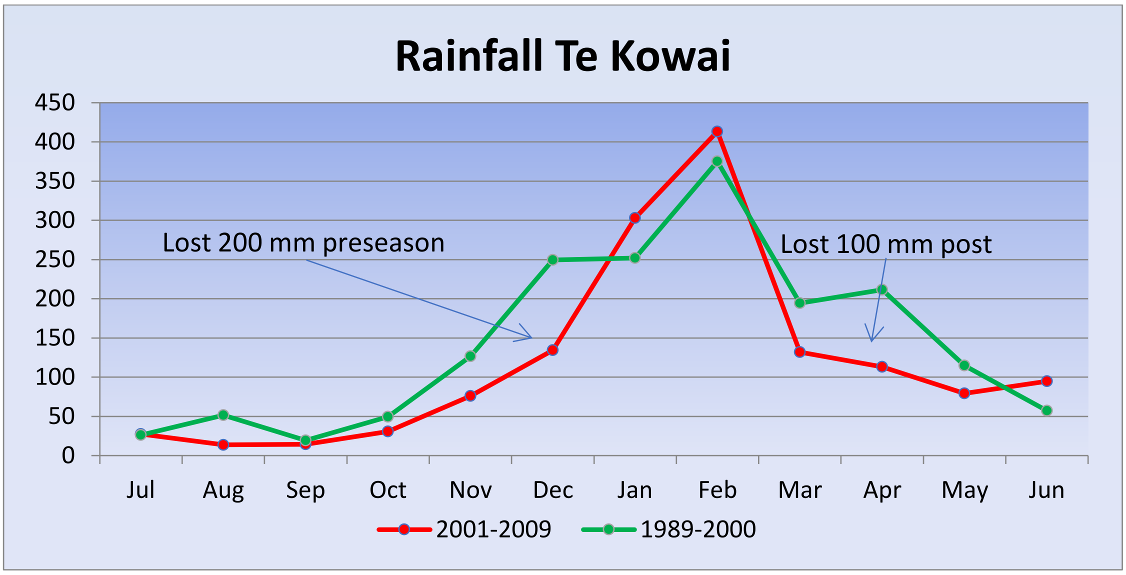
Rainfall distribution

The greatest impact on productivity has been rainfall distribution even though total rainfall has not decreased.

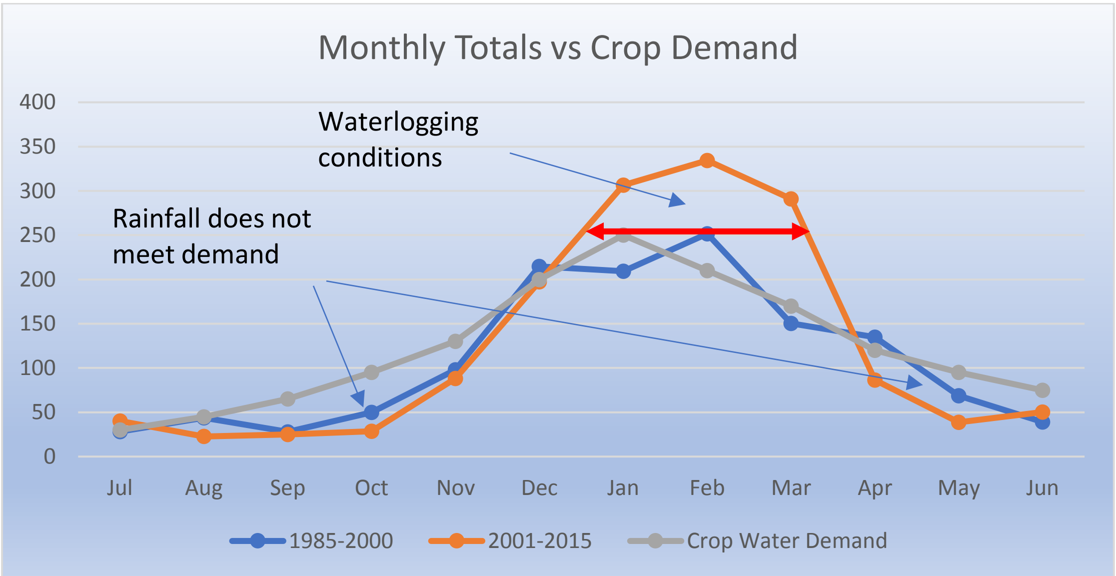
Graph 4



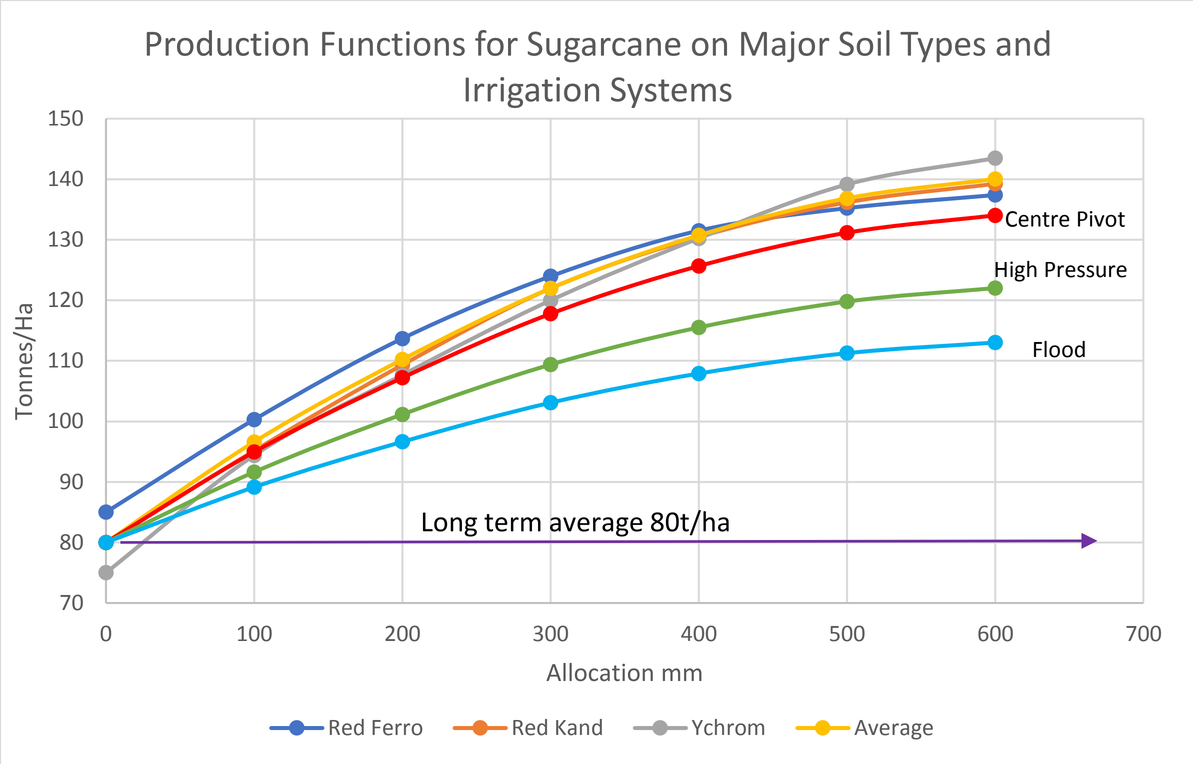
Graph 5



Graph 6



The graphs illustrate one of the major problems faced today and is probably the greatest contributor to reduced yields in the past 2 decades. Whether it is cyclical or whether it is due to climate change is debatable. The fact remains that rainfall events are spiking mid-season and early growing and late maturing phases in the crop cycle are experiencing reduced rainfall. This makes the argument for water storage, increased water use and irrigation efficiencies crucial. In the last decade we have lost 3 ML of water/ha during the early and late growing season, but more rain mid-season which exacerbates the situation because the stunted crop is not able to handle waterlogging conditions. It must be understood that this is a trend and cannot be applied to all seasons. If you consider that on average from historical figures we require 5ML/ha of irrigation per season to maximise production, the situation has been exacerbated. Total crop demand is 12ML/ha. Average effective rainfall is 7ML/ha. Shortfall on average is 5ML/ha. (See Table 1 page 16)



- The graph above shows average sugarcane production functions for 3 major soil types in the Mackay region with no limitations to inputs or water. (Source APSIM model)
- Included are production functions for low and high pressure systems and flood
- The long-term yield average is 80t/ha
- 60% of growers have some form of supplementary irrigation between 2-5ML/ha
- Available usable storage including bores is in the region of 170,000ML. Only 43% of allocations are used on average annually and declining
- Average allocation required to maximise production is 5ML/ha
- Hypothetically a foregone productivity loss of 100,000 ML/5ML/Ha =20,000Ha *(min 35t increase/ha) =700,000t
- Upgrading of systems to low pressure and if allocations are used will increase productivity by a further (30,000ha*19t/ha) = 570,000t.
- Total Gains 1,270,000 tonnes of cane equates to $50,000,000 (growers) $75,000,000(Industry) X multiplier effect? (regional)

<u>If there are major gains in productivity as above why are water allocations not used?</u>

- The cost of power and water (as explained previously)-see **Table 2** for declining water usage, and the section on water and electricity prices.
- Design of supplementary ad hoc systems with obvious inefficiencies (cannot apply enough water at the right time.)
- Majority of systems are high pressure with high pumping costs (60% of systems)
- Lack of applied knowledge to water use efficiencies and economic interpretation. Due to declining production and increased input costs creating a margin squeeze, growers are fixated on the expenditure items electricity and water.
- Limited water supply inhibits capital expenditure on more efficient but more expensive systems. The conundrum here is that most growers are on allocations of 2-3 ML/ha. This is not enough water to maximise production. The requirement to meet crop water demand is

in the region of 5ML/ha (**Table 1**) above effective rainfall and this can vary between 1-9 ML dependent on total rainfall figures and intensity. To payback an efficient system (such as a centre pivot or lateral move) requires huge capital outlays in the region of $3-5000/ha. This cannot be achieved at present water and electricity prices especially when water is limiting. Viability issues negate any thought of increased capital expenditure on irrigation development. There are other factors that can be considered and implemented to alleviate the situation: But only when we can reduce either power or water costs or both for those users paying the most.

- Use allocations to meet crop demand on the most productive blocks only.
- Introduce renewables and efficiencies to reduce costs.

To be assessed on an individual basis only and will depend on the trade-off costs between water and electricity. Becomes complicated.

Table 1

Annual Summary of Rainfall Deficit for 2000 to 2018

Year	1st Quarter (mm)	2nd Quarter (mm)	3rd Quarter (mm)	4th Quarter (mm)	Annual (mm)	Equivalent ML/ha
2000/01	164.4	68.5	0.4	81.8	315.1	3.2
2001/02	179.4	250.1	97.7	175.8	703.0	7.0
2002/03	169.7	393.1	194.9	161.3	919.1	9.2
2003/04	135.6	200.6	73.7	229.3	639.2	6.4
2004/05	217.5	65.4	162.0	6.4	451.3	4.5
2005/06	106.6	307.0	68.3	0.0	481.9	4.8
2006/07	85.0	216.5	23.0	26.1	350.5	3.5
2007/08	128.6	195.5	4.9	235.9	564.9	5.6
2009/10	139.5	222.0	27.0	150.0	538.5	5.4
2010/11	0.0	0.0	0.0	140.0	140.0	1.4
2011/12	138.0	137.0	55.0	93.0	423.0	4.2
2012/13	84.0	230.0	192.0	40.0	546.0	5.5
2013/14	133.0	287.0	16.0	57.0	493.0	4.9
2014/15	51.0	338.0	164.0	98.0	651.0	6.5
2015/16	115.0	210.0	58.0	9.0	392.0	3.9
2016/17	99.0	183.0	0.0	100.4	382.4	3.8
2017/18	205.0	200.0	112.0	140.0	657.0	6.6
Average =	126.6	206.1	73.5	102.6	508.7	5.1

Table 2

	Actual Use 2000 to 2018						Available ML 164571	
	Proserpine		Eton		Pioneer			
Year	Total ML	ML/ha based on 9518 ha (ie 38,075 ML @ 4 ML/ha)	Total ML	ML/ha based on 15,960 ha (ie 52,670 ML @ 3.3 ML/ha)	Total ML	ML/ha based on 15,508 ha (ie 46,526 ML @ 3 ML/ha)	All Schemes Total ML Used	Available Entitlement Used
2000/01	11636	1.22	18700	1.17	8900	0.57	39236	29%
2001/02	32363	3.40	49305	3.09	32422	2.09	114090	83%
2002/03	44991	4.73	45350	2.84	43270	2.79	133611	97%
2003/04	28539	3.00	24451	1.53	18210	1.17	71200	52%
2004/05	30443	3.20	19885	1.25	11055	0.71	61383	45%
2005/06	23653	2.49	27945	1.75	13469	0.87	65067	47%
2006/07	14251	1.50	18653	1.17	8641	0.56	41545	30%
2007/08	17665	1.86	16095	1.01	7631	0.49	41391	30%
2008/09	16800	1.77	10500	0.66	9121	0.59	36421	27%
2009/10	18000	1.89	21473	1.35	32000	2.06	71473	52%
2010/11	5200	0.55	5000	0.31	12000	0.77	22200	16%
2011/12	14400	1.51	15500	0.97	5200	0.34	35100	26%
2012/13	17400	1.83	15347	0.96	18000	1.16	50747	37%
2013/14	16800	1.77	20600	1.29	13500	0.87	50900	37%
2014/15	29700	3.12	20500	1.28	15800	1.02	66000	48%
2015/16	24275	2.55	25263	1.58	14366	0.93	63904	47%
2016/17	10000	1.05	13020	0.82	5000	0.32	28020	20%
2017/18	11840	1.24	19033	1.19	12036	0.78	42909	26%
Average =	20442	2.15	21479	1.35	15590	1.01	57511	43%

The economic impact on declining productivity has been immense as quantified in previous sections to this submission. Of note is the fact that where water prices on schemes throughout Queensland are approaching $100/ML water usage is drastically reduced. That figure is not to be used as an indicator of a break- even scenario. It is not it is way less than that, but also hinges on the cost of electricity.

Variability in production has an added debilitating effect on grower performance as well as the wider community. As an example where water resources are cheaper and meets demand eg the Burdekin the variability in production is 50% of the variability in the Mackay Whitsunday region where water prices are high and growers are dependent on supplementary irrigation.

The impact on water quality would also be immense with a decrease in NUE, but in all likelihood even more profound when you consider the fact that crops do not achieve maximum biomass potential early in the season due to stunted growth and then this is followed by waterlogged conditions mid-season increasing run-off and reducing the efficacy of both nutrients and chemicals applied to the crop.

<u>Environmental Considerations</u>

Mackay–Whitsunday report card

The Mackay–Whitsunday Healthy Rivers to Reef Partnership report card helps identify the regional pressures affecting waterway health in freshwater, estuarine and marine environments. Pressures in the Mackay-Whitsunday region range from those occurring on an international level such as climate change to reef-wide and localised regional pressures, among them coastal, port and agricultural development, tourism and litter.

Activities in the catchment strongly influence waterway health scores. Mackay–Whitsunday region is a major agricultural area with a significant area of the catchment under cane production, with catchment runoff of pollutants, particularly nutrients and pesticides, presenting a major pressure, notably in the Pioneer and Plane river basins. Rainfall is a key driver of water quality. Loss of wetlands and riparian vegetation is also a key pressure on the region's basins and estuaries.

The region was heavily impacted by Severe Tropical Cyclone Debbie in 2017.

Key messages of the 2016 report card:

- <u>*Rainfall is a key driver of water quality and two years of below average rainfall means scores for water quality in freshwater and estuaries are similar to the previous year, with pesticides remaining a key issue in the Pioneer and Plane basins.*</u>
- In the Whitsunday inshore marine zone, water quality scores from sampling at long-term monitoring sites decreased from moderate to poor. Research is currently underway to help us understand this situation.
- For the Whitsunday inshore marine zone the improvement from a D to a C score reflects only a marginal overall increase. This is because two out of three indicators improved, however the third has declined.
- Urban stewardship scores have improved from the last report card due to improvements in implementing the planning and management guidelines for urban development.

Key messages of the 2017 report card

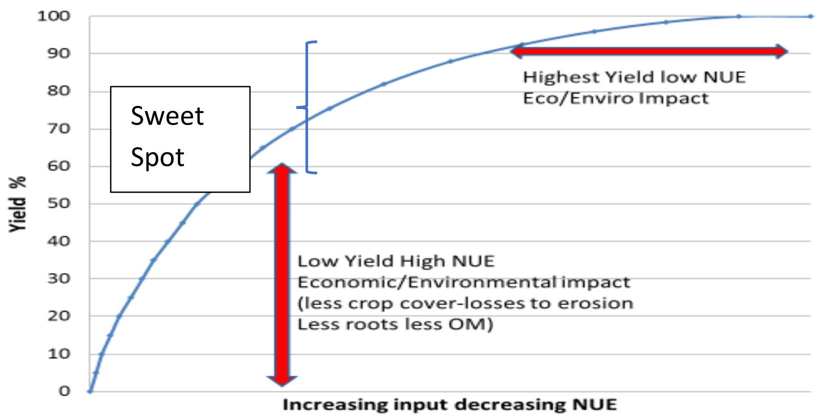
- The Mackay-Whitsunday region was brutally impacted by Severe Tropical Cyclone Debbie when the Category 4 storm crossed the coast on 28 March 2017. The 2017 reporting period (July 2016 to June 2017) captures only three months of post-cyclone water quality condition. The 2018 report card will further reflect any impacts from TC Debbie.

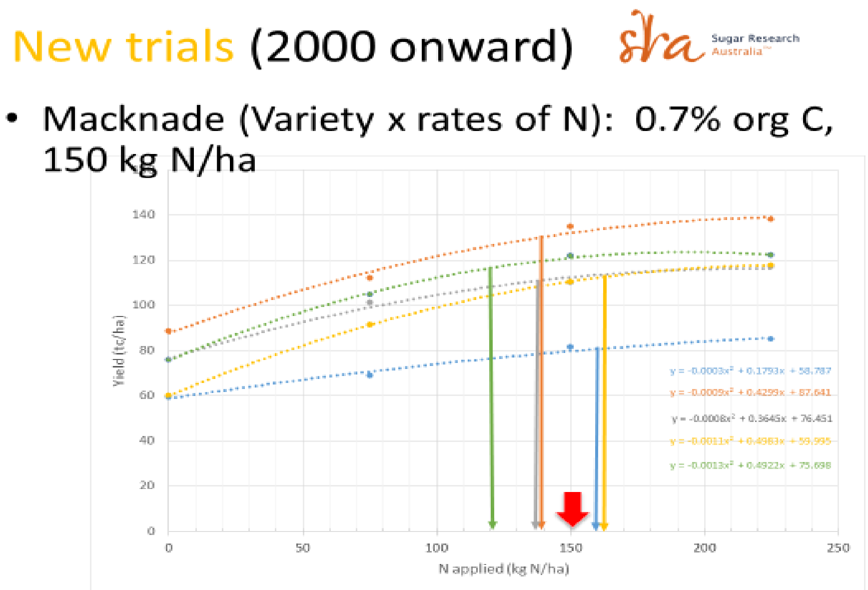
- Water quality in most estuaries, except for Sandy and Carmilla Creek estuaries, were in good condition, despite including the period when TC Debbie crossed the coast.
- Good water quality scores in the estuary systems suggest that water quality returned to pre-cyclone conditions soon after the event. The Region's estuaries are short systems that experience large tidal ranges, so that following large rainfall events pollutants are normally flushed out of the estuaries rapidly.
- Four out of the five reported basins were in moderate condition, similar to the 2017 report card.
- The Don basin scored very good for pesticides.
- Offshore marine water quality was very good for the fourth report card in a row.

Environmental Benefits of irrigation

The Mackay Whitsunday Region delivers high DIN and Pesticide loads to the GBR. The small incremental improvements being achieved at present in water quality are admirable but the improvements are small as seen in data provided by P2R modelling. We need a gamechanger wholistic look at what can achieve faster and greater benefits. *Business as usual will not cut it*. Projects carried out in isolation do provide information for change but are too slow in uptake and done in isolation do not create meaningful step-change. The use of irrigation strategies will improve water quality dramatically. Seems strange that Governments are obsessed with regulation and enforcing compliancy in a scatter gun approach as opposed to looking at the farming system holistically and strategically to maximise productivity profitability and at the same time meet environmental outcomes.

Nitrogen Use Efficiency





- Optimisation of all inputs not just N will maximise crop growth and vigour
- This in turn will lead to increasing OM the building block for soil health
- Increased crop cover and a healthy root system protects the soil from erosion or sediment loss and utilises nutrients so that losses are minimised.
- Given the fact that to the best of our knowledge 6es has determined our range of N rates within the "sweet spot" in most circumstances, our focus should look at what other tools are available to reduce N losses.
- Management strategies. Right product, right time, right placement, right rate.
- More critical than the above is having an incorporation strategy such as the correct application and timing of irrigation so that products are activated and used by the plants before losses can occur.

Consider the trials done by Ken Rhode

Although these trials were not replicated, they were large scale and provided some practical farming advice. It is obvious from the trial that the rate of N is not as critical as retaining what is applied. The 10/11 rainfall season was almost 90 % above long-term average. Despite receiving a favourable rain forecast, runoff occurred 3 days after fertilising and 10% of N fertiliser was lost. This was very much a worst-case scenario. In the 11/12 season more favourable conditions (longer period of time between application and first runoff event allowing smaller falls of rain to incorporate nutrients) occurred resulting in the high rate losing only about 0.6 kg N/ha more than the low rate. Each rate (200kg/Ha and 139kg/Ha) lost only 1% of applied N. I understand there are other pathways for losses but to some extent they would be proportional losses. Therefore, if the difference in losses are negligible then we can assume that most of the N was retained on farm at both rates!! The call for reducing rates is an oversimplification of a complex issue which can better be solved by holistic farm management. Farm retention of nutrients is more critical than rate! We can vastly improve water quality by more effectively using the N available. We can consistently reduce N losses by improved management practices like using the correct amount of overhead irrigation to incorporate fertiliser and activate crop uptake.

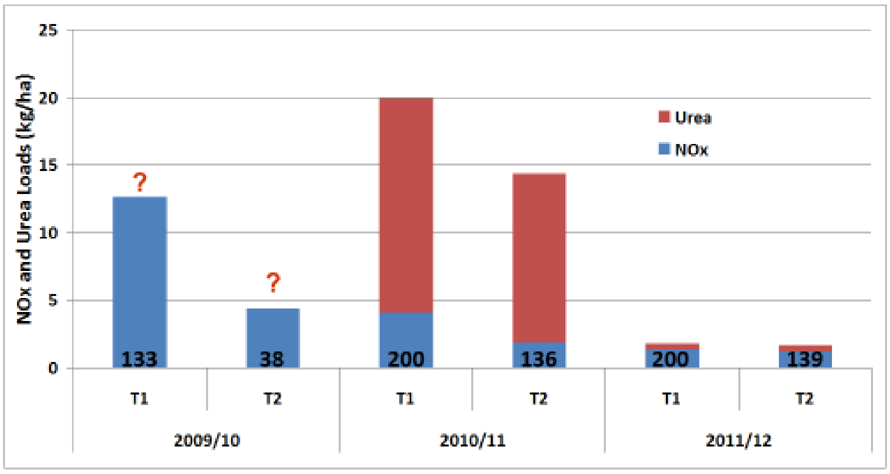
Important to note here that even though losses of N were reduced to 1% of applied N the crop that was harvested was only 85t/ha adding weight to the fact that timeliness and incorporation strategies are paramount to reducing losses and can be achieved without big increases in yield. The loss pathways other than run-off in this case were not quantified so more research is needed in this space.

Effective control of nutrients and chemicals via irrigation strategies

- Efficient irrigation maintains crop vigour which maximises productivity and maximises biomass as soil protection pre and post-harvest. High trash retention suppresses weed germination.
- Nutrient and chemical uptake is maximised by a healthy crop. This reduces the amount of run-off hyperbolically the longer the gap is between application and the first run-off events.

Annual nitrogen loads – Victoria Plains

- Losses in runoff of NO_x+Urea were ~10% of applied N in 2009/10 (urea not analysed) and 2010/11, but only ~1% in 2011/12
- Urea dominated N loss in 2010/11 due to runoff 3 days after application
- Timing of N application more important than rate applied?

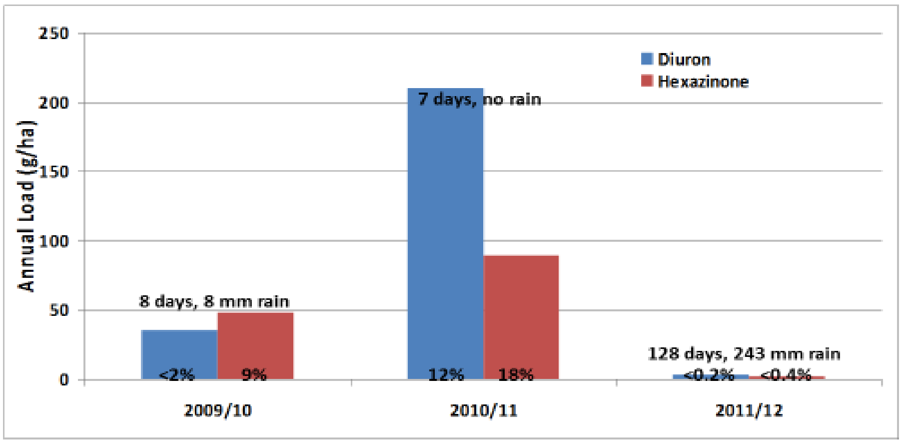


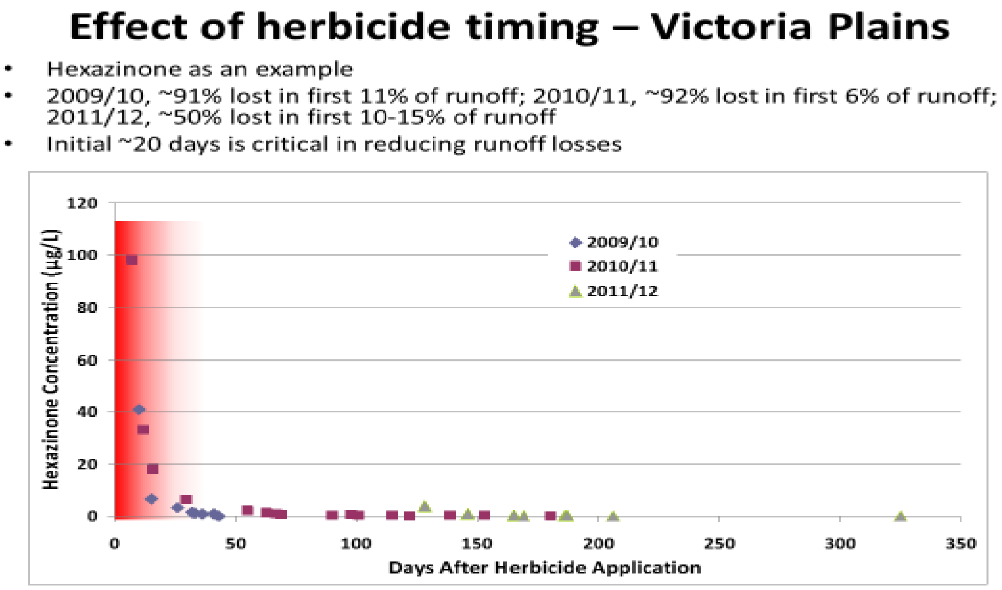
The same situation occurred with herbicide losses as per the graph below.

With regards herbicide losses it is even easier to control than nutrients because their shelf life is much shorter especially if they have been activated.

Annual herbicide loads – Victoria Plains

- Velpar/Bobcat applied each year at similar rates
- Losses mainly driven by period of time between application and first runoff
- Majority of losses occur in first few runoff events





These trials indicate that if we use irrigation management strategies correctly there will be a huge benefit to water quality.

MCL is at present working with growers to enhance irrigation efficiencies and to meet water crop demand via telemetrised data from probes to apply the right amount of water at the right time. We do not have the money to quantify loss reduction of DIN, but are able to use broader indicators like NUE.

In some instances we have had growers reduce their NUE from 2 kgN/Tc to 1.15 kgN/Tc, purely from increased production from an efficiently irrigated crop. We cannot assume a 75% saving on N as this is a complex issue and must be quantified, but the savings would be way more than what is being achieved at present. More importantly it achieves the desired TBL effect.

<u>**Socio Economic Considerations**</u>

The GRP of the Mackay Whitsunday Isaac region is approximately $6.92B and fluctuates dramatically dependant on the amount of coal exports and the price of coal. In 2017 this value increased by nearly 75% on the back of increased coal prices even though there was a decline in the quantum of coal exported. As such agriculture is a minnow when it comes to the overall contribution to the regional GRP figure.

Agricultural output is in the region of $1B with fluctuations around that figure largely dependent on weather conditions. Sugars contribution is in the region of $350-550M

However it is important to highlight the fact that Sugar punches above it's weight when it comes to providing stability and is the socio-economic backbone of the region. Of the registered 10,000 businesses in the region the largest proportion (1850) of these are registered Agriculture related businesses, representing 18.5%. As a net exporter agriculture quickly climbs the ladder and of the total net export value from Mackay, agriculture contributes $261M, which equates to 29.5% of the total net export value.

Local Mackay Whitsunday Production figures

- 5 mills (3 Mackay Sugar, 1 Proserpine, 1 Plane Creek)
- 1147 business units
- 130,000 hectares under sugar cane
- 110,000 ha harvested annually
- Employs approx. 3000 locals includes farming harvesting and milling enterprises
- Value of crop in the last 5 years ranged between $350 million to $500 million.
- Raw Sugar production in the last 5 years has ranged between 825,000 and 1,350,000 tonnes
- Dunder is produced at Plane Creek. Approximately 60,000 ha fertilised annually.
- Bio refinery producing ethanol.
- Co-generation plant producing 30% of Mackay's usage.
- 84% land in the region zoned as rural
- <5% of region's population inhabits rural areas
- 7% employed in agriculture (direct employment)

The resilience of grower and milling businesses have been sorely tested over the last two decades, with the milling sector at the point of bankruptcy due in the main to reduced crops and some bad financial and strategic decisions. The milling sector namely Mackay Sugar is in the process of seeking outside investors, however they will not recover at present production levels and nor would a restructured business survive at present levels. The present crop size is hovering around the 4.6MT mark and viability requires a crop of at least 5.8MT. The Mackay region has produced crops in excess of 100tc/ha in the past and there is no reason why this cannot be achieved again. 20% of caneland has gone out of production due to the feeling of insecurity and lack of confidence in the crushing capacity of mills, margin squeeze and regulatory pressures. The other Wilmar mills in the region do not face the same level of angst even though there have been other issues to resolve like the marketing and grower economic interest issues. Mackay Sugar is by far the biggest player in the region with >80,000 ha of sugarcane land contracted to the mill. Wilmar Sugar has approximately 48000 ha contracted to it. They also face viability issues if the crop size is not increased from present levels.

The region cannot afford anymore contraction of the supply of cane and is at a critical juncture. The reasons for contraction is twofold and involves socio-economic issues and productivity issues. The socio-economic issues can be overcome by improving productivity and improving viability.

Effective water resource management has the ability to make growers more profitable but also provides the opportunity to make their businesses more resilient to short term downturns whether that is due to a downturn in world sugar prices or the vagaries of weather which so often affects the central region. The effects of climate change has already had a phenomenal impact on the sugar industry especially in the central region due to high climate variability and the only way to negate this is ensuring that we increase water supplies in the long term and make the most efficient and effective use of available supplies in the short term.

As growers become more productive, mill viability becomes assured. This in itself will instil confidence in the industry and instil confidence in the younger generation that have moved off-farm to look for jobs in other industries. Agri-business and agriculture related businesses will benefit from increased on farm disposable income. A strong agricultural industry provides a fall back for those who have had to look for jobs in the resources sector either because of farm viability or because the younger generation saw no future in it.

Efficient irrigation provides a risk mitigation strategy for the farm business. It will also provide income in the event that the sugar industry contracts by providing the means to produce alternative crops.

Effective Water Resource Management.

Effective water resource management should encompass and consider the following:

Strategies that consider not only the efficient supply of water but achieving the most effective use of that water for the economic, social and environmental benefit of the communities for which those resources were harnessed.

To achieve this it is incumbent on Governments and their advisors to specifically consider:

The efficient operation of monopolies owned by Government. The assets for those monopolies were paid for by taxpayers and includes direct capital contributions by some taxpayers (irrigators) to secure resources for the benefit of all.

We cannot continue to look at these resources in isolation. A point in case is the effect that electricity prices have had on the price of water and how the combination of these price increases have had an effect on the viability of all businesses. At no point has the QG, Sunwater or QCA determined at what price water and electricity would undermine the capacity of the user to pay or the point where it undermines development or the socio-economic and environmental impacts. Should we be looking at Sunwater as an effective resource manager? Should we be considering equity in the supply/cost of water so that all regions are competing on a level playing field? At what point do customers cease to use the water and what is the opportunity cost when that resource is no longer used or usage is reduced. What would be the returns to the Eton and Pioneer Valley schemes if the cost of water is reduced and usage is increased?

What has SunWater done to reduce the cost of water? Have they installed renewable energy sources (solar) to augment the cost of pumping?

Climate change has already had an impact on productivity in the Central Region. We have argued the impact of available water and the cost of water on the TBL. We have not got to the worst point in this end game and yet we already have the problem of a substantial decline in productivity.

Implications for policy decision makers:

- Adequacy of the existing storages to cope with increased variability and reductions in rainfall
- Vulnerability of Industry to shortages
- Infrastructure planning
- Demands for environmental flows
- Water quality and algal blooms
- Water use efficiency
- Use and management of groundwater

- Productivity and carrying capacity of cropping and grazing systems
- Financial viability of cropping and grazing sectors
- Risk management and sustainability
- Industry adjustment and assistance schemes
- Industrial attraction and investment
- Environmental degradation
- Livability and social-economic impact

As a final note. There are a large number of growers who would now prefer to off-load their water allocations and have asked that QCA make deliberations towards an exit strategy.

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