

Tully Sugar Industry Project

“Working together for our future” Phase 2

SRDC FINAL REPORT-CG007

BY

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EXECUTIVE SUMMARY

The project utilised services of Organisational Psychologist Ian Plowman, to build capacity for change and develop the management ability of a number of participants in the Tully Sugar Industry.

The project was running immediately prior to the development of the Tully District Strategic plan and the District Productivity Plan. The project was able to provide a range of skills to 38 industry participants from growing, harvesting and milling sectors and provide them with project management tools and experience.

Workshops were conducted to demonstrate a number of tools, which could be used in reaching decisions within a group structure while managing time and minimising conflict. The project produced an increased number of people in the Tully Sugar Industry who are more aware of project management and who can now utilise a number of tools to arrive at group decisions.

The project provided three high quality presentations on:

1. Diversification options for the Tully industry;
2. Harvest Best Practice in relation to feedtrain optimisation,
3. Cost of Production benchmarking.

These presentations were delivered to the 90 attendees at the Tully Cane Productivity Awards in May 2005. All the presentations contained recommendations for the industry to move these important productivity issues forward into the future.

The project was able to focus those involved on the process of group decision making and project management. There have been benefits to the local sugar industry in the development of the Tully Strategic Plan which was incorporated into the Regional Advisory Groups Regional Plan and in identifying and prioritising major issues in the Tully Productivity Plan.

The skills learned in the “Working Together For Our Future” workshops are being demonstrated through a number of activities / projects developed and implemented since the workshops.

BACKGROUND

The Tully Sugar Industry comprises of a district group involved in growing, harvesting and milling sugar cane in the Wet Tropics of Queensland. Cross ownership is common with many individuals involved in management of farms, harvesters and shareholders and the sugar mill.

The industry has developed and expanded under a spirit of cooperation and an informal integrated framework. The reduction in sugar price has resulted in the need for rapid change and for greater cooperation between groups to achieve profitable outcomes. The project sought to use adult learning principles to skill participants to manage change and to arrive at decisions under a frame work, which managed the conflicts.

OBJECTIVES

The project objectives were to:

- Build capacity for change, learning and innovation in the current and future leaders across the value chain in the Tully Sugar Industry to enable the achievement of the Tully Vision.
- Develop the management skills set of participants in the established Vision Action Teams and leaders from current farmer groups to improve profitability and sustainability of the Tully Sugar Industry.
- Build capacity among those involved in implementing the Tully Strategic Plan in project design and evaluation

The project improved the skills of the industry participants involved in developing, evaluating and presenting projects to others in the local industry. Some in the development of the Tully District Strategic Plan and the Tully Business Plan have demonstrated the skills gained as participants in the “Working Together For Our Future Project”.

There has been no evidence of a realisation of the skills gained in the project in an improved whole of system approach to industry direction and productivity improvement.

METHODOLOGY

The project contracted DPI & F based Organisational Psychologist, Ian Plowman to conduct a series of workshops with Tully Sugar Industry participants. Participants for the workshops were invited with a focus given to those who had participated in Phase 1 of the project.

A two day skills development workshop was held where 38 participants worked through a program “Meeting Without Discussions” where tools were demonstrated and learnt whereby group outcomes are achieved with minimal conflict. A second workshop was held where participants reviewed and practiced the skills learned. Using the framework and skills defined in the workshops and review of the “Meeting Without Discussions” workshop the participants formed groups to research a productivity topic from the Tully Vision Project (Phase 1). The group’s aims were to deliver recommendations to the Tully Industry on the selected productivity issues.

A third two day workshop provided the opportunity for the groups to develop a high impact presentation on their chosen project. The workshop provided an opportunity to practice skills learned and to utilise these skills in developing the project presentation. The project teams organised a high profile industry forum in conjunction with the industry Productivity Awards Presentation and delivered the presentations that they had developed.

OUTPUTS

The skills set and understanding of the participants within the local industry has improved in the areas of:

- Project development and management.
- Group dynamics and the adoption of tools that achieve outcomes and outputs from groups with minimal conflict between the participants.
- Nine possible projects from the “Vision Project” were identified. From these possible projects four were researched and developed further. Critical to this process were the skills learned in the workshops. Of particular use were the skills gained in forming a group consensus on the decision making process.
- Three high quality project presentations were delivered to the Tully Area Productivity Awards. The presentations included overviews of the research on the topics chosen, the group’s consensus after reviewing the information, and the subsequent recommendations from the group on industry wide profitability improvement in the topic areas. Copies of these presentations can be found in attachment 1.
- Cost of production data was collected for a sample of 37 Tully growers to feed into cost of production and margin analysis models.
- Recommendations from the cost of production group on a shift in industry focus from productivity to profitability have been adopted by the industry. Practical examples of this are the inclusion of an profitability (gross dollar returns less harvesting and levies) per hectare comparison on the farm productivity reports.
- Recommendations from the harvester feedtrain optimisation group were used in the application for SIIF funding to promote greater adoption of harvest best practice (HBP) feedtrain settings in the Tully area.

INTELLECTUAL PROPERTY (IP)

The project involved a process developed by Ian Plowman over which he holds IP rights through trademark and copyright laws. These processes were made available to project participants and subsequently the Tully Sugar Industry as part of Mr Plowman’s fee, payable to DPI&F, conditional that the intellectual property not be used for commercial purposes outside of this project.

ENVIRONMENTAL and SOCIAL IMPACTS

No detrimental environmental or social impacts were expected as a result of the project. The adoption of best practice farming methods is expected to improve sustainable and profitable environmental outcomes. This project promoted and provided recommendations to the industry on the application of best practice in the Tully area thus improving environmental outcomes.

Although hard to quantify the beneficial impacts of the skill set improvement of participants in the project will not only improve the decision making and management of the Tully Sugar Industry it will improve the wider community as the skills gained and implemented in the project are applicable to any situation where interaction on a group basis occurs or management of projects or decision making is required.

EXPECTED OUTCOMES

The objectives of the project were to build the skill set and capacity for project management, efficient group decision making, change, and learning of the participants and ultimately a larger base within the local industry. Direct cost benefit is hard to determine however skills gained and framework developed should enhance the success of the Tully Strategic Plan and associated productivity plan. The plans have measurable key performance indicators and achievement criteria.

Quantitative base line data was measured via a survey of participants prior to the workshops. The results of this survey are outlined in Table 1. Pre & post workshop evaluation. The post workshop survey allows evaluation of the learning process.

Table 1. Pre & Post-Workshop Evaluation.

On a scale of 0 (none at all) through 4 (some) to 7 (a great deal), please indicate whether your knowledge and skill in the areas below has increased as a result of your participation in this series of workshops and final presentation.

	Survey Questions	Pre	Post	Difference
1	Asking clear and unambiguous questions,	4.21	5.44	1.23
2	Describing the current situation accurately and clearly	4.46	5.22	0.76
3	Generating new ideas	4.50	5.22	0.72
4	Asking critical questions	4.25	5.67	1.42
5	Developing decisions by consensus	4.29	5.67	1.38
6	Development of shared action plans	3.92	5.56	1.64
7	Understanding of the management practices and processes used by growers to deliver best practices in the seven cane growing districts in Tully.	4.08	5.00	0.92
8	Being aware of your own behaviours during a meeting, and being able to manage those in a positive way.	4.04	5.44	1.40
9	Facilitating an efficient meeting where there is high ownership of the outcome.	3.46	4.67	1.21
10	Knowing the various phases of project management	3.25	5.11	1.86
11	Development of a Vision Statement	3.83	5.11	1.28
12	Developing a project plan	3.75	5.33	1.58
13	Building a responsibility matrix	3.13	4.89	1.77
14	Building a GANTT chart	1.63	4.89	3.27
15	Costing a project	4.17	5.22	1.05
16	Strategically planning a project	3.83	5.33	1.50
17	Managing project quality	4.00	5.00	1.00
18	Dealing with resistance to change	4.21	5.00	0.79
19	Managing critical stakeholders	3.58	4.67	1.09
20	Monitoring and evaluating your project	3.83	5.56	1.73
21	Selling your project to others though effective presentation.	3.88	5.78	1.91
Average Difference				1.40

Overall there was an average improvement 1.4 grades in the post workshop survey results. Areas of the highest impact (above average gain) were in the elements of project management. Here the average gain was 1.57 grades. The gain in the areas of group and meeting management was a more modest 1.19 grades. These results are reflected in the production of the high quality presentations delivered to the industry at the productivity awards. The lower score in meeting and group management may also explain the observation "There has been no evidence of a realisation of the skills gained in the project in an improved whole of system approach to industry direction and productivity improvement" as documented in the objectives section of this report.

FUTURE RESEARCH NEEDS

RECOMMENDATIONS

Frequent revision of the tools provided and skills learnt in the workshops will maximise the gains made from this project. It is recommended that each of the industry organizations provided training for staff to increase the skills set in group and project management. For staff that have completed the training a refresher or revision courses should be scheduled into work programs. Similarly leadership teams at the industry organization board and grower group level should also receive training and refreshers on skill development at predetermined intervals.

PUBLICATIONS

The project produced

- One milestone report
- Documentation on opportunities and implementation plans
- Presentations to the industry forum Tully Area Productivity Awards
- SRDC final report.



VALUE ADDING DIVERSIFICATION OPTIONS FOR THE TULLY CANE INDUSTRY

Group Members

- **Veronica Lizzio,**
- **Gary Dore,**
- **John Marsillio,**
- **Gerry Borgna,**
- **Nick Stipis**

Our thanks to the work done by the previous value adding committee and input from Barry Dun



WE DID NOT INVESTIGATE

- Co-generation of electricity
- Methane production from composting for co-generation
- Ethanol/ Bio-diesel/ diesohol
- Bio- technology CRC



WE ARE GOING TO TALK ABOUT

THE FOLLOWING RESEARCH

- Filler Products
- Pelletising mud ash adding NPK
- Insulation material from bagasse
- Particle board manufacturing
- Cow Candy
- Distillation

FILLER PRODUCTS

- **BAGASSE BUILDING BLOCKS**
- **INSULATION MATERIAL-BAGASSE AS A THERMAL INSULATOR**

Study by Paul Britton, E-Jen The, David Close – JCU
Townsville

RECOMMENDATION:

Has a very good promise of success, worth of investing \$ to secure IP for Tully sugar industry. Short to medium term promise.

PELLITIZED FERTILIZER FROM MUDS/DUNDER/ASH

- Sugar Research Institute- Preliminary study into a new granulated fertilizer product from mud and ash (A.G Hanrahan January 2004)

RESULTS:

- Good quality Mill Mud can be granulated.
- Ideal size of granules of 2.5mm size of 10% moisture
- Uneconomic because of high energy costs incurred in reducing mill mud from 80% moisture to 10%.
- These costs alone are substantially higher then economic gain from lowered transport costs and revenue from the sale of granulated mud/ash.

OUR GROUPS RECOMMENDATIONS

Investigate costs of pelletising mill mud/ ash and added NPK

Benefits :

- Possibly cheaper NPK fertiliser
- Storable 1 tonne bags
- Easily spread by contractor/ farmer
- Reduced compaction from trucks
- Ready local market cane/ bananas/ small crops
- Reduction of environmental effects

OTHER RESEARCH WORTH PURSUING

- Composting of mud and ash

COMPRESSED PARTICLE BOARDS

BACKGROUND

Mulgrave Mill, Particle board (PB) project 1999/2001

- Mill looked into viability of facility for production of particle board from bagasse and wood fibre – A joint venture with a NSW board manufacturer
- Small 40-50,000 cubic metre per annum factory utilizing 2nd hand manufacturing system imported from Europe
- Total capital investment budgeted – AU\$13million
- Approx. 20% return prediction
- Project not deemed viable for following reasons
 - No return on investment was anticipated for 18 months
 - Stockpiling is the industry norm (need to provide shelter/humidity protection)
 - Must compete with imports

NEW DEVELOPMENTS

- German Process replaces urea formaldehyde resins in particle board bonding enabling boards to be used for exterior walls/roofing/flooring – increasing market appeal
- Manufacture does not require sophisticated equipment – considerable savings

POSITIVES

- Cement bonded boards have significant termite and wood destroying fungi resistance
- Better storage capacity, lower insurance rates
- Huge untapped Asian market (post tsunami)
- Close to Asian market and shipping terminals

NEGATIVES

- Distance from Australian markets and competition from existing manufacturers

RECOMMENDATION

- Worth further investigation

Info from Commercial Agroforestry Production Systems Project (CAPS), January 2005.

STOCK FEED – COW CANDY



**Cows in
Korea
enjoying a
feed of Cow
Candy**

WHAT IS IT? A novel animal food product made entirely from sugar cane.

PROCESS: Super heated, steam drying, no waste technology

COST: AU\$1m working capital, AU\$6m plant cost, AU\$0.6m project development

POSITIVES :

- *Ethical Investment in niche market
- *Market established in Korea
- *High interest from Taiwan, Japan – possibly 150, 000 tonnes
- *Other possibilities – China, Middle East – opportunistic domestic sales
- *Actively promoted overseas, esp. in Asia by State Development
- *Tully – closer proximity to Asia and sea ports
- *Possible expansion of export cattle from Mourilyan Harbour – 100,000 head per year
- *Bales exported in containers

NEGATIVES

- *May take cane away from sugar/molasses/bagasse production
- *Prices may be dependent on AU\$
- *Storage facilities for stockpile need to be put in place

ADVANTAGES FOR TULLY

- *Factory infrastructure in place – electricity/heat/office/manufacturing base
- *Win/Win Grower/Miller
- *Employment
- *May be produced out of season

RECOMMENDATIONS

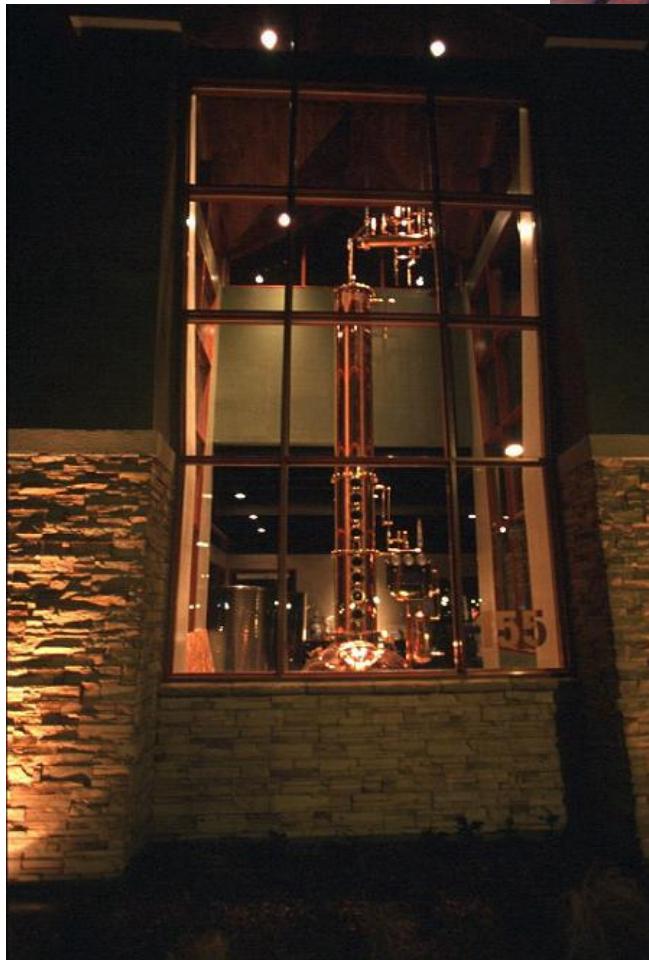
- *Look at licence agreement/joint venture/similar product
- *Go alone/sugar package/other funding
- *Can be implemented short term if investigations pan out

DISTILLERY



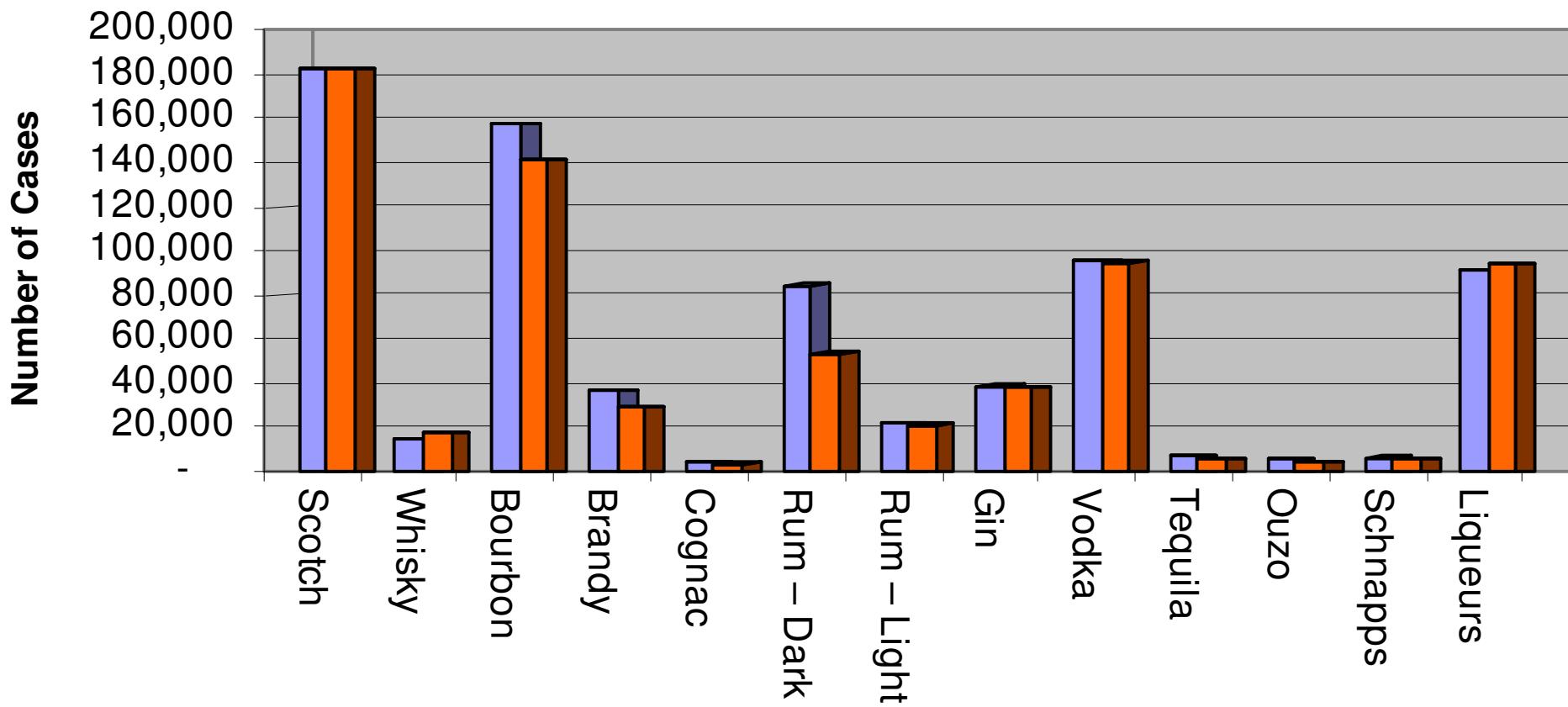
- SMALL SCALE BOUTIQUE
- NICHE MARKET PRODUCTS

BANYAN DISTILLERY COMPANY



Sales of Spirits (9 litre cases)

■ 2003 ■ 2004



Bottled Spirits down 7.3%

Source: Liquor Merchants Association of Australia

Pre – Mixed Drinks

Source: Liquor Merchants Association of Australia

Pre-Mixed (9L cases equiv.)	2003	%	2004	%
Scotch	183,923	7.2%	227,134	7.5%
Bourbon	984,527	38.7%	1,165,343	-38.5%
Brandy	3,096	0.1%	2,367	-0.1%
Rum	489,917	19.3%	691,136	22.8%
Gin	41,028	1.6%	35,555	-1.2%
Vodka	397,807	15.6%	398,536	-13.2%
Tequila	774	0.0%	-	0.0%
Ouzo	12,444	0.5%	12,408	-0.4%
Liqueurs	108,966	4.3%	109,290	-3.6%
Other Distilled	85,572	3.4%	120,641	4.0%
Other Fermented	236,487	9.3%	267,473	-8.8%
	2,544,541		3,029,883	
	Market Growth		19.1%	

Rum up 23%

Thank-you Barry Dun TSL

Pre-Mixed Drinks up 19%

DISTILLERY

- **POSITIVES**

- Improve sugar quality – ability to quarantine poorer quality cane to distillation process
- We have chemists and tradesman on site
- Centrally situated for a north Qld market
- Can be set up as a small scale plant and expand with the market
- Low cost set up
- Ability to increase employment prospects in the district
- Potential for tourism growth

- **NEGATIVES**

- Need to break into the market place
- High cost of marketing research and advertising
- Procuring rights to flavours/drink mixes

Recommendation

We recommend that a distillery be seriously looked at by the Tully sugar industry as a means of diversification and value adding to increase \$\$\$ to the district. A small farmers group has been established and research commenced. This may be a good place to start.

SUMMARY

Our groups recommendations for further action

Research Worth Funding

1. Pelletising with mud/ash adding NPK material
2. Insulation from bagasse

Projects that can be delivered short to medium term

- Particle board manufacturing
- Cow Candy
- Distillation

Questions

\$\$\$\$Investment Activity\$\$\$

Best Practice Harvest Management Group.

Group members:

Gwen Arcidiacono

Rino Cargnello

Rick Chappel

Sam Tirendi

Trent Stainaly

Best Practice Harvest Management Group.

- The aim of the group is to promote Best Practice Harvest Management.
- Best Practice Harvest Management is a broad topic. This group is focusing on the the adoption of BSES recommendations for harvester feedtrain optimisation.
- Harvester feedtrain optimisation is seen by the HBP group as the smallest part, easiest gain, and first step in the adoption of Harvesting Best Practise.

Presentation outline.

- **Review of BSES research information.**
- **Review of the current Tully Harvester Fleet performance.**
- **Options for the Tully Harvester Fleet.**
- **Recommendation from the group.**

Chopper Unit

Chopper Systems: Test Rig Results.

Auger Speed

Camera

- Losses increase as pour rate increases.
- Conservative harvesting rates and even feed reduce chopper losses.
- Mismatched tip speeds in the harvester feedtrain components increased billet damage and cane loss.
- The ratio of Chopper Tip Speed and Feedtrain Roller Tip Speed has a “SWEET SPOT” or OPTIMUM SETTING where damage to cane is minimised.

Source: Norris & Davis 2001

Chopper Systems: Test Rig Results.

Operating the feedtrain roller tip speeds outside of the “Sweet Spot” typically:

Increases chopper losses of juice and fibre from **2% to **7%**.**

- Increases billet damage.
- Gives a small reduction in billet length.
- Probably reduces chopper blade life.

Chopper Systems: Test Rig Results.

Even feedtrain tip speeds between rollers typically:

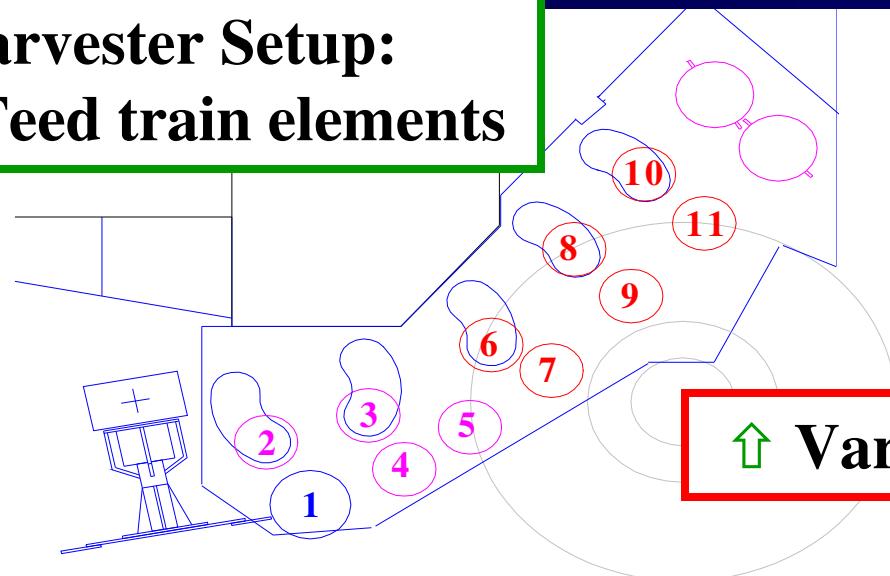
**Evens out the flow of cane through the harvester improving
cleaning and lowering damage to cane.**

Typical Harvester Setup: Limitations - Feed train elements

Demonstration:

- Feeding (uneven feed with varying roller tip speeds).
- Feedtrain roller and chopper tip speed match.
- Questions:

Typical Harvester Setup: Limitations - Feed train elements



Feed train elements

Buttlifter Roller 1 - 90 rpm

Feedtrain Rollers 2,3 - 145 rpm

Feedtrain Roller 4 - 90 rpm

Feed train rollers 6 -11

Roller speed 160-190 rpm

Billet length at the “**SWEET SPOT**” or **OPTIMUM SETTING** for various chopper configurations.

Chop Type	Metric (mm)		Imperial (inch)	
	Min	Max	Min	Max
4 x 15 (8 Blade)	192	212	7.6	8.3
3 x 15 (6 Blade)	255	282	10.1	11.1
3 x 12* (6 Blade)	204	227	8	8.9

*superseded design

What type of chopper system does your harvester have installed and what billet length is produced?

Source: James 2003

Chopper Testing: Results Summary.

BSES Recommendations:

- Even out the variation in feedtrain roller tip speeds to improve feeding and lower damage to cane.
 - Feedtrain roller tip speed should be 60% to 70% of chopper tip speed to minimise damage and losses in the chopping process.
-
- At optimum loss are typically 2% to 3%.
 - Losses increase (3%-7%) as the roller tip speed gets away from the optimum.

Tully Harvester Fleet Performance and Optimisation Stats:

- Tully harvester fleet feedtrain and chopper setup was surveyed in the 2004.
- BSES statistical analysis of grab sample cane quality data.
- Two groups of Harvesters identified by the survey:
 - ***Near Optimum and Optimum (13 machines) and Nonoptimum (16 machines).***

Thanks to TSL staff for collecting the survey data.

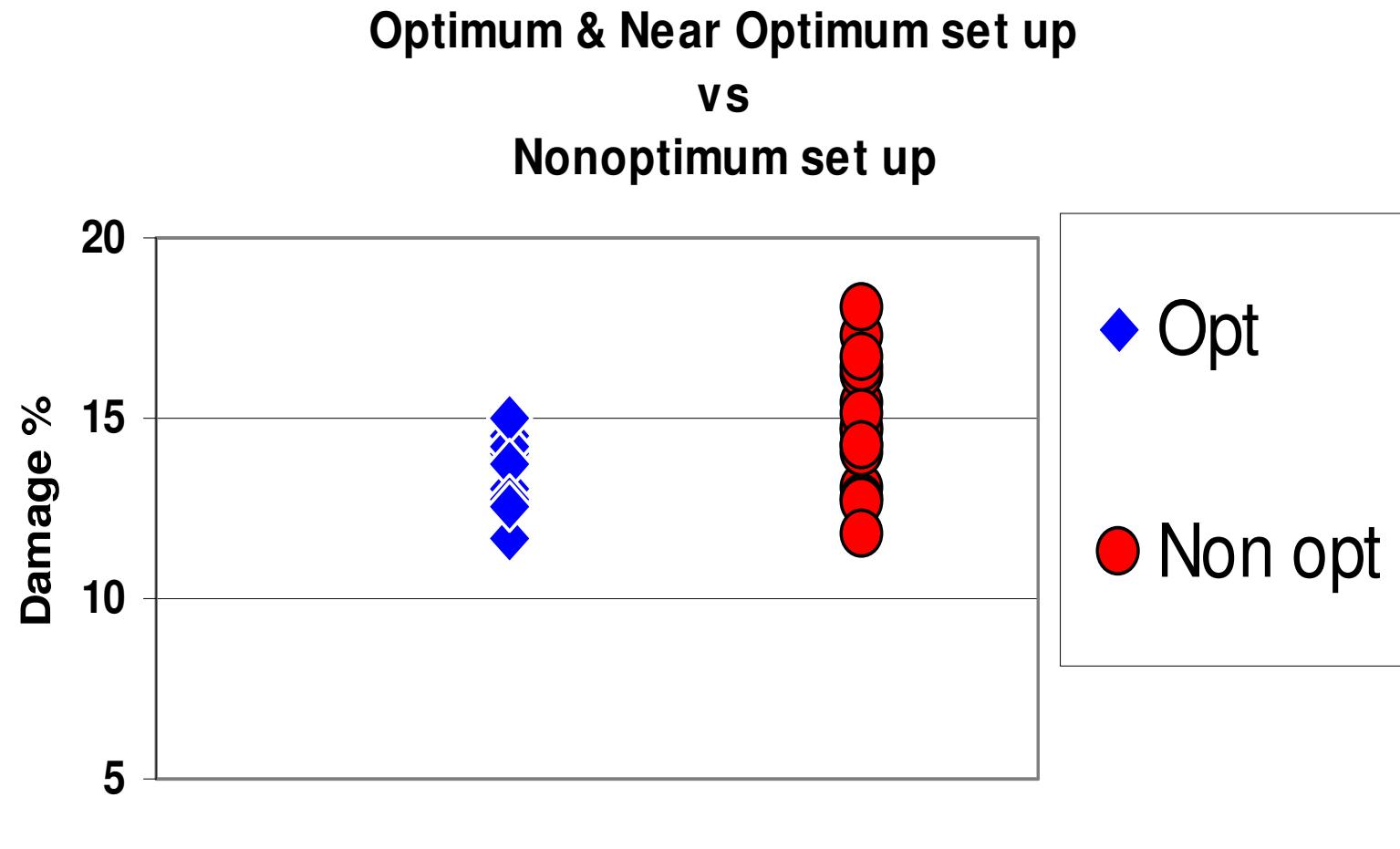
Tully Harvester Data Analysis:

The major trend identified in the 2004 harvester cane quality performance data was:

Harvesters that were operating at or near optimum feedtrain and chopper settings had, on average, 1.4% lower damage levels.

Thanks to BSES Limited for the statistical analysis

Tully Harvester Data Analysis:



Thanks to BSES Limited for the statistical analysis

Options for the Tully Harvester Fleet.

- Do you want to save 2% - 4% in cane loss?
- Do you want to improve billet quality?

If the answer is “Yes”

Optimise Now!

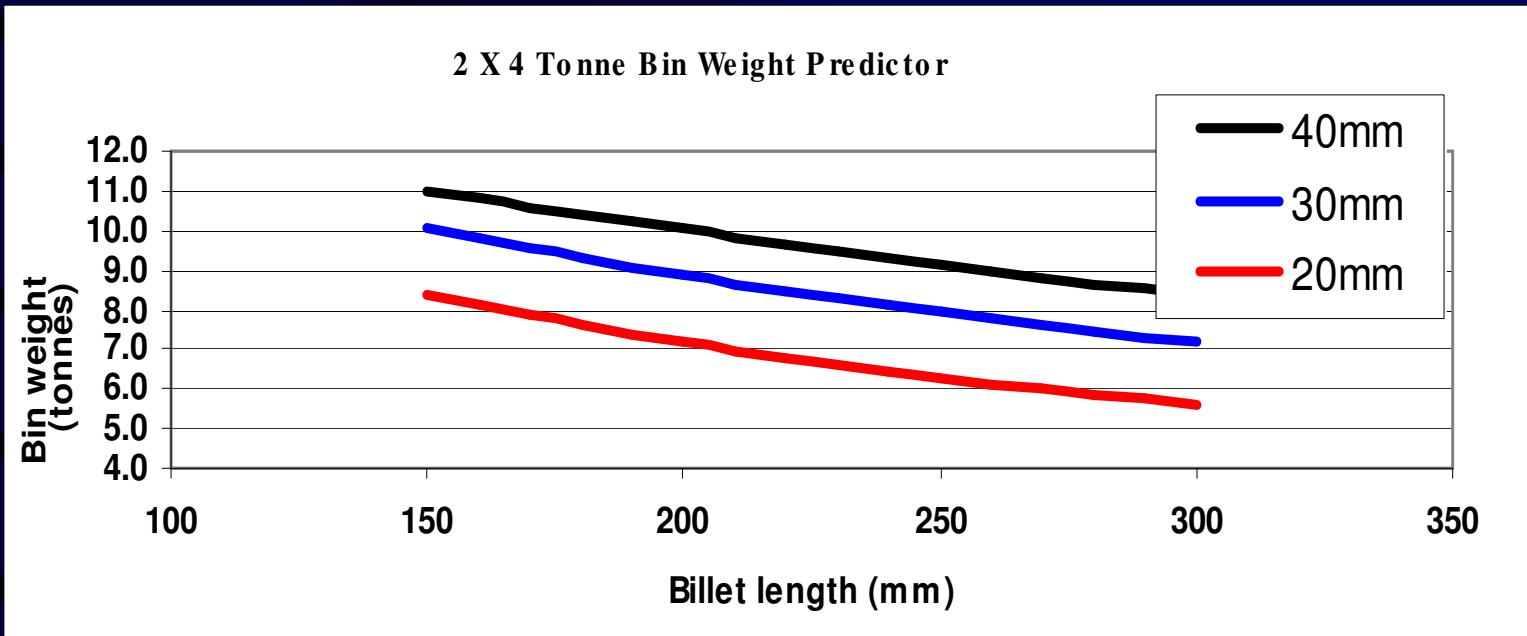
Options for the Tully Harvester Fleet.

What are the impacts of optimisation?

- Impacts on billet length.
- Balance the gains for industry and potential cost to harvesting, transport, and milling operations.

Chop Type	Metric (mm)		Imperial (inch)	
	Min	Max	Min	Max
4 x 15 (8 Blade)	192	212	7.6	8.3
3 x 15 (6 Blade)	255	282	10.1	11.1

Billet length & Bin Weight



If optimised the 15 harvesters with the 3 x 15 (6 Blade) chop configuration are estimated to produce 255mm Billet length

and a lower bin weight than current operation

This will have an effect on the efficiency of harvest, transport, and milling operations.

Source: Vitale & Domanti

Industry Gains & Costs

Calculations based on:

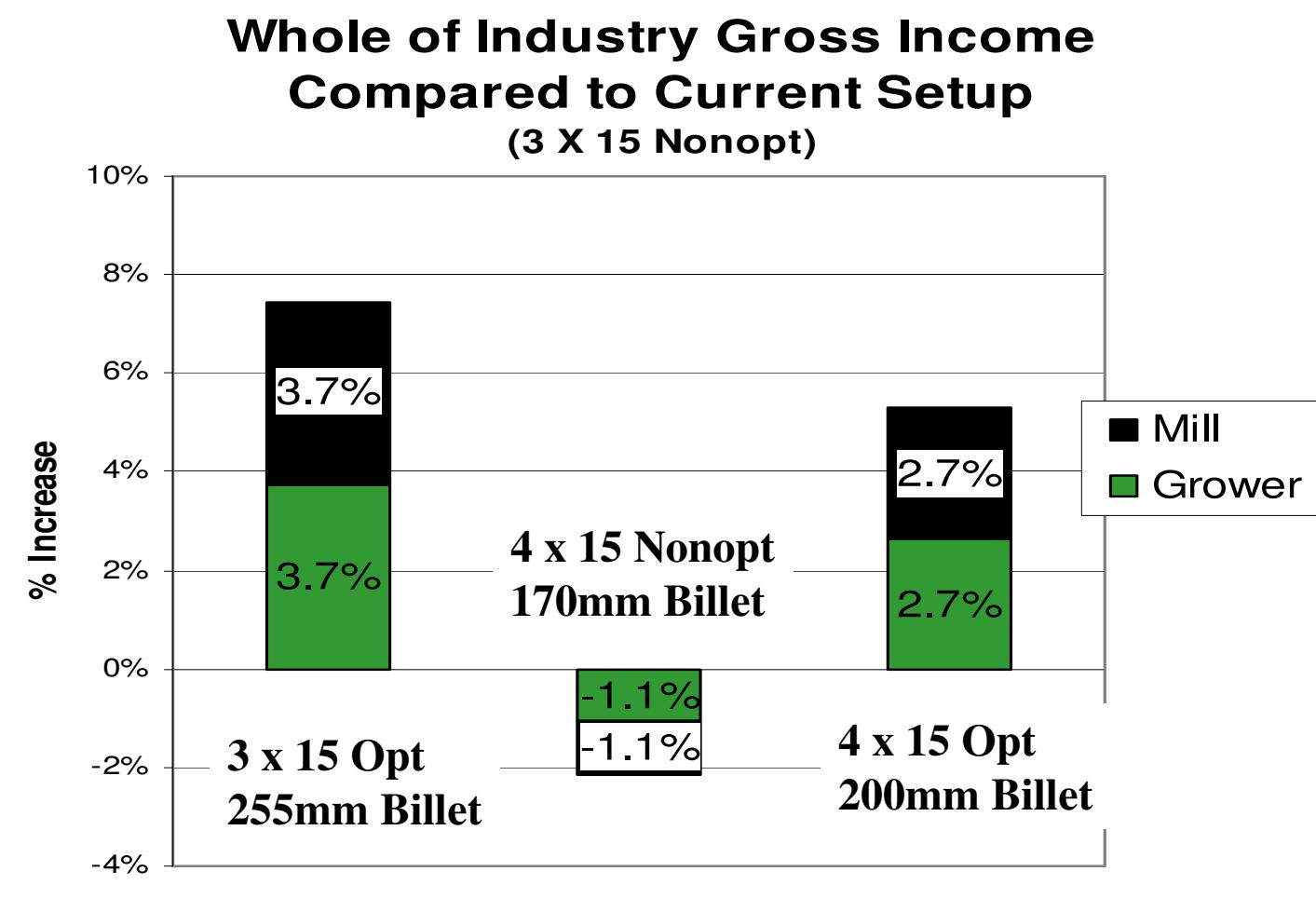
- Calculation based on “average group for Tully”
- Losses estimated from BSES chopper testing trials.
Nonoptimum losses estimated at 6 - 7% and optimum losses estimated at 2.5 - 3.5%
- No change in CCS with billet length.
(no published information available on billet length and the effects on CCS.)
- Harvesting set at not for profit (changes in harvesting cost pass onto growers).
- Harvest labor set @ \$1.90 / tonne.
- Estimated billet lengths from BSES trials & models.
- Bin Wt calculations based on Vitale & Dolmanti model.
- Mill cost - Difference in Seasonal and Slack labor.

Industry Gains & Costs

Calculations based on:

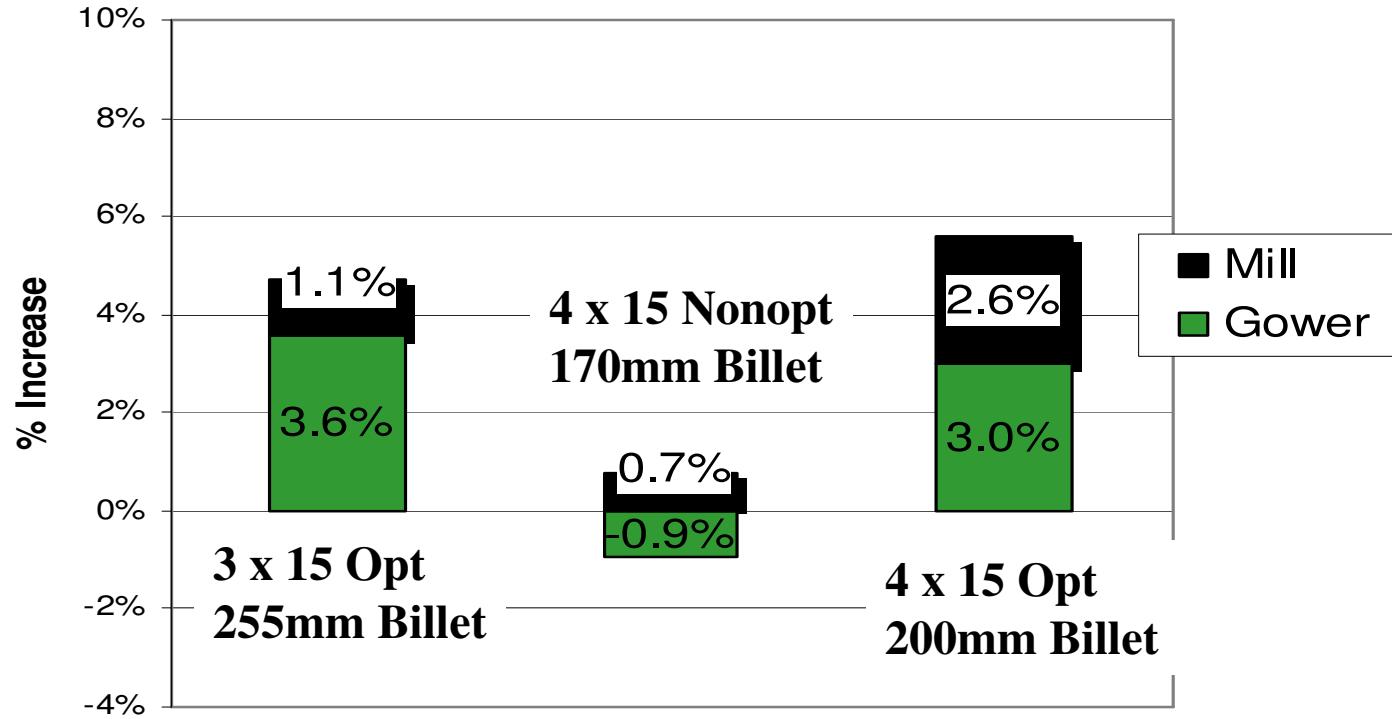
- Assumes all of the harvester fleet operating under the same configuration.
- Calculations based on 4 different scenarios:
- current operation of nonoptimum 3 x 15 (6 blade cutting 210mm billet)
- Optimum 3 x 15 (6 blade cutting 255mm billet)
- Nonoptimum 4 x 15 (8 blade cutting 170mm billet)
- Optimum 4 x 15 (8 blade cutting 200mm billet)
- All model outputs are expressed as a % change from the current operation – nonoptimum 3 x 15 (6 blade setup)

Industry Gains & Costs.



Industry Gains & Costs.

Whole of Industry Income Less Expenses Compared to Current Setup
(3 X 15 Nonopt)



Industry Gains & Costs Summary.

Model outputs:

- Gross industry income is improved by the reduction in chopper losses realised by optimisation.
- Selecting an optimised harvester set up that produces a 200mm billet provides the highest whole of industry returns by managing harvesting, transport, and milling costs.
- The model estimates an increase in harvester crew day length when cutting 255mm billets.
- Better costs for milling and transport would improve model accuracy.
- The model is very sensitive to changes in bin weight, mill crush rate, and harvest costs incurred on an hourly basis such as wear & tear and fuel (labor).

HBP Group Recommendations

- Optimise all harvesters it is an easy 3% - 4% yield increase.
- Disable, Dispose, Disconnect, Destroy, the Billet Length Control to reduce the temptation to operate at suboptimum settings.
- 4 x 15 chop configuration for a target 200 mm billet to maintain harvest and transport efficiency.
- Changes in harvest operations or grower – harvester – mill payment systems will alter recommendations. Detailed cost benefit analysis should be carried out before any adjustments to the system.

(the model can be improved)

Murray Harvesting Testimonial

- Old set up
- New set up
- Approximate cost
- Comments good & bad points



Presentation Summary.

- **Review of BSES research information.**
- **Review of the current Tully Harvester Fleet performance.**
- **Recommendation from the group.**

End of Presentation

Questions