2007

Final report - SRDC project BSS287: Enhancing grower groups in the Australian Sugar Industry

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CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUMMARY</td>
<td>i</td>
</tr>
<tr>
<td>1.0 INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2.0 OBJECTIVES</td>
<td>1</td>
</tr>
<tr>
<td>3.0 METHODOLOGY</td>
<td>2</td>
</tr>
<tr>
<td>4.0 GROWER GROUPS IN OTHER INDUSTRIES</td>
<td>2</td>
</tr>
<tr>
<td>5.0 GROUP STRUCTURE AND PLANNING</td>
<td>3</td>
</tr>
<tr>
<td>5.1 Group structure</td>
<td>3</td>
</tr>
<tr>
<td>5.2 Planning</td>
<td>6</td>
</tr>
<tr>
<td>5.3 Group dynamics</td>
<td>6</td>
</tr>
<tr>
<td>5.4 Outside recognition</td>
<td>7</td>
</tr>
<tr>
<td>6.0 SOURCING FUNDS</td>
<td>8</td>
</tr>
<tr>
<td>6.1 General funds</td>
<td>8</td>
</tr>
<tr>
<td>6.2 Project-specific funds</td>
<td>9</td>
</tr>
<tr>
<td>6.3 Collaborative funding</td>
<td>9</td>
</tr>
<tr>
<td>7.0 RESULTS OF PARTICIPATIVE R&amp;D</td>
<td>10</td>
</tr>
<tr>
<td>7.1 Sugarcane varieties relevant to the new farming system</td>
<td>10</td>
</tr>
<tr>
<td>7.2 Fallow management</td>
<td>13</td>
</tr>
<tr>
<td>7.3 Herbicides</td>
<td>15</td>
</tr>
<tr>
<td>7.4 Harvesting</td>
<td>15</td>
</tr>
<tr>
<td>7.5 Planting</td>
<td>17</td>
</tr>
<tr>
<td>8.0 CHANGE IN KNOWLEDGE, ATTITUDE AND PRACTICES</td>
<td>18</td>
</tr>
<tr>
<td>8.1 Initial benchmarking</td>
<td>18</td>
</tr>
<tr>
<td>8.2 Productivity performance</td>
<td>23</td>
</tr>
<tr>
<td>8.2.1 2005-season data</td>
<td>23</td>
</tr>
<tr>
<td>8.2.2 2006-season data</td>
<td>25</td>
</tr>
</tbody>
</table>
SUMMARY

Self-directed and self-funded grower groups in other Australian agricultural industries have demonstrated that participative R&D and action-learning processes can deliver knowledge, attitude and practice change at faster rates than conventional extension methods. Australian sugar-industry productivity groups have been slow to adopt these processes and concepts.

The project aimed to establish and assist a pilot grower group that could demonstrate and communicate to the broader industry the issues and benefits of participative R&D, action learning, and group incorporation and self-funding.

The project was successful in that:

- Plane Creek Sustainable Farmers Inc was established and focused on productivity improvements in the Sarina district. The group structure and focus were influenced by similar groups in other industries and districts.
- The group publicised their activities and produced an information sheet to guide the formation of other grower groups.
- The group established a range of field R&D activities to help improve productivity.
- The group demonstrated that participative R&D combined with action learning can deliver productivity, profitability and sustainability outcomes.
- However, the project demonstrated that long-term commitment and focus are difficult to maintain and delivery of proposed outcomes is difficult without a strong ‘driver’.
1.0 INTRODUCTION

The Australian sugar industry is threatened by declining productivity and economic sustainability. To address this, growers must adopt all relevant best-management practices (BMPs) to ensure continued viability. Self-directed and self-funded grower groups in other Australian agricultural industries have demonstrated that these participative R&D and action-learning processes can deliver knowledge, attitude and practice change at faster rates than conventional extension methods. Australian sugar-industry productivity groups have been slow to adopt these processes and concepts.

Conventional group-extension processes involve information exchange with some limited action learning. The main barriers to groups engaging in significant participative R&D and action learning (identified by Central productivity groups) are the costs of such activities and the groups’ uncertainty on how to undertake meaningful and measurable R&D. This is why the industry pressed for the formation of the Bureau of Sugar Experiment Stations at the beginning of the 1900s.

Two proactive grower groups in the Central region identified incorporation, self-directed R&D and action learning as means to deliver rapidly R&D outcomes that address their specific profitability, productivity and sustainability issues. Local agribusiness expressed significant interest in supporting such initiatives.

2.0 OBJECTIVES

The project aimed to establish and assist a pilot grower group that could demonstrate and communicate to the broader industry the issues and benefits of participative R&D, action learning, and group incorporation and self-funding.

Specific objectives were to:
- Investigate and document the options for grower groups to become a registered entity or incorporated body and communicate the outcomes of this investigation to the broader industry;
- Establish the first incorporated ‘productivity’-focused grower group in the Australian sugar industry;
- Build the pilot group’s capacity to source and manage on-going funding for the group;
- Build the pilot group’s capacity to undertake R&D activities that will deliver local productivity, profitability and sustainability outcomes;
- Investigate how incorporated productivity groups in other industries function and deliver local productivity, profitability and sustainability outcomes;
- Demonstrate to the Australian sugar industry how participative R&D combined with action learning can deliver greater productivity, profitability and sustainability outcomes in shorter periods than current sugar-industry extension tools.
The project was successful in that:

- Plane Creek Sustainable Farmers Inc was established and focused on productivity improvements in the Sarina district. The group structure and focus were influenced by similar groups in other industries and districts.
- The group publicised their activities and produced an information sheet to guide the formation of other grower groups.
- The group established a range of field R&D activities to help improve productivity.
- The group demonstrated that participative R&D combined with action learning can deliver productivity, profitability and sustainability outcomes.
- However, the project demonstrated that long-term commitment and focus are difficult to maintain and delivery of proposed outcomes is difficult without a strong ‘driver’.

3.0 METHODOLOGY

The project sought to achieve a partnership between about 20 innovative growers who were members of the Sarina Sustainable Farmers group, BSES Limited, Proserpine Cane Productivity Service Limited (PCPSL), CSR Sugar and local agribusiness. The project linked closely with BSS269 A New Cropping System for the Central District, BSS286 Improved Sugarcane Farming Systems, outcomes of the Sugar Yield Decline Joint Venture, and other industry and government initiatives.

The proposed approach for the project was to:
1. Have interested growers identify options for group structure and registration/incorporation;
2. Investigate how incorporated grower groups operate in other industries;
3. Establish a pilot group;
4. Have the grower group undertake participative R&D in conjunction with BSES, PCPSL and any other provider the group chooses to engage (utilising SRDC and grower funds);
5. Collate and analyse with the group outcomes from each year of the project;
6. Evaluate the process to assess change in knowledge, attitude and practices and in the economic and productivity impact of the practice changes;
7. Investigate options for on-going funding of the group’s R&D resources and source appropriate funding;
8. Communicate outcomes to the Australian sugar industry.

4.0 GROWER GROUPS IN OTHER INDUSTRIES

Members of the group attended the Birchip Cropping Group information workshop hosted by the ABC group. This provided valuable information for the formation and on-going activities of the group.

Some members of the group undertook a study tour of the MAD Cane Planting group in NSW to see how this group have addressed the problems of forming consistent beds in
fallow and blocks that still have trash. This provided input to the design of the R&D program.

Several group members travelled to Dalby and Gatton to examine soybean-planting equipment options. This provided input to the design of the R&D program.

Six group members travelled to NSW and Bundaberg (under a SRDC GGIP) investigating relevant options for managing traffic during conversion to controlled-traffic farming systems. Many ideas were canvassed, including some radical ideas that could be pursued in the future. A report on this trip and investigations to date was prepared for circulation. Powered paddle rollers are considered the most suitable option for wheeled harvesters. Four rollers of two different diameters have been constructed for the group by Hodge. One of each has been lagged and field-tested for performance on a harvester. A flow divider valve has been fitted to allow optimum speed of operation to be determined.

Members of the North Coast Grower Group visited the group to discuss options for extending harvester elevators.

5.0 GROUP STRUCTURE AND PLANNING

5.1 Group structure


In 2005, a meeting was held with a business support officer from the Mackay Area Consultative Committee (ACC) to discuss business structures and the support the ACC may be able to give establishing grower groups. A solicitor (David Wright from Wright, Wright and Condie) was interviewed and subsequently engaged to summarise the advantages and disadvantages of each incorporation option for the members’ consideration. Another source of information was from group members themselves – many members have established companies and co-operatives for their own businesses. They were able to provide insights into establishment and maintenance costs, benefits and pitfalls.

Eleven group members met in late September 2005 to consider the information previously gathered on incorporated group structures. Discussion of the pros and cons of each option occurred, with discussion of each option led by a different group member.

Discussion points were:
- the group was concerned to have an enduring structure, but one that could not have the objectives of the association easily hijacked by people with non-aligned views;
- the group wished to have a structure that could easily allow more members to join and participate;
time was spent debating whether the group should be non-profit. The major sticking point was the distribution of assets of the association should it wind up. The thought was that where the group had worked hard to develop machinery, etc, used for trial and demonstration purposes, they were not keen to see it wasted. Two factors that heavily influenced the final agreed decision to proceed with a non-profit organisation were, firstly, that the group believed it has a successful long-term future ahead of it and, secondly, that discussions the treasurer had had with potential sponsors indicated that they were more willing to support a not-for-profit organisation.

The previous unincorporated group was known as the Sarina Sustainable Farmers Group. Discussions regarding the name to be applied for the incorporated group centred around retaining the word sustainable in the title, but opening up the name, to help attract more members and to be more relevant to a wider grower audience. The preferred name applied for was Plane Creek Sustainable Farmers Inc. An application for incorporation as a non-profit association was completed and lodged with the Office of Fair Trading. The Certificate of Incorporation is given in Figure 1. Following receipt of the Certificate of Incorporation, the group subsequently applied for an Australian Business Number (56 009 877 443) and developed a Strategic Plan (Appendix 1).
Members decided upon the formation of a management committee to manage the day-to-day operations of the group, complete relevant paperwork, manage membership and accounts. The management committee consists of the President, Treasurer, Secretary and one other member. A team approach is to be used for R&D activities. A small team of members will be responsible for the successful undertaking of each activity in the R&D plan. Group meetings are to be held quarterly and an established email list is utilised to keep members up to date between meetings.

The following group members initially agreed to undertake the duties associated with the management of the group:

President:   Alan Pedersen  
Treasurer:   Bryan Baker  
Secretary:   Robert Sluggett  
Management Committee: Rick Garnham.

The current management group (from www.pcsf.com.au, 19 December 2007) is:

President:   Neil Walpole  
Treasurer:   Robert Sluggett  
Secretary:   Chris Aylward  
Management Committee: Rick Garnham and Bryan Baker.

The group elected to adopt the model rules, as provided by the Office of Fair Trading. There is only one class of member – Ordinary. To be eligible for membership, a person must have a vested interest in the sugar industry and support the vision and mission statements of the group. Membership fees are $10 per member or $20 per farming enterprise. The group agreed on a low nominal membership fee so that it would not be a barrier to new members entering the group.

Vision - To enhance a profitable and sustainable local sugar industry, that is able to support our families and the local community.

Mission Statement - To foster the development and enhanced adoption of improved and sustainable farming systems for the sugar industry.

Group objectives:
- Develop and promote controlled-traffic farming practices;
- Identify and develop solutions to obstacles restricting the productivity of controlled-traffic farming in sugarcane;
- Reduce environmental impact;
- Promote positive environmental stewardship;
- Promote the objectives of the group to the wider industry and community;
- Be an active participant in industry productivity forums;
- Build group members professional development and skills base;
- Develop positive working relationships with other grower groups, industry research and development organisations, input suppliers and support industry participants.

The process of incorporation was made available to industry groups through a BSES Information Sheet Incorporating Grower Groups (Appendix 6).
5.2 Planning

The group developed a Research and Development Plan at the group’s strategic planning workshop in late 2005. The plan (Appendix 2) included some on-going activities of the group and new priority work. The draft plan was provided to commercial partners when negotiating sponsorship arrangements.

The R&D plan was revised in January 2006 (Appendix 3). There were no major modifications to the plan the group had set in 2005, and the priorities for the group had not changed substantially. Alterations came about as a result of the experiences gained by the group in undertaking the activities in the plan up until this point. For example, one low-priority trial was dropped, trial procedures were reshaped for two trials, and some work that was anticipated to have been completed was not due to weather constraints, so it was carried forward.

5.3 Group dynamics

The group has operated each trial or activity on a ‘teams’ basis. The teams are made up of growers who are particularly interested in the issue being examined. Every group member is involved in at least one trial team. Each team plans, conducts and evaluates the trial/s for which they are responsible. The teams liaise with relevant external participants, eg Hodge Industries, Landmark, EHS Engineering or BSES staff, for input, assistance and monitoring of the work (Figure 2). This process is working well, as growers are taking more responsibility for their team’s efforts and reaping the rewards. Progress of activities is reported back to the group meetings (Figure 3).

Figure 2 Landmark representatives John Turner (L) and Don Searle (R) assess the effectiveness of a herbicide treatment with group member Kevin Borg
Capabilities and skills of individuals are enhanced by this process. Grower are involved in critical thinking, debate, presentation of ideas, learning to prepare and deliver presentations such as with Microsoft PowerPoint, interacting with others and allocating resources to issues.

Over the course of the project, group members have come a long way in understanding of the issues involved in planning, organising, conducting, assessing and reporting on trials. These experiences are only gained from actively participating and undertaking the work themselves. The learning experiences have noticeably increased the growers’ understanding and appreciation of trial work. Growers have taken pride in their achievements, which is evident in their presentations and discussions of their team’s activities back to the main group.

5.4 Outside recognition

The group was named regional winners in the 2005 and joint winners in the 2006 SRDC Excellence in Grower Group Awards (Figure 4).
6.0 SOURCING FUNDS

6.1 General funds

Early in the project, the group undertook negotiations with a number of potential commercial partners. These discussions highlighted the ready support that businesses are willing to provide to a grower group. Many businesses see grower groups as a new, unique way for them to be more beneficially involved with their clients and the industry. The discussions resulted in a number of partnership arrangements with groups such as Landmark, DuPont, CSR Distilleries, Brown and Bird Accountants, Hodge Industries, CSR Sugar and Independent Agricultural Resource. These arrangements vary to suit the needs of Plane Creek Sustainable Farmers Inc. (PCSF Inc) and the commercial partner. Arrangements vary from direct cash sponsorship, to provision of goods and services at no cost or reduced price, donated goods and provision of the time of skilled staff.

PCSF Inc has received more than $11,000 from direct sponsorship from two businesses and over $3200 in materials and agricultural supplies from three other companies.

The group quickly found that sourcing funding was not the largest challenge – managing the sources and funding to ensure long-term beneficial relationships was more difficult. Sponsors inevitably would like to see some return for their sponsorship ‘investment’. To ensuring that relationships and communication between the group and the sponsors were maintained at a high level, the group appointed one of the growers as a ‘sponsor relationship manager’. This group-member’s role is to ensure regular communication with sponsors and partners, and consideration of how the group’s work can be
communicated to or involve the sponsors and partners. The group was conscious not to attract too much sponsorship and make too many promises that are difficult to deliver. As more grower groups become incorporated and seek sponsorship and funding, that funding will be more difficult to secure and demands made by sponsors in exchange for sponsorship will be greater.

A good working relationship was established with an agricultural implement manufacturing company. Group members do product testing and feed ideas back to the company, and the company provides cash sponsorship and reduced rates for building equipment and parts the group requires for trial work.

### 6.2 Project-specific funds

PSCF Inc also received funding for an SRDC Grower Group Innovation Project (GGP008 - *Overcoming barriers to controlled traffic adoption - Managing traffic during conversion to controlled traffic farming systems*). This project started on 1 July 2005 and was due to be completed on 1 May 2007. The report has not been posted on the SRDC website (http://www.srdc.gov.au/ProjectReports/ViewReports.aspx?ProjectNo=GGP008) as at 19 December 2007.

The project aimed to develop solutions to filling cane bins adequately on wider row spacings and keeping harvesting traffic centred to reduce compaction. Many options have been examined and a powered roller has been developed as the most effective, widely applicable solution. PSCF Inc harvester team has made some unique modifications to the elevator, incorporating the powered roller for field testing. Preliminary testing has been very positive.

Demand for information on the powered rollers has come from far and wide - Mossman to NSW, even Argentinean visitors were very interested. This wide interest highlights the ability of grower groups to identify issues that are highly relevant to them.

### 6.3 Collaborative funding

PSCF Inc has collaborated with Coutts J & R Pty Ltd and Roberts Evaluation Pty Ltd in SRDC-funded project REL001 *Building grower capacity in steps*. This project aimed to help identify and map changes in the characteristics and capabilities of the Plane Creek Sustainable Farmers group and develop a model for other grower groups that outlines capabilities and skills needed and likely barriers that will be encountered. The professional assistance and interaction available from the staff undertaking this project was seen as very valuable by the group and should allow a much more detailed and comprehensive evaluation of the group’s progress and development.

Specific objectives were to:
- Identify the particular higher order capacities and aptitudes that farmer groups need to accomplish their objectives;
- Build the capacity of the PCSF grower group in areas such as working in groups, project management, evaluation, science research and presentation of findings;
• Ascertain the issues, barriers and strengths present in the group chosen and the steps needed to increase the required capacity or capacities;
• Isolate the critical points of change or transformation that are required to bring about the necessary increase in capacity;
• Generalise the results of the research and to develop a model for farmer groups that sets out a hierarchy of capacities and skills needed, the likely barriers encountered and to suggest ways to overcome these.

Findings from this project are detailed in section 10.0.

7.0 RESULTS OF PARTICIPATIVE R&D

Numerous R&D activities were commenced under the group’s R&D plan (Appendices 2 and 3). Most of the trials that the group carried out were designed by the BSES Limited extension officer for the Plane Creek area. In most of the trials, the growers undertook to look after the monitoring and the collection of the results. However, as detailed below, the results for some trials have not been made available to BSES, despite considerable efforts through contacts with growers and with the group Secretary and Treasurer, and they have not been posted on the PCSF website (19 December 2007). This is obviously a feature associated with changing priorities amongst individual growers and an incomplete understanding of the scientific method.

The trials are summarised below.

7.1 Sugarcane varieties relevant to the new farming system

Trial 1: Replicated variety trial

**Aim:**
1. Identify best-performing varieties for dual-row planting configurations.
2. Identify variety characteristics most suited to dual row, e.g. tiller number, thickness, etc.
3. Compare performance of selected varieties as single and dual rows on 1.83 m centres.

**Design:** Randomised complete block, 4 rows by 10 m, 2 replications

**Location:** Smith Brothers farm, Ilbilbie.

**Soil:** Site EC mapped by Independent Agricultural Resources. Trial located on a Gillinbin soloth soil type.

**Configuration:**
Planted 500 mm dual rows on 1.83 m centres.
33 commercial, promising and early stage clones planted in dual-row configuration. 7 of the commercial clones repeated as single row.

**Data collection:** Plant population, stalk death, crop water use, yield and CCS.

**Time:** September 2003 to December 2007

**Trial Partner:** BSES Limited
Results:
Except for Q205, all varieties had higher cane yields in the dual rows than in the single rows (Figure 5). On average, over each of the plant, first- and second-ratoon crops, the dual rows yielded 99 t/ha compared to 94 t/ha produced by the single rows.

Except for Q205, each of the varieties in the single rows had a higher CCS than in the dual rows (Figure 6). On average, over the plant, first- and second-ratoon crops, the single rows had a CCS of 16.14 compared to 15.93 produced by the dual rows.

Five of the seven varieties produced higher sugar yields in the dual rows than in the single rows (Figure 7). On average, over the plant, first- and second-ratoon crops, the dual rows had an average sugar yield of 15.76 t/ha compared to the single-row yield of 15.18 t/ha.

Figure 5  Cane yield (t/ha) in the replicated variety trial

Figure 6  CCS in the replicated variety trial
Trial 2: CCS observation trial  
Aim: Compare commercial CCS of new clones. 
Design: Unreplicated strip trial. 
Location: Bryan & Karen Baker’s farm, Sarina. 
Soil: Alluvial soil. 
Varieties: Q209, Q208, Q207, Q135. 
Data collection: Yield and CCS. 
Results: The grower was contacted several times by e-mail, phone and in person for the results of this trial, but none were made available.

Trial 3: YDJV variety trial  
Aim: Identify variety characteristics most suited to dual row, e.g. tiller number, thickness, erectness, etc 
Design: Split block, four rows by 19 m, three replications. Dual-row and single-row paired plots planted side by side. 
Location: Smith Brothers farm, Ilbilbie. 
Soil: Site EC mapped by Independent Agricultural Resources. Trial located on a Gillinbin soloth soil type. 
Data collection: Crop water use, biomass, plant populations, yield and CCS. 
Trial Partner: SYDJV. 
Results: The grower was contacted several times for the results of the above trial, but none was made available.
7.2 Fallow management

Trial 4: Development of a new soybean planter
Issue: Current BSES planter can only plant two rows per bed and has difficulty planting through trash on soft ground and freshly formed beds.
Aim: Build a planter that can plant three rows of break crop per bed, into worked ground or through trash cover.
Design: Three-row units, parallelogram, folding wings for transport.
Partners: Hodge Industries, BSES.
Results: This project is ongoing within the group. Some of the group members have been around the district and to other industries to look at different planters that are available. The biggest problem that they have encountered is that most planters that are commercially available do not have the ability to cut through trash and place the seed at the appropriate depth. Hence, this project is going to be an ongoing activity for some of the members of the group.

Trial 5: Improved bed forming
Issue: Uneven bed height causes variation in planting depth, potentially resulting in poor germination and stool tipping. In addition, renovating beds following a wet harvest is seen as an important issue. Different machines are currently used for forming beds from hill-up type boards to rearranged ratooning discs. None of the current equipment used builds consistent beds across a wide range of soil types and where residual trash is present.
Aims:
1. Follow up communications MAD Cane Planting group in NSW, who have the GGIP project ‘Accurate and consistent bed forming to promote better farming practices’.
2. Build a bed former effective under a wide range of conditions.
3. Develop guidelines for effective bed renovation following a wet harvest.
Activity: Compare performance of existing bed formers in trash and non-trash conditions. Share experiences with MAD Cane Planting group. Evaluate and develop improved bed former. Evaluate different methods of bed renovation.
Partners: Hodge, BSES Engineering.
Results: Some members of the group undertook a study tour of the MAD Cane Planting group in NSW to see how this group have addressed the problems of forming consistent beds in fallow and blocks that still have trash.

Doug Pederson has developed a bed former that does give uniform bed shape and size across the block, but there has been no planting done into these beds at the present. There will be cane planted into these beds this season, and the group will evaluate whether the beds that have been developed by will be suitable for planting cane with a double disc open planter.

The following photographs are of the bed former that was developed and the beds that have been developed with the bed former.
Trial 6: Sprayout of sugarcane in soybeans

Issue: In seasons where the sugarcane harvest extends into December, often the ideal soybean-planting window is passed by the time sugarcane ratoons are large enough for successful glyphosate sprayout. There is a need to investigate alternative herbicides to kill sugarcane ratoons in the soybean crop.

Aim: Identify suitable herbicides for control of sugarcane ratoons in soybeans.

Trial: Strip trials of various herbicide options.

Data Collection: Efficacy on sugarcane ratoons and weeds, phytotoxicity on soybeans.


Partners: Landmark, DuPont, Bayer CropScience.

Results: No data was received from the group. This work has been completed by the group.
Trial 7: Cover crops
Issue: Freshly formed beds are prone to soil erosion prior to break crop establishment. This soil may be deposited in the furrow, reducing the effective bed height and therefore affecting planting depth or it may leave the farm in runoff water, which is not acceptable environmentally. In addition, rainfall infiltration may be poor on unprotected surface sealing soils.
Aim: Identify suitable cover crops to protect beds from erosion and improve infiltration.
Trials: Trial using small plots of a range of potential cover crop species. Evaluate for ease and speed of establishment, effectiveness of protecting soil, potential for weediness, ease of control with glyphosate, ease of planting through with break crop planter.
Partners: Landmark, DuPont.
Results: This trial work has apparently been completed, but no data has been received.

7.3 Herbicides

Trial 8: Soybean sprayout
Issue: Soybean sprayout tank mixtures have not been 100% successful and reliable to date for control of soybean plants or associated weeds such as siratro or volunteer sugarcane. Rapid sprayout is required to prevent excess loss of soil mixture.
Trials: Strip trial alternative tank mixtures for soybean sprayout.
Data Collection: Efficacy on soybeans and weeds.
Partners: Landmark, DuPont.
Results: This trial work has apparently been completed, but no data has been received.

Trial 9: Control of glyphosate-tolerant weeds
Issue: Glyphosate-tolerant broadleaf weeds (including leucas, thickhead, crotalaria, blackberry nightshade, etc) are becoming dominant species in reduced tillage farming situations where glyphosate has become a frequently used knockdown herbicide. Glyphosate is anticipated to remain an important tank mix partner, due to its effectiveness in controlling problem weeds such as couch, nutgrass and volunteer cane.
Trials: Strip trials of glyphosate tank partners and other potentially suitable herbicides or weed control strategies.
Data Collection: Efficacy of herbicides or other control measures, species controlled, cost.
Partners: Landmark, DuPont, other chemical companies.
Results: This trial work has apparently been completed, but no data has been received.

7.4 Harvesting

Trial 10: Overcoming barriers to controlled-traffic adoption – managing traffic during conversion to controlled-traffic farming systems. SRDC GGIP
Issue: Present solutions to keeping harvesting traffic centred on wider row spacings while adequately filling cane bins are not effective, due to unsuitable harvester elevator
design, which results in a larger proportion of the field area being compacted, defeating the purpose of controlled traffic farming.

**Project Plan:** Review previous activities, travel to Bundaberg and New South Wales to examine cane-conveying systems. Assist SYDJV team to develop and field test prototype elevator paddle designs and other modifications. Review field trial results. Build commercial prototypes. Field test 2006 harvest. Results to industry.

**Time:** August 2005 to July 2007.

**Partners:** SRDC GGIP, SYDJV, McDonald and Murphy Machinery, EHS Engineering

**Results:**
Six group members travelled to NSW and Bundaberg (under a SRDC GGIP) investigating relevant options for managing traffic during conversion to controlled-traffic farming systems. Many ideas were canvassed, including some radical ideas that will be pursued in the future. Powered paddle rollers are considered the most suitable option for wheeled harvesters. Four rollers of two different diameters have been constructed for the group by Hodge. One of each has been logged and field-tested for performance on a harvester. A flow divider valve has been fitted to allow optimum speed of operation to be determined.

The group have tried paddles and conveyer extensions on harvesters over the last couple of years, and, as in previous reports, the group had done considerable work on paddles for the elevator.

A couple of the growers in the group made modifications to the elevator to suit the conveyer system, as the following photos show. With this system, the growers have found that they can move from the 1.5 m system to the 1.8 m dual-row system without any difficulty.

The works on these modifications are on going.

**Trial 11: Efficiency gains from harvesting wider row spacings**

**Issue:** Little information has been presented examining the efficiencies of harvesting wider row spacings. Are harvesters more efficient? Is harvesting wider rows more cost effective? What are the limitations to realising potential efficiencies?
Project: Document field measurements of time to fill bins, weights, yields, influences on harvester productivity in wide row (1.8 m duals) versus conventional (1.52 m) single rows.


Partners: Progressive Harvesting Co-Operative.

Results: Field assessments have been undertaken for this trial. Initial work showed a 7% reduction in fuel use in harvesting controlled-traffic cane compared to single-row conventional spacing. No further data has been received.

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Trial 12: Harvester GPS guidance evaluation

Issue: Potential cane losses from harvesting dual-row cane are much larger than in single rows due to basecutter spacing and design. GPS guidance would allow more accurate travel along the cane row, allowing operators to concentrate on other operations. GPS guidance is expensive technology and no efficacy and economic evaluations have been conducted.

Project: Work with Progressive Harvesting Co-Operative and PCPSL projects to evaluate GPS guidance technology for harvesters.

Partners: IAR, Progressive Harvesting Co-operative, PCPSL.


Results: Progressive Harvesting Co-operative has been investigating GPS systems over the last couple of years. There has been no system put in place as yet, but they are still investigating further. Hence, this is an ongoing project.

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7.5 Planting

Trial 13: Depth of planting

Issue: Some stool tipping has been observed in shallow planted sugarcane fields. Stool tipping results in increased soil at harvest and low yields in ratoons. Does depth of planting and height of mound influenced stool tipping?

Trials: Observation site planted at Marian with different depths of planting into preformed mounds. We will communicate with FutureCane Bundaberg where a trial has been established.


Partners: FutureCane, BSES.

Results: No data has been received.

---

Trial 14: Row spacing

Issue: Considerable interest exists in controlled-traffic farming of sugarcane, but many growers do not convert due to perceived problems with dual rows. These include cost of converting a planter and harvesting difficulties. Single-row, wide-chute planting configurations are claimed to be a solution. These were to be tested in this trial.

Trial: Compare dual-row, wide-chute and narrow-chute planting for yield and CCS.

Time: July 2006 to December 2007.

Partners: BSES, PCPSL.

Results: No data has been received.
8.0 CHANGE IN KNOWLEDGE, ATTITUDE AND PRACTICES

8.1 Initial benchmarking

The group developed a survey form to capture a range of information to be used to benchmark the status and practices of group members and to provide a means of measuring changes in the group over time. The survey included a skills audit, current practices benchmark, trial involvement and grower-group involvement and expectations of grower-group potential.

Skills Audit

Eleven growers out of 16 responded to the survey. Some growers indicated they were too busy to fill in the survey form.

The mean years of sugarcane production experience amongst this group was 33.5 years. The highest level of schooling was to Grade 11, with 73% of the group having only attended to Grade 10. Almost half the respondents had completed some trade qualification. Most growers have completed some additional training courses (mean 2.8 courses per grower), usually associated with the sugar industry such as ChemCert farm chemical use, FarmSafe, Compass or computer training.

90% of growers were involved in community activities, often associated with the sugar industry, such as rural fire board, and often in an administrative capacity such as treasurer.

90% of growers listed their computer skills as basic, with only one as excellent.

Discussion - The skills audit highlighted that preparedness to adopt new technology and trial better farming practices is not limited by a growers’ time in the industry (and by default, age!) or level of formal education. Plane Creek Sustainable Farmers Inc. has a broad skills base to be tapped into in future activities.

Farming Practices

The sample group managed 1545 ha of controlled-traffic sugarcane. Individual properties varied from 25% to 100% of the cropped area under controlled-traffic farming systems. Only one grower did not plant his entire area to 1.8 m row spacings or greater. 100% of the controlled-traffic area planted by this group in 2005 was to 50 mm dual rows on 1.8 m centres or greater.

100% of the growers had reduced tillage practices (Figure 8), and 80% were growing break crops and had modified their planters to disc opener. Just over 70% of respondents were planting into preformed mounds.
Figure 8  Adoption of controlled-traffic farming practices

Discussion - There was a range of experience in the group with different aspects of the controlled-traffic farming system. This helped stimulate interaction and learning amongst members. Preformed beds were an issue highlighted later in the survey as a high priority area for further research – this data suggested that the perceived issues with beds are restricting their adoption. Those that have adopted beds were reporting problems with them during the survey.

What are the benefits you anticipate getting from controlled traffic and when do you expect to start to reap these benefits?

<table>
<thead>
<tr>
<th>Immediate benefit</th>
<th>% response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased profit</td>
<td>55</td>
</tr>
<tr>
<td>Less compaction</td>
<td>45</td>
</tr>
<tr>
<td>Less tillage</td>
<td>36</td>
</tr>
<tr>
<td>Less offsite movement of nutrients and chemicals</td>
<td>36</td>
</tr>
<tr>
<td>Reduce tractor use / labour time</td>
<td>36</td>
</tr>
<tr>
<td>Improved soil health</td>
<td>27</td>
</tr>
<tr>
<td>Increased productivity</td>
<td>27</td>
</tr>
<tr>
<td>Better soil moisture retention</td>
<td>18</td>
</tr>
<tr>
<td>Improved harvester efficiency</td>
<td>18</td>
</tr>
<tr>
<td>Wider planting window</td>
<td>18</td>
</tr>
<tr>
<td>Less turning</td>
<td>9</td>
</tr>
<tr>
<td>Less fuel use</td>
<td>9</td>
</tr>
<tr>
<td>No rock picking</td>
<td>9</td>
</tr>
<tr>
<td>Timeliness of operations</td>
<td>9</td>
</tr>
<tr>
<td>Reduced risk of rain on fresh planting</td>
<td>9</td>
</tr>
</tbody>
</table>
**Benefit in 5 years**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>% response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved soil health</td>
<td>72</td>
</tr>
<tr>
<td>Increased production</td>
<td>27</td>
</tr>
<tr>
<td>Reduced chemical use</td>
<td>27</td>
</tr>
<tr>
<td>Less offsite movement of nutrients and chemicals</td>
<td>18</td>
</tr>
<tr>
<td>Maintenance savings</td>
<td>9</td>
</tr>
<tr>
<td>Reduce tractor use / labour time/ fuel use</td>
<td>9</td>
</tr>
</tbody>
</table>

Discussion - Some of the responses to this question were lower than were anticipated – however, the question asked the growers to nominate benefits without prompting.

Controlled-traffic farming practices are contributing a wide range of immediate benefits to growers who are adopting the system. 55% nominated improved profitability being experienced immediately. This is an encouraging figure, given the modest investments being made by growers to adopt this system (see Investment, below). Many other efficiency benefits were reported, including 36% less tractor use, 18% improved harvester productivity, 9% less turning, and 9% improved timeliness of operations.

**What investments have you made to change to controlled traffic eg new machinery purchased or $$ spent on modification? (List machinery & cost)**

<table>
<thead>
<tr>
<th>Machinery purchased or modified</th>
<th>% of growers</th>
<th>$ cost</th>
<th>$ range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planter</td>
<td>90</td>
<td>10290</td>
<td>4000 - 22000</td>
</tr>
<tr>
<td>Elevator extension</td>
<td>54</td>
<td>2300</td>
<td>0 - 4300</td>
</tr>
<tr>
<td>Minimum tillage ripper</td>
<td>54</td>
<td>7350</td>
<td>100 - 17000</td>
</tr>
<tr>
<td>Bed former</td>
<td>45</td>
<td>5050</td>
<td>100 - 10000</td>
</tr>
<tr>
<td>Spray boom</td>
<td>45</td>
<td>1925</td>
<td>500 - 5000</td>
</tr>
<tr>
<td>Disc opener modification to existing planter</td>
<td>27</td>
<td>12000</td>
<td>6000 - 15000</td>
</tr>
<tr>
<td>Harvester front</td>
<td>27</td>
<td>15000</td>
<td></td>
</tr>
<tr>
<td>Yetter / rolling cultivator</td>
<td>18</td>
<td>3250</td>
<td>2000 - 4500</td>
</tr>
<tr>
<td>Fertiliser box modifications</td>
<td>9</td>
<td>2000</td>
<td>0-2000</td>
</tr>
<tr>
<td>Plant cutter</td>
<td>9</td>
<td>2500</td>
<td></td>
</tr>
</tbody>
</table>

Discussion - The cost of change over to a controlled-traffic farming system varied from $6000 to $39000, with a mean changeover cost of $22645. By far the most expensive item to modify has been the planter. This seems a surprisingly low figure on face value, given the nature of the change to the farming system. However, there are a number of factors nominated by growers that have kept changeover costs low. These include modification of existing equipment by grower, sharing equipment with neighbours, use of loan equipment from BSES Sarina and use of contractor services.
What are the major issues with controlled traffic farming that you think more trials need to be done on?

<table>
<thead>
<tr>
<th>Issue</th>
<th>% response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevator extensions</td>
<td>45</td>
</tr>
<tr>
<td>Mounding / size / shape</td>
<td>45</td>
</tr>
<tr>
<td>Harvesting issues / losses</td>
<td>27</td>
</tr>
<tr>
<td>Planting depth</td>
<td>27</td>
</tr>
<tr>
<td>Varieties response</td>
<td>27</td>
</tr>
<tr>
<td>Optimum plant populations</td>
<td>27</td>
</tr>
<tr>
<td>Grub control</td>
<td>18</td>
</tr>
<tr>
<td>GPS guidance</td>
<td>18</td>
</tr>
<tr>
<td>Planting soybean into trash</td>
<td>18</td>
</tr>
<tr>
<td>Overcoming soil structural problems</td>
<td>18</td>
</tr>
<tr>
<td>Water penetration issues</td>
<td>18</td>
</tr>
<tr>
<td>Weed control</td>
<td>9</td>
</tr>
<tr>
<td>Ratoon length</td>
<td>9</td>
</tr>
<tr>
<td>Fertiliser placement</td>
<td>9</td>
</tr>
</tbody>
</table>

Discussion - A diversity of issues remains unresolved in the current controlled-traffic farming systems. The clearly biggest issues are related to harvester elevator issues associated with filling bins of cane, while keeping haul-out traffic restricted to the traffic zone and the issue of mound forming under variable conditions. Both of these issues were priority areas targeted in the group’s R&D plan.

Are you currently involved in any trials on your farm? If yes, please list.
83% of respondents are involved in on-farm trials. The three highest responses were for canegrub control, variety selection and harvester modifications. These topics were highlighted earlier in the survey as areas requiring more research to be undertaken.

<table>
<thead>
<tr>
<th>Trials grower involved in</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canegrub control</td>
<td>36</td>
</tr>
<tr>
<td>Variety</td>
<td>27</td>
</tr>
<tr>
<td>Harvester modifications</td>
<td>27</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>18</td>
</tr>
<tr>
<td>Irrigation timing</td>
<td>18</td>
</tr>
<tr>
<td>Weed control</td>
<td>9</td>
</tr>
<tr>
<td>Ripener</td>
<td>9</td>
</tr>
<tr>
<td>Direct-drill planting</td>
<td>9</td>
</tr>
</tbody>
</table>

Is anyone else involved in these trials?

<table>
<thead>
<tr>
<th>Partners in on-farm trials</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSES</td>
<td>72</td>
</tr>
<tr>
<td>CSIRO</td>
<td>18</td>
</tr>
<tr>
<td>Chemical company</td>
<td>18</td>
</tr>
</tbody>
</table>

The majority of these trials were being conducted with BSES, while CSIRO and Syngenta were involved in some on-farm trials. It was pleasing to see a range of participants in on-
farm trials. Of interest is the lack of nomination of other growers or neighbours in trials. It was known that many of the growers in this group are co-operating with various aspects of the farming system and machinery and over the life of the project it was planned that co-operation between growers with trials will be stimulated.

**What are the major issues with controlled-traffic farming that you would like more information on?**

<table>
<thead>
<tr>
<th>Issue</th>
<th>% response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water infiltration</td>
<td>27</td>
</tr>
<tr>
<td>Nutrition</td>
<td>27</td>
</tr>
<tr>
<td>Grub control</td>
<td>18</td>
</tr>
<tr>
<td>GPS guidance</td>
<td>18</td>
</tr>
<tr>
<td>Bed formation / shape</td>
<td>18</td>
</tr>
<tr>
<td>Plant populations for optimum production</td>
<td>9</td>
</tr>
</tbody>
</table>

**Discussion -** This question was included to seek out issues that were of immediate importance to the respondents, as highlighted by topics on which respondents were seeking further information. A number of growers did not answer this question and, on being asked about it, responded that they felt their requirement for further information was included in the topics requiring additional research that was asked above.

**Have you been actively involved in a grower group?**

All respondents said they had been actively involved in a grower group and all considered themselves active participants. The average length of involvement in a group was 2.5 years.

**What are the advantages of being involved in a grower group?**

<table>
<thead>
<tr>
<th>Issue</th>
<th>% response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information sharing with other growers</td>
<td>100</td>
</tr>
<tr>
<td>On-farm trials</td>
<td>36</td>
</tr>
<tr>
<td>Talk about problems and success</td>
<td>36</td>
</tr>
<tr>
<td>Group information tours</td>
<td>18</td>
</tr>
<tr>
<td>Experimentation with equipment modifications</td>
<td>9</td>
</tr>
<tr>
<td>Host other growers / groups</td>
<td>9</td>
</tr>
<tr>
<td>Latest information available</td>
<td>9</td>
</tr>
<tr>
<td>Ability to be heard by industry</td>
<td>9</td>
</tr>
</tbody>
</table>

**Discussion –** Clearly, growers relish the opportunity to interact with other growers to discuss issues and problems. Discussions regarding trials that other growers are undertaking, along with successes and failures experienced by trying different practices is also seen as valuable.

It was interesting to note that the average involvement the growers have had with the group is 2.5 years, but there was still 100% interest in the opportunity to continue interacting with the other growers in the group. The group has not exhausted its ability to generate new issues of interest and this is reflected in the response to this question. It will
be important for the group to maintain the interest of members and this will be achieved if the group remains committed to tackling relevant issues.

**Conclusion**
The baseline survey provided the foundation of measuring the success of the project. Progress of group participant’s adoption of farming practices, involvement in trials, knowledge building activities, roles and support for group processes may be benchmarked.

8.2 **Productivity performance**

Analyses of the productivity data for the members of the group was undertaken to compare group performance with that of the entire Plane Creek mill area. Productivity data from the 2005 and 2006 harvests were provided by CSR Plane Creek Mill for these analyses.

8.2.1 **2005-season data**

Data for the Plane Creek Sustainable Farmers Inc group was taken from 24 farms, with over 1900 ha of area harvested and producing 168,000 t of cane.

This analysis shows that group members on average produced 8.78 t/ha of cane, 0.21 units/ha of CCS, 1.4 t/ha of sugar and returned $227 per hectare more than the average Plane Creek Mill area grower in 2005 (Figures 9-12).

![Figure 9](Comparison of cane yields between group members and the average Plane Creek Mill grower)
Figure 10  Comparison of CCS between group members and the average Plane Creek Mill grower

Figure 11  Comparison of sugar yield between group members and the average Plane Creek Mill grower

Figure 12  Comparison of net returns per hectare between group members and the average Plane Creek Mill grower
The data suggest that members of the group have a higher level of productivity and profitability than the average achieved for the mill area. The data includes production for farms that are entirely under controlled-traffic farming practices and others in various stages of conversion. Thus, the productivity differences suggested are not entirely related to adoption of controlled traffic or to participation in the project.

### 8.2.2 2006-season data

Data for the Plane Creek Sustainable Farmers Inc group was taken from 30 farms. When group is compared to the rest of the mill area, the big difference that is evident is the amount of time and resources invested in this group. This group have had considerably more one-on-one time and effort spent on them by the BSES extension officer than the rest of the mill area.

The group members on average produce 7.53 t/ha of cane, 0.31 units of CCS, 1.34 t/ha of sugar and a gross return of $248/ha more than the rest of the growers in the mill area in 2006 (Figures 13-16).

![Comparison of cane yields between group members and the average Plane Creek Mill grower](figure13.png)
**Figure 14**  Comparison of CCS between group members and the average Plane Creek Mill grower

**Figure 15**  Comparison of sugar yield between group members and the average Plane Creek Mill grower
Figure 16  Comparison of gross returns between group members and the average Plane Creek Mill grower

The above data suggest that members of the group have a higher productivity and profitability than the rest of the growers in the Plane Creek Mill area. The data shows production for farms that are 100% controlled traffic and farms that are at various stages of adoption of controlled traffic. Hence, the difference in productivity between the group and the mill area is not entirely due to the adoption of controlled traffic or participation in the project.

8.3 Attitude change

Evidence of grower commitment to group processes and changes in roles and characteristics include (Figures 17-18):

- substantial time invested by the growers to compile trial data, learn aspects of Microsoft PowerPoint to prepare and finally present their results at the ‘GIVE’ day. 10 group members participated in the learning experience at the Burdekin ‘GIVE’ day - five other group members invested an additional day in Townsville to share experiences with other grower groups.
- one member participated in an SRDC evaluation workshop in Brisbane and has reported back to the group on practical methods to incorporate evaluation into activity planning;
- all grower members have nominated to be part of a trial or project team - these teams are working to produce results that should feed back to the benefit of the group;
- group members hosting numerous visitors and participating in various industry activities to share their knowledge and encourage others;
- substantial learning effort and time commitment by the web site team to develop the site and get it up and running, coordinate feed back and make changes and improvements in readiness for an industry-wide promotion of the site;
- group members have negotiated with potential sponsors, and interacted with existing sponsors to manage and secure the financial future of the group;
substantial time put in by several members to complete the application for SRDC grower-group awards for 2006.

Figure 17 Group members are working together to overcome common problems. Here three team members examine equipment for renovating permanent beds at the end of the crop cycle.

9.0 COMMUNICATION

The group quickly realised that the most resource-efficient way for a small group to communicate within the group and externally is by electronic means. All of the group members have access to internet and email and all group meeting notices and communications are sent via email.

At a strategic planning meeting on 26 September 2005, the group discussed the different incorporation options and the information sources accessed to gather this information. Debate occurred regarding the best methods to make this information widely available to other growers and potential grower groups throughout the sugar industry. Given the breadth of sources of information and the complexity of the information, the group decided that a fact sheet, summarising and simplifying the options would be most useful for other growers. The fact sheet is available in an electronic format so that it can be distributed easily and rapidly to interested growers (Appendix 6). It was decided that an article promoting the benefits of incorporation and the fact sheet to other growers and groups should be compiled and submitted to an industry publication (BSES Bulletin initially chosen).

An article was prepared for the BSES Bulletin promoting the benefits of being involved in a grower group, group incorporation, and highlighting the availability of a fact sheet on
incorporation options (Appendix 4). The timing of the release of this information in the wet season was designed to allow interested growers time to consider it and pursue further information and establish groups prior to the following crushing season.

The group established its own web site (www.pcsf.com.au). This was a major learning exercise for the group members who took on the associated tasks. One member prepared content, learned how to design and construct the site, and uploaded information. The major problem that the group is finding is that they do not have the time that is needed to keep updating the web site and putting the information in a form that it can be easily distributed to the greater industry. However, the website does not appear to have been updated recently (accessed 19 December 2007). Most of the work in putting the data in a form to be communicated to the industry was being done by the BSES extension officer. The group have looked into employing a communication person on a casual basis to address this problem, but currently they are undecided if this is feasible.

Some examples of communication activities are:

- Presentation of group trial results at ‘GIVE’ day (Figure 18). Over 300 growers from throughout the industry attended the day.
- Mackay BSS269 grower group addressed by PCSF growers on group activities on two occasions. Included presentation of data from trials, display of powered paddles and field demonstration of prototype wheelie rake for mechanical weed control and hill-up in beds.
- Three bus trips and six private tour visits have been hosted and shown results of the group’s work.
- Three SYDJV staff visited local farms to inspect variety performance in row-spacings trials, zero-till planting into trash blanket demonstration, sprayout of sugarcane in soybean trials and a trial examining water runoff from beds on a surface sealing soil. Interaction with research staff is seen as important to ensure continued cross-fertilisation of ideas.
- Results of groups work was presented to FutureCane advisers meeting in Bundaberg in February 2006. FutureCane staff from across the state were present and are able to take information and experiences back to their regions.
- Results of three activities written up, placed on the web site and provided to visiting growers.
10.0 FUTURE OF THE GROUP

At a meeting of the group with Roberts Evaluation on 19 February 2007, it was agreed that members would complete a short survey on the potential future direction of the group. Sixteen members responded to the survey by either returning their responses by email or participating in a brief phone interview. A summary of these responses are presented below.

What vision do you have for the group?
In response to this question, all members who responded expressed an interest in the group staying together and moving forward. No member expressed a desire to see the group disband but a range of ideas as to how the group could best operate in the future were expressed.

Four responses indicated a desire to see the group continue as a place to exchange ideas and information:

Within the context of sharing ideas, some members (two responses) specifically identified the group as playing a self-help role.

However, a number of members (eight responses) wanted the group to become bigger and attract a larger membership. At least three members expressed interest in seeing the group grow to a size that could employ paid personnel to support activities that would provide some relief from constantly relying on volunteering. Within this range of responses, suggestions included an increased focus on research, becoming an independent body or
taking up a networking role and acting as an umbrella organisation for other groups in the region.

However, not all were clear on the group’s vision and at least one member responded that they had never really understood the reasoning behind the group.

**What do you want out of your involvement with the group?**
The majority of members responded that they sought access to information, research and an exchange of ideas that would improve their management practice and increase productivity (eight responses). This included activities like practical trials and demonstrations.

Three members also identified the importance of sustainable farming practices and using the group to develop the skills to respond to climate change.

In addition to knowledge exchange and environmental management, one member also suggested the group could play a role in networking activities and the cooperative exchange of equipment among farmers in the area. Two members chose not to respond to this question.

**How does your involvement with the group help you with the running your business?**
In terms of how involvement in the group had helped with the running of their own businesses, the half the members who responded to this question (seven) indicated their membership had been beneficial in that it had exposed them to a range of new ideas, increased confidence to try new things and information about potential funding sources.

Another five were also specific in linking this information to increased productivity on farm or better environmental management.

However not all members (three) felt that being part of the group had been beneficial for their business.

**How do you think we (the researchers – Roberts Evaluation) can help the group?**
Members were asked to comment on how they felt Roberts Evaluation might provide assistance or guidance to the group. Many members (six) indicated that bringing a new perspective and drawing on experience with other groups would be beneficial to creating momentum and finding a direction for the group.

The role of facilitation and communication was also identified as important:

Finally, two members suggested that Roberts Evaluation might provide assistance with some of the more formal arrangements regarding the group. For example, either through providing advice on how to grow the group into a bigger entity or by exploring options like cooperative arrangements and partnerships.

**How can the researchers help the members?**
Members’ responses to this question seemed to cluster around three main areas where Roberts Evaluation might provide some help for members of the group – skills development, the direction of the group and networking. In relation to skills development,
members picked-up on a variety of areas for possible development ranging from communication skills through to management skills which might be met through specific training. One member also responded that just being able to recognise the skills they already had, had been valuable.

Finding direction for the group was another issue that three members raised.

Connecting with other groups and networking was also identified as important for members:

**Next Steps**
Most members of the Plane Creek Sustainable Farmers Group have clearly said that they want to expand. A path was laid out to help with this:
1. Check that the rules of the group are capable of handling its projected expansion.
2. Ensure that the management committee has the appropriate structure (number of positions, roles etc).
3. Set up sub-committees:
   - Sponsorship
   - Membership
   - Research
   - Employment
4. Contact sponsors.
5. Commence a drive to recruit new members.
6. Investigate ways to employ staff. Employ a full or part time co-ordinator who can start the admin process; organise events; write up results of the trials, write funding submissions.
7. General:
   - Formulate topics of research and investigation requirements and start discussing on farm trials with researchers (DPI&F, CSIRO, BSES).
   - Keep SRDC informed with what you are doing at all stages.
   - Make all events fun.

**11.0 INTELLECTUAL PROPERTY**

Trial results and advice on incorporation have been made available by PCSF to all interested parties. Some of these are available on the group’s website (www.pcsf.com.au).

**12.0 ENVIRONMENTAL AND SOCIAL IMPACT**

Many of the farming practices tested by the group are expected to have positive environmental benefits. None of these benefits was quantified in the experimental program undertaken by the group.
Formation of the group and the activities undertaken by them have had positive social impacts as described through this report.

13.0 OUTPUTS

- Plane Creek Sustainable Farmers Inc was established and focused on productivity improvements in the Sarina district. The group structure and focus were influenced by similar groups in other industries and districts.
- The group publicised their activities and produced an information sheet to guide the formation of other grower groups.
- The group established a range of field R&D activities to help improve productivity.
- The group demonstrated that participative R&D combined with action learning can deliver productivity, profitability and sustainability outcomes.
- However, the project demonstrated that long-term commitment and focus are difficult to maintain and delivery of proposed outcomes is difficult without a strong ‘driver’.

14.0 OUTCOMES AND RECOMMENDATIONS

- The group has not reached the stage of managing themselves and realises that is lacking a driver to keep them on track, collect data and help communicate to the industry. This is obvious from the above progress of the group and was noted by Kate Roberts from Roberts Evaluation Pty Ltd in her review of the group. This is an important part of the group process and is needed to ensure that the work being done will have some meaning at the end of the day. Such a driver could be employed through BSES Limited or could be one of the group (although none of the present group wants this role).
- Considerable field and trial work has been carried out by the group, although it has proved impossible to extract data from some participants and little has been posted on the group’s website. This should not be viewed as a failure to achieve the objectives of the project, but as an example that highlights an outcome of the project – that is, a deficiency in the grower-group concept.
APPENDIX 1 - STRATEGIC PLAN

Plane Creek Sustainable Farmers Inc.

Strategic Plan 2005 – 2007

Special thanks to our Sponsors and Supporters who are helping us achieve our vision:

[Logos and names of sponsors and supporters]
Background:
Plane Creek Sustainable Farmers Inc. began in late 2001 as a group of growers exchanging ideas on the adoption of controlled traffic farming systems in sugarcane, based on the work of the Sugarcane Yield Decline Joint Venture. As time passed, the growers began sharing equipment, visiting each other’s properties for ideas and support, conducting trials and travelling to other cropping industries to gain further insights into aspects of controlled traffic farming. As success was achieved the group began to promote the concepts of controlled traffic farming systems in sugarcane to other growers throughout the sugar industry. Numerous bus trips and field days have been hosted by our members and media articles produced portraying our successes. We have a close and cooperative working relationship with BSES, PCPSL, SYDJV and others who contribute to our success.

Our group became known as the Sarina Sustainable Farmers group, an unincorporated grower group, and in early 2005 the Sugar Research and Development Corporation (SRDC) recognised our group as the winner of the Regional Awards for Excellence in Grower Groups within the Sugar Industry for the Central region.

Our group is currently working with BSES and SRDC on a project titled “Enhancing Grower Groups in the Australian Sugar Industry”. This project is designed to assist our group in becoming incorporated and enhance our ability to effectively function in the future and to develop our skills to help promote and assist other groups with formation and incorporation, so they too can enjoy the benefits of grower group teamwork.

Group Logo
To be developed.

Our Vision:
To enhance a profitable and sustainable local sugar industry, that is able to support our families and the local community.

Mission Statement:
To foster the development and enhanced adoption of improved and sustainable farming systems for the sugar industry.
Membership eligibility:

To have a vested interest in the sugar industry and support the vision and mission statements of the group.

Membership Fee:

The Annual membership fee is set at $10 per member or $20 per farming entity or business. All names are to be recorded as members.

Group Objectives:

- To develop and promote controlled traffic farming practices
- To identify and develop solutions to obstacles restricting the productivity of controlled traffic farming in sugarcane
- Reduce environmental impact
- Promote positive environmental stewardship
- Promote the objectives of the group to the wider industry and community
- Be an active participant in industry productivity forums
- Build group members professional development and skills base
- To develop positive working relationships with other grower groups, industry research and development organisations, input suppliers and support industry participants.

Further Information:

President:  Mr Alan Pedersen
            Phone: 0749 503986

Secretary:  Mr Robert Sluggett
            Phone: 0749 562576

Treasurer:  Mr Bryan Baker
            Phone: 0749 430100

Management Committee:

            Mr Rick Garnham
            Phone: 0749 50220
APPENDIX 2 - 2005-2006 R&D PLAN

Plane Creek Sustainable Farmers Inc.

Research and Development Plan 2005 – 2006

Special thanks to our Sponsors and Supporters who are helping us achieve our vision:
Research and Development Plan:  

Our research and development activities are focussed on achieving the objectives of the Plane Creek Sustainable Farmers group. We undertake a range of activities from observation and demonstration trials to fully replicated trials depending on the issue, need and stage of technology development. Our activities are to be conducted in partnership with our sponsors and supporters to maximise the likelihood of success, speed of success and benefit to a wider range of industry participants.

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- To develop and promote controlled traffic farming practices
- To identify and develop solutions to obstacles restricting the productivity of controlled traffic farming in sugarcane
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- Build group members professional development and skills base
- To develop positive working relationships with other grower groups, industry research and development organisations, input suppliers and support industry participants.
Research and Development Priorities

1. Sugarcane Varieties Relevant to the New Farming System

Current commercial sugarcane varieties are bred and selected to suit single row 1.5m farming systems. Controlled traffic farming systems involve wider row spacing which currently necessitates the need for dual row or wider row planting configurations. Problems with current commercial varieties include earlier lodging, difficulty to harvest, increased extraneous matter and death of immature stalks.

**Trial 1: Replicated Variety Trial**

**Aim:**
1. Identify best performing varieties for dual row planting configurations
2. Identify variety characteristics most suited to dual row eg tiller no, thickness etc
3. Compare performance of selected varieties as single and dual rows on 1.83m centres.

**Design:** Randomised complete block, 4 rows * 10m, 2 replications

**Location:** Smith Brothers farm, Ilbilbie.

**Soil:** Site EC mapped by Independent Agricultural Resources. Trial located on a Gillinbin soloth soil type.

**Configuration:**
Planted 500mm dual rows on 1.83m centres.
33 commercial, promising and early stage clones planted in dual row configuration.
7 of the commercial clones repeated as single row.

**Data Collection:** Plant population, stalk death, crop water use, yield and ccs.

**Time:** September 2003 to December 2007

**Trial Partner:** BSES

**Trial 2: CCS Observation Trial**

**Aim:** Compare commercial CCS of new clones.

**Design:** Unreplicated Strip Trial

**Location:** Bryan & Karen Baker’s farm, Sarina.

**Soil:** Alluvial soil.

**Varieties:** Q209, Q208, 93C896, Q207, Q135

**Time:** September 2004 to December 2007

**Data Collection:** Yield and CCS

**Trial 3: YDJV Variety Trial**

**Aim:** Identify variety characteristics most suited to dual row eg tiller no, thickness, erectness, etc.

**Design:** Split block, 4 rows * 19m, 3 replications. Dual row and single row paired plots planted side by side.

**Location:** Smith Brothers farm, Ilbilbie

**Soil:** Site EC mapped by Independent Agricultural Resources. Trial located on a Gillinbin soloth soil type.

Data Collection: Crop water use, biomass, plant populations, yield and ccs.

Time: September 2005 to December 2008

Trial Partner: SYDJV

2. Fallow Management

Trial 4: Development of a new Soybean Planter

Issue: Current BSES planter can only plant two rows per bed and has difficulty planting through trash on soft ground and freshly formed beds.

Aim: Build a planter that can plant 3 rows of break crop per bed, into worked ground or through trash cover.

Design: 3 row units, parallelogram, folding wings for transport

Time: November 2005 to February 2006

Partners: Hodge Industries, BSES

Trial 5: Improved Bed Forming

Issue: Uneven bed height causes variation in planting depth, potentially resulting in poor germination and stool tipping. Also, renovating beds following a wet harvest is seen as an important issue. Various machinery is currently used for forming beds from hill-up type boards to rearranged ratooning discs. None of the current equipment used builds consistent beds across a wide range of soil types and where residual trash is present.

Aims:
1. Follow up communication with MAD Cane Planting group in NSW, who have a GGIP project Accurate and consistent bed forming to promote better farming practices.
2. Build a bed former effective under a wide range of conditions
3. Develop guidelines for effective bed renovation following a wet harvest.

Activity: Compare performance of existing bed formers in trash and non-trash conditions. Share experiences with MAD Cane Planting group. Evaluate and develop improved bed former. Evaluate different methods of bed renovation.

Time: November 2005 to May 2006

Partners: Hodge, BSES Engineering

Trial 6: Cover Crops

Issue: Freshly formed beds are prone to soil erosion prior to break crop establishment. This soil may be deposited in the furrow, reducing the effective bed height and therefore affecting planting depth or it may leave the farm in runoff water which is not acceptable environmentally. Also, rainfall infiltration may be poor on unprotected surface sealing soils.

Aim: Identify suitable cover crops to protect beds from erosion and improve infiltration.
Trials: Trial small plots of a range of potential cover crop species. Evaluate for ease and speed of establishment, effectiveness of protecting soil, potential for weediness, ease of control with glyphosate, ease of planting through with break crop planter.

Partners: Landmark, Dupont

Time: November 2005 to March 2006

3. Herbicides

Trial 7: Soybean Sprayout

Issue: Soybean sprayout tank mixtures have not been 100% successful and reliable to date for control of soybean plants or associated weeds such as siratro or volunteer sugarcane. Rapid sprayout is required to prevent excess loss of soil moisture.

Trials: Strip trial alternative tank mixtures for soybean sprayout.

Data Collection: Efficacy on soybeans and weeds

Time: February 2006 to May 2006

Partners: Landmark, DuPont

Trial 8: Control of Glyphosate tolerant weeds

Issue: Glyphosate tolerant broadleaf weeds (including Leucas, thickhead, crotalaria, blackberry nightshade etc) are becoming dominant species in reduced tillage farming situations where glyphosate has become a frequently used knockdown herbicide. Glyphosate is anticipated to remain an important tank mix partner, due to its effectiveness in controlling problem weeds such as couch, nutgrass and volunteer cane.

Trials: Strip trials of glyphosate tank partners and other potentially suitable herbicides or weed control strategies.

Data Collection: Efficacy of herbicides or other control measures, species controlled, cost.

Time: November 2005 to March 2006

Partners: Landmark, DuPont, other chemical companies

4. Harvesting

Trial 9: Overcoming Barriers to Controlled Traffic Adoption – Managing Traffic During Conversion To Controlled Traffic Farming Systems. SRDC GGIP

Issue: Present solutions to keeping harvesting traffic centred on wider row spacings while adequately filling cane bins are not effective, due to unsuitable harvester elevator design, which results in a larger proportion of the field area being compacted, defeating the purpose of controlled traffic farming.

Project Plan: Review previous activities, travel to Bundaberg and New South Wales to examine cane conveying systems -> Assist SYDJV team to develop and field test prototype elevator paddle designs and other modifications -> Review field trial results -> build commercial prototype -> field test 2006 harvest -> results to industry.

Time: August 2005 to July 2007

Partners: SRDC GGIP, SYDJV, McDonald and Murphy Machinery
Trial 10: Efficiency Gains Harvesting Wider Row Spacings

**Issue:** Little information has been presented examining the efficiencies of harvesting wider row spacings. Are harvesters more efficient? And is harvesting wider rows more cost effective? What are the limitations to realising potential efficiencies?

**Trials:** Document field measurements of time to fill bins, weights, yields, influences on harvester productivity in wide row (1.8m duals) vs conventional (1.52m) single rows.

**Time:** August 2005 to December 2006

**Partners:** Progressive Harvesting Co-Operative

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Trial 11: Harvester GPS Guidance Evaluation

**Issue:** Potential cane losses from harvesting dual row cane are much larger than single row due to base cutter spacing and design. GPS guidance would allow more accurate travel along the cane row, allowing operators to concentrate on other operations. GPS guidance is expensive technology and no efficacy and economic evaluations have been conducted to date.

**Project:** Work with progressive harvesting Co-Operative and PCPSL projects to evaluate GPS guidance technology for harvesters.

**Partners:** IAR, Progressive Harvesting Cooperative, PCPSL

**Time:** November 2005 to December 2006

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5: Planting

Trial 12: Fertiliser Rates and Root Burn

**Issue:** Local growers are concerned about the potential of root burn to affect the germinating sett where fertiliser is placed in close proximity to the sett, such as in disc opener planters.

**Trials:** Observation sites will be planted with different rates and types of planting fertiliser and root development monitored and shoot counts assessed.

**Time:** May 2006 to December 2006

**Partners:** Landmark, BSES

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Trial 13: Depth of Planting

**Issue:** Some stool tipping has been observed in shallow planted sugarcane fields. Stool tipping results in increased soil at harvest and low yields in ratoons. Does depth of planting and height of mound influenced stool tipping?

**Trials:** Observation sites will be planted with different depths of planting into pre-formed mounds. We will communicate with FutureCane Bundaberg where a similar trial is established.

**Time:** March 2006 to December 2007

**Partners:** FutureCane, BSES

---

Trial 14: Row Spacing

**Issue:** Considerable interest exists in controlled traffic farming of sugarcane, but many growers don’t convert due to perceived problems with dual rows. These include cost of
converting a planter and harvesting difficulties. Single row, wide chute planting configurations are claimed to be a solution. These will be tested in this trial.

**Trial:** Compare dual row, wide chute and narrow chute planting for yield and ccs.

**Time:** July 2006 to December 2007

**Partners:** BSES, PCPSL

6. **Professional Development**

**Issue:** Ongoing skill and professional development of our members will help our group grow and manage future challenges.

**Interaction with Other Grower Groups**
Plane Creek Sustainable Farmers will establish linkages, build relationships with and share knowledge and experiences with other grower groups.

**Timing:** Ongoing.

**Travel to other industries**
Other industries offer new and different technologies, new ways of viewing and dealing with problems. Plane Creek Sustainable Growers will support and encourage members to visit other industries to broaden our mind set.

**Training and Skill Development**
Plane Creek Sustainable Growers will support and encourage members to attend workshops, field days and skill building activities.

**Timing:** Ongoing
APPENDIX 3 – 2006-2007 REVISED R&D PLAN

Plane Creek Sustainable Farmers Inc.

Research and Development Plan 2006 – 2007

Special thanks to our Sponsors and Supporters who are helping us achieve our vision:
Plane Creek Sustainable Farmers Inc.

Research and Development Plan 2006 – 2007

Research and Development Plan:

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Aim: 1. Identify best performing varieties for dual row planting configurations
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Location: Smith Brothers farm, Ilbilbie.
Soil: Site EC mapped by Independent Agricultural Resources. Trial located on a Gillinbin soloth soil type.
Configuration:
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33 commercial, promising and early stage clones planted in dual row configuration.
7 of the commercial clones repeated as single row.
Data Collection: Plant population, stalk death, crop water use, yield and ccs.
Time: September 2003 to December 2007
Trial Partner: BSES

Trial 2: CCS Observation Trial
Aim: Compare commercial CCS of new clones.
Design: Unreplicated Strip Trial
Location: Bryan & Karen Baker’s farm, Sarina.
Soil: Alluvial soil.
Varieties: Q209, Q208, Q207, Q135
Time: September 2004 to December 2007
Data Collection: Yield and CCS

Trial 3: YDJV Variety Trial
Aim: Identify variety characteristics most suited to dual row eg tiller no, thickness, erectness, etc.
Design: Split block, 4 rows * 19m, 3 replications. Dual row and single row paired plots planted side by side.
Location: Smith Brothers farm, Ilbilbie
Soil: Site EC mapped by Independent Agricultural Resources. Trial located on a Gillinbin soloth soil type.
History: Soybeans 2003/04 summer, trial first planted September 2004. Poor germination resulted in the trial being sprayed out. Soybeans direct drill planted in
summer 2004/05. Soybeans sprayed out and variety trial direct drilled with disc opener planter September 2005.

**Data Collection:** Crop water use, biomass, plant populations, yield and ccs.

**Time:** September 2005 to December 2008

**Trial Partner:** SYDJV

## 2. Fallow Management

### Trial 4: Development of a new Soybean Planter

**Issue:** Current BSES planter can only plant two rows per bed and has difficulty planting through trash on soft ground and freshly formed beds.

**Aim:** Build a planter that can plant 3 rows of break crop per bed, into worked ground or through trash cover.

**Design:** 3 row units, parallelogram, folding wings for transport

**Time:** November 2005 to February 2007

**Partners:** Hodge Industries, BSES

### Trial 5: Improved Bed Forming

**Issue:** Uneven bed height causes variation in planting depth, potentially resulting in poor germination and stool tipping. Also, renovating beds following a wet harvest is seen as an important issue. Various machinery is currently used for forming beds from hill-up type boards to rearranged ratooning discs. None of the current equipment used builds consistent beds across a wide range of soil types and where residual trash is present.

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1. Follow up communication with MAD Cane Planting group in NSW, who have a GGIP project Accurate and consistent bed forming to promote better farming practices.
2. Build a bed former effective under a wide range of conditions
3. Develop guidelines for effective bed renovation following a wet harvest.

**Activity:** Compare performance of existing bed formers in trash and non-trash conditions. Share experiences with MAD Cane Planting group. Evaluate and develop improved bed former. Evaluate different methods of bed renovation.

**Time:** November 2005 to May 2006

**Partners:** Hodge, BSES Engineering

### Trial 6: Sprayout of Sugarcane in Soybeans

**Issue:** In seasons where sugarcane harvest extends into December, often the ideal soybean planting window is passed by the time sugarcane ratoons are large enough for successful glyphosate sprayout. There is a need to investigate alternative herbicides to kill sugarcane ratoons in the soybean crop.

**Aim:** Identify suitable herbicides for control of sugarcane ratoons in soybeans.

**Trial:** Strip trials of various herbicide options.

**Data Collection:** Efficacy on sugarcane ratoons and weeds, phytotoxicity on soybeans

**Time:** February 2006 to May 2006

**Partners:** Landmark, DuPont, Bayer CropScience
Trial 7: Cover Crops

**Issue:** Freshly formed beds are prone to soil erosion prior to break crop establishment. This soil may be deposited in the furrow, reducing the effective bed height and therefore affecting planting depth or it may leave the farm in runoff water which is not acceptable environmentally. Also, rainfall infiltration may be poor on unprotected surface sealing soils.

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**Data Collection:** Efficacy of herbicides or other control measures, species controlled, cost.

**Time:** November 2005 to May 2007

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**Trial 10: Overcoming Barriers to Controlled Traffic Adoption – Managing Traffic During Conversion To Controlled Traffic Farming Systems. SRDC GGIP**

**Issue:** Present solutions to keeping harvesting traffic centred on wider row spacings while adequately filling cane bins are not effective, due to unsuitable harvester elevator
design, which results in a larger proportion of the field area being compacted, defeating the purpose of controlled traffic farming.

**Project Plan:**
- Review previous activities, travel to Bundaberg and New South Wales to examine cane conveying systems -> Assist SYDJV team to develop and field test prototype elevator paddle designs and other modifications -> Review field trial results -> build commercial prototype -> field test 2006 harvest -> results to industry.

**Time:** August 2005 to July 2007
**Partners:** SRDC GGIP, SYDJV, McDonald and Murphy Machinery, EHS Engineering

**Trial 11: Efficiency Gains from Harvesting Wider Row Spacings**

**Issue:** Little information has been presented examining the efficiencies of harvesting wider row spacings. Are harvesters more efficient? And is harvesting wider rows more cost effective? What are the limitations to realising potential efficiencies?

**Trials:** Document field measurements of time to fill bins, weights, yields, influences on harvester productivity in wide row (1.8m duals) vs conventional (1.52m) single rows.

**Time:** August 2005 to December 2007
**Partners:** Progressive Harvesting Co-Operative

**Trial 12: Harvester GPS Guidance Evaluation**

**Issue:** Potential cane losses from harvesting dual row cane are much larger than single row due to base cutter spacing and design. GPS guidance would allow more accurate travel along the cane row, allowing operators to concentrate on other operations. GPS guidance is expensive technology and no efficacy and economic evaluations have been conducted to date.

**Project:** Work with progressive harvesting Co-Operative and PCPSL projects to evaluate GPS guidance technology for harvesters.

**Partners:** IAR, Progressive Harvesting Cooperative, PCPSL

**Time:** November 2005 to December 2007

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**6: Planting**

**Trial 13: Depth of Planting**

**Issue:** Some stool tipping has been observed in shallow planted sugarcane fields. Stool tipping results in increased soil at harvest and low yields in ratoons. Does depth of planting and height of mound influenced stool tipping?

**Trials:** Observation site planted at Marian with different depths of planting into pre-formed mounds. We will communicate with FutureCane Bundaberg where a trial has been established.

**Time:** March 2006 to December 2007
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Trial 14: Row Spacing

**Issue:** Considerable interest exists in controlled traffic farming of sugarcane, but many growers don’t convert due to perceived problems with dual rows. These include cost of converting a planter and harvesting difficulties. Single row, wide chute planting configurations are claimed to be a solution. These will be tested in this trial.

**Trial:** Compare dual row, wide chute and narrow chute planting for yield and ccs.

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7. Professional Development

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**Training and Skill Development**
Plane Creek Sustainable Growers will support and encourage members to attend workshops, field days and skill building activities.

**Timing:** Ongoing.
APPENDIX 4 – BSES Bulletin article

Grower group incorporation - opportunity knocks

> Robert Suggitt

There is a fair bit of interest and discussion occurring throughout the sugar industry about grower groups and their potential to help increase the speed of new technology uptake.

Why grower groups?
Grower groups have been shown to increase the adoption rate of new technologies on farms. This largely comes about by the growers involved in the group doing trials on new technology or testing recommendations coming from industry researchers. By testing the research recommendations on their own farms, in their own environment, the research can be properly refined, evaluated, and made commercially viable for growers. Groups also foster rapid, effective communication amongst a wide number of growers.

In the grains industry, grower groups are helping to increase the development and speed of new technology adoption and improved farming practices. A grains industry report from 2003 showed about 45% of grain farmers, covering about 4 million hectares, had been influenced positively by grower-group activities.

Promoting grower groups in the sugar industry
The Sugar Research and Development Corporation (SRDC) has embarked on a number of innovative initiatives promoting and supporting the formation and activities of grower groups throughout the sugar industry.

As part of this SRDC initiative, BSES is managing a project “Enhancing Grower Groups in the Australian Sugar Industry”. This project has facilitated the incorporation of a group of growers who have been working on improving controlled-traffic farming systems in the Plane Creek mill area for the last few years. Plane Creek Sustainable Farmers Inc. has been incorporated, developed a strategic plan as well as a research and development plan and has established partnerships with a number of other organisations to help them achieve their goals.

Why incorporate?
Incorporation is the process of getting a grower group its own legal identity so it can access funding and improve the effectiveness of the group.

Rick Garnham, who is on the Plane Creek Sustainable Farmers Incorporated management committee, says the process of incorporation was a necessary step for the Plane Creek Sustainable Farmers group to take. Rick, along with his parents and brother farmed over 300 ha in the Carmila district at the southern end of Plane Creek mill area. Rick has been involved with the Sustainable Farmers group for 2 years. “My experience is that it has been very worthwhile to be involved in doing things as a group” said Rick “as an individual things move more slowly, the rate of developing new ideas particularly.” Rick believes the growers involved in the Plane Creek Sustainable Farmers group are an enthusiastic lot who stay fairly well focused on the issues that are important. Major benefits to their farming operations have come from moving to a controlled-traffic farming system with the support of the group.

Above: Rick Garnham inspects plant cane establishment in a grub-control trial conducted in conjunction with BSES.
Above: Keith Schmidtke, group member, with a high clearance spray rig he has modified to suit his controlled-traffic farming practices.

The Garnham family now have around 110 ha under controlled-traffic. Interaction with the group has helped them to modify their own planter to a dual row planter with disc openers, and plant into pre-formed beds. This change has saved their time and money in land preparation and has been a major, immediate benefit to the farm business.

However, there are a number of important problems which they are experiencing that need to be addressed – particularly with harvesting and grub control. Funding is needed to carry out trials and test new ideas to overcome these and other issues. Incorporation allows the opportunity to access funding, which is otherwise not available to the group.

“Our group is grateful to BSES and SRDC for supporting us to become incorporated and preparing us to stand on our own two feet. However, funding comes with a cost – there is more accountability, reports need to be written and deadlines met. It can be difficult for growers to find the time or have the skills to do some of the paperwork required,” said Rick. Rick believes a partnership approach between grower groups and organisations such as BSES and SRDC will produce the most effective outcomes and result in quicker adoption of new technology on farms.

Rick said, “I encourage other growers involved in groups, or considering forming a group to consider seriously the benefits of incorporation. We have worked with BSES staff to put together a fact sheet to assist others in weighing up the benefits.”

The fact sheet is available on the BSES website at www.bses.org.au; it.pdf

SRDC has another round of funding for Grower Group Innovation Projects. Grower groups are encouraged to develop and build their capability to conduct their own trials and development. Funding applications are due by the 10th of May, 2006. Further information is available from the SRDC website www.srdc.gov.au.

Above: Pauline and Peter Creber (group members) with their planter modified to disc openers after seeing the success other group members had with discs.
APPENDIX 5 – Effective Bin Filling in Controlled Traffic document

Effective Bin Filling in Controlled Traffic – Keeping traffic where it belongs

By Plane Creek Sustainable Farmers Inc.

What is the Issue?
? Present solutions to keeping harvesting traffic centred on wider row spacings while adequately filling cane bins are often not effective, due to unsuitable harvester elevator design, which results in a larger proportion of the field area being compacted, defeating the purpose of controlled traffic farming.
? The issue of getting cane in the bin in wider row spacings is more problematic than is currently recognised by many promoting the adoption of CTPS in the sugar industry. The existing harvester elevator suits 1.5m row spacings. Simply extending the whole elevator is unsuitable for wheeled machines due to the increase in weight, as are bolt on elevator extensions. Increases in weight reduce harvester stability on uneven fields and is a major safety issue. Additional weight also increases wear and tear on pins and bushes and increases costs.

Project Aim
Develop a low cost, low weight system to adequately fill cane bins, maintaining harvester traffic centred in the inter-row, minimising compaction and improving safety in wide row farming systems and during conversion.

Criteria
- Relatively cheap
- Light weight
- Suit 1.5m to 1.85m rows

What was done?
? In 2004, three PCSF Inc. group members trialled powered paddles on their harvesters. The paddles were light weight, were fairly cheap to make and could be operated in both wide row spacings (1.83m) and narrow (1.5m) row spacings of farms in conversion to CTPS. However, because of different elevator designs on the different harvesters, all of the paddles increased cane losses through the secondary extractor and two increased cane losses from recirculation.
? In 2005 SRDC funded Plane Creek Sustainable Farmers Inc. to examine potential options and develop a commercial prototype unit for industry use.
? Group members travelled to Ingham, Proserpine, NSW and spoke to BSES engineers in Bundaberg to examine other ideas being used.
? As a result of investigations of the different options available, a table of options was developed and is presented in Table 1 below.
? During the 2005 season four prototype powered rollers were tested on several harvesters. A variable speed valve was fitted to one harvester to allow the effect of different roller speeds on throw and cane loss to be compared.
? The impact of an elevator extension on the weight and stability of a harvester was examined.
Elevator Modification Options

There are a number of elevator modification options available for harvesting wider row spacings. However, each option has positive and negative attributes. Table 1 below summarises the attributes of each system.

Table 1: Options for Elevator Modifications to Fill Bins on Wide Row Spacings

<table>
<thead>
<tr>
<th></th>
<th>Bin Weight</th>
<th>Safety</th>
<th>Stability</th>
<th>Ease of use</th>
<th>Compaction control</th>
<th>Suit 1.5 &amp; 1.85m</th>
<th>Cane loss</th>
<th>Maintenance &amp; durability</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kurzman Extension</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Bolt on Conveyor</td>
<td>X</td>
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<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hook on Conveyor</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheep Elevator &amp; top floor</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powered paddles</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From this table it can be seen that the powered paddle option satisfies most requirements. The major drawback of powered paddles is their ability to significantly increase cane loss through the secondary extractor. Following this analysis of options, PCSF Inc. decided the most appropriate course of action was to refine the powered paddle.
The Prototypes Tested

Four prototype paddles were tested on several harvesters. Paddle size, design, placement and speed were tested under different conditions.

Original Powered Roller
(180mm slats on 37mm shaft, 35kg)

Modified Powered Roller
(300mm centre, 50mm slats, weight 54kg)

Lagged Rollers, 300mm and 400mm diameter
weight 41.5kg

Flat Roller with 50mm fins
weight 25.5kg
The Results

Each roller was tested at different rotational speeds. Assessments were made of cane loss, throw and bin weights. Video footage was taken of each roller in operation for later review. Table 2 provides an example of results recorded for one trial.

Table 2: 2005 Powered Roller Assessments

<table>
<thead>
<tr>
<th>Trial 2</th>
<th>RPM</th>
<th>Av Bin Wt</th>
<th>CCS</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>16° Lagged roller</td>
<td>360</td>
<td>3.35</td>
<td>14.6</td>
<td>Not throwing past bin centre</td>
</tr>
<tr>
<td>16° Steel + slats</td>
<td>360</td>
<td>3.5</td>
<td>15.35</td>
<td>More positive throw, more cane out 2ndry fan</td>
</tr>
<tr>
<td>16° Steel + slats</td>
<td>255</td>
<td>3.37</td>
<td>15.5</td>
<td>Reduced 2ndry loss</td>
</tr>
<tr>
<td>16° Steel + slats</td>
<td>180</td>
<td>3.3</td>
<td>15.2</td>
<td>Too slow, not enough throw</td>
</tr>
<tr>
<td>16° Steel + slats</td>
<td>228</td>
<td>3.19</td>
<td>15.2</td>
<td>Improved performance</td>
</tr>
</tbody>
</table>

Observations

? All rollers tested were suitable for use in 1.5m and 1.85m row spacings
? Position of the roller is crucial in relation to elevator flights and secondary fan position. Ideal roller position will depend on elevator design and any modifications that have been made to it.
? All elevators tested with powered paddles required a “wedge” to be inserted to move the secondary fan away from the trajectory of cane as it leaves the paddle. The size of the wedge will depend on elevator design and modifications, but a 75mm to 420mm wedge has been found to be suitable on several machines.
? Paddle speed is needed to be balanced between achieving adequate throw, without increasing cane loss. Shaft rotational speeds of around 225 to 300 rpm were found to be suitable, with slower speeds for more aggressive paddles.
? A speed control valve is useful to adjust roller speed on initial setup, but once a suitable operational speed is established, it has not been found to be necessary to adjust it.
? Aggressive rollers with large slats caused increased cane loss through the secondary fan and increased recirculation losses.
? Recirculation losses were reduced by “filling in” between slats (as for modified roller above).
? The lagged rollers tested were not as aggressive and gave inadequate throw particularly at lower rotational speeds and in high trash and wet conditions.
? Lagging is robust and showed little sign of wear after harvesting over 2000 tonnes
? The bin flap needs to be extended to give improved control of billet flow.
Figure 5: Powered roller placement is critical in relation to elevator flight rotation. Note the 75mm to 420mm “wedge” used to move secondary extractor fan assembly away from the cane flow. A similar modification is essential to minimize cane loss through the secondary fan. Note lengthened bin flap and mounting bracket allowing roller positioning to be adjusted.

Further Work
Further work is planned to refine powered paddle use further. Work is also underway to examine the advantages for machine stability from moving the secondary extractor assembly along the elevator.

Acknowledgements
Thanks to Sugar Research and Development Corporation, Hodge Industries and BSES for supporting this activity.

For further information contact: Brian Stevens, PCSF Inc. info@pcsf.com.au
APPENDIX 6 – Incorporating Grower Groups Information Sheet

Incorporating a farmer group

Many sugarcane growers are involved in a grower ‘group’. The group is usually made up of neighbours or growers with common interests, usually co-operating to share ideas, experiences and equipment. There often comes a time when the group needs to become more formal. This may be to reduce individual liabilities, to allow the group to seek sponsorship or funding, to allow introduction of new members, or to allow the group to plan a path for the future.

For growers wishing to form a group or existing groups and contemplating the next step, incorporation, this fact sheet is designed to answer common questions, provide guidance and to point you in the right direction for further information.

What is Incorporation?
Incorporation is the process of setting up a legally recognised structure that your group will be known by in the future. There are a number of legal entities a farmer group can become; for example a group could form a not-for-profit association, a company or it may even become a co-operative. Incorporated Associations and Co-operatives are applied for through and regulated by the Office of Fair Trading in Queensland and Company structures are regulated through the Australian Securities and Investment Commission (ASIC).

Why Incorporate?
Incorporation has a number of advantages including providing the group with a clear, legal identity that is separate from the members, that continues regardless of changes to membership, and that establishes a management committee with specific responsibilities. Incorporation provides some protection for management committee members against the possibility of being personally responsible for the association’s debts or other liabilities.

Having a formal structure with a management committee and operational rules can help a group reach its goals, manage opportunities and deal with conflict. It is helpful for the group to develop a strategic plan to help provide a clear path for the group’s activities and to help ensure a successful future.

Disadvantages of incorporation
There are some disadvantages associated with becoming an incorporated body. These include an increased time requirement to complete and maintain relevant paper work, a requirement for formal meetings, a need for committee members, various record-keeping requirements, fees for establishment and ongoing public liability insurance, and finances must be maintained appropriately and audited annually.

There are specific legal responsibilities set out in Parliamentary Acts that are applicable, depending on the incorporated structure the group adopts and the State in which incorporation will occur.

Incorporated Structures
The three main options for grower groups to consider when incorporating are an Incorporated Association, Co-operative and a Company type structure.
### Table: Summary of Incorporated Structure Options

<table>
<thead>
<tr>
<th>Incorporated Structure</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| 1. Incorporated Association | - relatively easy to set up  
- relatively cheap to establish  
- separate legal entity  
- members not personally liable  
- perpetual succession  
- may register to become a cooperative in the future | - must have at least 7 members  
- fees to establish  
- requires $1.1 million public liability insurance  
- financial record keeping/auditing obligations  
- must have management committee  
- obliged to hold AGM and meetings in accordance with the act  
- on wind-up, assets must be passed to a like organisation, not members |
| 2. Co-operative Non-Trading Cooperative – without shares | - no upper limit on members  
- separate legal entity  
- members not liable for cooperatives debts or liabilities  
- member has advantages of services and facilities provided by co-operative  
- part of surplus may be distributed to members as bonus, shares, rebates or dividends  
- one member one vote irrespective of shareholding | - more complex to establish than incorporated association  
- must have at least 5 members and 3 directors  
- financial record keeping/auditing obligations  
- need to have AGM and other meetings as per rules  
- must have share capital to operate  
- unable to distribute profits  
- non-trading cooperative with shares have additional rules and processes dealing with shares |
| 2. Co-operative Non-Trading Cooperative – with shares | - allows distribution of surplus profits or share capital  
- aims to maximise returns to members by undertaking commercial activities beyond the capability of individuals  
- provides services such as collective marketing, bulk purchasing etc | - more complex to establish  
- funding and sponsorship opportunities may be more limited due to the direct profit benefit to members  
- financial record keeping/auditing obligations  
- need to have AGM and other meetings as per rules |
| 3. Company | - separate legal entity  
- limitation of liability and protection for members  
- continuing entity – indefinite life  
- multiple ownership possible with variations of individual shareholder rights  
- voting rights vary with shareholding  
- franking of dividends of distributions from tax paid profits | - most expensive to set up and maintain  
- more complex option – regulated by ASIC  
- capital gains tax discount not available to companies  
- financial management and reporting obligations more stringent |

### 1. Incorporated Association

This is the simplest and easiest option for grower groups to contemplate. Any group with at least seven members (5 in NSW) may become incorporated, under the Associations Incorporation Act 1981 (Qld) and 1984 (NSW), provided the purpose is not for the financial gain of its members. The procedure for applying for incorporation is outlined in Figure 1.
Figure 1: Process for becoming Incorporated Association

Unincorporated group of farmers working together

Meeting of at least 7 members
- Group makes decision to incorporate as association
- Elect management committee of at least 3 (President, Treasurer, Secretary)
- Nominate name for incorporated association
- Write up minutes authorising management committee to apply for incorporation and open bank account
- Adopt proposed rules for the new association

Association Rules
Model rules are available to ensure associations have coverage of the requirements of the Act. Only allowed changes to:
1. Name of the association and unincorporated association.
2. Objects of the association.
3. The financial year of the association.

Any other changes mean your rules are no longer model rules and become the associations own rules, requiring additional steps in the incorporation application procedure.

Adopting Own Rules
Management committees must ensure own rules address all mandatory requirements of the Act.

Adopting model rules

Submit documentation and fees to Office of Fair Trading

OFT Approval - Certificate of Incorporation

Open bank account

Incorporated Association now operating

Hint: Download the model rules before meeting, from OFT website.

Tip: You can start with the model rules and make changes in the future with special resolutions.

Hint: Although you need the incorporation certificate to open the bank account to be able to pay the fees, most banks will allow you to open the account and supply the certificate later.

Tip: Need 100 points ID for signatories, need minutes authorising opening of account and incorporation certificate.
2. Co-operative
A cooperative can be formed by 5 or more members and is registered under the Cooperatives Act 1997 (Qld) & 1994 (NSW). The Office of Fair Trading administers this act in Queensland and New South Wales. Cooperatives are established where there is a common service benefit that may be enjoyed by members, for example provision of technical agronomic advice to members. There are two types of cooperatives, trading cooperatives and non-trading cooperatives.

Trading cooperatives have rules that allow them to pay distributions of profits or capital surplus to members. Non-trading cooperatives can be set up to either have shares or not have shares. Non-trading cooperatives cannot make distributions of surpluses to members.

The process for establishing a cooperative is more involved and expensive to establish and maintain than for an Incorporated Association. It is recommended that professional legal and accounting advice be sought if your group is considering formation of a cooperative. The strongest structures are built on solid foundations.

3. Company Structure
It is recommended that professional legal and accounting advice be sought if your group is considering formation of a company structure.

Australian Business Number or ABN
If an incorporated group of farmers is going to interact with other businesses, for example sponsors or equipment suppliers, it will require an Australian Business Number (ABN).

Some funding bodies may also only provide funding to incorporated farmer groups with an ABN. Applying for an ABN is relatively easy - a form can be downloaded from the ATO website and submitted or an accountant can complete the application and lodge it on behalf of your group.

However, the group will need some type of incorporated structure in place first, before it can apply for an ABN.

Goods and Services Tax or GST
Seek professional accounting advice as to whether your group needs to be registered for GST. Quite often it doesn’t, if the group’s annual turnover is below $100,000. However, the group will be unable to recoup the GST component of any expenses if it is not registered for GST.

Acknowledgements
Information in this fact sheet has been drawn from Office of Fair Trading Website, Australian Tax Office website, Queensland University of Technology website, S.B. Wright, Wright & Condie solicitors Mackay and the experiences of Plane Creek Sustainable Farmers Inc.

Funding and support came from Sugar Research and Development Corporation and BSES through project BSS287 "Enhancing Grower Groups in the Australian Sugar Industry".

Further Information:
Associations Incorporation Act 1981 (Qld) and Associations Incorporation Act 1984 (NSW)
Associations Incorporation Regulation 1999 (Qld)
Australian Tax Office website www.ato.gov.au
Cooperatives Act 1997 (Qld) and Cooperatives Act 1994 (NSW)
Your accountant
Your Solicitor

Some Farmer Group Websites:
www.pcsf.com.au
www.bcg.org.au
www.wantfa.com.au

Queensland Government
Department of Primary Industries and Fisheries

Information Sheet
www.bses.org.au