

BSES Limited



**FINDINGS FROM THE 2006 'MAXIMISING PROFITABILITY
IN THE HERBERT SUGAR INDUSTRY WORKSHOP'
PROJECT BSS264 ADOPTION OF AN OPTIMAL SEASON LENGTH
FOR INCREASED PROFITABILITY**

by

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SUMMARY

In 2003, the Herbert sugar industry established an industry working team to investigate ways to manage the harvest and processing of larger crops and investigate methods of increasing industry profitability.

In 2004, SRDC funded the BSS264 *Adoption of an optimal season length for increased profitability* project. The project aims are to maximise CCS, sugar yields and industry profitability in the Herbert region by exploiting regional variation in CCS, soil moisture and trafficability. The project was also funded to develop economic models, SugarMax and Rainrisk models specific to the Herbert region.

In 2005, SRDC funded the Herbert industry study tour of Southern Africa to investigate the season length issues and farm management systems.

This report presents the findings from an industry workshop conducted within BSS264. The workshop was conducted to gain industry participants' views and opinions pertaining to harvest-season length, crop-management issues associated with an extended season length, industry-infrastructure utilisation, community impacts, development of alternative income streams, industry viability and cash flows. The workshop also presented research undertaken to date and research activities underway.

The workshop highlighted issues and barriers that may be encountered in attempting to increase the Herbert Sugar Industry profitability. These issues and barriers must be addressed to enable progress to occur.

The workshop highlighted the strained relationship between the miller and grower sectors of the industry. It is apparent that this relationship is preventing opportunities for the industry to increase profitability and reducing the regions ability to grow financially.

Clear direction was provided by the workshop were key industry research and development priorities are required. These findings will be incorporated into the BSS264 project work program or will be incorporated into the research priorities of research and development bodies servicing the local industry. Workshop participant highlighted strongly that further research is required in the value adding and value chain areas.

The workshop highlighted that the Herbert sugar industry in genuinely seeks to improve industry profitability and to secure the regions financial position into the future. It is now up to the industry stakeholders and community to enact upon the findings of this report and move the industry forward.

1.0 BACKGROUND

There is considerable potential to increase total sugar production, and individual grower and district CCS through better management of harvesting scheduling and crop management. The project BSS264 *Adoption of an optimal season length for increased profitability* attempts to implement change management through active participation and involvement of all industry sectors. The ‘Maximising Profitability in the Herbert Sugar Industry’ workshop informed the industry of various research findings and encouraged change management through active participation processes.

BSS264 *Adoption of an optimal season length for increased profitability* aims to maximise CCS, sugar yields and industry profitability in the Herbert region by exploiting regional variation in CCS, soil moisture and trafficability.

This report presents the findings from the ‘Maximising Profitability in the Herbert Sugar Industry’ workshop (conducted within BSS264) held on 31 January 2006.

The workshop program, questions and survey were developed by the industry working team overseeing and reviewing the project and the associated programs. The working team consists of representatives from CANEGROWERS, CSR Sugar, QMCHA, BSES Limited and HCPSL. Alf Musumeci from Queensland Government Department of Communities undertook the independent role as workshop facilitator.

The one-day workshop format consisted of a number of presentations from various research organisations undertaking research for the BSS264 project and the series of questions that were workshopped in small groups. Appendix 1 gives the workshop agenda.

Invitations in the form of a formal letter were sent to growers, harvester operators, millers, researchers and extension staff in the Herbert River region. The workshop was also promoted through advertisements and articles in the local newspaper (*The Herbert River Express*) and a radio interview. The general community was also invited to the workshop through the newspaper and radio promotions.

2.0 WORKSHOP PRESENTATIONS

2.1 Historical productivity data

Michael Sefton (HCPSL Productivity Data Manager) presented historical productivity data for the Hebert region (Appendix 2).

Findings presented:

- Data presented indicated that there is significant geographical variation throughout the district for CCS and cane yield.
- Trends in CCS and cane yield are different between short and long seasons and need to be separated when analysing data.

- Earlier starts will provide the greatest benefit in the drier areas of the districts, particularly in years when there is little rainfall during the season.
- Optimum TSPH is achieved in most sub-districts between 13-27 September, with the exclusion of drier southern areas that peak earlier between 30 August and 13 September, and the wetter northwestern areas that peak later between 4-18 October.
- In years with larger crops, it appears yield potential in all areas will be optimised by starting earlier.

2.2 Early CCS sampling

Lawrence Di Bella (BSES Extension Officer) reported on the grower early CCS sampling program undertaken in 2004-05 to monitor and develop CCS curves for the May and June period (Appendix 3).

Seven harvesting groups were selected through district (Map 1). The growers within the group nominated and sampled cane blocks that were to be harvested within the first two harvesting rounds for CCS. CCS sampling was undertaken on 16 May and 6 June each year.

HARVESTING GROUPS FOR EARLY CCS SAMPLING

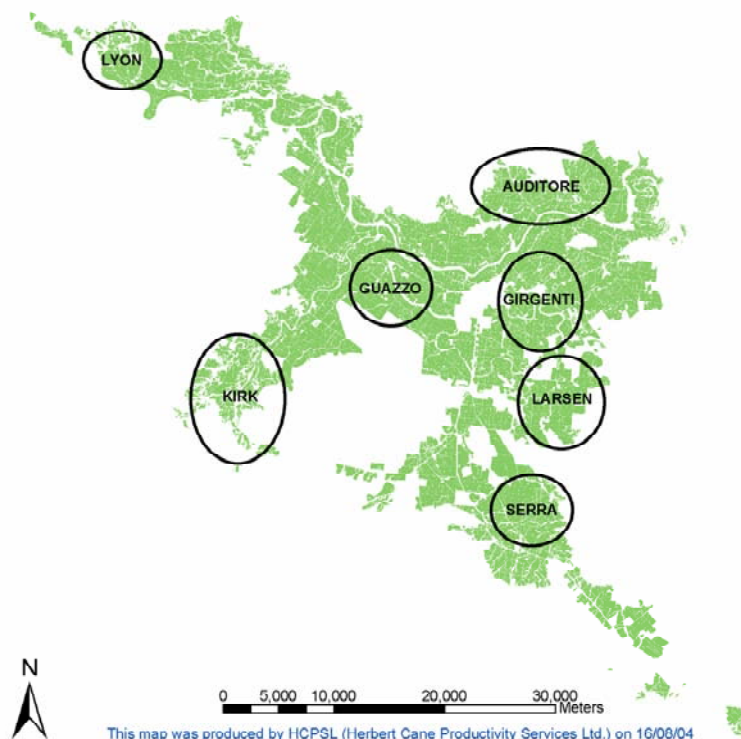


Figure 1 Location of harvesting groups for early CCS sampling

The results to date indicate that CCS increased by 0.43 units per week in 2004 and 0.32 units per week in 2005 during May and June.

2.3 Crop management for early harvested cane

Lawrence Di Bella (BSES Extension Officer) reported on crop-management strategies for early harvested cane (Appendix 3).

Findings reported:

- Variety management is critical to maximise CCS, yield potential, ratooning and profits.
- Adequate areas of cane should be planted to harvest early CCS varieties.
- Select early CCS varieties for harvest.
- A refractometer could be used to assess blocks for CCS potential, prior to harvest.
- Select blocks on farm that normally have higher CCS early and have good traffic access.
- Crop ripeners and crop growth regulators have been found to be cost effective in improving CCS of early harvested cane in some situations.
- Reduced nitrogen rates may be appropriate for early harvested cane to achieve higher CCS or for saving costs on both.
- Controlled-traffic systems or increased row spacing will allow blocks to be harvested in moist soil conditions without damaging stools.
- Harvest crops that were planted or ratooned early the previous year. Crops for early harvest should be close as possible to 12 months of age.

2.4 Crop ripeners / growth regulators

Phil Armytage (Syngenta Technical Service Lead) reported on (Appendix 4):

- Crop ripeners and growth regulators use globally.
- Review of MODDUS™ trial data that indicates that there are significant opportunities to improve CCS and monetary return to the industry with the application of MODDUS™ in particular situations.
- Crop growth responses to MODDUS™
- The 2006 Herbert MODDUS™ pilot application program

2.5 Optimising sugar yield

Di Prestwidge (CSIRO Research Officer) reported on the SugarMax modelling for the Herbert (Appendix 5). The model has been developed to assist industry investigate options to maximise CCS and TSPH. Various scenarios have been developed demonstrating the models capability and opportunities to increase monetary return through the scheduling harvesting differently.

2.6 Rainfall risk

George Antony (CSIRO Research Officer) reported on the Rainfall Risk modelling undertaken for the Herbert region (Appendix 6). The aim of the research is to understand the risk of rainfall that would reduce soil trafficability during harvesting across the region. The data concentrated upon the early and late parts of the season where there was considerable risk associated with extension of a season length. The model has potential to assist industry prioritise bin allocations during a rainfall event, extend SugarMax to schedule trafficable blocks for harvest, show financial costs/ benefits of seasons for different geographical rainfall patterns and for different risk aversions of industry stakeholders.

2.7 A concept for combining harvesting groups for geographical harvesting

Lucio Mastripolitto (Herbert River CANEGROWERS Board member) and Peter Sheedy (Herbert River CANEGROWERS Manager) presented a concept for combining existing harvesting groups across the district (Appendix 7). The concept attempts to minimise the risks associated with wet weather harvesting and to increase industry profitability through the improvement of harvesting scheduling. Lucio stated that he did not have all the answers, but urged industry to consider alternative options to improve industry profitability. Peter highlighted that the Herbert CANEGROWERS organisation will be seeking SRDC funding to investigate further opportunities to evaluate the combining of harvesting groups and the organisation was seeking interest from industry to join a pilot study group.

2.8 Learnings from Southern Africa and Brazil

Andrew Wood (CSR Herbert Productivity Manager) presented learnings and observations made during visits to South Africa, Swaziland and Brazil in relation to season length issues (Appendix 8). The presentation highlighted the issues and opportunities associated with season length in these overseas sugar industries.

2.9 Alternative products from cane

Andrew Wood highlighted that the Australian sugar industry is currently reliant on the returns from crystal sugar, but new products could be made from sugarcane (Appendix 9). The presentation highlighted that the industry may need to review the issue of season length to allow the development and investment in value added by-products of sugarcane.

3.0 WORKSHOP QUESTIONS

Workshop participants formed seven, roughly equal-numbered groups. Composition of the groups was organised by randomly allocating a number between one and seven and having people with the same number form a discussion group. This was done in an attempt to have diversity in the groups. Each group was allocated a 'group facilitator' to ensure that: (i) everyone was clear in regard to the task at hand; (ii) pens, butcher's paper, etc, were available as needed; (iii) time constraints were met; (iv) someone in the group was recording the group's responses; and (v) individuals had a 'fair go' during group discussions.

The workshop facilitator introduced each question before it was considered by the participants.

3.1 “What are the opportunities to increase ongoing district profitability?” and “What role does season length play with achieving these opportunities?”

The participants were asked to consider “What are the opportunities to increase ongoing district profitability?” and to note “What role does season length play with achieving these opportunities”. Specifically they were asked to indicate alongside each identified opportunity whether a longer or shorter season would be preferred. Workshop groups were requested to record their responses on butcher's paper and, in turn, report back to all other groups.

Appendix 10 reports the responses from each discussion group.

After the workshop, the responses were collated and grouped under broad headings. The result of this process is in Appendix 10, and is summarised in Figure 2.

Opportunities for District Profit

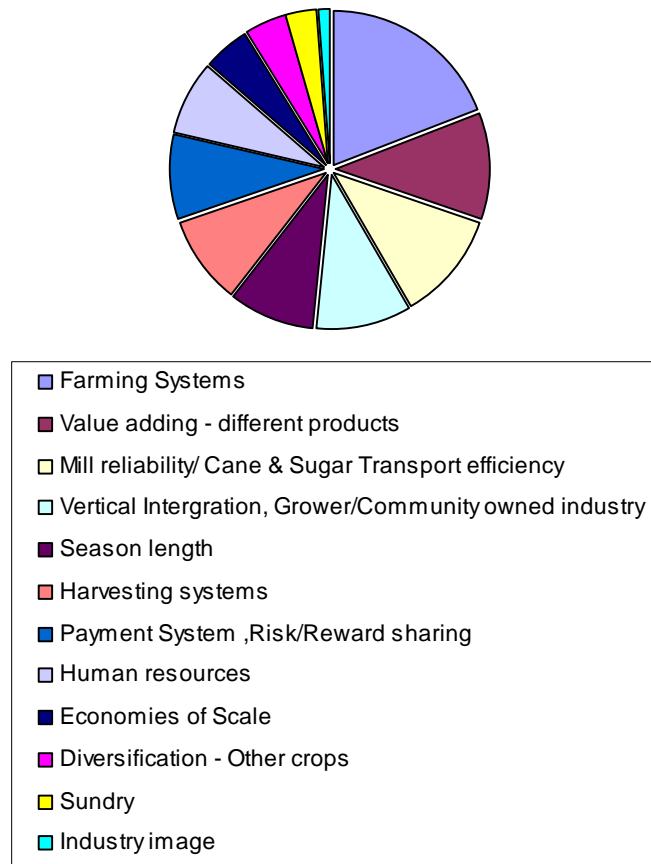


Figure 2 Collated and grouped responses - Opportunities for profitability

Conclusions:

- The responses in relation to season length were incomplete. They did however confirm that the concept of an optimal season length depended on the combination of products and by-products produced, viz
 - A longer season length would be essential to enable value adding to be viable option (ie. co-generation, ethanol and bio-plastics) and to enable better use of capital.
 - While the industry continued to focus on the production of raw crystal sugar, it was perceived that season length should be short to maximise CCS and yield potential. This activity could be sometimes to the detriment of efficient use of industry capital and employment opportunities (especially in the harvesting sector).
- Improvements in farming systems were rated the highest priority. Gains could be made through crop-improvement programs, development of bio-factory crops, improvements in crop agronomy, adoption of alternative farming systems, use of crop ripeners, two-row harvesting, and better monitoring of the crop growth.
- Value adding and vertical integration of the sugarcane business were also perceived as opportunities to increase district profitability.

- Mill reliability and mill transport issues rated very highly. It was perceived that mill reliability and mill transport issues limited or reduced the district’s potential to increase profitability. The whole mill-grower relationship was questioned and was viewed as a major impediment to increasing profitability.

3.2 “What are the risks or barriers associated with adopting the opportunities?”

Each participant was asked to consider “What are the risks and barriers with adopting these opportunities” and identify at least three points. During the lunch break, forum facilitators grouped like responses, allocated a heading and reported back to the entire workshop. Appendix 11 reports each response under the allocated heading as they were reported back to the workshop, whilst Figure 3 summarises the frequency of responses under each of the headings.

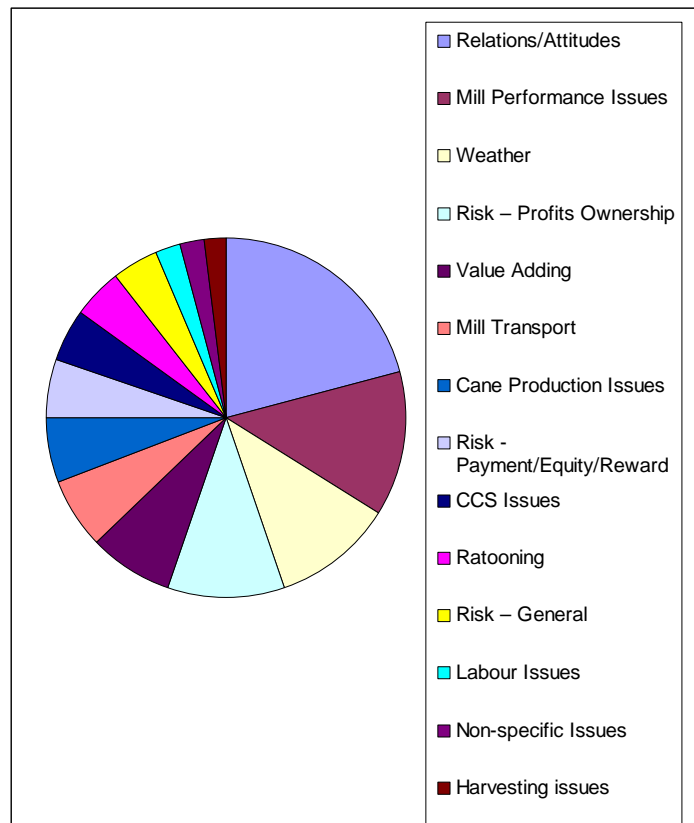


Figure 3 Proportion of responses for the question “What are the risks or barriers associated with adopting the opportunities?”

Conclusions:

- Relationships and attitudes were rated highest. Responses were varied, but mill-grower relationships, and reluctance to change due to social, family, age and perceived monetary gains from changes were prominent.
- Mill performance issues also rated highly. Participants' concerns were in relation to mill performance, mill reliability, transport issues and lack of maintenance of sugar mills and associated infrastructure. These issues contributed to strained relationships between the millowner and growers.
- The issue of profit sharing from value-added by-products appears to be a major impediment to the development and progress of value added by-products in the region.

3.3 “What are the knowledge gaps- what should the industry focus on and what are the future priorities?”

Workshop participants discussed the questions and as a group prioritised their response. Each group was asked to report their highest three priorities to the entire workshop group. Like responses were then grouped and all participants were then asked to vote on the grouped issues they regarded as the highest priorities. Each participant had the opportunity to cast a maximum of three votes. Appendix 12 records all responses, how they were grouped and where votes were cast. Figures 4 summarises the results of the voting process.

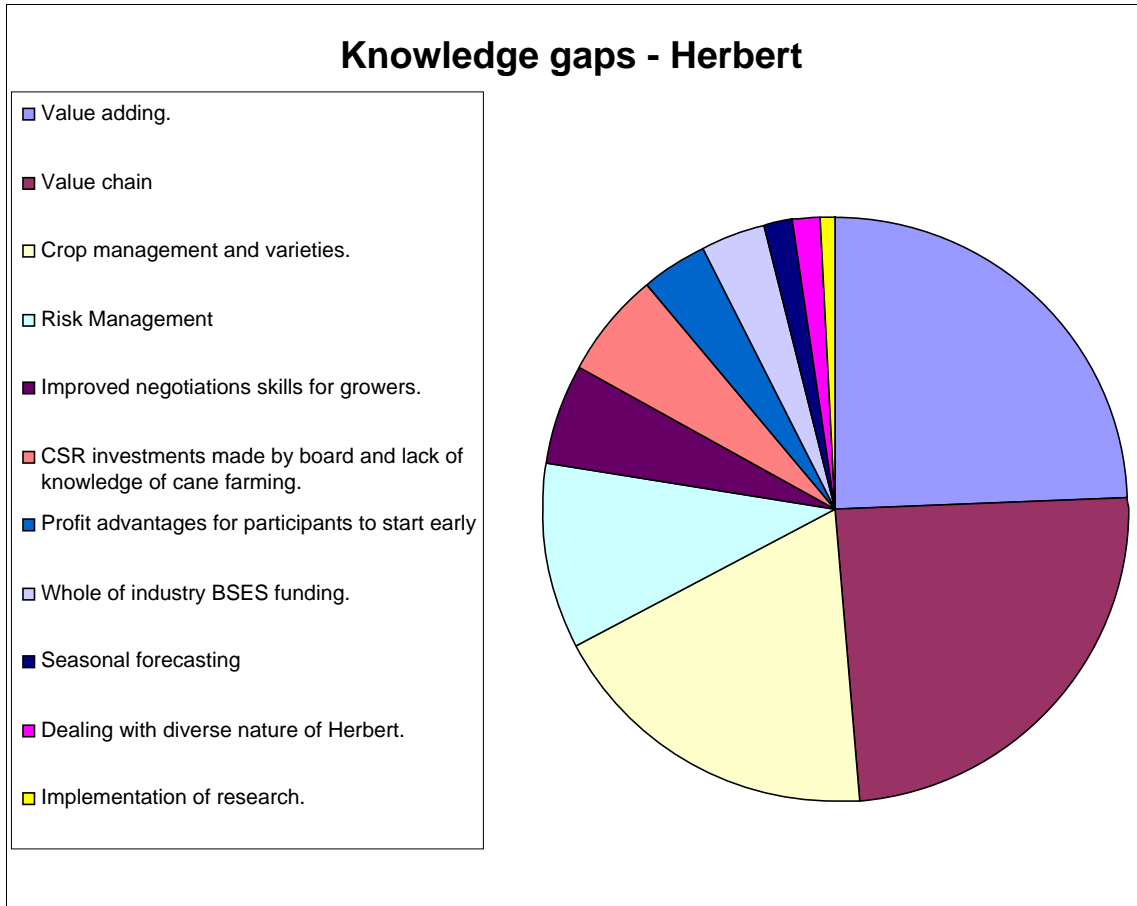


Figure 4 Proportion of responses for the question “What are the knowledge gaps- what should the industry focus on and what are the future priorities?”

Conclusions:

- Value-adding and value-chain issues rated the highest, together accounting for almost 49% of responses. Participants believe that there are considerable opportunities in value adding, but responses indicate that there are considerable knowledge gaps in value adding initiatives and understanding of the whole value chain.
- Crop management and varieties also rated very highly. Responses indicated that participants had a strong desire to seek more knowledge on different crop-management techniques and an improved understanding of variety management.

4.0 WORKSHOP EXIT SURVEY

At the conclusion of the workshop, attendees were asked to complete a workshop exit survey. The survey consisted of questions to assess participant view and opinions on various issues associated with the workshop format, industry profitability, season length and other issues associated with crop management. No discussion was permitted during the completion of the survey. Participants were asked to answer the survey in an honest and sincere manner; to ensure that industry viewpoints were expressed.

The survey comprised a series of yes/no questions, short answer questions, and questions where the participants could express their opinion .

4.1 Findings from the Workshop Exit Survey

QUESTION 1 - *Were you satisfied with today's workshop?*

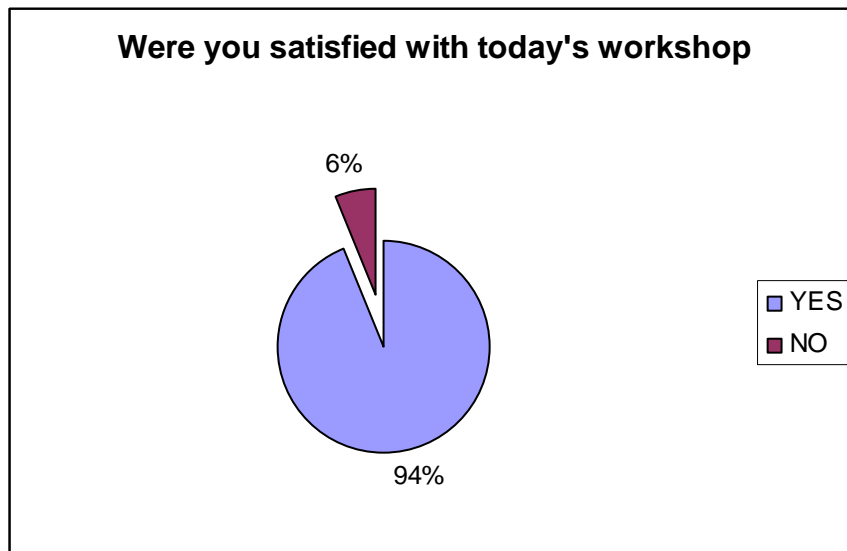


Figure 5 Were you satisfied with today's workshop?

Comments:

- Questions were not clear and decisive – Open to interpretation = confusion.
- Could have been smaller groups.
- The connection between issues identified and barriers were lost for the afternoon session.
- The issues should have been used to identify the R & D items representing season-length implementation.
- Question could have been friendly.
- Too focused solely on season length.
- Agenda and outcome pre-determined.
- More time for informal discussion.

- Time was the essence.
- Round table better for discussion.

QUESTION 2 - *Has today's workshop convinced you that we should change the way we address season length management?*



Figure 6 **Has today's workshop convinced you that we should change the way we address season length management?**

Comments from those who answered yes:

- Lots of data presented that showed issue of harvesting well into December.
- We should talk about the benefits and the negatives.
- Shorter season.
- Go for the shorter season to allow growers/farmers maximum income in positive way.
- Crop optimisation.
- Only if weather permits.
- To maintain CCS and tonnage levels throughout the season.
- Opportunity to increase district profitability.
- We need to look at the bigger picture.
- By better negotiation.
- The lack of knowledge on the component of impact samples objective consideration of options.
- Risks and profit must be shared.
- Identified the issues to focus on.
- Better crops.
- Shorter season.
- Desirable way to harvest

- Base the discussion on season length by using data and not stories.
- Get better CCS with cutting right time.
- Unless value adding is introduced and benefits are shared, seasons length should remain short as possible.
- Economic and social gains.
- Need better economic evaluation of the effects of change on all sections for changes in CCS, yield over 5-year cycle.
- Reconsider cane-payment methods.
- If value adding, the season length could be longer.
- More benefit to grower.
- Late finish, loss of CCS and ratoons.
- Increase district profitability.
- Paradigm shift → longer season length will encourage value adding.
- Only if it benefits everybody.
- Profitability issue.
- Manage to maximise returns.
- The longer the season goes, the costs are too great.
- Gains everywhere.
- So many issues to take into account.
- A complex issue, need debate like this with facts/ tools, etc.. to take to other stake holders.

Comments from those who answered no:

- There's a good reason why.
- Needs to be the focus on how to demonstrate that growers will not be disadvantaged.
- This is about letting the mill off the hook.
- I get no benefit out of a longer season.
- We can't control the weather.
- Reason is apparent. Mill is not going to increase capacity. If we want to grow larger crops then we have to increase the season length regardless.
- I think it is handled well.
- We have too much to risk.
- Need cost and benefit.
- Not really, I think the links is too high for the returns.
- CSR has a lot of catching up to do.
- Lost focus at times.
- The fundamental factors were not identified, ie. mill efficiency, transport capacity etc. This essential background information was not delivered. I do believe some changes in management of crop harvesting will deliver some of the changes needed.
- Current system is proven.
- It shows quite plainly that it should be shorter and that we are losing money as a result.
- No clear reason to change. No advantage to myself or industry.
- No financial gain.
- We should have a shortest possible season and early finish.

QUESTION 3 - *What was the highlight of the workshop?*

- Being able to have input.
- We hope change for the better.
- Presentation on rain risk.
- Data and tools presented.
- Group discussions/opinions.
- Number of people involved and type.
- When all the dots went up on board.
- Everyone's involvement.
- That value adding is most important.
- Presentations.
- Working and thinking together.
- Address.
- The organisation.
- Working together.
- Partnered harvesting concept.
- Seeing how many pen pushers this industry supports and pays their salary (some are a waste of good space).
- Lucio's presentation – clear, concise, to the point, big-picture thinking.
- Fundamental information on weather (G. Antony) and lovely passionate delivery of need to change.
- The dot board.
- 'Skin the cat'.
- Value adding.
- The vote at the end.
- The address by all was top class.
- Two main topics – Value Adding and Value Chain.
- Exchange of ideas between participants. A very well run workshop.
- Nothing for me.
- Good organisation and facilitation.
- The fact that we had a good number of participants.
- The way people voted.
- Knowing that most farmers do not want to change too much.
- Presentations.
- The number that attended.
- Lucio Mastripolitto and Peter Sheedy, even though I might not agree with everything they said.
- Mastripolitto presentation.
- Lucio Mastripolitto speaking of the need to consider new ways – Good to see CANEGROWERS leading the way.
- Presentation of research.
- Dealing with various factors of season length and crop ripeners.
- Whole workshop
- The voting.
- Alf Musumeci facilitator

- Well presented and enjoyable.
- Process was OK. But agenda outcome was pre-determined.
- Ensuring that everyone had a say.
- Able to say what you want.
- The friendly way it was.
- Getting to hear other people's thoughts.
- The enthusiasm of the participants.
- Workshop around table.
- Prioritising the Knowledge Gap. Good visual display.

QUESTION 4 - *Should some parts of the district start harvesting before other parts of the district?*

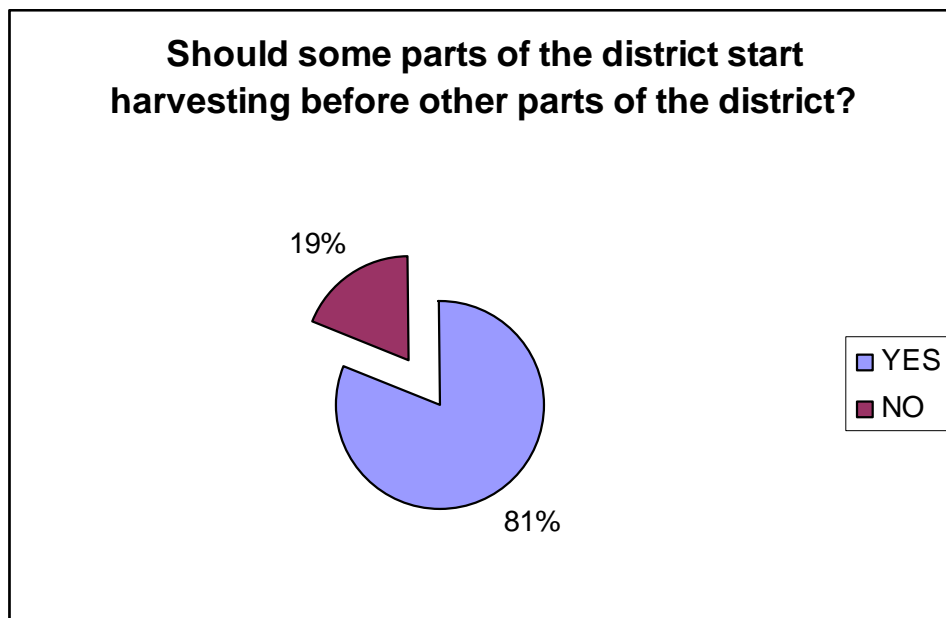


Figure 7 **Should some parts of the district start harvesting before other parts of the district?**

Comments for yes answer:

- Drier parts of the district - 5 replies.
- Optimise CCS - 19 replies.
- Balance of higher (early CCS) with risk of rainfall.
- Maximise returns.
- Improve district TSPH average.
- Only where weather permits - 2 replies.
- Avoid late cuts.
- Under a special collective arrangement that does not disadvantage others.
- Make more profit - 5 replies.
- Reduce compaction - 2 replies.

- Better weather management - 4 replies.
- Early starters finish early - 3 replies.
- Only with big crops.
- Maintain a fair season length or shorter season.

Comments for no answer:

- Risky with CSR management.
- Has to be an incentive - 3 replies.
- Mixed results on sugar quality and equity.
- No equity - 3 replies.
- Sharing of CCS average and risk of late cane - 2 replies.
- Can not control CCS.
- No personal benefit.

QUESTION 5 - *Should harvesting groups starting early be allowed to finish early?*

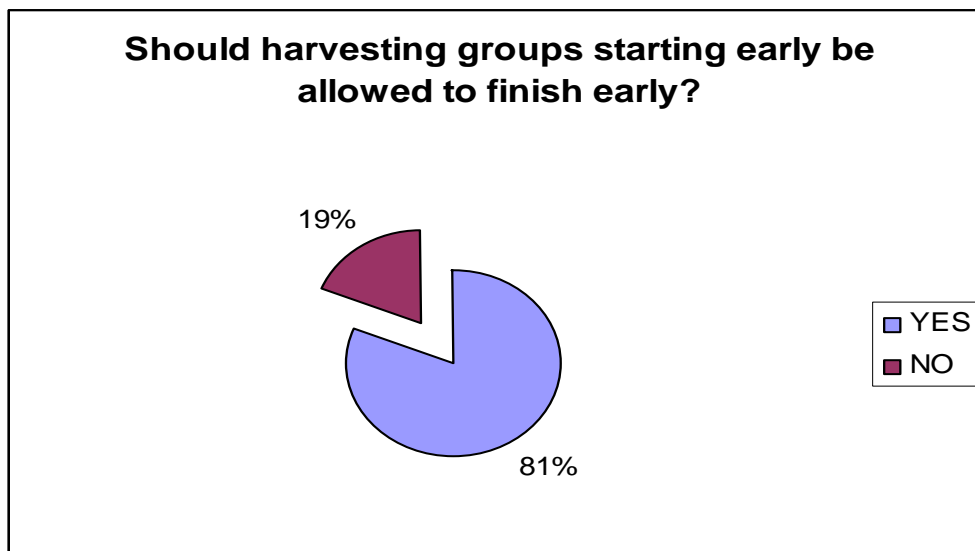


Figure 8 **Should harvesting groups starting early be allowed to finish early?**

Comments for yes answer:

- Provides an incentive - 16 replies.
- Improved CCS - 6 replies.
- Improved ratoons - 2 replies.
- Everyone should have a equal season length - 4 replies.
- Weather management - 4 replies.
- No cost to growers - 2 replies.
- Assists with crop management.
- Easier to manage logistics (transport) - 3 replies.
- Must start early every year.
- More profit

- Under special collective arrangements.
- Risk sharing - 2 replies.

Comments for no answer:

- Got an advantage by early start.
- Separating district.
- Early harvested areas should not interfere with rest of district, if you can not harvested early.
- Shifts risks to later in season.
- Weather issues
- Finish together - 2 replies.
- All ratooning cane harvested first.
- Too risky with CSR Management.

QUESTION 6 - *If cost effective crop ripeners/growth regulators were available would you consider using such products?*

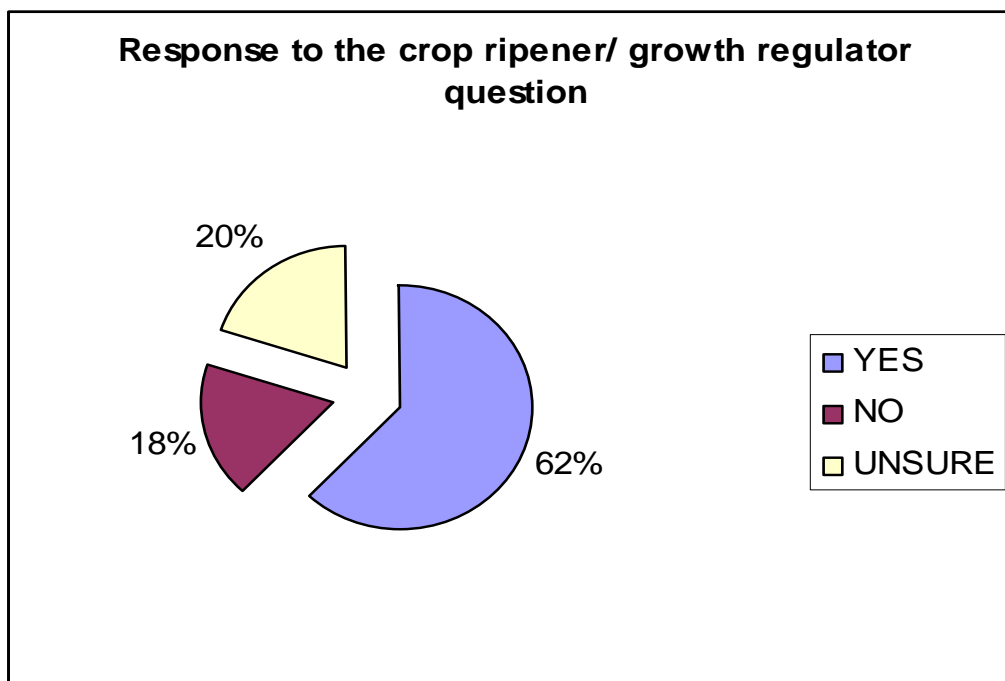


Figure 9 **If cost effective crop ripeners/growth regulators were available would you consider using such products?**

Comments:

- Not proven - 1 reply.
- More research needed - 2 replies
- Needs a clear benefit to growers - 2 replies
- Must be cost effective e- 3 replies.
- Who pays? - 1 reply.

QUESTION 7 - *Would you consider different harvesting arrangements within your harvesting group if opportunities were available?*

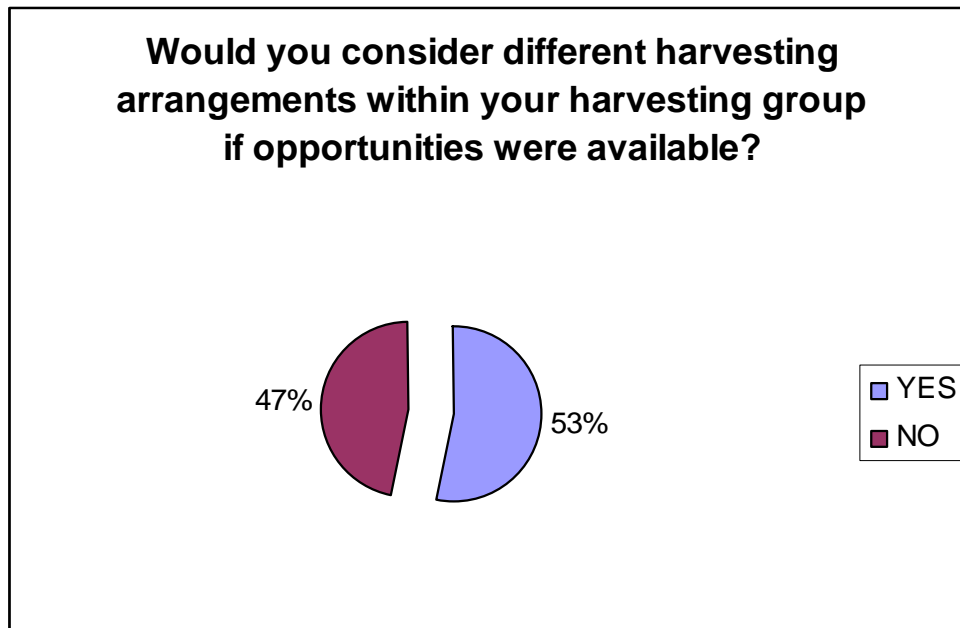


Figure 10 **Would you consider different harvesting arrangements within your harvesting group if opportunities were available?**

Comments:

- Combine smaller groups - 2 replies.
- Payment on HBP.
- Optimise CCS and tonnes - 5 replies.
- Group rotation and number of rounds.
- Staggered start.
- Reliable bin supply will make a difference.
- Harvest dry areas first.
- Provided equity retained.
- Provided it is not detrimental to the harvesting contractor business.
- Rewards need to be clear.
- Open to suggestions - 2 replies.
- Group rotation - 2 replies.
- Remove equity and install co-operative methods.
- Mill interchange.
- Improve ratoons.
- Weather management - 3 replies.
- Growers from different parts of district in same group.
- Allow for early start.

QUESTION 8 - *Looking back at last season would it have been better to have started and finished the season earlier?*

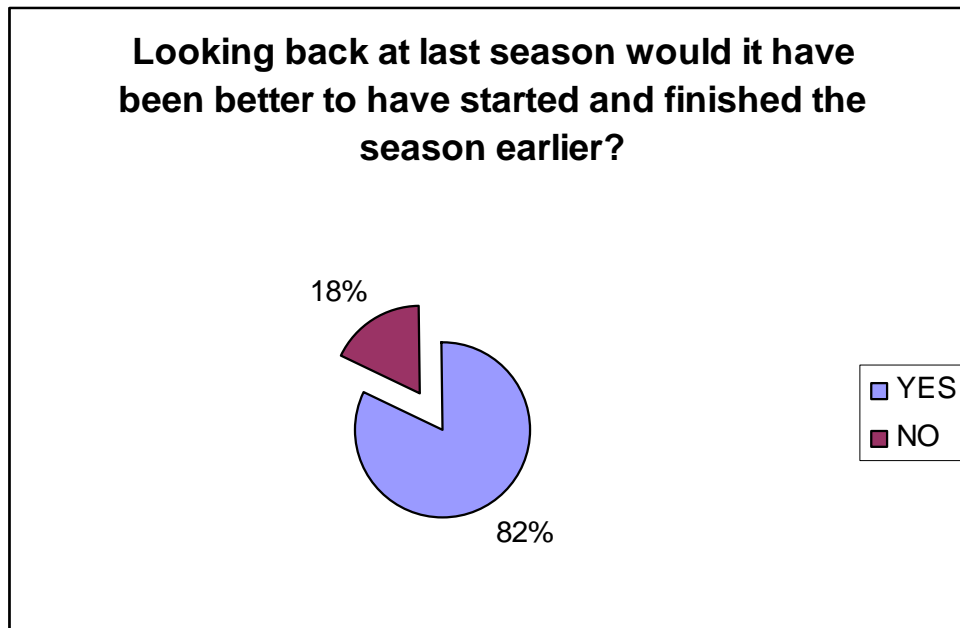


Figure 11 Looking back at last season would it have been better to have started and finished the season earlier?

Comments for yes answer:

- Loss of ratoons - 9 replies.
- Loss of CCS - 9 replies.
- Loss of TSPH - 2 replies.
- Less risk - 2 replies
- More security - 2 replies.
- Finish earlier - 3 replies.
- Loss of yields - 3 replies
- Allow for improved fallow management - 4 replies.
- Mill performance too unreliable - 2 replies.
- Late finish.
- Contract not complete - 2 replies.
- Proves the reasoning for an early start - 2 replies.
- Loss of income to district - 2 replies.
- If mill were operating.
- Weather management.

Comments for no answer:

- Mills need to be more efficient (mill issues) – 6 replies.
- Ground too wet - 5 replies.
- Did not know crop size.
- No CCS underpinning available.

QUESTION 9 - *If this year's crop estimate is more than 5 million tonnes, should we start the season earlier than last year?*

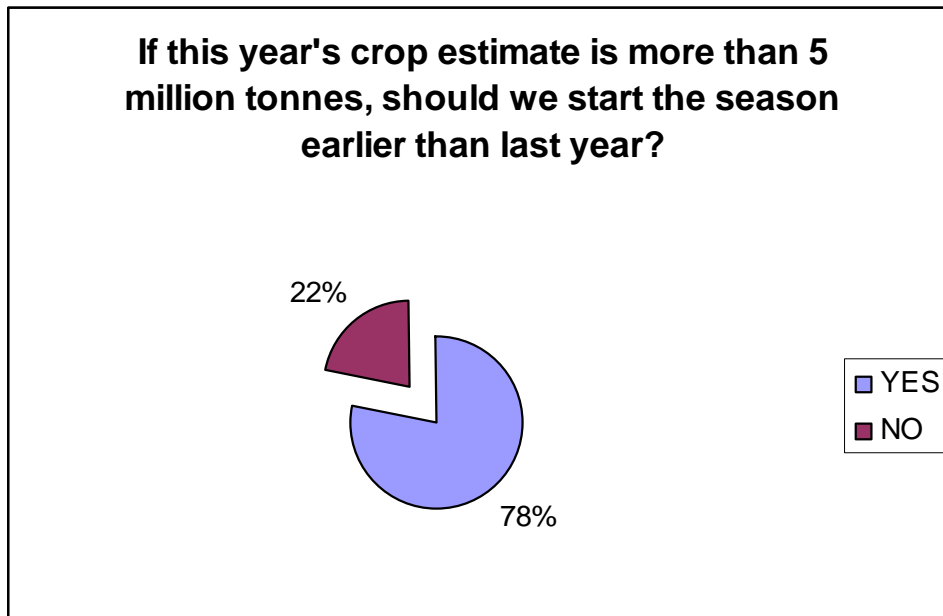


Figure 12 **If this year's crop estimate is more than 5 million tonnes, should we start the season earlier than last year?**

Comments for yes answer:

- Weather issues - 5 replies.
- Need agreement.
- High enough CCS - 2 replies.
- Improve mill reliability.
- 1 week increase.

Comments for no answer:

- Can crush 5 million 15 June to 15 November if mill efficiency is improved.
- Improve mill systems.

QUESTION 10 - *What is the earliest that the season could start for your area?*

Only growers were asked to answer this question.

Growers also indicated what sub-districts within the region they farmed. Grower responses were also categorised for each date reply based on whether their farm was in a wet or dry area. Dry sub-districts are numbered 1-6 and 11-12 on Figure 13.

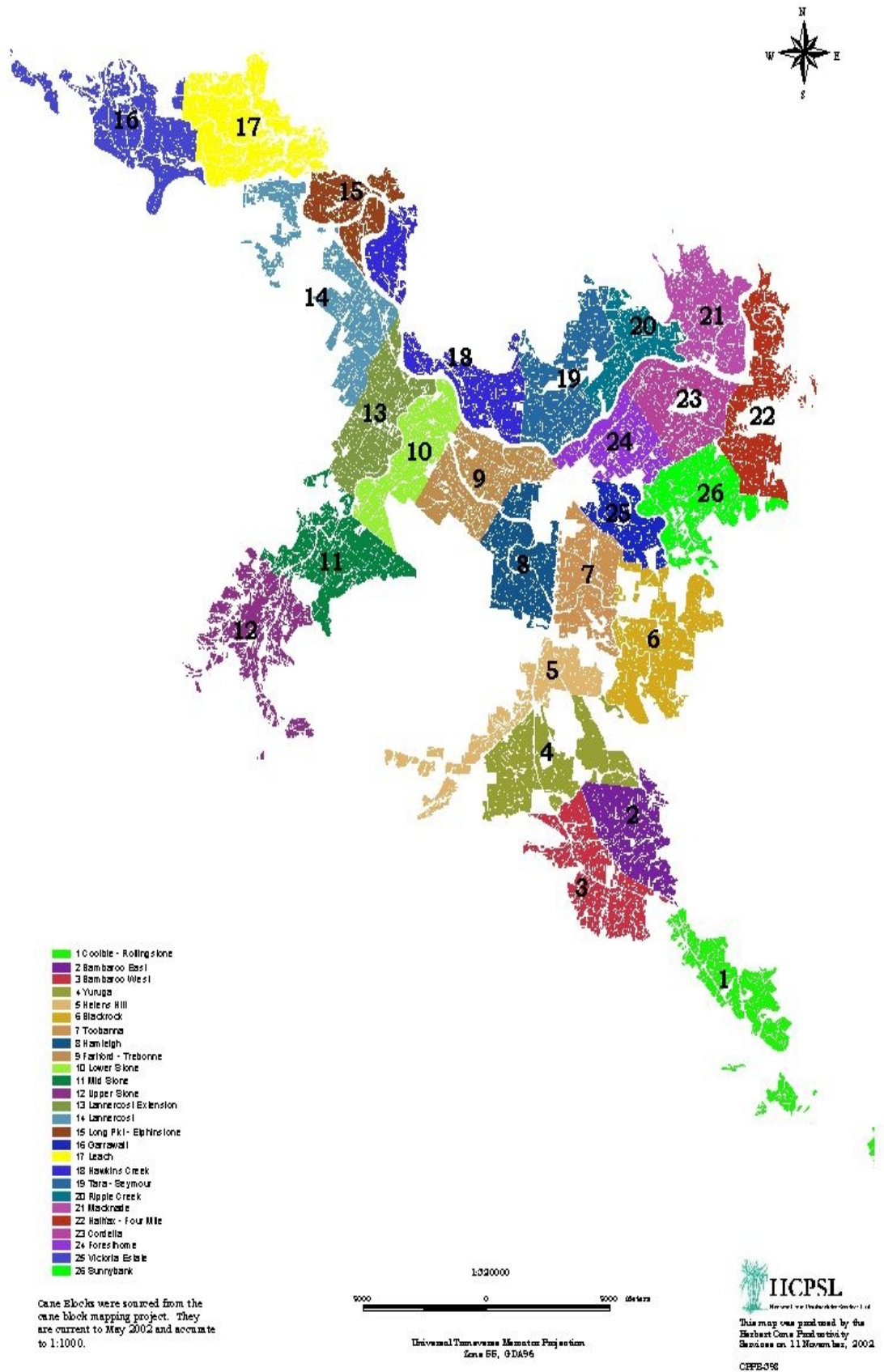


Figure 13 Herbert River Cane Productivity Forum areas

Comments:

- 2% of replies indicated 21-31 (late) May.
33% of responses came from growers in the wetter areas of the district.
- 23% of replies indicated 1-10 (early) June.
55% of responses came from growers in the wetter areas of the district.
- 42% of replies indicated 11-20 (mid) June.
85% of responses came from growers in the wetter areas of the district.
- 27% of replies indicated 21-30 (late) June.
All responses came from growers in the wetter areas of the district.
- 2% of replies indicated 1-10 (early) July.
All responses came from growers in the wetter areas of the district.
- 2% of replies indicated 11-20 (mid) July.
All responses came from growers in the wetter areas of the district.
- 2% of replies indicated 21-30 (late) July.
All responses came from growers in the wetter areas of the district.

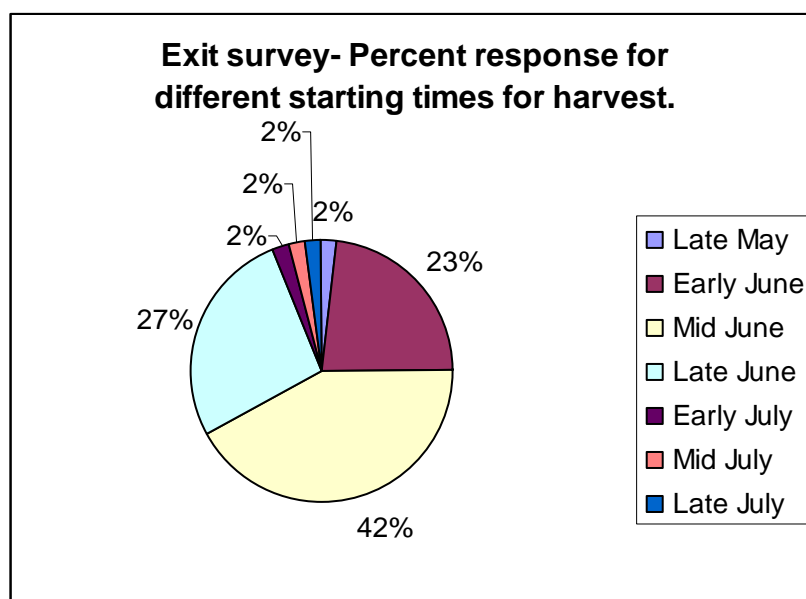


Figure 14 Proportion of favoured starting times for harvest

QUESTION 11 - *What is the latest the season could finish for your area?*

Only growers were asked to answer this question.

Growers also indicated what sub-districts within the region they farmed. Grower responses were also categorised for each date reply based on whether their farm was in a wet or dry area. Dry sub-districts are numbered 1-6 and 11-12 on Figure 13.

Comments:

- 2% of replies indicated 11-20 (mid) October.
All responses came from growers in the wetter areas of the district.
- 4% of replies indicated 21-30 (late) October.
All responses came from growers in the wetter areas of the district.
- 11% of replies indicated 1-10 (early) November.
85% of responses came from growers in the wetter areas of the district.
- 46% of replies indicated 11-20 (mid) November.
81% of responses came from growers in the wetter areas of the district.
- 28% of replies indicated 21-30 (late) November.
76% of responses came from growers in the wetter areas of the district.
- 4% of replies indicated 11-10 (early) December.
40% of responses came from growers in the wetter areas of the districts.
- 3% of replies indicated 11-20 (mid) December.
33% of responses came from growers in the wetter areas of the district.
- 2% of replies indicated 21-30 (late) December.
All responses came from growers in the wetter areas of the district.

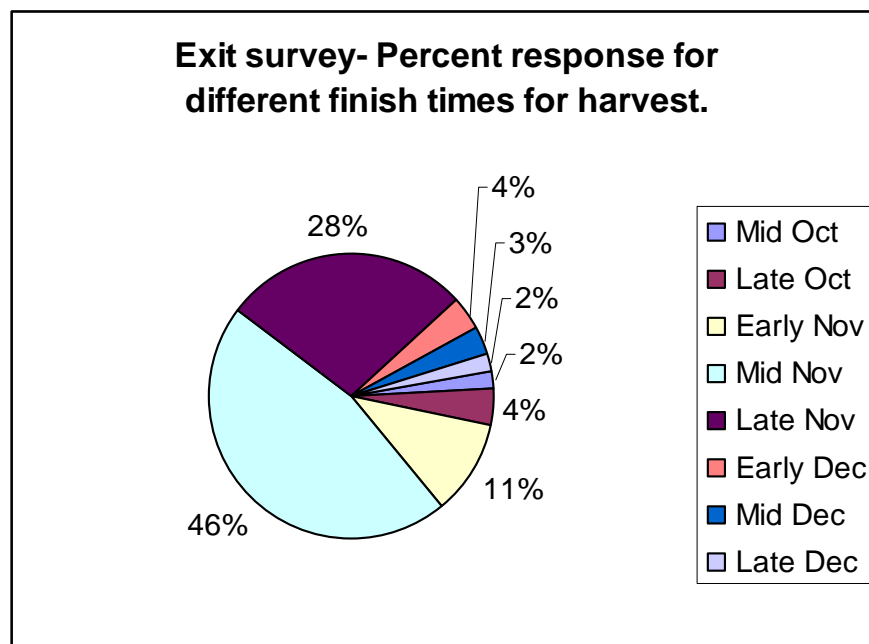


Figure 15 Proportion of favoured finishing times for harvest

QUESTION 12 - *Would you like to make any further comments in relation to the optimal season length program?*

Comments:

- A viable season length is very important. Don't change the goal posts too much. May lose!
- Optimal length is inevitable if we are to grow large crops and mill does not expand. If agreements can be reached on payment for cane, then it will happen.
- This mill has to be more efficient and we would have plenty of time.
- The biggest challenge is to find ways to utilise the research that has already been undertaken on this issue.
- Must be a compromise between growers and millers.
- Reliable mill would be good.
- Economics should be looked at.
- Fix mill up first, then we will talk.
- Those people who start earlier are taking early risk, therefore they should have lessened risk in the end.
- Geographical harvesting, not early start.
- Early start needs to have a new payment formula negotiated by participants.
- As an outsider it's difficult for me to comment on some of the above. If longer seasons occur, it is important to consider how this will impact the families and the broader communities.
- There is a very good reason why we have had season length constraints and that's the weather.
- We don't get any commitment from CSR on improving mill reliability and rolling stock.
- The actual figures show that we are limited to a season length.
- Growers should be compensated for losses for early start and late finish. Also, the farmers should share in the savings to be made.
- A late season not only puts young ratoons at risk of wet weather, but also encourages weed growth due to the cane canopy not closing over. Therefore, spraying twice can be necessary, increasing the extra cost of chemical.
- As short as is reasonably possible.
- Look at minimising the season instead of lengthening it.
- All parties working together for the same goal.
- CSR should pull their weight.
- Great attendance – good workshop – very friendly atmosphere.
- Well done!
- Get mill to 90% availability.
- Underpin CCS to 15 June – 15 November.
- Season length for those at the workshop means different scenarios. From my perspective season length should be 12 months, where possible, to maximise capital investment.
- Things can change very quickly as do weather conditions.
- Once again we seem to be changing what we do because of a shortfall on the milling side.
- As long as there is not cost transfer or business put in jeopardy.

- Identify the hidden costs of current arrangements for realistic comparison for benefits from change.
- If some monetary incentives were forthcoming, we might consider longer seasons, otherwise optimal season length for the Herbert is 22 weeks.
- Value adding opportunities versus lack of mill performance. No.
- Only after a study assess gains or losses to crop harvested over 5-year period. Assess CCS, payment methods, losses to crop (early and late harvest), labour utilisation in the harvesting and milling sectors).
- We must be compensated for any longer season.
- Farmers to be paid for carbon credits.
- Make sure mills are ready for early start. NOTE: Please make available last season harvesting time data so as we can plan this year's harvest to maximise CCS.
- Just do it! NB – I'm not a grower.
- Explore any options.
- Season of 22 weeks for farmer and harvesters.
- CSR not cooperating.
- Fix mill and improve rolling stock.
- No late finish.
- If there is benefits for the whole industry perfect.
- Look at changing the way we are paid for cane – to suit new SugarMax model /concept.
- Up to the mills to start to perform.
- Leave as it is.
- Encourage researchers to present key messages only. Not reams of data.
- Follow-up actions from workshop.
- Continued communication between industry and researchers is important to the success of this project. Good luck in attracting people to the pilot trial!
- Continue to be open in discussions – facts will stop problems.
- Food good.
- Room hot in the morning.
- Lack of participation of women in the decision making process is an industry problem.
- Decisions about longer seasons (if it means longer hours) will affect women.
- Group rotation question - how to achieve a 12-month-old crop every time.
- Farmer is supposed to get a benefit but there is a real risk.
- Miller definitely gets a benefit from a longer season and this is why they are interested.
- Farmer should not wear the cost.
- SugarMax and Rainfall risk modelling is nothing new to growers.
- Fix the mill to become more reliable (as Tully mill), then we can consider extending the season.

5.0 CONCLUSIONS

The workshop was a worthwhile opportunity for the Herbert industry and community to discuss openly the opportunities to maximise profitability in the Herbert Sugar Industry.

The workshop co-ordinators were pleased with the level of participation and response of the participants during the workshop process.

The workshop highlighted issues and barriers that may be encountered in attempting to increase the Herbert Sugar Industry profitability. These issues and barriers must be addressed to enable progress to occur.

The workshop highlighted the strained relationship between the miller and grower sectors of the industry. It is apparent that this relationship is preventing opportunities for the industry to increase profitability and reducing the regions ability to grow financially.

Clear direction was provided by the workshop were key industry research and development priorities are required. These findings will be incorporated into the BSS264 project work program or will be incorporated into the research priorities of research and development bodies servicing the local industry. Workshop participant highlighted strongly that further research is required in the value adding and value chain areas.

The workshop highlighted that the Herbert sugar industry in genuinely seeks to improve industry profitability and to secure the regions financial position into the future. It is now up to the industry stakeholders and community to enact upon the findings of this report and move the industry forward.

6.0 ACKNOWLEDGEMENTS

Thanks to the project working team (representatives from CANEGROWERS, CSR Sugar, QMCHA, BSES, HCPSL, CSIRO).

Thanks to Queensland Government Department of Communities for their assistance.

A special thanks to Alf Musumeci (Queensland Government Department of Communities) for accepting and undertaking the role as workshop facilitator.

Thanks to the industry and community groups who participated in the workshop.

Thanks to SRDC and BSES for funding the BS264 project.

APPENDIX 1 – Workshop program



Dear industry stakeholder you are invited to the:

**“MAXIMISING HERBERT SUGAR INDUSTRY
PROFITABILITY WORKSHOP”**



Date: 31st January 2006

Venue: Royal Hotel

Time: 8:00am- 3:00pm

Items for discussion:

- Season length optimisation;
- The issues and advantages associated with season length management;
- Crop management;
- Use of crop growth regulators;
- Cane productivity and CCS;
- Crop management modelling;
- Harvest management.

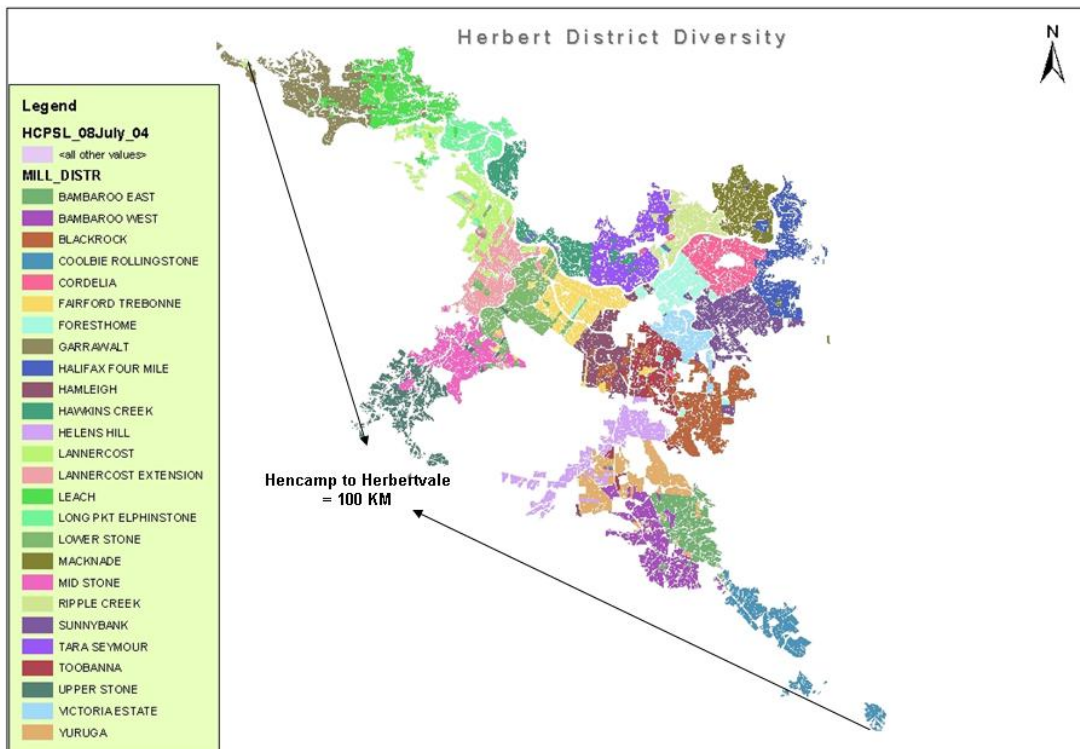
Cost: \$16 for lunch

RSVP: 26th January 2006
(for catering purposes)

Phone BSES Herbert Office on 4776 2500 to confirm your attendance.

APPENDIX 2 – Sefton presentation

Historical CCS trends



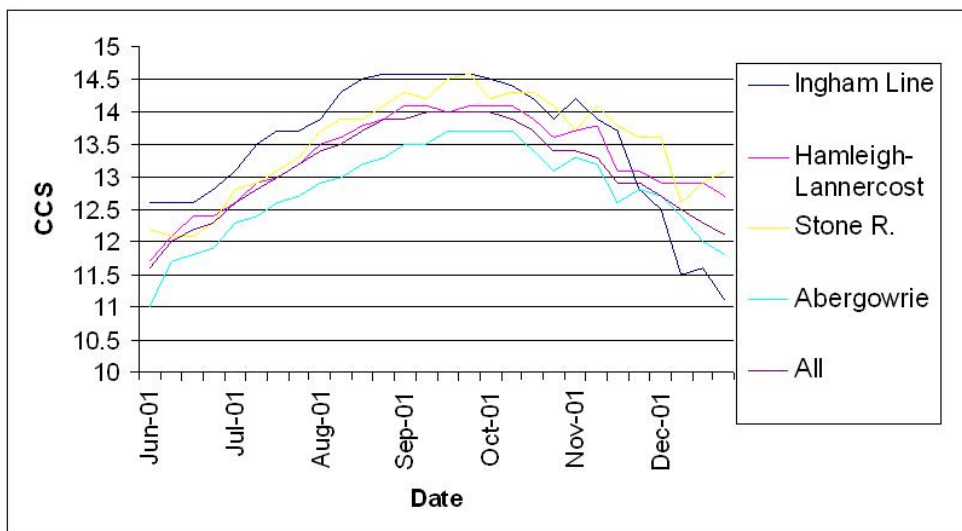
Week Conversion Chart

dates of interest

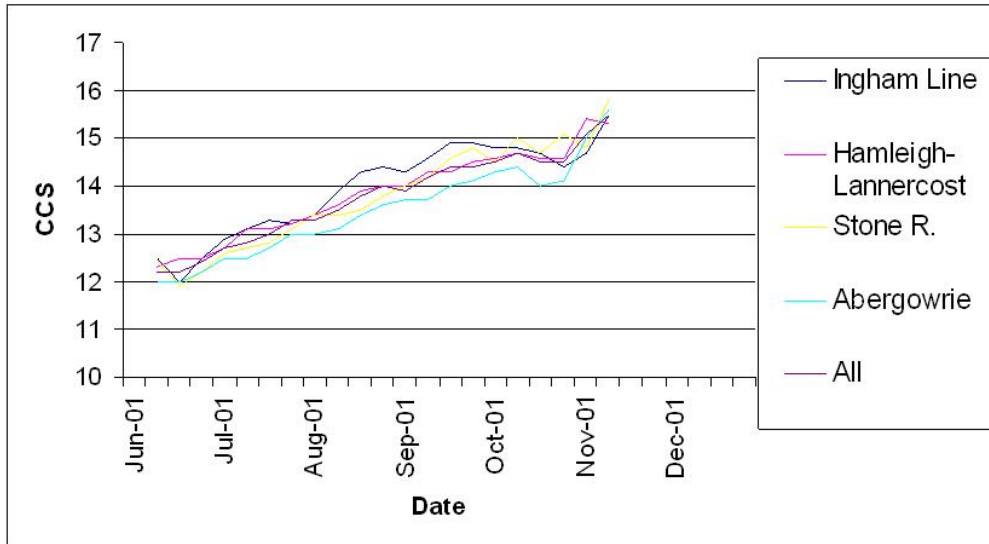
- Week 13- 1 June
- Week 15- 14 June
- Week 18- 5 July
- Week 28- 13 Sept
- Week 30- 27 Sept
- Week 33- 18 Oct
- Week 37- 15 Nov
- Week 40- 6 Dec



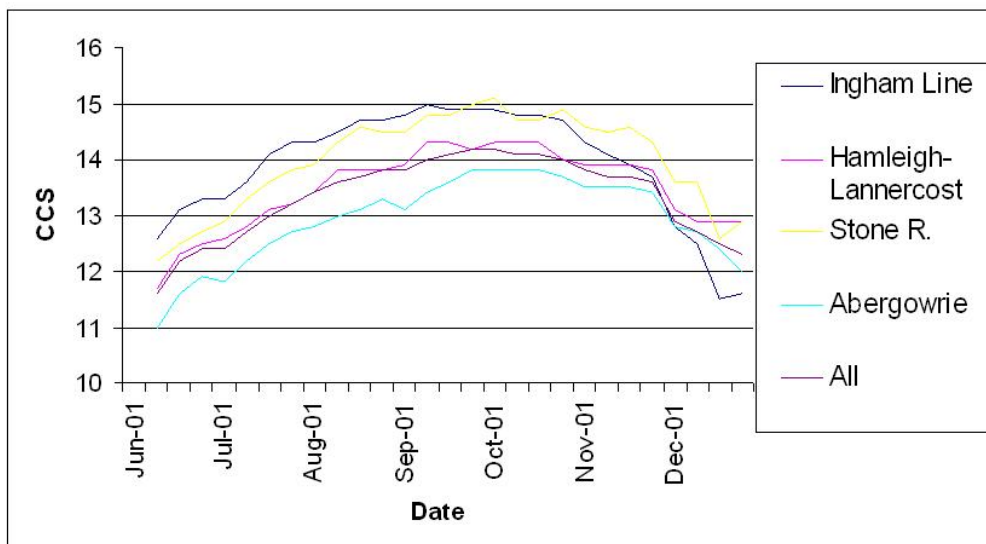
CCS curves 1993-2002

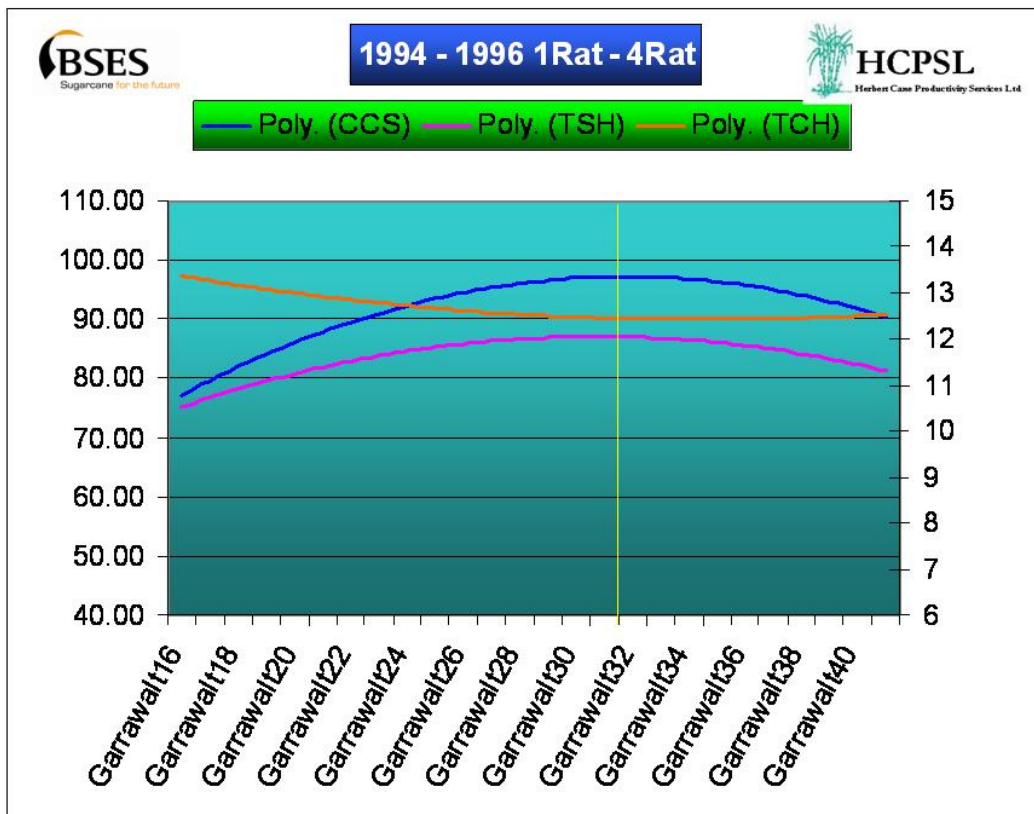
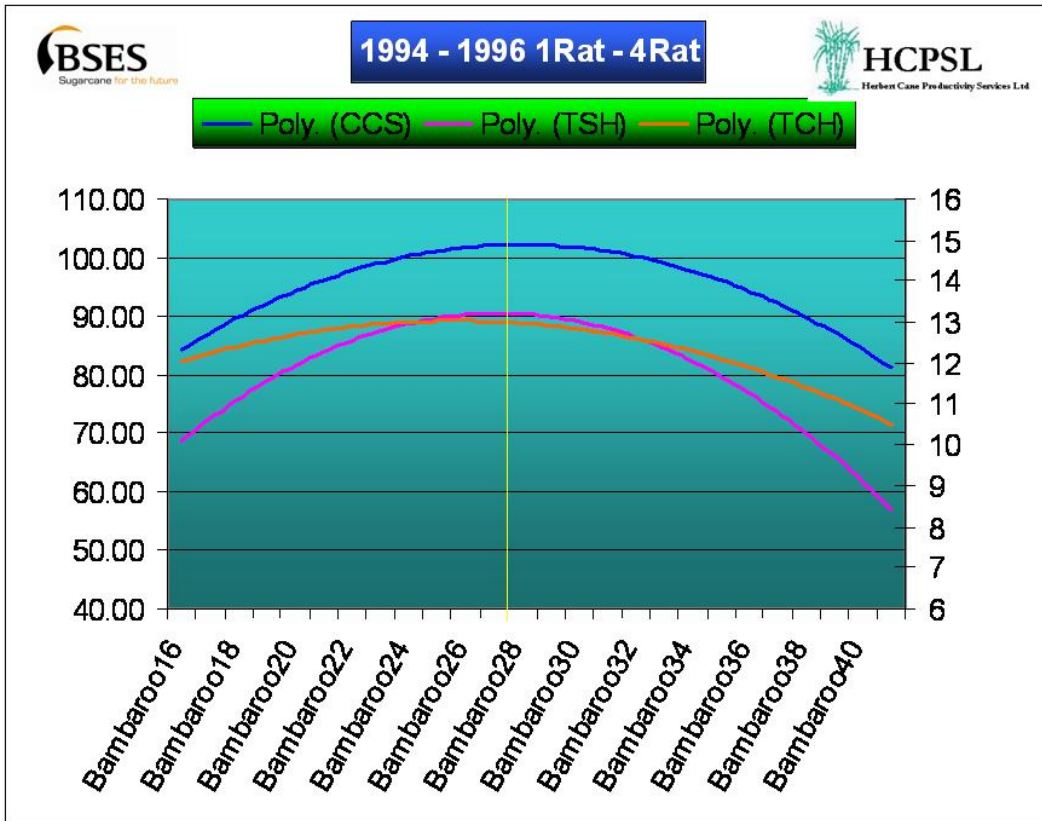


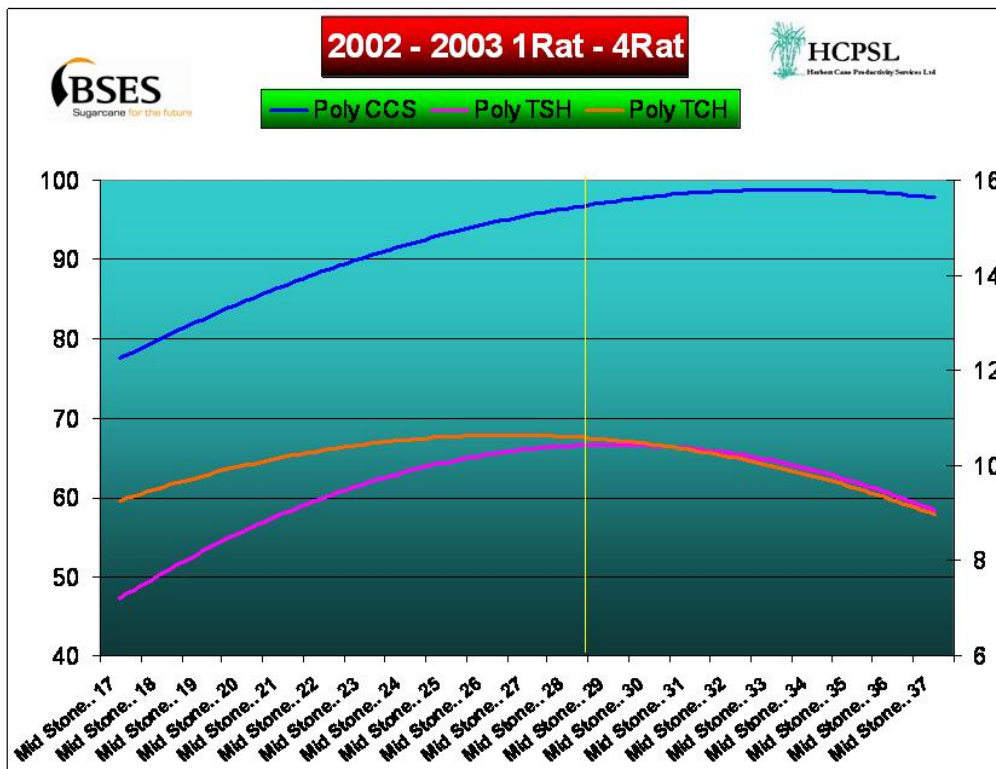
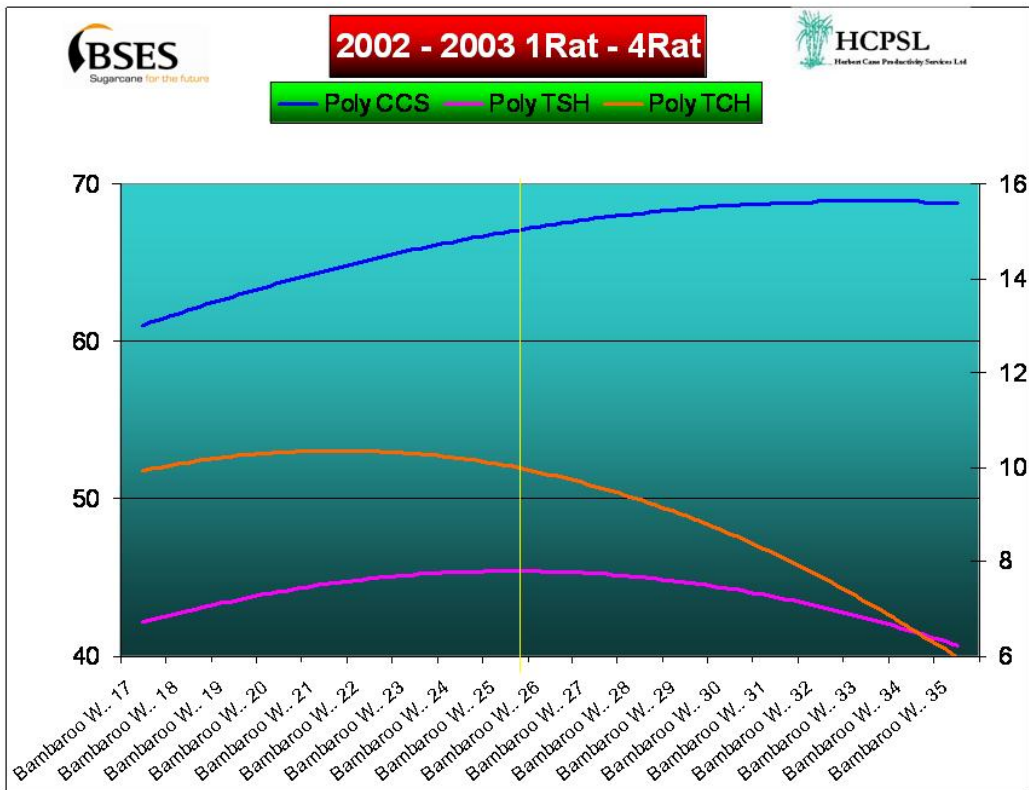
CCS curves 1999-2002

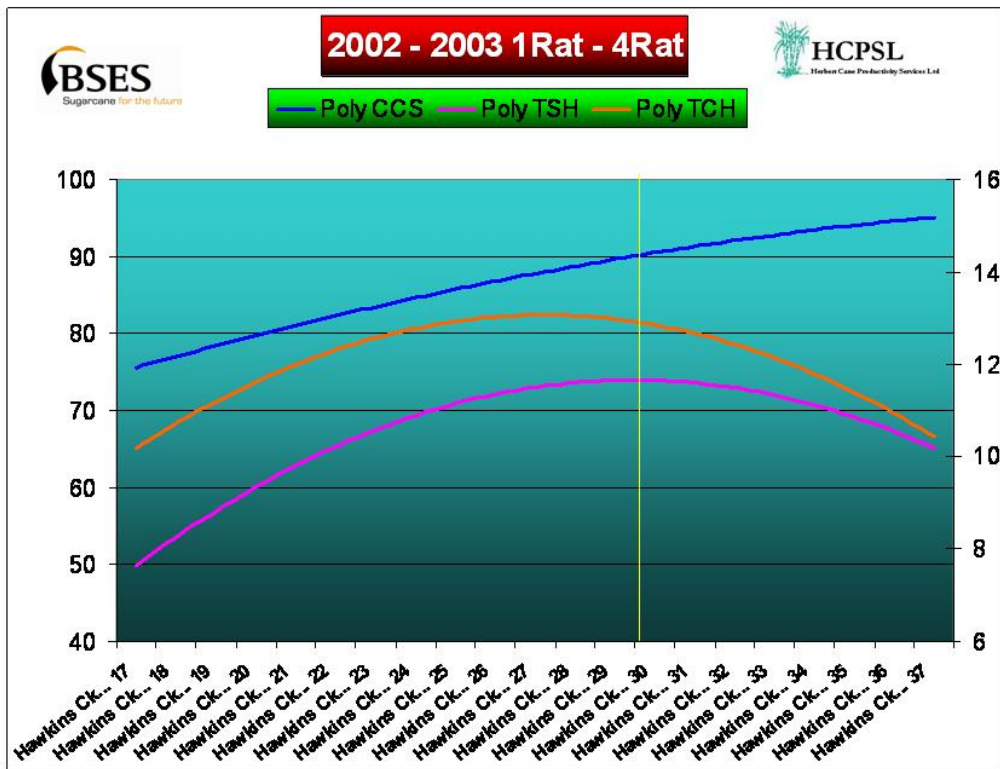
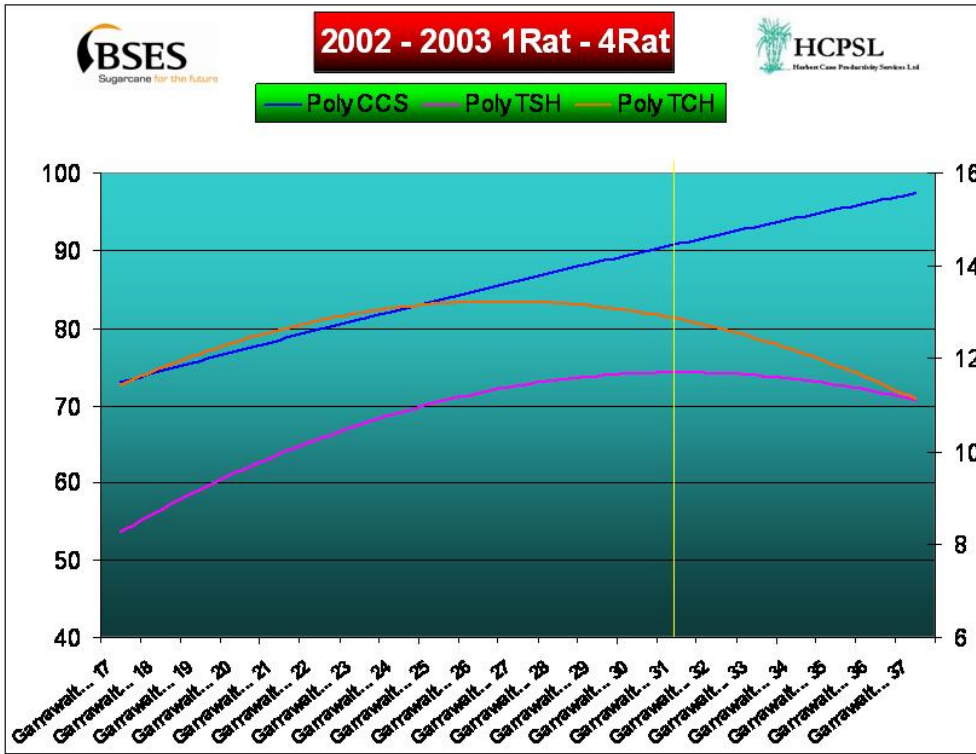


CCS curves 1993-1997









Conclusions

- Optimum TSPH is achieved in most sub-districts between weeks 13th of Sept. and 27th of Sept. , with the exclusion of:
 - Bambaroo and Coolbie/ Rollingstone areas- between August 30 and Sept 13.
 - Lannercost, Long Pocket- Elphinstone, Leach and Garrawalt areas- between Oct 4 and Oct 18
- In drier years earlier starts will maximise sugar yield potential in the drier areas of the district

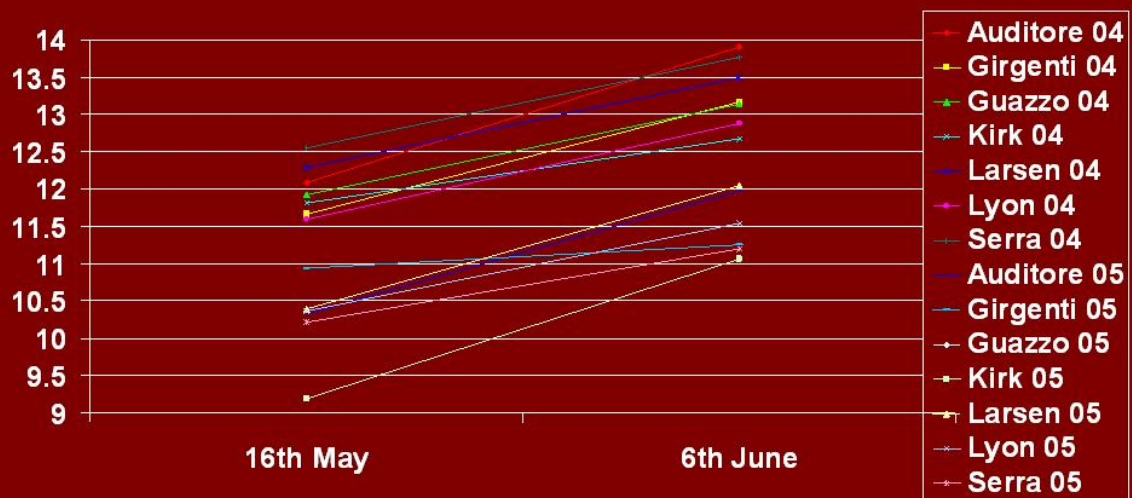


APPENDIX 3 – Di Bella presentation

Early CCS sampling



Grower small mill sampling.



CCS increased 0.43 units per week from May- June 2004

CCS increased 0.3183 units per week from May-June 2005

Crop management for early harvest



Crop management for early harvest

Variety management is critical to maximise CCS, yield potential, ratooning and profits.



Good planning is essential!



Variety x time of harvest-

June/July: Q115, Q157, Q174, Q186, Q190, QC84-621

July/Aug: Q96, Q115, Q120, Q157, Q174, Q186, Q190, Q200, Q204,
QC84-621

Aug/Sept: Q96, Q115, Q120, Q135, Q157, Q164, Q187, Q190, Q194, Q195,
Q200, Q204, Argos, QC84-621

Sept/Oct: Q135, Q157, Q158, Q162, Q164, Q187, Q194, Q195, Q215, Q216,
Argos, QC84-621

Oct/Dec: Q135, Q157, Q158, Q162, Q164, Q187, Q215, Q216, Argos

Note: Varieties may perform differently in some sub-districts.



Crop management for early harvest

- Plant an adequate area of cane on your farm to harvest early CCS potential varieties.
- Select cane blocks that are suitable for early harvest.
- Consider using a refractometer to assess blocks for CCS potential, prior to harvest.



Crop management for early harvest

- Harvest varieties which mature early and have high early CCS.
- Harvest blocks that normally have higher CCS. Some soils tend to produce crops with higher CCS than others.



Crop management for early harvest

- Plan at least one year in advance for early harvest. Identify the right block, have the right variety growing in it and manage it for early harvest.
- Harvest crops that were planted or ratooned early the previous year. Crops for early harvest should be close as possible to 12 months of age.



Crop management Time of harvest trials.

Stone River trial:

Variety Q157:

TREATMENT	DATE HARVESTED IN 2004	TCPH	CCS	TSPH
Early harvest	22/6/04	97	12.5	12.1
Later harvest	15/7/04	91	12.9	11.7

Harvested 26/6/05



Crop management Time of harvest trials.

Crop growth at the Mutarnee Variety x Time of harvest trial. 24/01/06



Crop management for early harvest



- Crop ripeners / growth regulators have been found to be cost effective to improve CCS of early harvested cane, in some situations.
- Syngenta will present more data later in the workshop.



Crop management Nitrogen x time of harvest trials

Grower	Nitrogen rate (kgN/ha)	CCS	TCPH	Gross \$/ha	\$/ha minus nitrogen fertiliser costs
Minato	116	14	78	1404	1260
	150	13.9	79	1413	1227
Morley	98	11.4	103	1203	1082
	156	11.4	103	1205	1010
Steine	115	12.8	76	1151	1007
	153	12.9	75	1151	961

Assumptions used:
 Sugar price- \$270/ton
 Harvesting and levies- \$6.80
 Nitrogen value- \$1.24/kg of nutrient
 Date harvested- 23/6/05



Crop management Nitrogen x time of harvest trials

Russo trial

Fertiliser blend	CCS	TCPH	Gross \$/ha	\$/ha minus fertiliser costs
GF501 (lower nitrogen rate)	14.3	112	2107	1815
GF560 (higher nitrogen rate)	13.76	121	2110	1751

Assumptions used:

Sugar price- \$270/ton

Harvesting and levies- \$6.80

Fertiliser cost:

GF501- \$563.20

GF560- \$558.80

Nutrients for each fertiliser blend:

GF501- 122kgN/ha, 21kgP/ha, 86kgK/ha, 12kgS/ha

GF560- 163kgN/ha, 18kgP/ha, 96kgK/ha, 23kgS/ha



Crop management- Consider controlled traffic systems

- Consider implementing a controlled traffic system or consider increasing row spacing, so that blocks can be harvested in moist soil conditions without damaging the stool.



Crop management- Consider controlled traffic systems

Photo.

Harvesting of a controlled traffic block early in the season.

Block located at Bilyana.



APPENDIX 4 – Armytage presentation

**Facilitated industry
workshop on Season
Length Optimisation**



Philip Armytage
Tech Services lead, Sugar / Cotton

31st January 2005

Early sugar

Ripeners and
Plant Growth Regulators

Moddus

What it does
What it doesn't do

Herbert pilot program 2006



Ripeners and Plant Growth Regulators

Ethrel: ethylene ripening gas
Artificial ripening



3

Image: Baxia.com, Victory seeds, Syngenta

syngenta

Ripeners and Plant Growth Regulators



4

syngenta

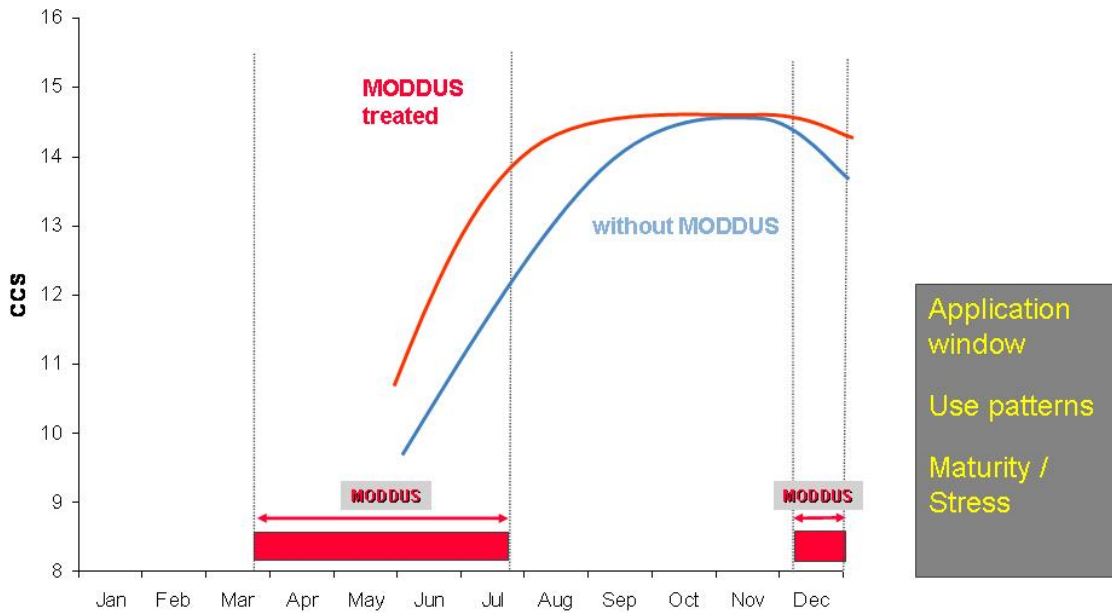
Ripeners and Plant Growth Regulators



5



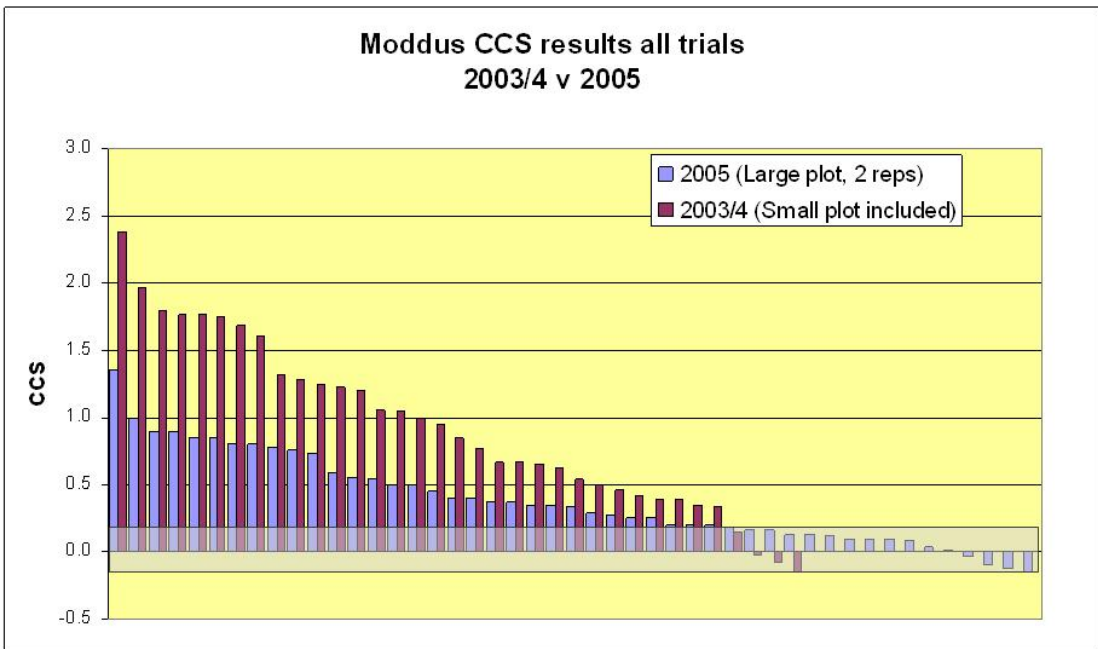
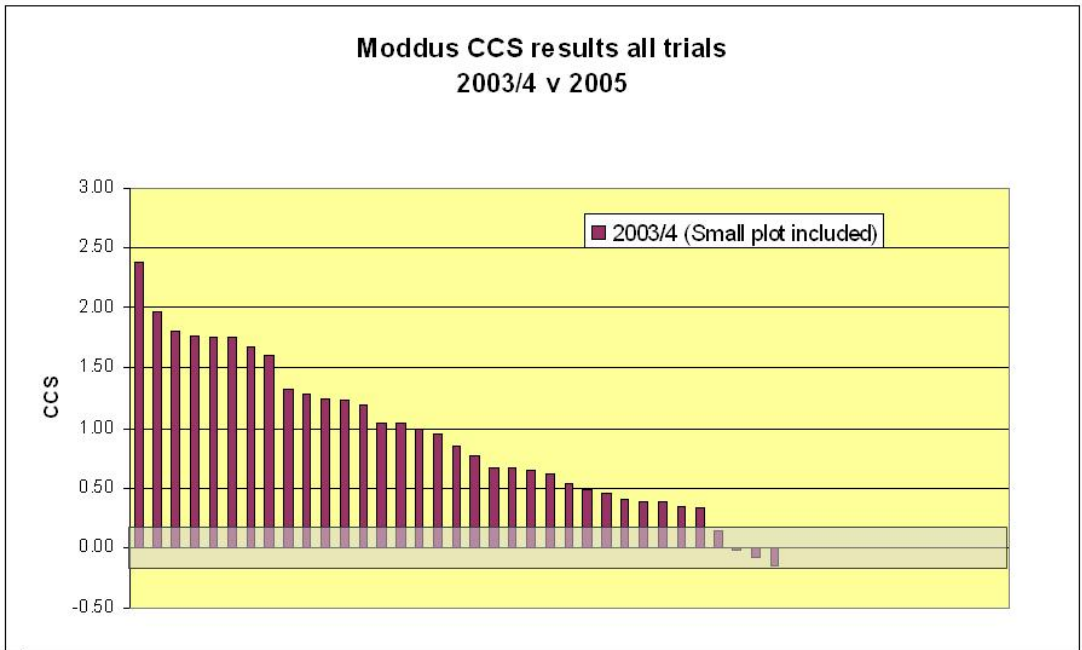
MODDUS - What does it do?

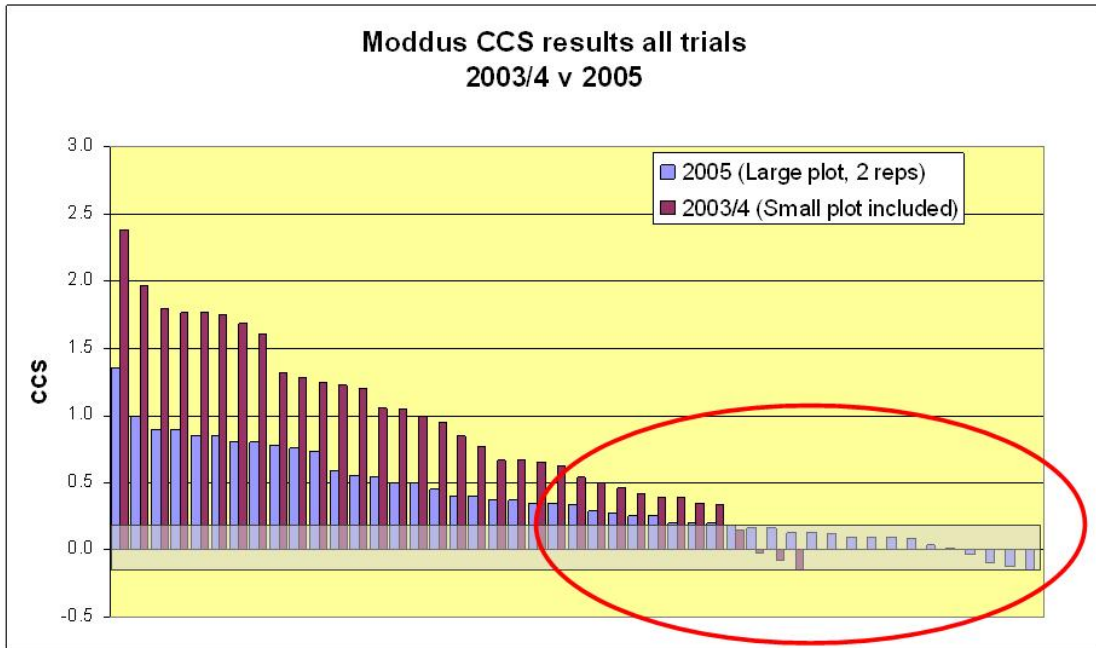


Source: Syngenta Brazil

6







MODDUS - Making it work

Maturity / Flowering

Juice purity

Stress

Q174...

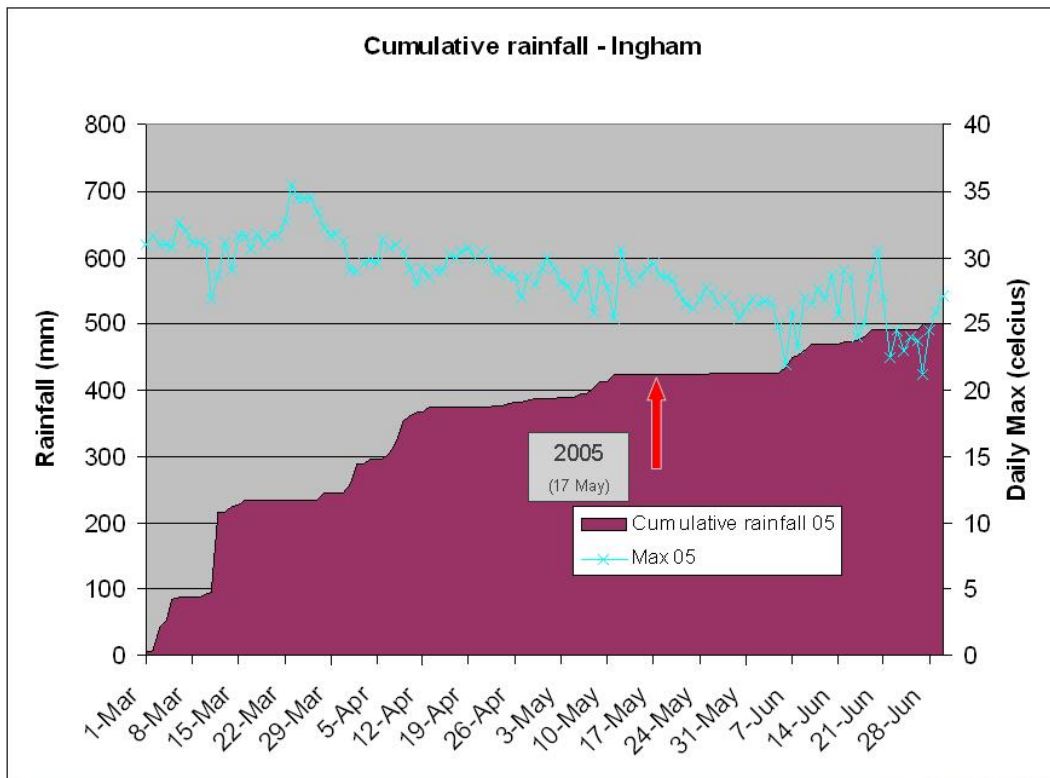
- Soil moisture
- Disease / Nutrition

(Q152 Q120 Argos MIDA
Q117 Q127 Q195 Q96)

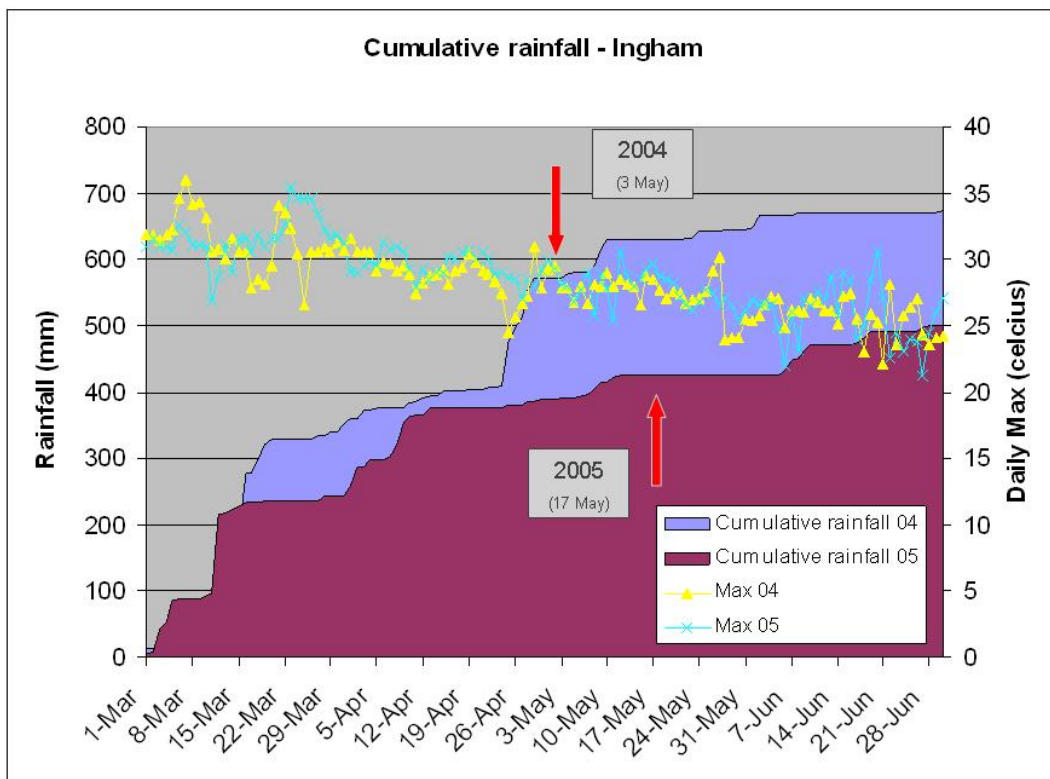
Green leaves

Lodged crops





11



12

Visual effects from **MODDUS**





Mid season rainfall

Inhibiting growth

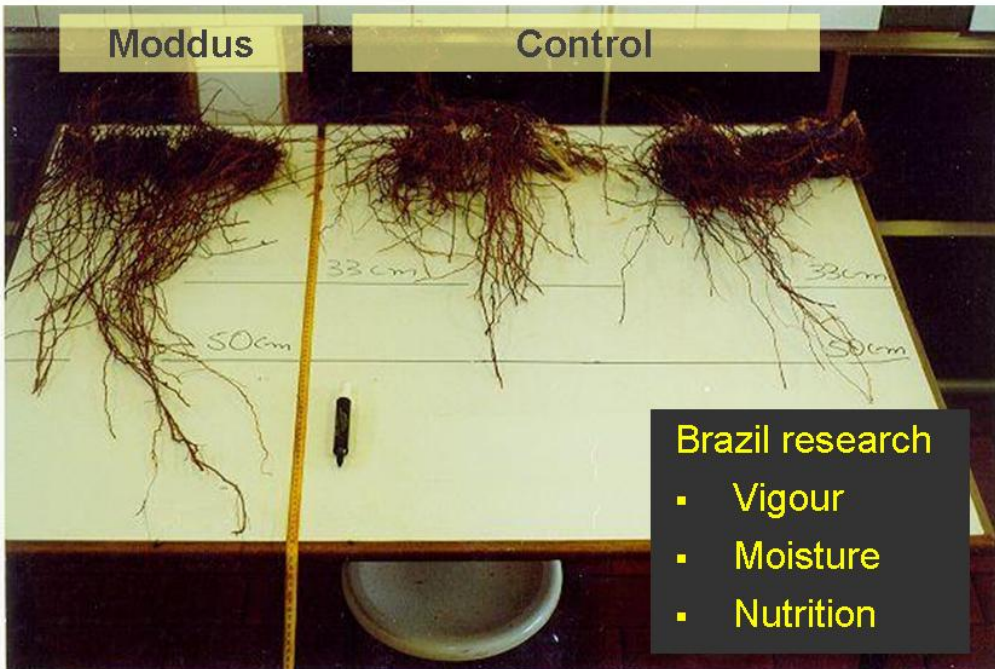
- Suckers
- Top growth

CCS decline





17

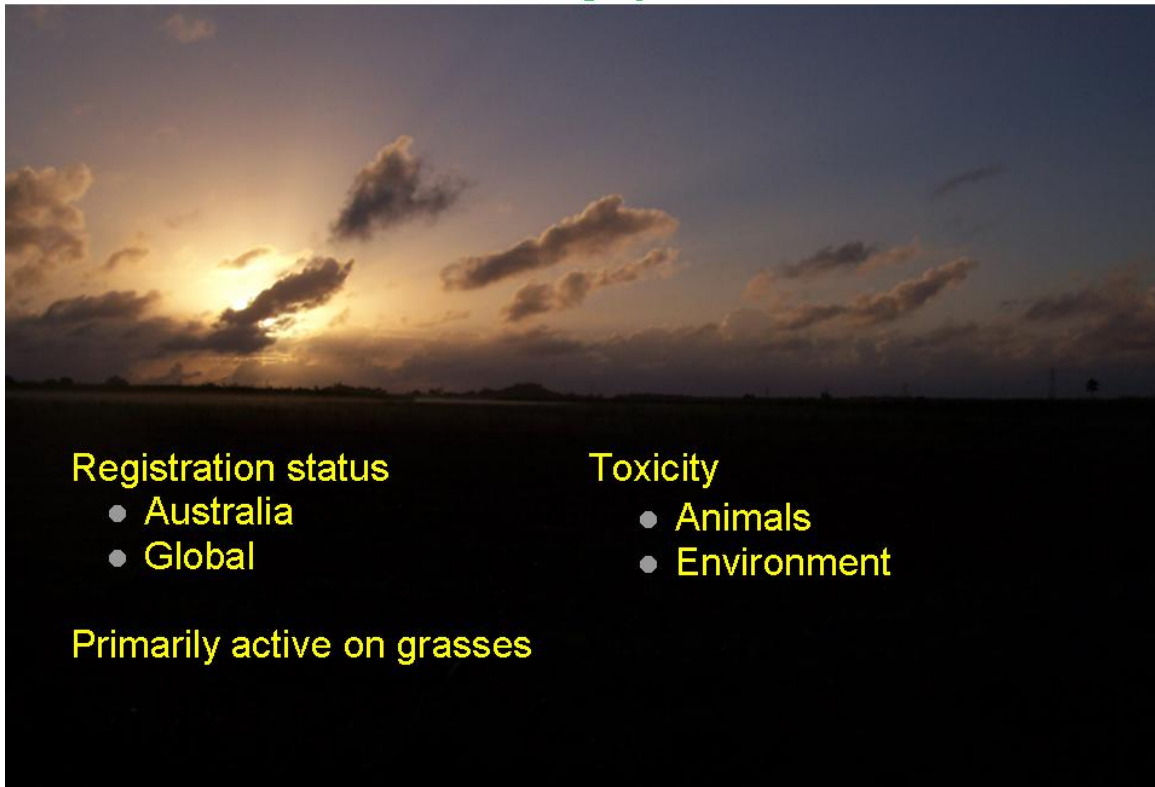


18

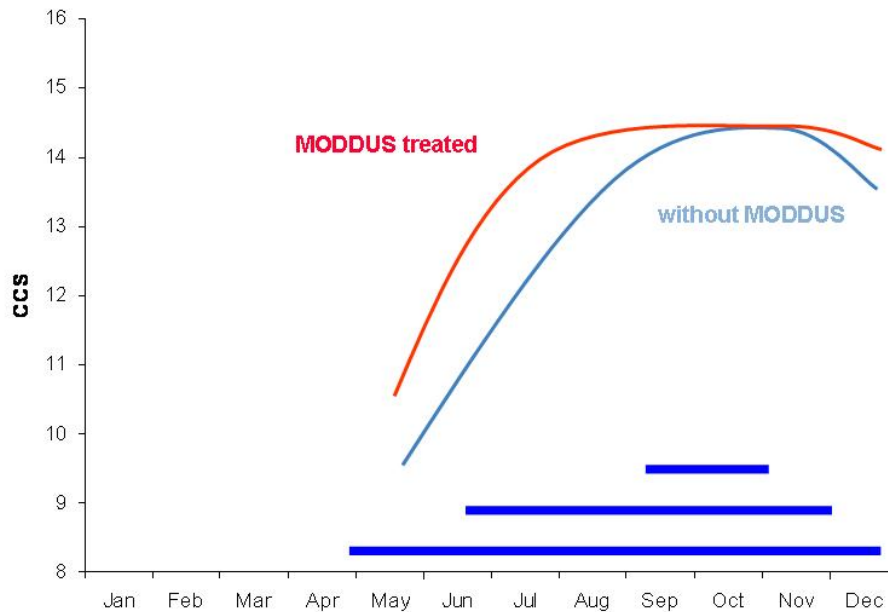
MODDUS Ratoon effects



MODDUS - Other things you should know



MODDUS and season length



21

Herbert pilot program 2006



CANEGROWERS

4,000ha large scale permit

User accreditation

- Grower and aerial applicator
- Good neighbor program

Field inspection

- HCPSL field visit
- Data collation



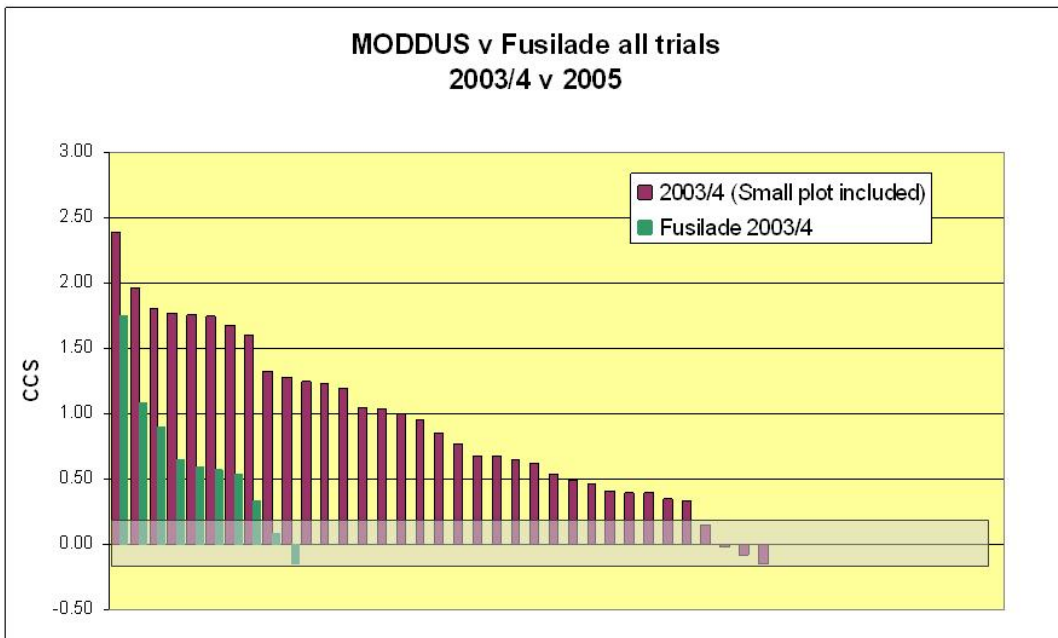
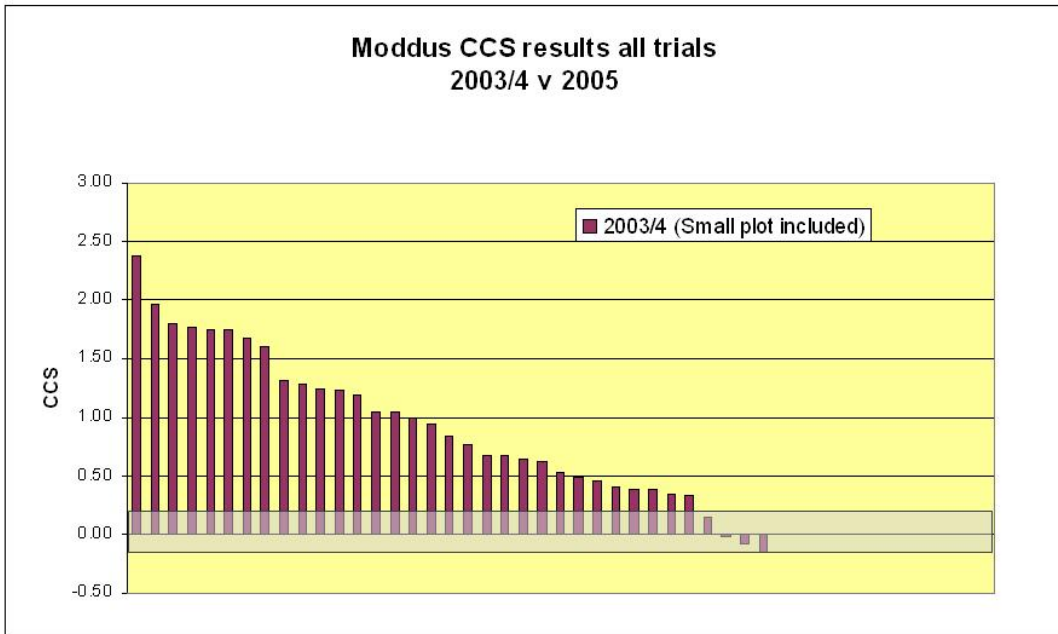


MODDUS



South Africa and Fusilade





APPENDIX 5 – Prestwidge presentation



Optimising Sugar Yield

CSIRO Sustainable Ecosystems
 Di Prestwidge
 Andrew Higgins
 Adam Power
 Luis Laredo

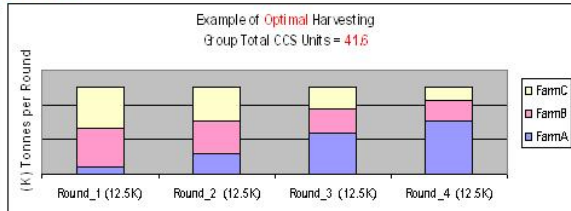
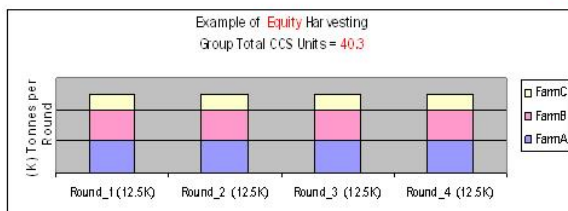
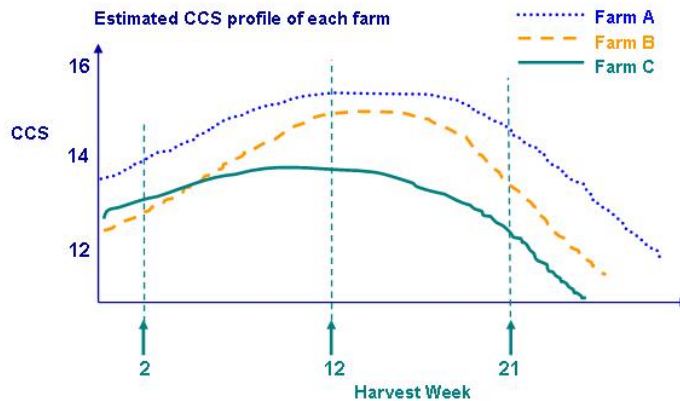


Presentation Content

- **Introduce SugarMax concepts**
- **How SugarMax has been modelled for the Herbert**
- **Example of Region-wide harvest schedules**
 - Ordering Harvesting by Districts
- **Examples of Harvesting Group harvest schedules**
 - Harvesting 2 groups as 1 group
 - Harvesting using Wet and Dry machines
 - Harvesting by scheduling Varieties
- **Examples of Farm level harvest schedules**
 - Ordering Harvesting by Varieties / Ratoons / Wet and Dry Blocks



SugarMax concept: - aims to provide an optimal time of harvest schedule to gain the maximum amount of sugar using historical CCS and Cane Yield trends.



(SugarMax also uses Cane Yield trends to estimate Sugar Yield)



SugarMax concepts:-

Harvest Scheduling implications:-

- **Transport scheduling**
 - Line capacity, Siding capacity, Loco runs
- **Harvester and Siding Logistics**
 - Harvesting costs, Movement costs, Harvester RDO rosters, Siding Rosters
- **On-Farm operations**
 - Irrigation scheduling, Nutrient management, Ripeners management, Plough-out Re-Plant decisions



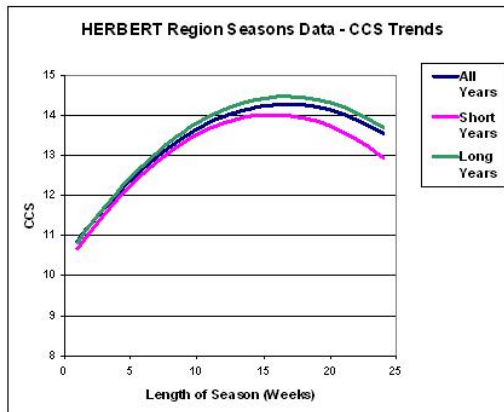
SugarMax in the Herbert

Maximising Sugar within:-

- the **Region** by optimally scheduling **Districts**
- **Harvesting Groups** by optimally scheduling **Farms** (or sets of **Blocks** from **Farms**)
- **Farms** by optimally scheduling (a) **Variety** and/or (b) **Wet/Dry Blocks**

Using historical **CCS** and **Cane Yield** trends from Long and Short seasons

- **All** years data (1990-2004)
(approx. 22 weeks)
- **Long** seasons data (1993-1997, 2004)
(approx. 24 weeks)
- **Short** seasons data (1990-1992, 1999-2003)
(approx. 18 weeks)



Region-wide – optimally scheduling Districts (Example using Lawrence & Andrew’s nominated Districts for Rounds)

DISTRICT (Tonnes)	ROUND_1	ROUND_2	ROUND_3	ROUND_4	ROUND_5	ROUND_6
SUNHYBANK	264 K					
BAMBAROO WEST	135 K					
BAMBAROO EAST	102 K	34 K				
HELENS HILL		177 K				
YURUGA		154 K				
FAIRFORD TREBONNE		249 K				
COOLBIE ROLLINGSTONE		130 K				
HALIFAX FOUR MILE		236 K				
MACKNADE			218 K			
UPPER STONE			163 K			
TOOBARNA			142 K			
TARA SEYMOUR			235 K			
BLAC KROCK		22 K	252 K			
RIPPLE CREEK				151 K		
CORDELIA				214 K		
LANHERCOST				195 K		
HAMLEIGH				159 K		
MID STONE				185 K		
FORESTHOME				97 K	74 K	
VICTORIA ESTATE					119 K	
HAWKINS CREEK					198 K	
LOWER STONE					246 K	
LANHERCOST EXTENSION					186 K	
LEACH					246 K	79 K
LONG PKT ELPHINSTONE						147 K
GARRAWALT						274 K

SugarMax model estimated an average Region-wide gain of **\$0.25/tonne** (approx. \$1.24M)

(Example using: –

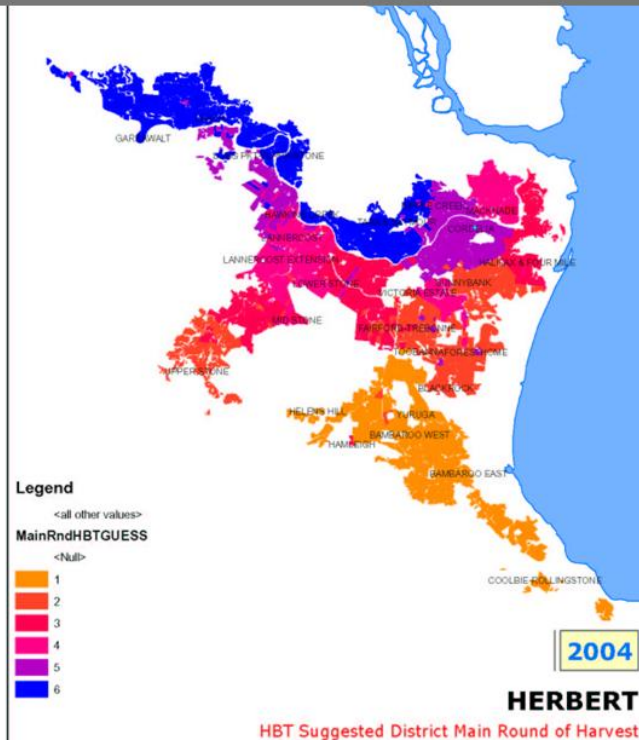
- LD&AW suggestions
- District CCS trends **ONLY**
- Short years data
- Max. of 100% per Round
- Sugar price of \$270/t)



Region-wide – optimally scheduling Districts (using Lawrence and Andrew suggestions)

MAP OF REGION showing an Optimal Harvest Schedule for DISTRICTS

(showing Main Round of Harvest
for each District)



Region-wide – optimally scheduling Districts

Examples of **Region-wide** harvest schedules - changing Years of data, Max. % per Round and CCS/TCH trends

<i>Example</i>	<i>Years</i>	<i>Modelled</i>	<i>CCS/TCH</i>	<i>Max % per Round</i>	<i>\$/tonne Gain</i>
1	Short	LD&AW	CCS	100%	\$0.25
2	Short	LD&AW	CCS	50%	\$0.06
3	Short	LD&AW	CCS+TCH	50%	\$0.20
4	Short	SugarMax	CCS	100%	\$0.63
5	Long	SugarMax	CCS	100%	\$1.51
6	Long	SugarMax	CCS	50%	\$1.27

**Note: This table shows the benefits from a Long season are greater than from a Short season. (2006 should be a Long season)



Harvest Group – optimally scheduling Farms (Example of scheduling 2 Groups harvesting as 1 Group)

(Using:- LD&AW District Rounds; District CCS trends ONLY
Short years data; Max. of 70% per Round; Sugar price of \$270/t)

SUGARMAX Optimised Results: hbt-2groups-harvesting-as-1group

EXAMPLE GROUP EXAMPLE GROUP

Sugar Price (\$/t):- \$270 Rounds :- 6 Season Length :- 22 Maximum % taken per Round :- 70 TCH Trends Used? :- No

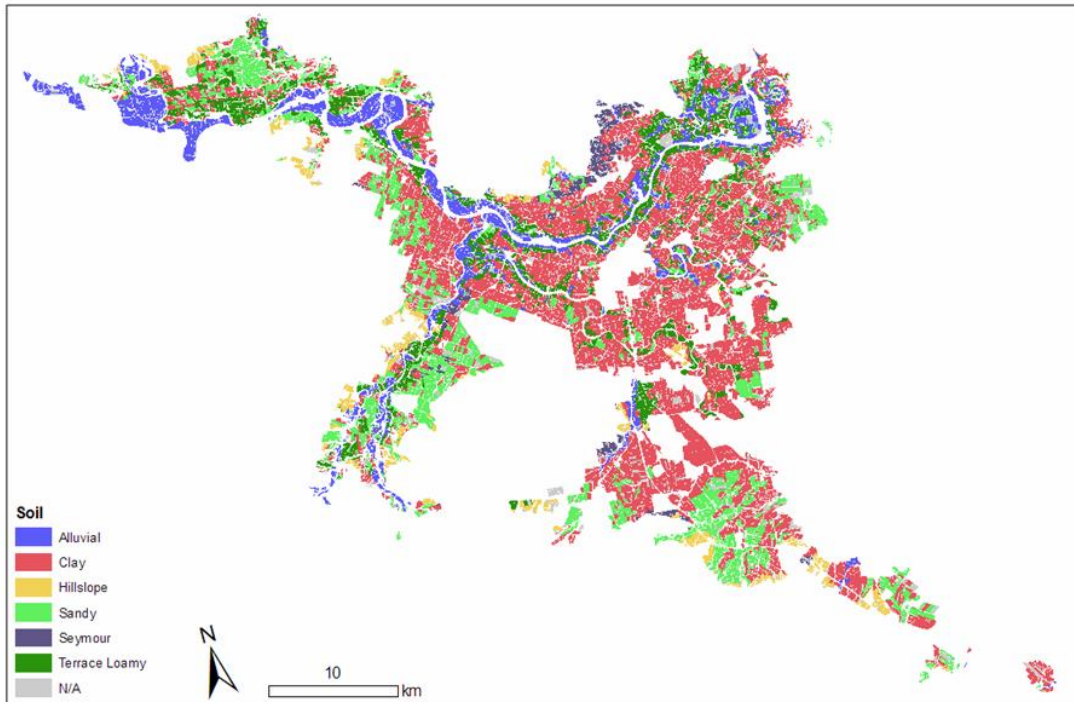
Equity \$ / Tonne:-	\$35.45	Optimised \$ / Tonne:-	\$36.29	\$ / Tonne gained:-	\$0.84
Equity Gross (\$):-	\$3,378,202	Optimal Gross (\$):-	\$3,458,690	Gross Gained (\$):-	\$80,477

Optimal Harvest Schedule - Tonnes (%) per Round

Grouped by FARM	Rnd 1	Rnd 2	Rnd 3	Rnd 4	Rnd 5	Rnd 6	Total Tonnes
FA RM_1_A	0 (0%)	8,776 (23%)	0 (0%)	0 (0%)	19,061 (51%)	9,531 (26%)	37,368
FA RM_2_A	1,902 (43%)	2,567 (57%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	4,469
FA RM_3_B	5,420 (70%)	2,323 (30%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	7,743
FA RM_4_B	2,203 (29%)	5,336 (70%)	104 (1%)	0 (0%)	0 (0%)	0 (0%)	7,709
FA RM_5_B	0 (0%)	0 (0%)	18,357 (50%)	19,061 (50%)	0 (0%)	0 (0%)	38,019
TOTAL	9,531 (10%)	19,061 (20%)	19,061 (20%)	19,061 (20%)	19,061 (20%)	9,531 (10%)	95,307



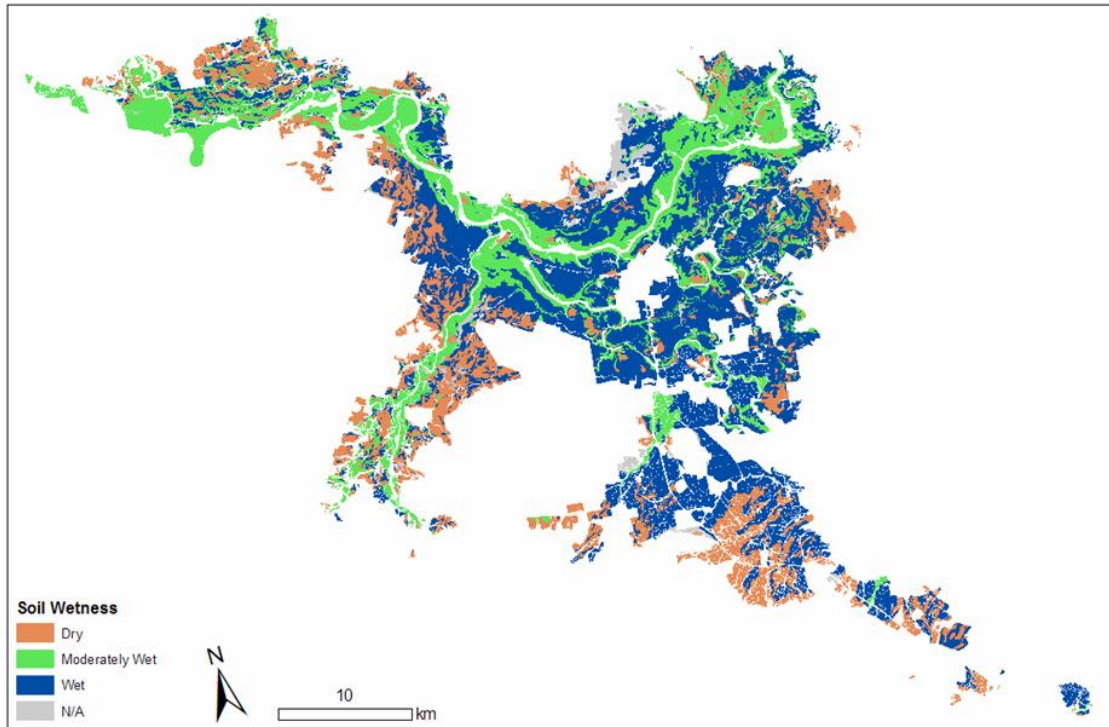
Harvest Group - optimally scheduling Farms (Example of scheduling Wet and Dry Blocks) - (Soils Distribution)





Harvest Group - optimally scheduling Farms

(Example of scheduling Wet and Dry Blocks) (Soil Wetness Distribution)



Harvest Group - optimally scheduling Farms

(Scheduling Wet and Dry Blocks across the season)

(Scheduling 2 Groups harvesting as 1 Group

– Dry Blocks scheduled towards end of season)

Equity \$ / Tonne:-	\$35.67	Optimised \$ / Tonne:-	\$35.71	\$ / Tonne gained:-	\$0.03
Equity Gross (\$):-	\$2,727,758	Optimal Gross (\$):-	\$2,730,197	Gross Gained (\$):-	\$2,439

Optimal Harvest Schedule - Tonnes (%) per Round

Grouped by FARM	Rnd 1	Rnd 2	Rnd 3	Rnd 4	Rnd 5	Rnd 6	Total Tonnes
GROUP_A_FARM_10-Wet	2,374 (34%)	1,137 (16%)	0 (0%)	3,511 (50%)	0 (0%)	0 (0%)	7,022
GROUP_A_FARM_11-Wet	0 (0%)	0 (0%)	1,611 (50%)	1,611 (50%)	0 (0%)	0 (0%)	3,221
GROUP_A_FARM_12-Wet	0 (0%)	1,277 (50%)	0 (0%)	1,277 (50%)	0 (0%)	0 (0%)	2,553
GROUP_A_FARM_13-Wet	2,430 (50%)	0 (0%)	2,294 (47%)	136 (3%)	0 (0%)	0 (0%)	4,860
GROUP_A_FARM_14-Wet	0 (0%)	0 (0%)	1,699 (50%)	1,699 (50%)	0 (0%)	0 (0%)	3,398
GROUP_A_FARM_15-Wet	2,843 (50%)	704 (12%)	2,139 (38%)	0 (0%)	0 (0%)	0 (0%)	5,685
GROUP_A_FARM_1-Wet	0 (0%)	4,179 (50%)	4,179 (50%)	0 (0%)	0 (0%)	0 (0%)	8,358
GROUP_A_FARM_4-Wet	0 (0%)	770 (50%)	770 (50%)	0 (0%)	0 (0%)	0 (0%)	1,540
GROUP_A_FARM_5-Wet	0 (0%)	964 (50%)	0 (0%)	964 (50%)	0 (0%)	0 (0%)	1,929
GROUP_A_FARM_6-Wet	0 (0%)	1,055 (15%)	0 (0%)	3,406 (50%)	2,350 (35%)	0 (0%)	6,811
GROUP_A_FARM_7-Wet	0 (0%)	2,368 (50%)	2,368 (50%)	0 (0%)	0 (0%)	0 (0%)	4,737
GROUP_A_FARM_8-Wet	0 (0%)	2,606 (50%)	0 (0%)	0 (0%)	2,606 (50%)	0 (0%)	5,212
GROUP_A_FARM_9-Wet	0 (0%)	233 (50%)	233 (50%)	0 (0%)	0 (0%)	0 (0%)	466
GROUP_B_FARM_1-Dry	0 (0%)	0 (0%)	0 (0%)	912 (7%)	6,269 (50%)	5,357 (43%)	12,537
GROUP_B_FARM_2-Dry	0 (0%)	0 (0%)	0 (0%)	1,778 (50%)	1,778 (50%)	0 (0%)	3,557
GROUP_B_FARM_4-Dry	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2,290 (50%)	2,290 (50%)	4,580
TOTAL	7,647 (10%)	15,293 (20%)	15,293 (20%)	15,293 (20%)	15,293 (20%)	7,647 (10%)	76,465



Harvest Group - optimally scheduling Farms (Example of scheduling Wet and Dry Blocks)

(Example of scheduling Wet and Dry blocks within a Group)

SUGARMAX Optimised Results: Herbert. Example of harvesting Wet and Dry blocks in a group

GROUP		EXAMPLE GROUP					
Sugar Price (\$/t):-	\$270	Rounds :-	6				
Season Length :-	18	Maximum Percent taken per Round :-	100				
TCH Trends Used? :-	No						
Optimised \$ / Tonne:-	\$35.34	\$ / Tonne gained	\$0.06				
Equity \$ / Tonne:-	\$35.28	Dry					
Equity Gross (\$):-	\$1,884,184	Gross Gained (\$):-	\$3,153				
Optimal Gross (\$):-	\$1,887,336						
Grouped by WETNESS							
Optimal Harvest Schedule - tonnes (%) per round							
	Rnd 1	Rnd 2	Rnd 3	Rnd 4	Rnd 5	Rnd 6	Total Tonnes
Dry	0 (0%)	0 (0%)	0 (0%)	0 (0%)	7777 (59%)	5341 (41%)	13118
Mod. Wet	5341 (30%)	10682 (59%)	1938 (11%)	0 (0%)	0 (0%)	0 (0%)	17960
Wet	0 (0%)	0 (0%)	8744 (39%)	10682 (48%)	2905 (13%)	0 (0%)	22330
TOTAL	5341 (10%)	10682 (20%)	10682 (20%)	10682 (20%)	10682 (20%)	5341 (10%)	



Harvest Group - optimally scheduling Varieties

(Example of scheduling Varieties across a Group using District trends)

Optimised \$ / Tonne:-	\$16.22	\$ / Tonne gained	\$0.82	Equity Gross (\$):-	\$318,456	Gross Gained (\$):-	\$16,885
Equity \$ / Tonne:-	\$15.40			Optimal Gross (\$):-	\$335,342		
Optimal Harvest Schedule - tonnes (%) per round							
vty_code	Rnd 1	Rnd 2	Rnd 3	Rnd 4	Rnd 5	Rnd 6	Total Tonnes
0	1155 (10%)	2311 (20%)	2311 (20%)	2311 (20%)	2311 (20%)	1155 (10%)	11555
127	0 (0%)	999 (81%)	233 (19%)	0 (0%)	0 (0%)	0 (0%)	1232
137	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	173 (100%)	173
141	0 (0%)	0 (0%)	594 (38%)	162 (10%)	223 (13%)	672 (41%)	1651
155	0 (0%)	0 (0%)	307 (100%)	0 (0%)	0 (0%)	0 (0%)	307
157	0 (0%)	0 (0%)	0 (0%)	387 (100%)	0 (0%)	0 (0%)	387
158	845 (77%)	250 (23%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1095
159	0 (0%)	0 (0%)	0 (0%)	1141 (100%)	0 (0%)	0 (0%)	1141
173	67 (10%)	134 (20%)	134 (20%)	134 (20%)	134 (20%)	67 (10%)	668
26	0 (0%)	393 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	393
6	0 (0%)	0 (0%)	556 (100%)	0 (0%)	0 (0%)	0 (0%)	556
62	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1467 (100%)	0 (0%)	1467
83	0 (0%)	48 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	48
TOTAL	2067 (10%)	4135 (20%)	4135 (20%)	4135 (20%)	4135 (20%)	2067 (10%)	



Farms - optimally scheduling Varieties / Ratoons / Wet/Dry Blocks

(Example of Farm scheduling Varieties using District level trends)

	\$/tonne	Variety	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6
Farm A	\$0.98	0	16%	22%	23%	19%	10%	10%
		108	0%	0%	0%	100%	0%	0%
		127	0%	0%	100%	0%	0%	0%
		13	0%	100%	0%	0%	0%	0%
		134	0%	0%	100%	0%	0%	0%
		135	0%	0%	0%	0%	100%	0%
		137	0%	0%	100%	0%	0%	0%
		141	0%	0%	0%	17%	83%	0%
		155	0%	100%	0%	0%	0%	0%
		157	0%	0%	100%	0%	0%	0%
		158	0%	100%	0%	0%	0%	0%
		159	0%	0%	33%	67%	0%	0%
		16	0%	0%	0%	0%	100%	0%
		26	7%	5%	11%	0%	0%	77%
		6	0%	0%	100%	0%	0%	0%
	83	100%	0%	0%	0%	0%	0%	
	88	0%	100%	0%	0%	0%	0%	
Farm B	\$0.42	0	16%	22%	23%	19%	10%	10%
		137	0%	0%	100%	0%	0%	0%
		141	0%	0%	0%	51%	49%	0%
		26	10%	39%	36%	15%	0%	0%
		85	51%	0%	0%	0%	0%	49%



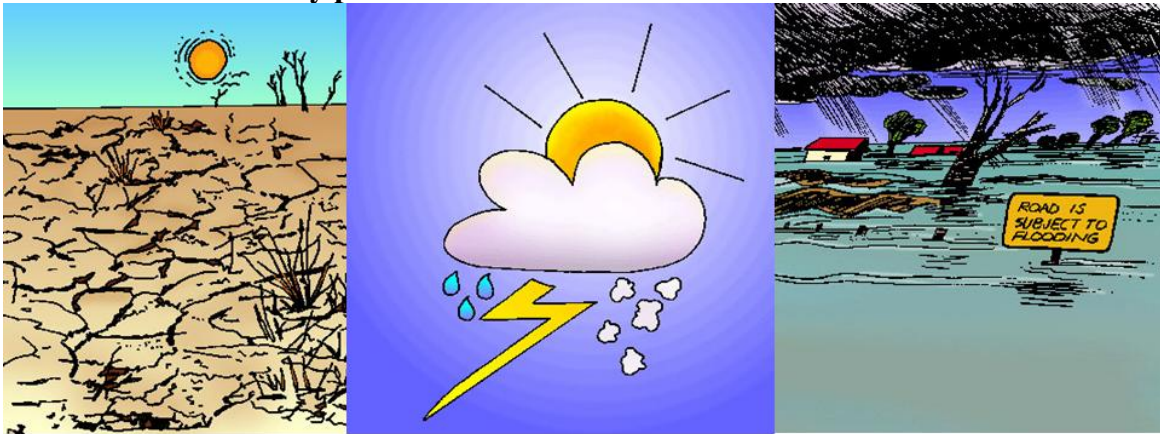
SugarMax summary

SugarMax:-

- Maximises Sugar across Farms, Groups, Region
- At no additional cost
- By optimising harvest schedules
- Develops revised schedules during season in response to changed conditions

**BUT what happens if it
RAINS????????**

APPENDIX 6 – Antony presentation

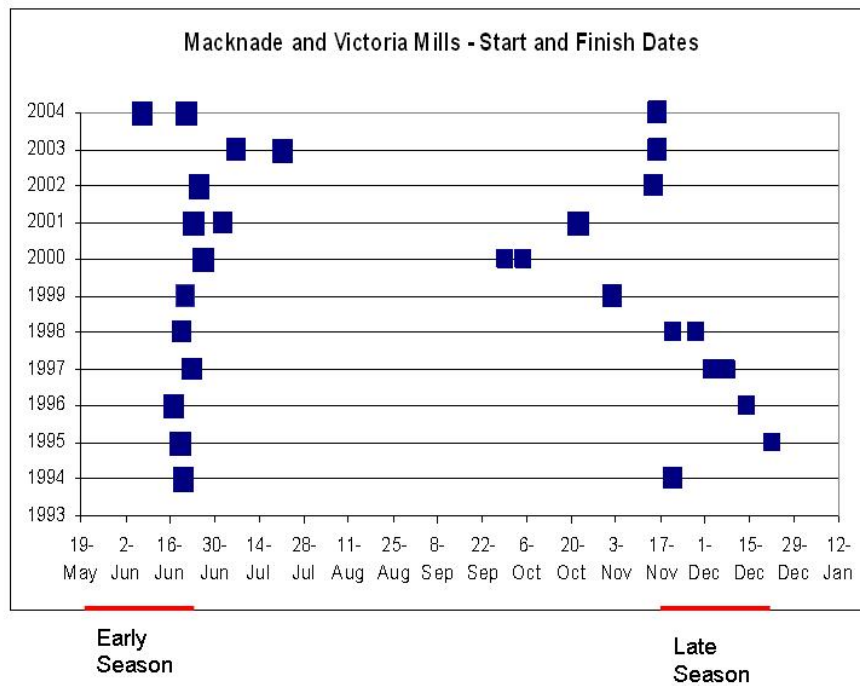


Rainfall Risk in the Herbert region

CSIRO Sustainable Ecosystems
 Di Prestwidge
 George Antony
 Andrew Higgins
 Adam Power
 Luis Laredo



Recent season lengths in the Herbert





Optimising Harvesting Season Length – Rainfall risk distribution across the region

Aim: To understand the risk of rainfall that would reduce soil trafficability during harvesting across the region

- Uses actual historical rainfall data
- Interpolated for each 5km grid across the region
- Concentrates on
 - Early Season (May 21 to June 17, weeks 21 to 24)
 - Late Season (Oct 23 to Nov 19, weeks 43 to 46)



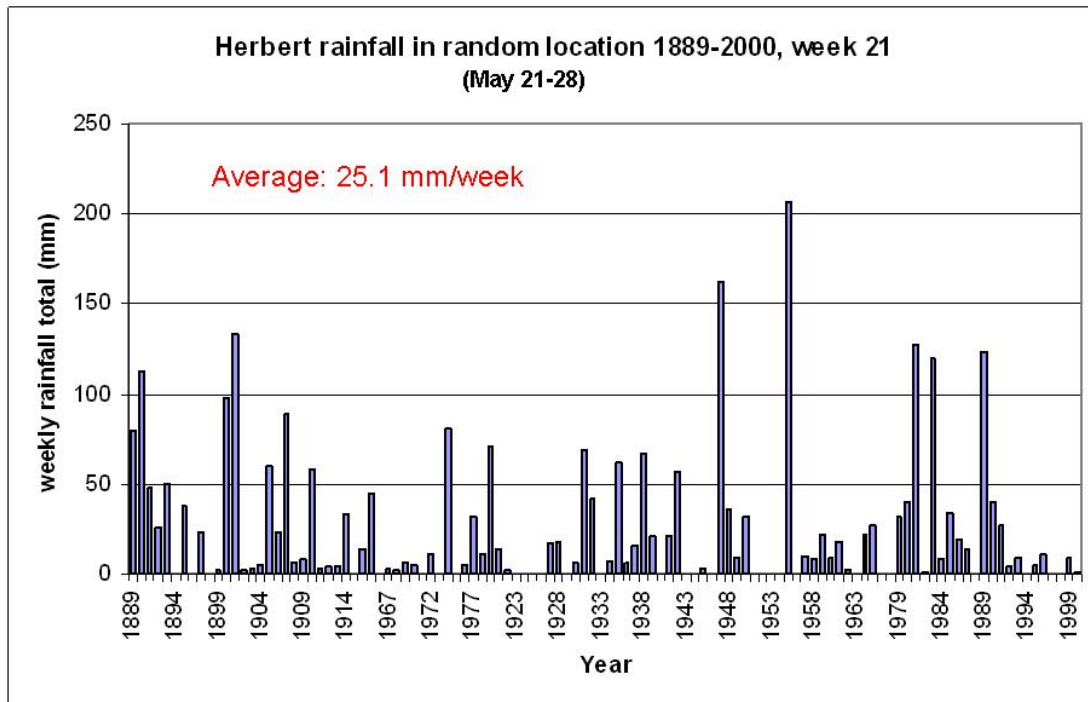
Wetday rules

Aim: To represent the impact of rainfall levels on harvester operations

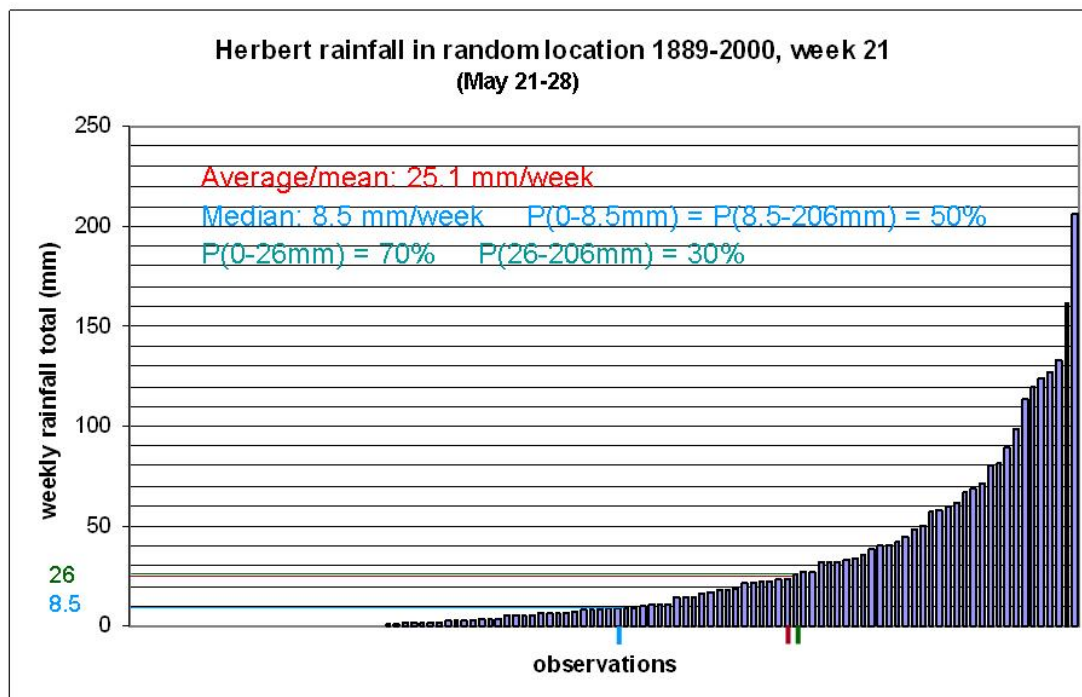
- Based on local expert opinion
- **WETDAYS1** - total no. of wet (W) days for the week
 - if rain between 10mm and 20mm then that day is WET (W) (RULE 1)
 - if rain between 20mm and 30mm then that day + 1 are WET (WW)
 - if rain ≥ 30 mm then that day + 2 are WET (WWW)



Rainfall probability – raw data



Rainfall probability – distribution



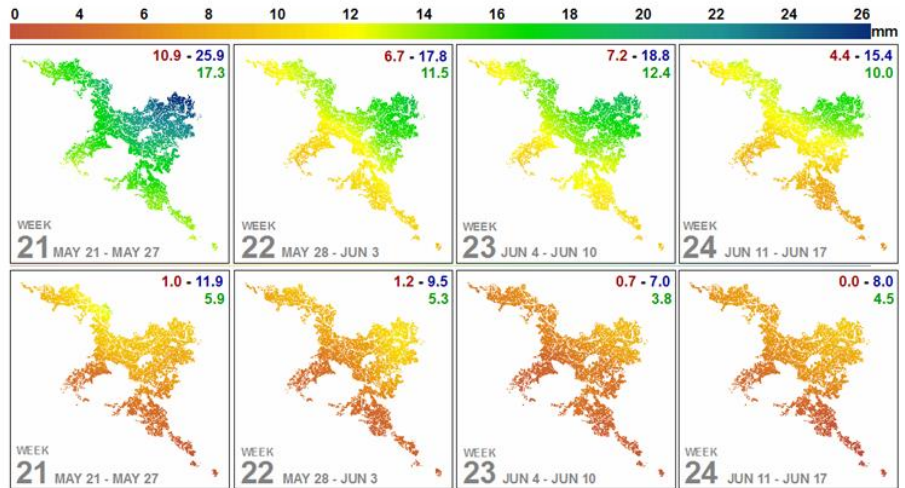


Average vs median weekly rainfall

EARLY Season Weeks

Average Weekly Rainfall

Median Weekly Rainfall

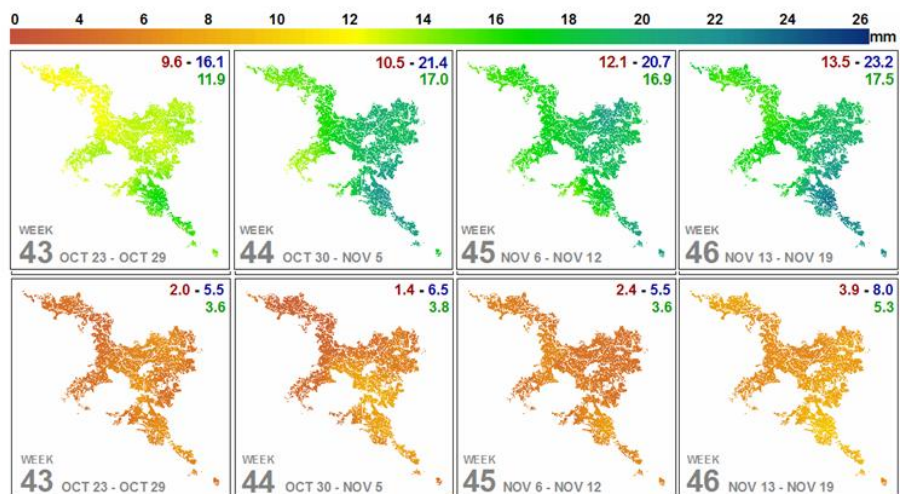


Median weekly rainfall

LATE Season Weeks

Average Weekly Rainfall

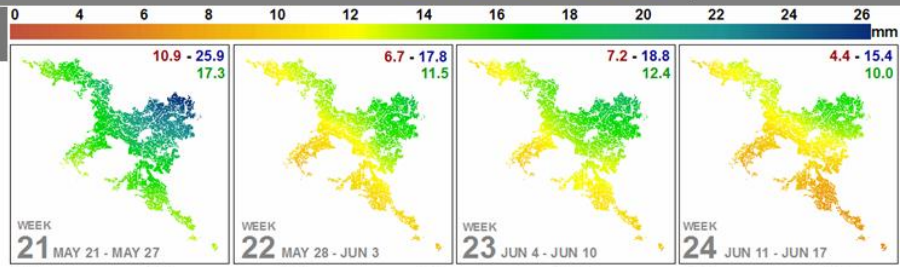
Median Weekly Rainfall





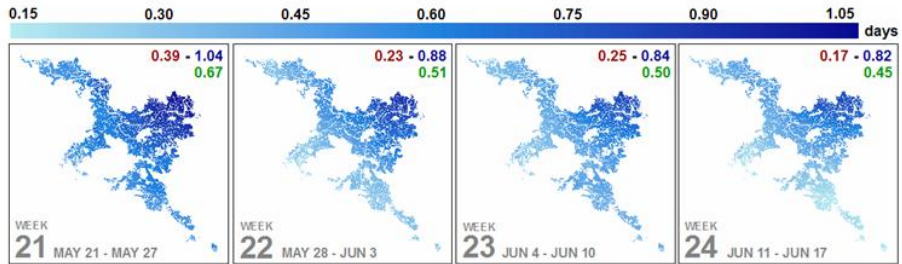
EARLY Season Weeks – SHORT CCS years

Average Weekly Rainfall



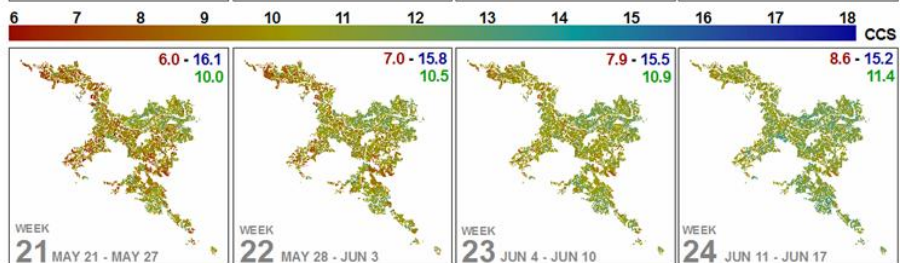
Average Number of Wet Days

using WETDAYS1 rules – rainfall to stop harvesting



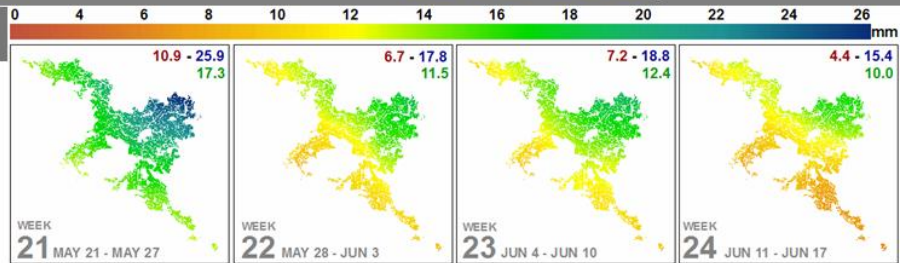
Average Farm CCS

using actual and interpolated data (SHORT years)



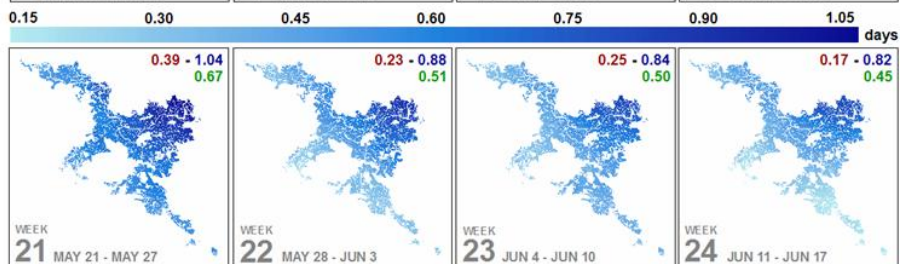
EARLY Season Weeks – LONG CCS years

Average Weekly Rainfall



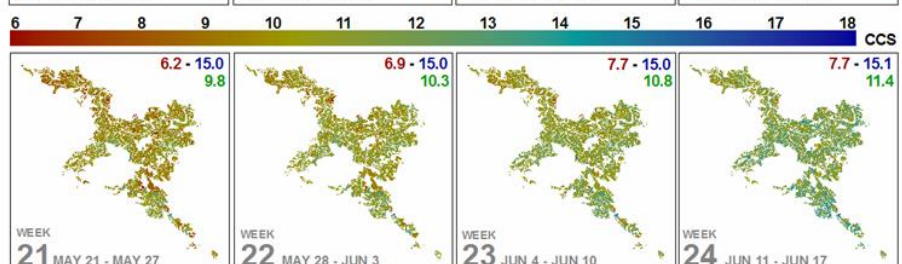
Average Number of Wet Days

using WETDAYS1 rules – rainfall to stop harvesting



Average Farm CCS

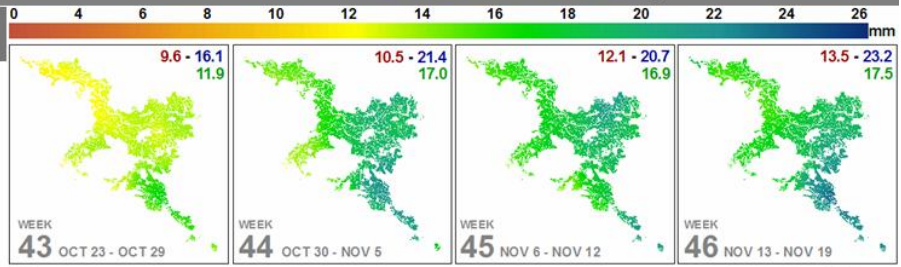
using actual and interpolated data (LONG years)





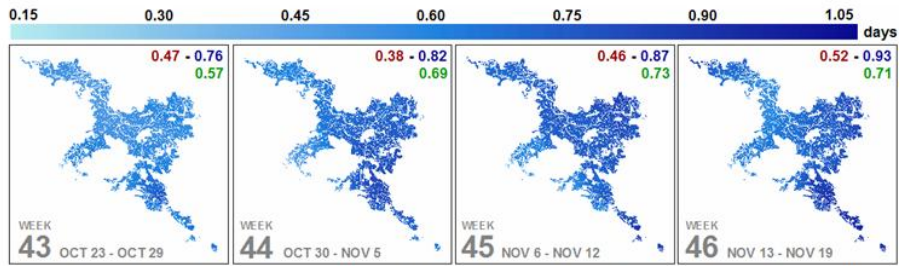
LATE Season Weeks – SHORT CCS years

Average Weekly Rainfall



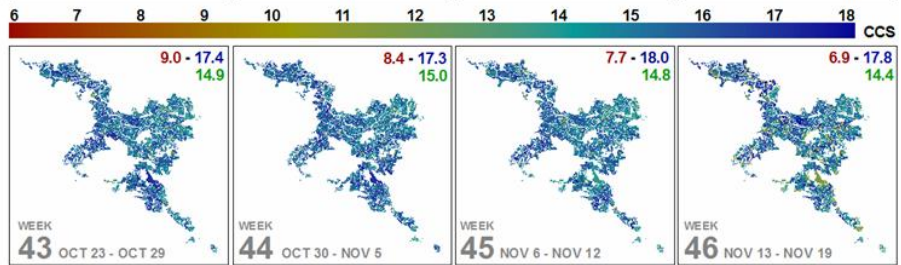
Average Number of Wet Days

using WETDAYS1 rules – rainfall to stop harvesting



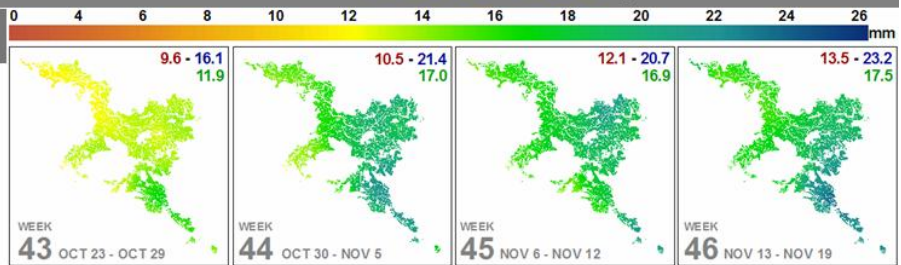
Average Farm CCS

using actual and interpolated data (SHORT years)



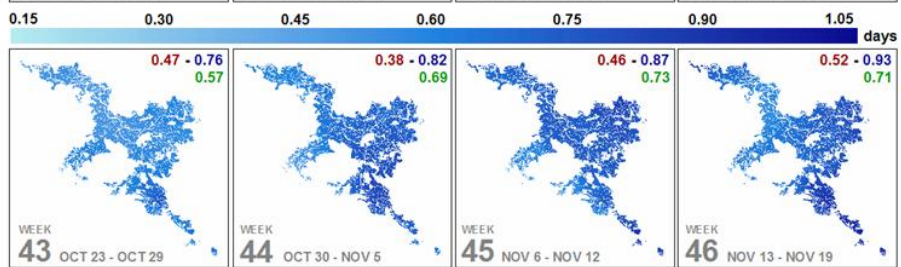
LATE Season Weeks – LONG CCS years

Average Weekly Rainfall



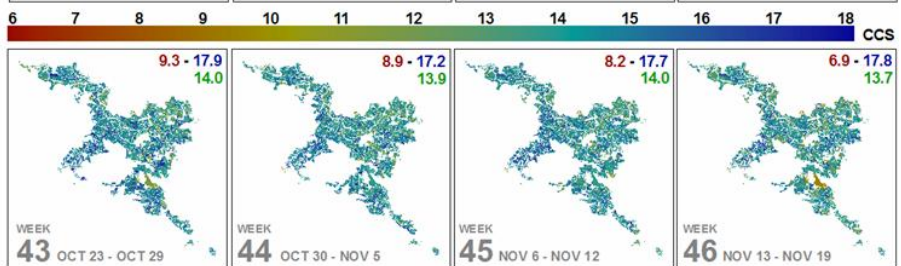
Average Number of Wet Days

using WETDAYS1 rules – rainfall to stop harvesting



Average Farm CCS

using actual and interpolated data (LONG years)





Inclusion of rainfall risk in harvest decisions

- **Shows financial costs/benefits of extended seasons for**
 - Different rainfall patterns and
 - Different risk aversion of stakeholders
- **Potential to extend SugarMax to schedule trafficable blocks for harvest**
- **Possible future work**
 - Incorporation of climate forecast information for in-season decisions
 - Linkage to forecasting the following year's crop

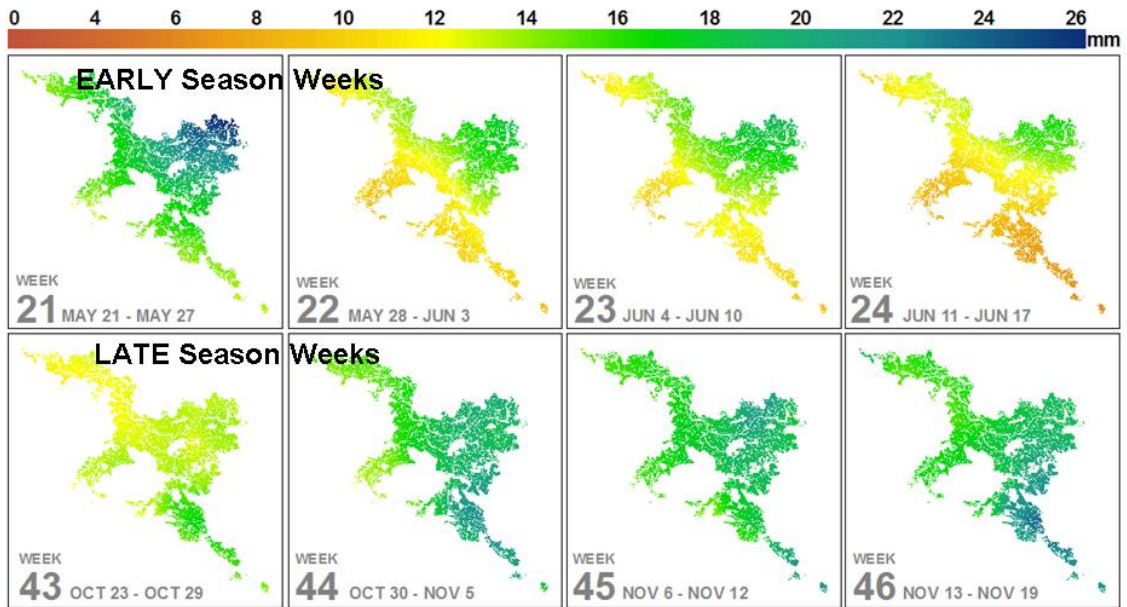


Thank You

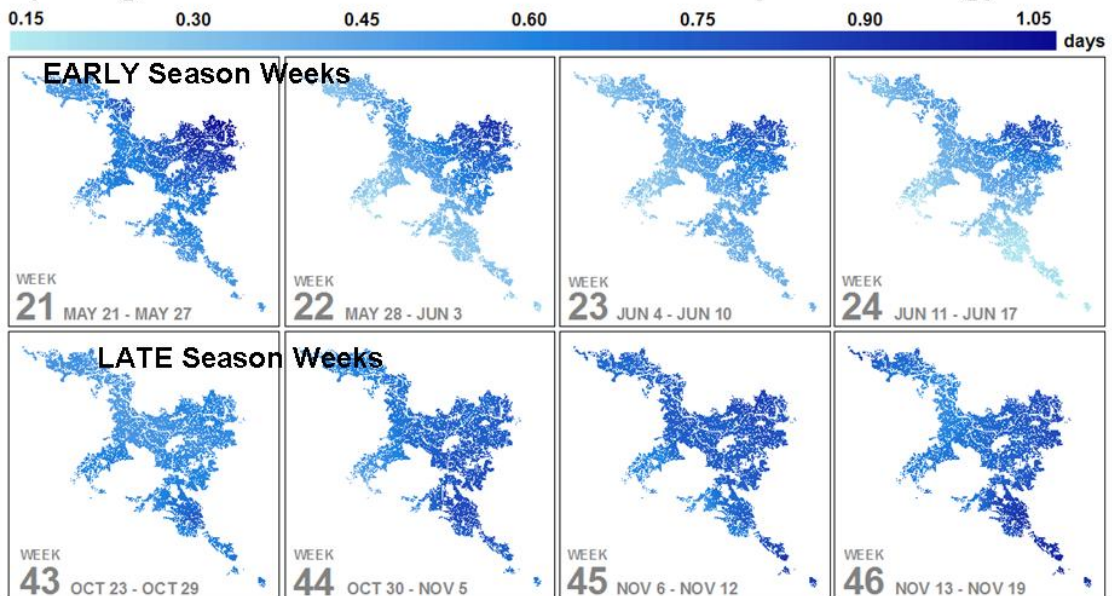
Contact: George Antony
george.antony@csiro.au
ph: 3214-2636



Average weekly rainfall (112 years data)



Average No. of Wet Days per Week (over 112 years) (using WETDAYS1 rules – rainfall to stop harvesting)



APPENDIX 7 - Mastripolitto and Sheedy presentation

A CONCEPT FOR COMBINING HARVEST GROUPS FOR GEOGRAPHICAL HARVESTING



Optimising the Herbert's Harvest

The real goal.

**A new concept in grouping and
working co-operatively.**



Optimising the Herbert's Harvest

There is more than one way to skin a cat.



The Herbert has unique characteristics.

50 years ago – All harvested manually.



Optimising the Herbert's Harvest

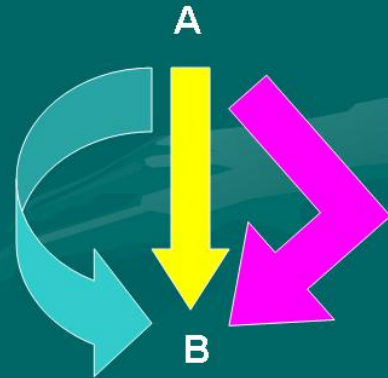
Innovation and enterprise has paid off.

Fully mechanised harvesting green.



Optimising the Herbert's Harvest

**There are many ways
of getting from
Point A to Point B.**



**In the end – we want the best
smartest way.**



Optimising the Herbert's Harvest

Processing a 5 million Tonne Crop

Numerous possible scenarios

15th June to 15th November



Optimising the Herbert's Harvest

Starting possibilities????

One Possibility

Say 5th June or some other early start date

Both Mills go after 2 or 3 weeks



Optimising the Herbert's Harvest

Partnered approach to work during the early start period (Before both Mills run together)

- **Then the core season**
- **Then partner before ratooning cane is cut**
- **Then finish the season**



Optimising the Herbert's Harvest

Make Hay while the Sun Shines



WIN FOR:

- **Growers**
- **Harvesters**
- **Mills**



Optimising the Herbert's Harvest

**New Approach
to Harvest**



**More Cane
and Sugar**



Upgrade Capacity



APPENDIX 8 – Wood ‘learnings’ presentation



SEASON LENGTH LEARNINGS FROM OVERSEAS



Southern Africa



Season length issues

- Set by mill capacity
- For given crop size the smaller the mill capacity the longer the season length
- Season length ranged from 31-45 weeks



Season length issues

- Daily crushing rates are small by Australian standards
- Sth. Africa's largest mill has a lower daily crushing rate than Macknade.



Harvesting Operations

- Nearly all cane cut by hand
- Larger farms cut cane every day of season
- Cut to crush period is several days
- Lower rainfall than Herbert



Advantages of longer seasons

- Better use of milling and cane transport infrastructure
- Lower capital outlay in relation to crop size
- More attractive employment period for seasonal workers
- Smaller work force for harvesting

Main disadvantage is low sucrose levels

Crop ripeners

- **Used extensively in Southern Africa**
- **60-70% crop treated in 2005**
- **Used early and late in season**
- **Main ripeners Ethrel and Fusilade Super**
- **Used in combination or separately depending on variety**
- **Ripeners are not the silver bullet**



Cane suitable for chemical ripening

- **> 8 green leaves per stalk**
- **Actively growing**
- **No signs of stress**
- **No sign of lodging**
- **No sign of flowering (Ethrel suppresses flowering)**



Summary

- Long seasons are accepted as part of growing cane in Southern Africa
- Growers and millers have similar discussions about season length
- Growers aware of cane age at harvest
- Growers aware of when ripeners will work
- Less nitrogen applied and drier (cane more likely to ripen naturally)



Brazil



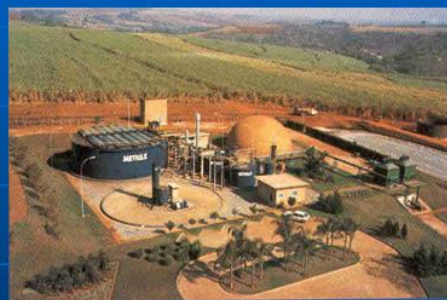
Season length in Brazil

- Generally around 30-32 weeks
- Most mills start in mid April and finish in mid to late November
- Much of cane in Centre South grown on large farms and mill estates



Crop ripeners

- **Moddus, Glyphosate, Ethrel and Fusilade**
- **Trials in Brazil have shown that Moddus is effective in increasing CCS throughout the season**
- **Trials also suggest that Moddus stimulates root growth and ratooning**



Geographical harvesting

- **Easy to conduct geographical harvesting on large farming units**
- **Multiple harvesters operating**
- **GIS based record keeping to identify most profitable sequence of blocks for harvest**



Summary

- **Longer seasons are accepted in Brazil**
- **Blocks for harvest based on variety and crop age**
- **Wide spread use of crop ripeners/ growth regulators**
- **Geographical harvesting to exploit most mature cane with high CCS**

APPENDIX 9 – Wood ‘alternative products’ presentation

Alternative products from cane



Alternative products

- Electricity
- Ethanol
- Fibre board
- Furfural
- Wax
- Bioplastics
- Alcohol for beverages
- Pharmaceutical products



Season length issues

- Continuous supply of cane desirable
- Longer seasons more attractive for development of alternative products



Value adding in the Herbert

Herbert Regional Plan identifies the following value adding opportunities:

- Co-generation
- Ethanol
- Bio-plastics



APPENDIX 10 - Responses from the workshop questions “What opportunities to increase ongoing profitability?” and “What role does season length play with achieving these opportunities?”

Responses in respect of the role season length plays in achieving the opportunities is indicated in red as follows:

S- shorter season length

L- longer season length

N/A- not applicable

Where there is no indication, the respondents did not comment.

Group 1

- Cane varieties – Management of current varieties and breeding of new ones. N/A
- Access to CSIRO tools. N/A
- Target finish of season 15/11. S
- Not willing to cut below mill 10 CCS. S

Group 2

- Better, more reliable and port/milling fewer breakdowns. N/A
- Good partnerships between all participants. N/A
- Better varieties. N/A
- By products. (more an option with longer season length)
- Increase in human capacity better understanding. N/A
- Decrease growing costs eg. Min. till. S
- Adopt BMP. N/A
- Sidings more and bigger capacity. S
- Some control of geo groupings. N/A
- Better use of existing capital areas. L
- Co-generation –innovative bagasse storage?
- Focussing on HR specific issues
 - What’s important to HR people
 - All areas.
- Repositioning ourselves (media & worldwide) as green, premier custodians of the land.
- Vertical integration.
 - Our business
 - Partial integration of between stakeholders.
- Traffic (weighbridge) control.

Group 3

- Earlier finish will promote more opportunities.
- Providing pricing mechanism addresses the proportion to each party.
- Shorter season would benefit (needs modelling economics).
- For crystal sugar production (season length is critical).
- Early finish is better.
- A grower’s future depends on a viable season length.
- Alternate crops (companion crops) to use existing infrastructure!

- Pricing mechanism to cater for everything produced from cane!
- Grower needs reward for cutting when CCS is lower.
- Partnered harvesting rewards need to cover all the costs of shifting if necessary.
- Improve soil balance (fertility)
- Improve profitability by improving mill performance (re-investing in reliability) to process more!

Group 4

- To grow the pie. **L**
- Value adding – for district. **L**
- Lowering costs and maximising profit. **N/A depends**
- Better milling performance.
 - Milling Capacity
 - Transport Restraints (Storing on Pad.) **L**
- Grower monitoring of CCS. **N/A**
- GPS harvester overlay CCS. **N/A**
- Maximise Harvester capacity for those who can start early (no harvester migration.) **L**
- Outside 22 weeks – Risk shared. **L**

Group 5

- Geographical harvesting eg. Roaming. **N/A**
- 2-row harvesting. **N/A**
- Mill efficiency. **L**
- Minimum tillage. **N/A**
- Bed forming. **N/A**
- Sugar by products. **L**
- Value adding. **L**
 - Co generation.
 - Plastic.
 - Electricity etc.
 - Fertiliser.
- Farm rationalisation. **N/A**
- Extended hours harvesting. **N/A**
- Variety Management. **N/A**
- Complimentary crop diversification (during rotation.) **S**
- Drainage –farm layouts. **N/A**
- Capital rationalisation eg Harvesters. **N/A**
- Training.
 - Employment Opportunity.
 - The next generation.
 - Young people. **S,L, N/A**
- Equity.
 - Harvest.
 - Risk and Reward. **N/A**

Group 6

- Farmers to own mill - **S**
- Cut costs – Two row harvesting to improve economics **N/A**
- Optimum return from current crop (CCS and season length and ratooning ability.) **S**
- Different products/alternatives from crop eg co generation. **L**
- Diversification. **N/A**
- Make mill more efficient throughout year. Particularly at peak harvesting times (transport & mill operation.) **S**
- Improved varieties suited to area – Better CCS at different times. **S or L**
- Form large district co-ops to buy machinery, fertiliser and fuel. **N/A**
- Community bank and lending facility. **N/A**

Group 7

- Alternative (products e.g. co-generation within existing system (Storage of baggage.) **L**
- Minimising season length for growers and harvesters. Works well for sugar crystal only?
- Mill then continues on, farmers can then work off farm. Need new profit share arrangement!
- On farm monitoring for CCS. **Shorter** season increase profit.
- Complimentary crops eg. Bambaroo. **Shorter** season increase profit.
- Change of forum to maximise return eg. Mackay and preliminary discussion with CSR. **N/A**
- Establish more trust for millers and growers. Transparency required.
- Investigate. Close Lucinda and transport sugar from Townsville. **L**
- Controlled traffic (influence costs.) **N/A**
- Wide swath harvesting **N/A**

Issue	Season length comment	Responses	
		No.	%
Payment System ,Risk/Reward sharing			
Providing pricing mechanism addresses the proportion to each party.	No comment		
Pricing mechanism to cater for everything produced from cane.	No comment		
Grower needs reward for cutting when CCS is lower.	No comment		
Partnered harvesting rewards need to cover all the costs of shifting if necessary.	No comment		
Outside 22wks – Risk shared.	Longer season		
Risk and Reward.	N/A		
Mill then continues on, farmers can then work off farm. Need new profit share arrangement!!	No comment		
Change of formula to maximise return eg. Mackay and preliminary discussion with CSR.	No comment		
Diversification - Other crops		4	4.5%
Alternate crops (companion crops) to use existing infrastructure!	No comment		
Complimentary crop diversification (During Rotation.)	Shorter season		
Diversification.	N/A		
Complimentary crops eg. Bamboo.	Shorter season		
Economies of Scale		4	4.5%
Better use of existing capital.	Longer season		

Farm Rationalisation.	N/A		
Capital rationalisation eg Harvesters.	N/A		
Wide swath.	No comment		
Farming Systems		17	19.1%
Adopt BMP.	N/A		
Minimum tillage.	N/A		
Bed forming.	N/A		
Fertiliser.	No comment		
Drainage –farm layouts.	N/A		
Controlled traffic (influence costs.)	No comment		
Access to CSIRO tools.	N/A		
Decrease growing costs eg. Min. till.	Shorter season		
Improve soil balance (fertility)	No comment		
Grower monitoring of CCS.	N/A		
GPS harvester overlay CCS.	N/A		
Optimum return from current crop (CCS and season length and ratooning ability.)	Shorter season		
On farm monitoring for CCS. increase profit.	Shorter season		
Cane varieties – Management of current varieties and breeding of new ones.	N/A		
Better varieties.	N/A		
Variety Management.	N/A		
Improved varieties suited to area – Better CCS at different times.	N/A		
Human resources		7	7.9%
Increase in human capacity better understanding.	N/A		
Focussing on HR specific issues	No comment		
What’s important to HR people	No comment		
Training.	No comment		
Employment Opportunity.	No comment		
The next generation.	No comment		
Young people.	N/A		
Harvesting systems		8	9.0%
Some control of geographic groupings.	N/A		
Maximise Harvester capacity for those who can start early (no harvester migration.)	Longer season		
Geographical harvesting eg. Roaming.	N/A		
2 row harvesting.	N/A		
Extended hours harvesting.	N/A		
Cut costs – Two row harvesting. improve economics	No comment		
Wide swath.	No comment		
Harvest.	No comment		
Industry image		1	1.1%
Repositioning ourselves (media & worldwide) as green, premier custodians of the land.	No comment		
Mill reliability/ Cane & Sugar Transport efficiency		10	11.2%
Better, more reliable and port/milling fewer breakdowns.	N/A		
Sidings more and bigger capacity.	Shorter season		
Traffic (weighbridge) control.	No comment		
Improve profitability by improving mill performance (re-investing in reliability) to process more!	No comment		
Better milling performance.	No comment		
Milling Capacity	No comment		
Transport Restraints (Storing on Pad.)	Longer season		
Mill efficiency.	Longer season		
Make mill operation and transport more efficient throughout year.	Shorter season		
Particularly at peak harvesting times.	Shorter season		
Investigate closing Lucinda and transport sugar from Townsville.	Longer season		
Season length		8	9.0%
Target finish of season 15/11.	Shorter season		
Not willing to cut below mill 10 CCS.	Shorter season		

Earlier finish will promote more opportunities.	No comment		
Shorter season would benefit (needs modelling economics).	No comment		
For crystal sugar production (season length is critical).	No comment		
Early finish is better.	No comment		
Growers future depends on a viable season length.	No comment		
Minimising season length for growers and harvesters. Works well for sugar crystal only?	No comment		
Vertical Integration, Grower/Community owned industry		9	10.1%
Good partnerships between all participants.	N/A		
Vertical integration.	No comment		
Our business	No comment		
Partial integration of between stakeholders.	No comment		
Equity.	No comment		
Farmers to own mill -	Shorter season		
Form large district co-ops to buy machinery, fertiliser and fuel.	No comment		
Community bank and lending facility.	N/A		
Establish more trust for millers and growers. Transparency required.	No comment		
Value adding - different products		10	11.2%
By products.	Longer season		
Co-generation –innovative bagasse storage?	No comment		
Value adding – for district.	Longer season		
Sugar by products.	Longer season		
Value adding.	Longer season		
Co generation.	No comment		
Plastic.	No comment		
Electricity etc.	No comment		
Different products/alternatives from crop eg co generation.	Longer season		
Alterative products e.g. co-generation within existing system (Storage of baggage.)	Longer season		
Sundry		3	3.4%
All areas.	No comment		
To grow the pie.	No comment		
Lowering costs and maximising profit.	N/A		
	TOTALS	89	100%

APPENDIX 11 - Individual responses under specific categories pertaining to- “What are the risks or barriers associated with adopting an optimal season length?”

Risk - Payment/Equity/Reward

- Pay system for Harvester crews.
- Hourly rate for harvester’s crews.
- Reward for risk.
- Payment calculation.
- Equity between Grower’s vs. Compensation.
- A system to reward growers for early start and a penalty for late crushing.
- Remuneration systems – cane payment, harvesting etc.
- Price signal to encourage early season start.
- Rewards aren’t forthcoming as expected.
- More return incentives to the grower and harvester contractor.
- Current cane payment formula.
- Grower payment arrangements.
- A payment system to better represent the industry.
- Equitable payment system.

Relations/Attitudes

- Know what we don’t know.
- District is risk averse.
- No cooperation for joint benefit.
- Longer season may be detrimental to family life.
- Effect on family life.
- Time spent with families.
- Inter-personal relationships.
- Tools, facts and skills to educate and gain acceptance.
- Decision making.
- Keep our young people on the land.
- Old attitudes miller/Grower/Harvesting Contractors.
- Business, Resources and thoughts of growers.
- Limited business skills.
- Sugar parading in short season thinking.
- Talking – let’s just do it.
- We jump into the wrong scenario (don’t look at all the options first up).
- Must be win-win.
- Tradition – “it’s also been done that way”- wasn’t been done before, risk higher.
- Belief that early cut farmers are making a sacrifice for no/little reward.
- Knowing that change will benefit everyone.
- Barrier: Inability to see big picture, district-wide advantage.
- Change of comfort zone.
- Where are we heading as a district?
- Success determined by perceptions not facts.
- Age based reluctance to change or re-invest.
- The ability to change mentally or physically or dollars.

- Grower and miller agreement.
- Agreement on changes between parties.
- Resistance to change.
- Barrier – Hard to get agreement from all sectors to change.
- Commitment that CSR has capacity to crush it all.
- Harvester acceptance.
- Miller acceptance.
- Farmer acceptance.
- Lack of trust between the parties.
- All to think as one team.
- Agreement by Grower and Miller.
- Grower/Miller relationship.
- Tradition.
- Murphy's Law (He's a bastard).
- Mill and Grower agreement.
- Lack of trust.
- Us versus them.
- Resources for Ingham kept in the district.
- People's attitude.
- If we don't change or seize opportunity we won't be there.
- Contract with CSR and unions.
- Contract with miller.
- Relationship with miller.
- Millers and Growers pulling different ways.
- Different agendas.
- Getting everyone to agree.
- Not a farmer owned mill or vice versa.
- CSR.
- Suspicion of Mill/Growers motives.
- Private ownership of mill.

Risk – General

- Ability to negotiate share of income is big risk for longer seasons.
- Too early harvest
- No change from 22 weeks for just Raw Sugar.
- 22 week for crystal sugar.
- No barriers to adopting 22 week season if mill is willing mill is not willing.
- Season length.
- The real impact of season length is not measured.
- Optimum for Bambaroo growers different to Abergowrie.
- Agreements to be at least two seasons in advance.
- Optimum for mill different to growers.
- Reliance wholly/solely on CCS to determining value to growers

Risk – Profits Ownership

- Financial loss to individuals.
- Risk of standover – who’s last?
- Understanding and believing the risks.
- How to share profits equally.
- Risk sharing mechanisms.
- Ego/shirt in decision making.
- If season is longer than 23 weeks it cost big money – I need compensation.
- Loss of income caused by a longer season.
- Profits margins.
- Cost sharing from charges incurred.
- Some sectors may gain an advantage.
- For profitability we need shorter season 22-23 weeks.
- World sugar price.
- \$ Returns.
- Low profits.
- The “do-nothing” scenario is preferred – risk adversity.
- Risk – Impossible to quantify the full range of risks and benefits to each player in the chain.
- Profit sharing.
- Focus on share rather than size of cake.
- The risk that someone might gain \$\$ at your expense.
- Ownership of reward share of risks.
- Equity manager as a Risk manager tool = How effective is it?
- Lack of risk sharing for new ways of operation.
- Share of extra income from change.
- Understanding the effects on all parties.
- Risk management sharing between stakeholders.
- Not sharing in any benefits of change.
- Profit and risk sharing.

Value Adding

- Government regulation e.g. ethanol mandates.
- Policies.
- Public perception on GMOs.
- More than one product going through our sugar terminals (keep them maintained).
- Government policy on renewable energy.
- Season length to suit maximum profit for whole district and stakeholders.
- Ethanol – Varieties, income ratoonability longer season to maximize profits.
- Environmental issues.
- EPA.
- Labour force acceptance.
- Skills base to move into other crops.
- Need for greater vertical integration in local industry.
- Resources/new incomes left in district.
- Focus on crystal sugar.

- Each party trying to get a bigger share of pie.
- Lack of profit sharing from new practices between sectors.
- Barrier – Funding for capital investment to change.
- Research into value adding plastics/co-generation, etc.
- Understanding value adding.
- Avoiding volatility impacts.
- Depends on products being produced.

Mill Performance Issues

- A performance guarantee.
- Mill reliability.
- Mill capability.
- Logistics and mill capacity to meet season length.
- 22 week optimum mill crushing capacity inefficient t/port system.
- Mill capacity.
- Mill transport.
- Infrastructure.
- Mill.
- Sugar needs better mill capacity and transport system that stands in road of optimal season length.
- Mill capacity.
- Mill reliability.
- Mill maintenance.
- Mill arrogance.
- Crushing capacity in the barrier.
- Mill, transport and crushing capacity.
- A guarantee by mill on performance.
- Less mill performance, less maintenance.
- Mill breakdowns too often.
- Mill performance and reliability.
- Run down mill.
- CSR upgrade mill and infrastructure.
- Infrastructure constraints.
- Mill efficiency.
- May create mill and harvest inefficiencies.
- Mill reliability.
- No money spent on mill infrastructure if there is a long season.
- Reliable millers more so.
- Milling capacity.
- CSR will not invest in milling capacity.
- Mill will adopt less production regime.
- Upgrade run-down mill.
- Mill reliability.
- CSR reliability.

Mill Transport

- Rail capacity.
- Number of trains to one subdistrict and sidings.
- Need for staggered bin deliveries and sidings.
- Transport.
- Transport system (more efficiency).
- Transport reliability.
- Bin capacity.
- Better loco maintenance.
- Larger Harvesting groups without a strategy.
- Efficiency of bin supply.
- Mill transport system.
- Logistics.
- Gluts and sidings.
- Mill transport not reliable or flexible.
- Siding capacity.
- Assuming crystal sugar – mill transport is the barrier.
- Limitations – siding capacities.

Labour Issues

- Labour force.
- Workplace health and safety.
- Fatigue management harvesting.
- Season length for workers earnings and what to remain.
- Labour.
- Employment duration.

Ratooning

- Group – equity, ratooning, rotation.
- Late ratoons.
- Ratooning capability.
- Yields.
- Loss of ratooning capacity for next year's crop.
- Ratooning.
- Poor ratoons.
- Ratoons for crops following years.
- Late finish poor ratoons no chances for plough out or alternate crops.
- No point ratoons won't grow.
- 30 week optimum ratooning problems CCS declines hot weather fire threats.
- CCS and poor ratoon.

Harvesting issues

- Longer season haulout and field workers work longer season for the same money.
- Research change in cane pay to suit geographic harvesting.
- Harvester shirtings all over district.
- Flexible harvest and transport system.

- Harvesting system.

Cane Production Issues

- BSES to monitor farms (CCS, tonnes etc) paid through service agreement.
- Containing input costs – chemicals and fertilizers.
- Access to CSIRO research tools – operationalism.
- Cane varieties.
- Compaction – loss of production.
- Match good early sugar varieties with soil types/weather.
- Performance of varieties.
- Lower production effect to be addressed.
- Varieties suit season length.
- Long season – poor soil structure.
- Agronomics and variety management to meet season length.
- Better CCS varieties.
- Longer fallow.
- Long season – poor fallow crops.
- Variety- CCSs.
- Soil nutrition.

CCS Issues

- CCS levels.
- CCS content.
- Late finish.
- Loss of CCS season to finish by mid November.
- CCS.
- CCS for profit.
- CCS underwriting.
- Loss of sugar content.
- Loss of CCS and productivity for the following year.
- Crop size.
- Low sugar content.
- Longer season.
- Less cane.

Weather

- Crop not harvested due to weather.
- No wet weather insurance scheme.
- Climatic variability.
- Wet weather risks to be renumerated.
- Rainfall also effects season length.
- Wet weather.
- Weather.
- Wet weather risk, sharing, arrangements.
- No weather.
- Adverse weather district wide.

- Weather short season needed.
- Large variation in weather wet – too dry.
- Greater risks caused by weather – when season is extended.
- Yearly changes in weather pattern.
- Weather risk is larger than that which was stated today.
- Crop size and weather conditions.
- Climate variability – minimise the risk – how?
- Rainfall diversity across region.
- Managing adverse weather conditions.
- Grower equity due to weather.
- Late harvest/standover cane and impact on following year.
- Weather restriction.
- Contingency to manage risks due climate.
- Fear of a disastrous wet weather event.
- Farm damage due to wet weather.
- Unseasonal circumstances.
- Early wet weather or late.
- Weather risks.
- Managing wet weather at harvest.

Non-specific Issues

- Conservative leadership.
- Sack all the academics.
- Unachievable.
- Insanity, I will grow cows.
- End of sugar industry in Ingham.

APPENDIX 12 - Individual responses under specific categories pertaining to- “What are the knowledge gaps – what should the industry focus on?”

Knowledge Gaps	Votes	
	No	%
Value adding.	55	24.3%
Bio-factory the cane plant. Economic Analysis of Alternative Products across value chain. What is known about all the products that can be produced from cane? Value adding with totally new products/crops. Repositioning/selling ourselves better Do we know what our client(s) want? – Quality, amount, type, characteristics Herbert industry/community does its own markets research Value adding: chocolate etc Economic Analysis of alternative product or by product		
Value Chain	55	24.3%
Value chain impacts – what each sector does, and know it affects downstream \$/environments systems approach . Mill production cost to be available to growers (trust). Understand value chain. Economic evaluation needed on the effect on Mill, Growers and Harvesters – each section of losses Vs gains on CCS, crop yield, over 5 yrs when season extends beyond 22 weeks. Do we know what our clients want? Research harvest system to maximise returns Harvest losses- ratoon damage, harvest speed. Hours of harvesting – humidity/temperature, sugar loss Price projection – Predictive models Research payment formula options Mill info disclosure: Growers always open at forums workshop. Whole Industry Economic Model to demonstrate impact of changes. Cost of tonne cane to be crushed. Mill profits for all products and production costs. How to make a win – win situation for both millers and growers. Marketing. Value change analysis		
Crop management and varieties	42	18.6%
Varieties Research Varieties GM Costs of traditional soil management. The sugar cane plant physiology -Water tolerance, ratooning . Chemical ripeners- Varieties Research Control traffic systems Early CCS Varieties to suit season length Soil health		
Risk Management	23	10.2%
How do we manage the risk of extending the season length? Understanding risk – transparent. Women into positions leadership and employment (Harvest Haul out)		
Improved negotiations skills for growers.	13	5.8%
Improved negotiation skills for growers. Encouraging new young industry participants Negotiating skills – or ‘professional’ negotiator Skilling the next generation of farmer		
CSR investments made by board with lack of knowledge of cane farming.	13	5.8%
Profit advantages for participants to start early	8	3.5%

Profit advantage for differing start times – payment system		
Whole of industry BSES funding.	8	3.5%
BSES agreement fee for service/monitoring farms		
Seasonal forecasting	4	1.8%
Seasonal climate forecasting		
Dealing with diverse nature of Herbert.	3	1.3%
Implementation of research.	2	0.9%
Implementation of Research- communication, education, access to research.		
TOTAL	226	100.0%