

# **SRDC Grower Group Innovation Project**

## **Final Report**

**SRDC project number:** GGP035

**Project title:** Developing implement coulters for volcanic red soils.

**Group name:** Innisfail Babinda Innovative Farmers Group

**Contact person:** Miles Darveniza, Jason Benn

**Due date for report:** 1/11/08

**Funding Statement:** This project was conducted by Innisfail Babinda Innovative Farmers Group in association with the Sugar Research and Development Corporation (SRDC). SRDC invests funds for sugar R&D derived from the sugar industry and the Australian Government.



**Australian Government**  
**Sugar Research and  
Development Corporation**

The Innisfail Babinda Innovative Farmers Group is not a partner, joint venturer, employee or agent of SRDC and has no authority to legally bind SRDC, in any publication of substantive details or results of this Project.

# Executive Summary

This project was specifically designed to alleviate problems faced by farming enterprises growing sugarcane in undulating red volcanic soils. Traditional disc coulters used on farming implements in undulating red volcanic soils tend to merely push the green trash blanket instead of cutting through it increasing the likelihood of increased soil erosion. By trialling and developing disc coulters currently being utilized by growers in other industries and areas the grower group wanted to cut through the trash blanket lessening disturbance leading to reduced runoff (soil and chemical). Another key outcome would be to achieve BMP (Best Management Practice) goals set within the sugarcane industry such as sub-surface fertiliser application and minimal till planting of fallow crops.

With these principals in mind the group researched disc coulters leading them to a company in Dalby, Queensland. Milne industries produce the “Day Break” disc coulters that the group members decided would best suit the situation and achieve their goals. Originally the plan was to employ a local engineering firm to build a frame to house the coulters. After discussion Milne industries was chosen to supply the coulters and frame to alleviate any assembling issues. Upon receiving the disc coulters the group began a rigorous trialling and refinement phase in pursuit of the project goals.

The outcomes and achievements of the project;

- Successful development of implement disc coulters to use on sugarcane crops in undulating red volcanic soils
- Successful development of techniques to ascertain appropriate soil moisture levels for the implement to operate properly
- Improvement of grower skills in agricultural mechanisation, tillage, erosion control and project management
- Potential for improvement of farm runoff through better tillage and application techniques

# Background

Farming enterprises growing sugarcane on undulating red volcanic soils have had difficulty adopting the use of coulters in their topography for two main reasons.

1. Traditional coulters used on farming implements, such as ripper coulters, sub-surface fertiliser applicators and Confidor Guard® applicators, tend to merely push the green trash blanket instead of cutting through it. This causes a build up of soil on the cutting edge of a traditional coulters rendering it useless.
2. Soil and chemical runoff from trash blanket disturbance.

Due to grower willingness on undulating red volcanic soils to adopt best management practice it is necessary for them to investigate means to use disc coulters effectively.

## Aims

This project aimed to relieve problems encountered on red volcanic slopes growing sugarcane by;

- Researching different coulters options currently in the marketplace,
- Purchasing selected equipment and modifying/developing this equipment for this particular soil type
- Remove impediments and allow group members to align with sugar industry best management practice.
- Furthering the skills being developed by growers in the IBS002
- Enhancing the skills of the group members in the areas of: project management and working within the group environment.

## Methodology

- The working plan included below (table 1) is a clear demonstration of how the project was conducted and how the aims of the project were met through the dictated milestones. The way this project has been conducted will allow for a refined principal to be communicated to other growers in the district upon project completion. By using the refined disc coulters in best management practices previous impediments, such as soil disturbance will not be an issue benefiting growers on these soil types. An evaluation of the project methodology indicates the planning framework constructed was most appropriate.

**Table 1** Work plan for grower group project GGP035

<b>Milestone</b>	<b>Due date</b>	<b>Total cost of activity</b>	<b>SRDC contribution</b>
1. Signing of Agreement with SRDC	1 July 2007	\$0	\$0
2. Work plan and Evaluation Strategy (a) Develop a detailed work plan in consultation with SRDC, including design of trials and methods of data collection, including advice from BSES Ltd. (b) Develop an evaluation strategy in consultation with SRDC.	1/08/07		
3. (a) Travel of 2 group members to areas currently using Gyal and Daybreak coulters. (b) Group members meet to decide on equipment. (c) Purchase of preferred alternate coulters and transport to Innisfail. (d) Consult with local engineering firm and fabricate frame to trial coulters.	1/11/07		
4. (a) Trial coulters in areas experiencing difficulty with traditional coulters usage, including recording of soil moisture conditions. (b) Remodify existing coulters set up following on from initial trials.	01/02/08		
5. (a) Retrial coulters in problem areas, including recording of soil moisture conditions. (b) Farm walk for interested farmers to see equipment and operation. (b) Review project activities by group members. (c) Report project findings. (d) Develop plan for future modification of coulters and adaptation to existing implements.	01/05/2008		
6. Final Report prepared using the template from the SRDC website. Final report to include: (a) Costs of constructing the implement and operating cost (tractor hrs/ha, tractor hp); (b) Results of harvest yields from areas treated with new coulters vs. standard equipment; (c) Report on promotion by group members of the outcomes of the project (through farm walk, shed meetings, industry meetings, local newsletters and annual productivity report); (d) Recommendations for construction of improved coulters for red soils, the moisture conditions for best results, and future plans for implementation by group members across Innisfail-Babinda.	1/11/08		
	<b>Total</b>		

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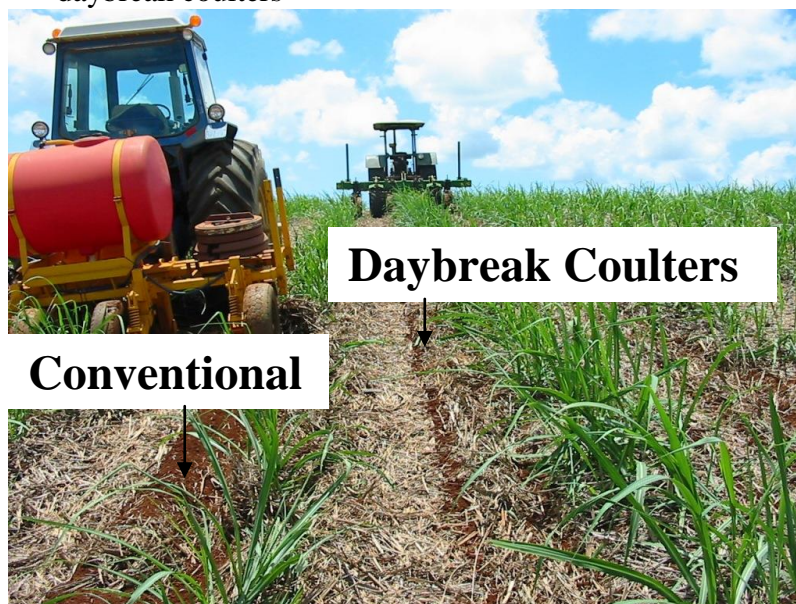
## Results and Outputs

An analysis of the results of the project indicates that the coulters have allowed growers on red volcanic slopes to attain their goals and significantly decrease disturbance of the trash blanket reducing runoff.

The major results for the project;

- Group research and selection of appropriate disc coulters
- Successful trial comparison of the daybreak coulters implement against current disc coulters implements in the region (figure 1)
- Group members learning and developing techniques to appraise appropriate soil moisture levels to operate trial implement in
- Initiative and planning skills of group members improved to a level where they can acknowledge success of coulters and adapt current implement to complete application of insecticide (Confidor Guard ®)
- Successful demonstration of coulters and other techniques learnt in the project to district growers
- Group management skills developed to a level where plans implemented to take advantage of current project success and further develop disc coulters principle.

**Figure 1** Successful trial comparison between conventional disc coulters and daybreak coulters



The key results the group expected from their work plans.

**Milestone Agreement:**

**Costs of constructing the implement and operating cost (tractor hrs/ha, tractor hp);**

The construction and operating costs for the implement are included in table 2. The cost of constructing the disc coulters seem to be no barrier to adoption as inquiries and orders for the coulters have increased since the success of the project was communicated to growers.

**Table 2 Construction and adaptation costs for “Daybreak” coulters**

<b>Operation</b>	<b>Hours</b>	<b>Cost</b>
Construction of “Daybreak” coulters, and working frame by Milne industries and freight to Innisfail		\$27,000
Adjustment and re-alignment of coulters before and during trial stages.	40Hrs @\$40/hr	\$1,600
Modification of coulters to apply Confidor Guard includes fitting and tank purchase		\$2,700
Trialling of coulters using 120Hp tractor	40Hrs @\$96/hr*	\$3,840
Workshop Consumables		\$400
<b>Total</b>		<b>\$35,540</b>

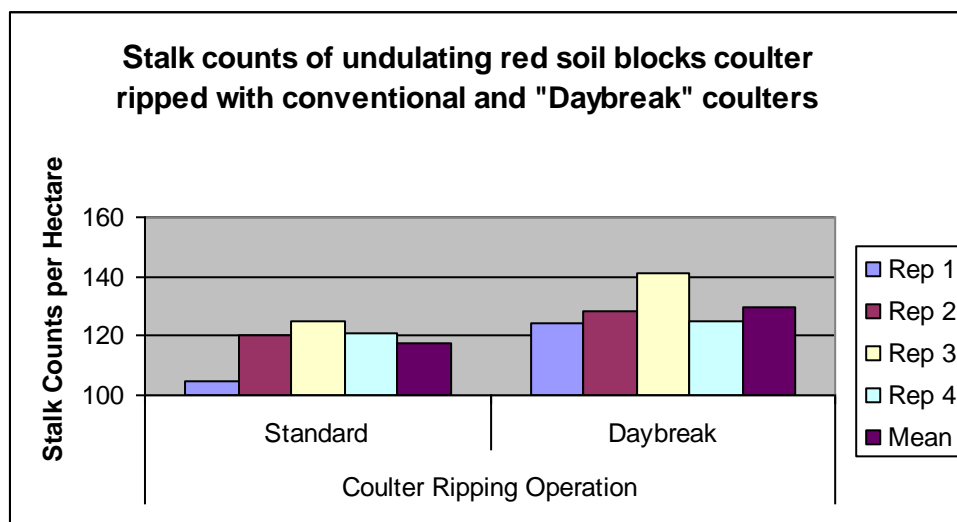
**\*Innisfail Babinda Cane Productivity Service contractor rates.**

**Milestone Agreement:**

**Results of harvest yields from areas treated with new coulters vs. standard equipment;**

The data set collected from the project was a comparison of standard disc coulters versus the “Daybreak” system. Graph 1 is a representation of the results from the stalk counts conducted. Analysis of the data shows that the daybreak coulters produced higher stalk counts and therefore have a higher yield potential than standard coulters systems in red soil. Although this data can be considered arbitrary it is possible to make the conclusion that using the coulters had no negative impact on stalk production.

The group aims to further trial the coulters and collect data on water quality and yield response from sub surface fertiliser application.



**Graph 1 Coulter ripping comparison**

## Intellectual Property and Confidentiality

The principles and equipment used and purchased are the property of the businesses they were purchased off. The principles developed by this project such as the technique for assessing soil moisture are an output of the project. The outputs of the project should be freely available to be adopted by growers on similar soils and topography.

## Capacity Building

Through conducting this project the group capacity to plan and develop projects to drive farm productivity and sustainability has been elevated. The recommendations from this project and planning for another project are evidence of the group's ability to manage another GGIP.

## Outcomes

The outcomes and achievements of the project;

- Successful development of implement disc coulters to use on sugarcane crops in undulating red volcanic soils
- Successful development of techniques to ascertain appropriate soil moisture levels for the implement to operate properly
- Improvement of grower skills in agricultural mechanisation, tillage, erosion control and project management
- Potential for improvement of farm runoff through better tillage and application techniques

## Environmental Impact

This project has revealed that it will have only positive environmental impacts. By assessing the water quality from runoff of sugarcane paddocks treated with the disc coulters it is expected that water quality will be improved compared to normal treatment of undulating red volcanic soils.

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Figure 2 shows a trash blanket that lays undisturbed after the daybreak coulters have been used in the paddock. It is expected that any detrimental runoff will be reduced by this.



**Figure2** Undisturbed trash blanket after tillage pass with “daybreak coulters”

## Communication and Adoption of Outputs

### **Milestone Agreement:**

**Report on promotion by group members of the outcomes of the project (through farm walk, shed meetings, industry meetings, local newsletters and annual productivity report);**

Outcomes of the project have been promoted by group members in four key areas.

1. Farm walk and one on one grower discussions
  2. Shed meetings
  3. Local newsletter and media
  4. Project communication with BSES extension
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1. Once initial setup and trialling was complete group members held a farm walk and demonstration of the coulters to interested growers. (Figure 3) The coulters were shown operating for growers to see and witness the minimal amount of soil disturbance caused by the coulters. The field walk was a win-win situation for the group as it created a forum where growers could comment on what changes could be made to the implement. At the field walk and on other occasions group members have discussed the coulters with other growers on a one on one basis. In these situations the group members have promoted the advantages gained by using the coulters. Discussion has also been centred on how the implement could be best used by the grower.
  2. The group is in the process of developing a short presentation to be delivered during the round of shed meetings held by the Innisfail Babinda cane productivity service. The presentation will centre on the key outcomes of the project. These meetings will be able to target all the growers in the district in a relaxed atmosphere.

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- An article on the field walk and trialling of the coulters has been placed in the joint newsletter released by local cane productivity services and BSES (Figure 2). This newsletter is distributed to all growers in the grower groups' mill area and will be a valuable tool to promote grower adoption of the coulters.

**Figure 2** Newsletter article on coulters


**SRDC Grower Group Project a Success**

On the 19<sup>th</sup> of December 2008 25 cane growers from Innisfail and Babinda districts attended a coulters demonstration at Miles and Boise Darveniza's farm on Henderson drive Wangan. The coulters have been designed and manufactured as part of an SRDC grower group project.

The versatility and precision of the Daybreak coulters has created a lot of interest with the manufacturers "Milne industries" in Dalby fielding inquiries.

The emphasis is to develop coulters that will work in difficult sticky red soil. Other benefits include the coulters ability to operate over rough terrain and the versatility of being able to apply fertiliser, insecticides and seed with minimal soil disturbance.

After the initial demonstration growers were invited to inspect the implement and discuss how they could use the implement on their farm. These comments were collated by the group and used in future developing plans for the implement.



Growers inspecting Daybreak coulters in field

IBCPS Coordinator	- 4064 3300	Jason Benn	- 0417 795 514
IBCPS Babinda	- 4067 1266	IBCPS Mourilyan	- 4063 2230
Bill Brand	- 0428 774 922	James Dunn	- 0427 632 230
BSES Limited PO Box 630 Innisfail Qld 4860 Ph. 07 4064 3458 Fax 07 4064 3459			
Bill Dalton	- 0439 537 823	Michael Porta	- 0427 620 316

- The group has been communicating with BSES extension on an informal basis to promote the use of the coulters. This collaboration has involved the group regularly informing the local extension officer of their activities regarding the coulters project. Communication with the BSES will allow for extension of the coulters principles to all of the sugar industry.

## Recommendations

### Milestone Agreement:

**Recommendations for construction of improved coulters for red soils, the moisture conditions for best results, and future plans for implementation by group members across Innisfail-Babinda.**

Recommendations for construction of improved coulters for red soils, the moisture conditions for best results, and future plans for implementation by group members of the Innisfail innovative farmers group include

- Readjustment of the cover wheels and their angles of travel
- Documentation of coulters operation parameters I.e. best travel speed crop size etc
- Re-design of the coulters backbone to further minimize crop damage
- Planting machinery, single disk zero till planting of fallow or opportunity cash crops
- Fertiliser, fungicide and seed application at depth in a zonal tillage farming system
- Adaptation to apply Confidor Guard ® for cane grub control has been done and was highly successful

Because this project has been a success it is a major recommendation that the findings are adopted by the SRDC and a wider adoption program is instituted. This will be done through purchasing application equipment to implement BMP's in the red volcanic soils which have previously been difficult to do. The best way to achieve this would be by the innovative farmers group fitting more application equipment to the coulters. The group could then test water quality using testing kits provided by canegrowers to validate whether runoff has been improved.

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## Future Plans

The group plans to implement the main recommendation from this current project and fit a multipurpose application box to the coulter assembly. This multi purpose box will be able to apply, fertiliser, seed and soil ameliorants in sites selected by the group. Table 3 is a proposed budget for the purchase and fitting of the box onto the disc coulters. The group has determined that they will seek funding for this and have already developed a project ready submission when applications are called.

Daybreak multipurpose box	\$13,000
Freight of box from Dalby to Innisfail	\$1,800
Fitting of box to coulters	\$4,000
<b>Total</b>	<b>\$18,800</b>

## Publications

No required publications were associated with this grower group project.