SRDC Grower Group Innovation Project
Final Report

SRDC project number:	GGP023
Project title:	Utilising Available Technology to Better Manage Yield Variability Within Blocks
Group name:	Blackburn Harvesting
Contact person:	Lee Blackburn
Due date for report:	1st June 2008
Funding Statement:	This project was conducted by [*name of 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

Body of Report

Executive Summary:

(An overview of the aim, conduct, key results and learnings from the project. Maximum 500 words)

The specific aim of this project was to gain information on the different layers of information collected at a block level to allow site specific crop management. The Blackburn Brothers have also investigated the farm economic within the fallow period by introducing fallow options like peanuts.
Blackburn Brothers have collected a number of different layers of information such as: Satellite imagery, EM Mapping "soil", Yield Mapping, soil analysis and leaf analysis, from the information collected, management of the nutrient applied, the gross margins achieved, all have allowed for better decision making that have improved the bottom line.

A replicated strip trial site was established and determined that there was no significant difference between the peanut fallow and bare fallow in the plant cane crop while the economics determined that the peanut fallow achieved $1147.22 per hectare more than the bare fallow. Within these two treatments two nitrogen rates were utilised 45kg / ha and 150 kg / ha with no significant difference achieved.

The results achieved by utilising available technology to better manage yield variability within blocks has been adopted over the total farming area (470 ha) by the confidence achieved by conducting this project. The group has also now undertaken that complete record keeping will be utilised and this will lead to better management decisions to be made at a block level.

Background:

(Why did you need to do this project?)

SYDJV findings i.e. FS principles, has achieved significant success in Central Region with leading growers implementing these principles. Rather than relax with this success, it is imperative to intensify momentum by anticipating and investigating higher level achievements.

Yield variability is known to occur between and within blocks caused by a number of variables. Variables include soil type variation; water holding capacity; and disease, pest and weed prevalence. Accepting these variables co-exist, it is necessary to develop a process which identifies the variable/s causing the yield variation, and facilitate a strategy to specifically address the identified variable/s in isolation.

Given success achieved by implementation of FS principles, it is timely to advance this progress and work towards diagnosing, and treating in isolation, the *additional* variable/s responsible for yield variation occurring between and within blocks.

Growing conditions are complex and variable due mainly to the perennial nature of sugarcane; highly weathered soils; and coastal soil types which vary both between and within blocks. Developing a detailed management strategy, including incorporation of Variable Rate Application Technology (VRAT) is complex, requiring a thorough understanding of the underlying variables.

Aims:
(Include the Aim and the expected benefits that were listed in Section 2 of your original Application)

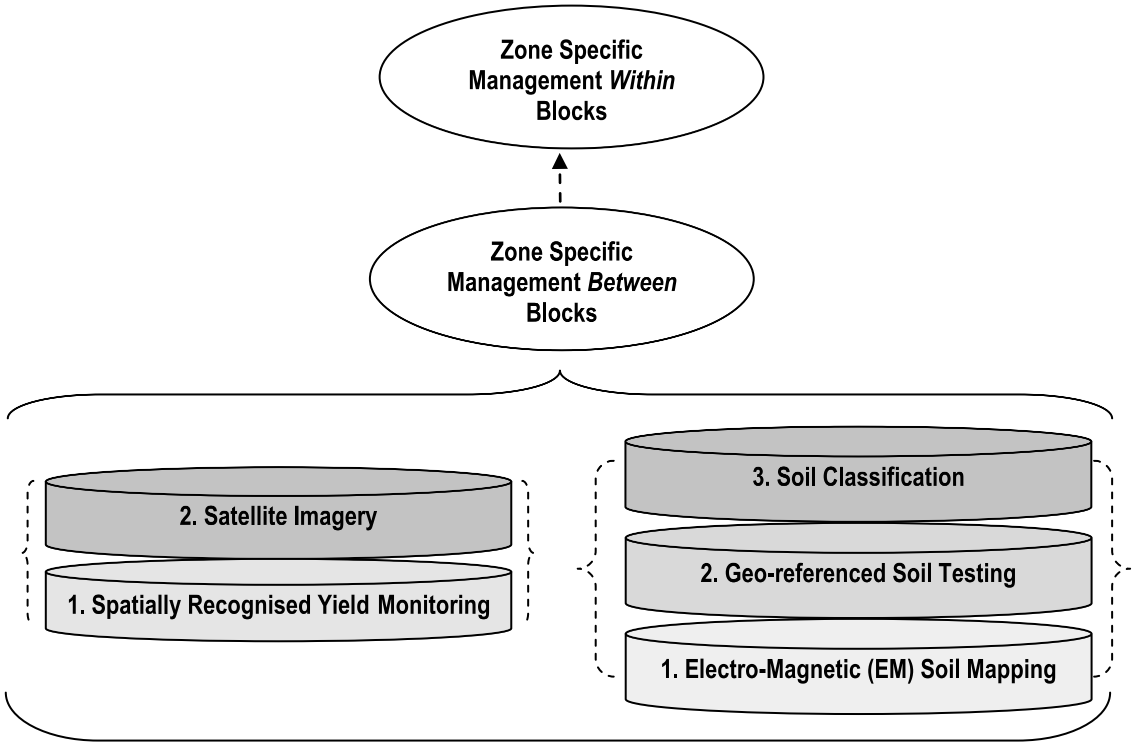
- To address the issue of yield variation (caused by many variables) as evidenced by Mackay Sugar Co-operative satellite imagery
- Variables, including soil type variation identified as major contributing factor to yield variation, management of which is beyond the scope of FS principles
- Project will build upon FS platform and undertake activities enabling the identification and referencing of soil type variation zones and their bio-physical attributes

Group members' skills developed via direct involvement in project activities at all levels and with all project partners, particularly in the use of tools and techniques used and interpretation of results

Methodology:
(How was the project conducted?)

- Project Activities:

Project will undertake activities described below to build upon FS platform, and strategically add the next layer of R&D to achieve Zone Specific Management *Between* Blocks initially, aiming towards Zone Specific Management *Within* Blocks.



1: Exercise to map soil type variations between blocks and within blocks

2: Ground-truthing mapping results by conducting geo-referenced soil tests, also revealing the nutritional attributes of the designated soil type zones identified by the EM Soil Mapping activity

3: Classification of designated soil type zones

Results and Outputs:

(What results were produced by the Project? The results should include data collected, articles or reports written, events held and anything else you see as relevant to the industry. Relevant files including photographs should be provided on a CD.)

The introduction of legume peanut cropping into a traditional bare fallow program has provided an opportunity to compare the two fallow management systems from an, economic and agronomic perspective

Trial objectives

The trials involved the establishment of plant cane into a traditional bare fallow and into a peanut cropped fallow programme. The trials were established to determine:
Yield response to added nitrogen (urea) in both systems
Financial returns from both fallow management systems

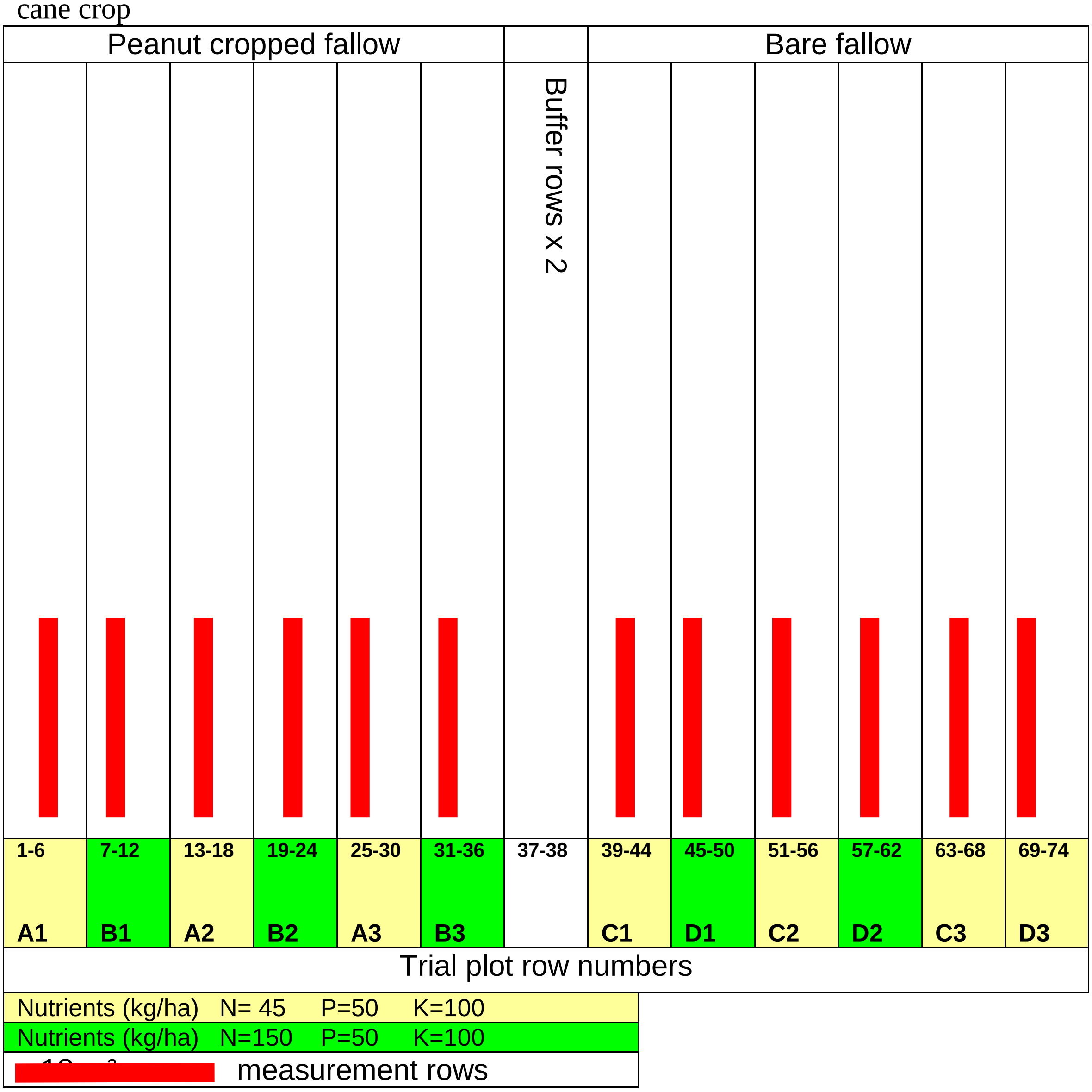
Materials and Methods

The trial was established on Blackburn's farm number 3120A, block 9-2 on the Eton/Marian Road via Mackay (S 21.22797 and E 148.96418) on a soil type classified as a brown chromosol. The randomised plot trials were established on block 9-2, half of which had been left as bare fallow and the balance planted to peanuts on a well prepared seedbed following a ripping, two rotary - hoeing and a final bed forming operation. Two rows of peanuts were planted into 1.8 metre pre-formed beds. After the threshing of the peanut crop the wheel tracks were ripped and the beds zonally hoed prior to the planting of cane (Q208) on the 27 August 2006.
The bare fallow section of the block was initially disced twice, ripped and followed by two strategic glyphosate applications. Prior to the planting of cane, the bare fallowed area had a final hoeing followed by the bed-forming operation (under GPS guidance)

The trials consisted of applying two nitrogen rates (45 and 150 kg/ha respectively) to the plant cane in both the peanut cropped and bare fallow sections of the paddock with three replications per treatment in randomised plot layouts. Each randomised plot comprised of 6 x 1.8 metre beds with two buffer rows between the peanut and bare fallow sections of the trials. Soon after plant cane establishment, permanent ten linear metre measurement areas ($18m^2$) were marked out in the third cane row of each plot with a 5 metre buffer strip established between the headland and the start of the measurement plots

A modified HBM billet planter (460mm shute) was used to plant the sugarcane variety Q208 at 1.8m row spacing on the 27 August 2006. Di-ammonium Phosphate was applied at planting at 250 kg/ha (45 kg/ha N and 50 kg/ha P). All the plots in both trials were side dressed with Muriate of Potash at 250 kg/ha (100 kg/ha K) at 79 days after planting (DAP). At 79 DAP, Urea at 228 kg/ha (105 kg/ha N) was applied to alternate plots in each trial with three replications per trial (Figure1)

Figure 1: layout of peanut and bare fallow trials with treatments applied to subsequent plant cane crop



The plant cane in both trials was multi-weeded on three occasions with a final hill-up operation at the out of hand stage. Volunteer peanuts were controlled with an application of Starane and Atradex (1.5 L/ha and 1.5kg/ha respectively) with both trials receiving a final residual spray of Stomp and Atradex (2 L/ha and 1.5 kg/ha respectively)

Measurements and Data Collection
Prior to the planting of peanuts an EM (electromagnetic) survey was conducted on the trial block to determine variations in soil properties. Soil analysis (0-250mm) were conducted in both the bare fallow and peanut cropped sections of the block, the composite samples being extracted from the permanent measurement areas established in each of the trial sites

Stalk counts were undertaken at 44,128, 246 and 395 days after planting (DAP) respectively from the permanent measurement areas in each replicate from both trials. Leaf tissue samples were extracted from the permanent measurement areas in each replicate from both trials at 277 DAP following BSES tissue sampling protocols

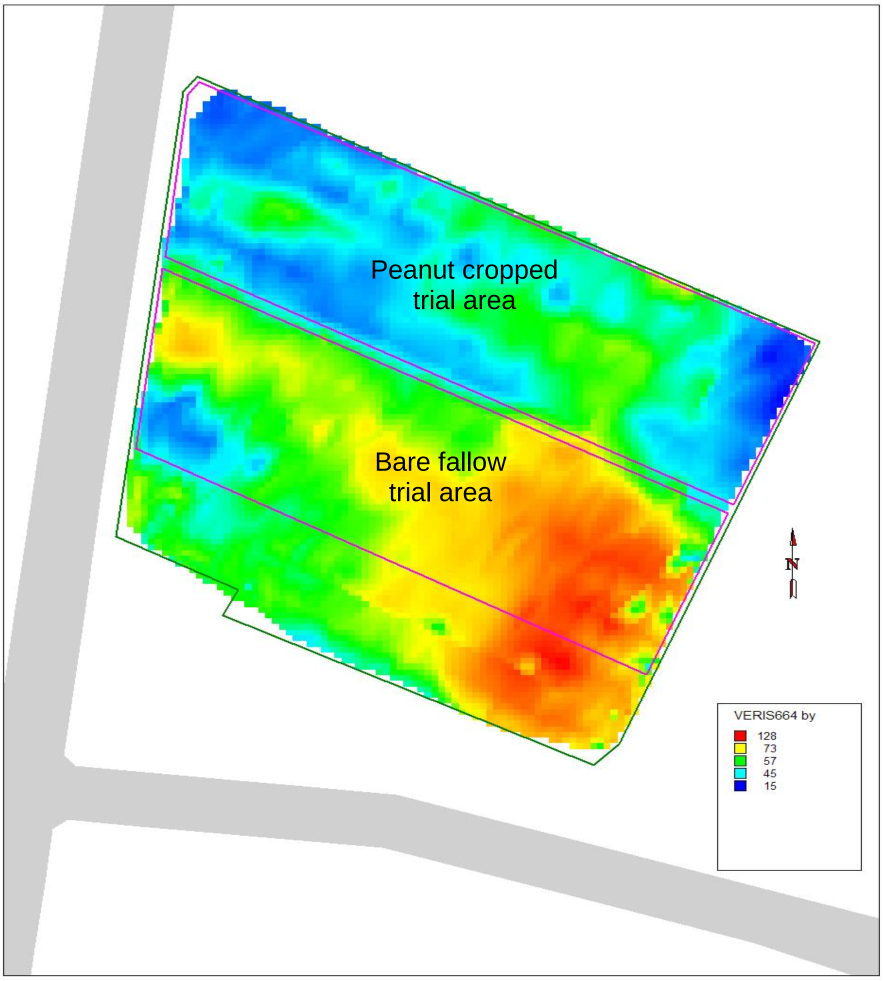
The trial plots were machine harvested on the 27 September 2007 (427 DAP) using the BSES weigh truck. However, the bare fallow plant cane trial was confined to the harvesting of only two replicates from the 45 and 150 kg/ha nitrogen treatments as the Q208 smut resistant variety planted in the trial was in short supply and was previously harvested for planting material. At 427 DAP, six stalks were randomly selected from the measurement areas in each replicate and stalk diameters measured midway between the cane notches at a height of 90cm.

All variable costs and data from both the peanut cropped and bare fallow trials were entered into the DPI&F developed, Farm Economic Analysis Tool (FEAT) software to generate gross margins for each fallow management system demonstrated in the trials

Results and discussion
Although both trials were established in the same block the results from each trial (plant cane following a peanut cropped fallow and plant cane following a bare fallow) cannot be directly compared as there was no randomised replication of treatments between the two trials. However the economic returns from plant cane and a peanut cropped fallow will be compared to returns from plant cane and a bare fallow.

Soil, plant tissue analysis and EM soil mapping
The trial block (block 9-2) has had a history of mill mud applications and nutrient inputs on plant cane and ratoons followed traditional BSES recommendations. The patterns from the EM map of the trial block generally indicated higher electrical conductivity (EC) readings in the bare fallowed section of the block relative to the peanut cropped area (Figure 2). Elevated EC readings in EM mapping surveys are generally associated with a higher moisture levels and this is reflected in the soil tests taken in the bare fallow and peanut cropped areas. The bare fallow soil tests displayed higher organic carbon percentages and cation exchange capacity values (Table 1 and Figure 3). The grower acknowledged that the southern section of the trial block (bare fallowed area) has traditionally yielded higher than the northern section of the block (peanut cropped area). Mackay Sugar's satellite yield estimation maps validate the higher yielding southern section of the trial block (Appendix 1)

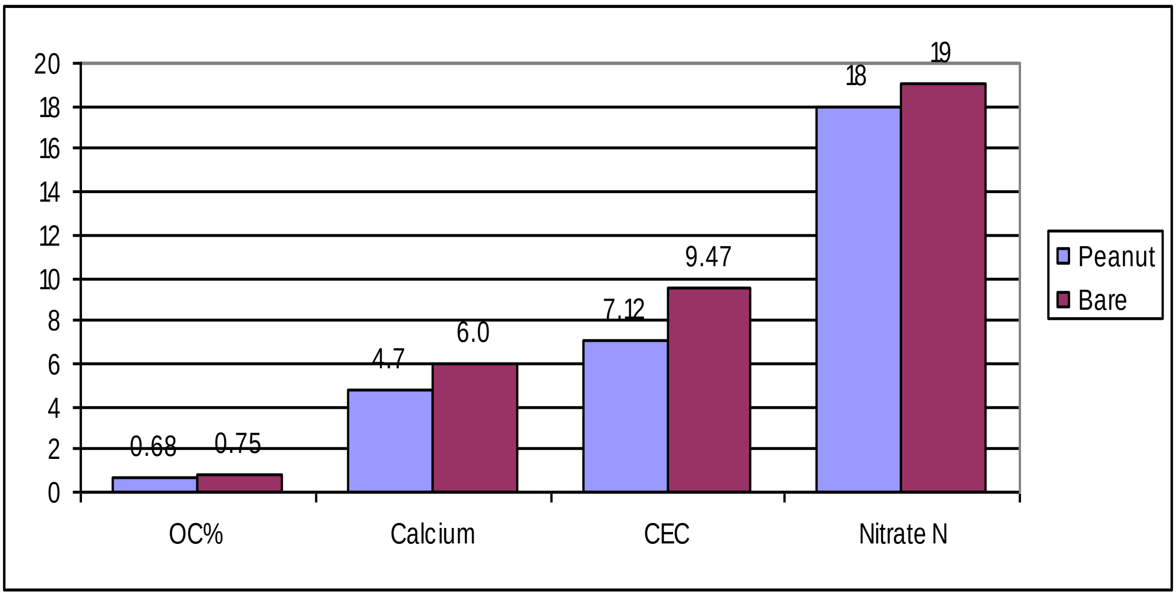
Figure 2: EM map of block with trial locations; red colouring representing the higher electrical conductivity (EC) values with blue representing the lower EC readings



Analyte	Peanut	Bare
pH (1:5 Water)	7.10	7.10
Organic Carbon %C	0.68	0.75
Nitrate Nitrogen mg/kg	18.00	19.00
Sulfate Sulfur (MCP) mg/kg	3.90	3.90
Phosphorus (BSES) mg/kg	120.00	170.00
Phosphorus Buffer Index	33	50
Potassium (Amm-acet.) meq/100g	0.15	0.20
Calcium (Amm-acet.) meq/100g	4.70	6.00
Magnesium (Amm-acet.) meq/100g	2.10	3.00
Sodium (Amm-acet.)	0.17	0.27
Chloride mg/kg	36.00	42.00
Elect. Conductivity dS/m	0.10	0.10
Copper (DTPA) mg/kg	0.76	1.20
Zinc (DTPA) mg/kg	0.76	1.60
Manganese (DTPA) mg/kg	6.1	9.7
Iron (DTPA) mg/kg	42.00	42.00
Zinc (BSES-HCl Zn)	2.90	3.90
Potassium (BSES-Nitric K) meq/100	0.97	1.30
Cation Exch. Cap. meq/100g	7.12	9.47
Calcium/Magnesium ratio	2.20	2.00
Sodium % of cations (ESP)	2.4	2.90
Elec. Cond. (Sat. Ext.) dS/m	0.80	0.80
Silicon(BSES) mg/kg	46.00	58.00

Table 1: Soil test results from bare fallow and peanut cropped areas of the trial

Figure 3: Variations in organic carbon percentages, calcium, cation exchange capacity and nitrate nitrogen values between the two trial areas



Leaf tissue analysis taken in the permanent measure rows (277 DAP) in both trials indicated no nutrient deficiencies with all values in excess of the critical levels set for each nutrient (Table 2). In both trials nitrogen percentages were marginally higher in the 150kg/ha N treatments.

Peanut	***N %dm***	***Ca %dm***	***Mg %dm***	***P %dm***	***K %dm***	***S %dm***	***Cu mg/kg dm***	***Zn mg/kg dm***	***Fe mg/kg dm***	***Mn mg/kg dm***	***C % dm***
45 kg/ha N	2.17	0.415	0.309	0.432	1.632	0.205	5.8	23.7	70	29	46.1
150 kg/ha N	2.20	0.358	0.302	0.417	1.908	0.216	5.8	22.9	67	29	46.5
Bare fallow											
45 kg/ha N	2.04	0.325	0.255	0.419	1.923	0.191	5.9	23.7	65	31	46.2
150 kg/ha N	2.07	0.300	0.249	0.409	1.960	0.197	5.4	22.3	62	31	46.2
Critical values	***1.80***	***0.200***	***0.080***	***0.190***	***1.100***	***0.130***	***2.0***	***10.0***		***15***	

Table 2: Leaf tissue analysis values for plant cane following the peanut cropped fallow and bare fallow

Stalk count dynamics

In both trials plant cane stalk numbers peaked at approximately 4 months and then declined (Figures 3 a-b). Stalks per square metre at the final count (395 DAP) were not significantly different in both trials and were in the order of 12.3 and 13.5 at the respective nitrogen rates of 45 and 150 kg/ha in the peanut cropped trial and 12.4 and 13.3 stalks/m² respectively in the bare fallowed plant cane (Table 3)

Figure 3a: Stalks per hectare in plant cane following a peanut fallow at two nitrogen rates (45 and 150 kgs/ha)

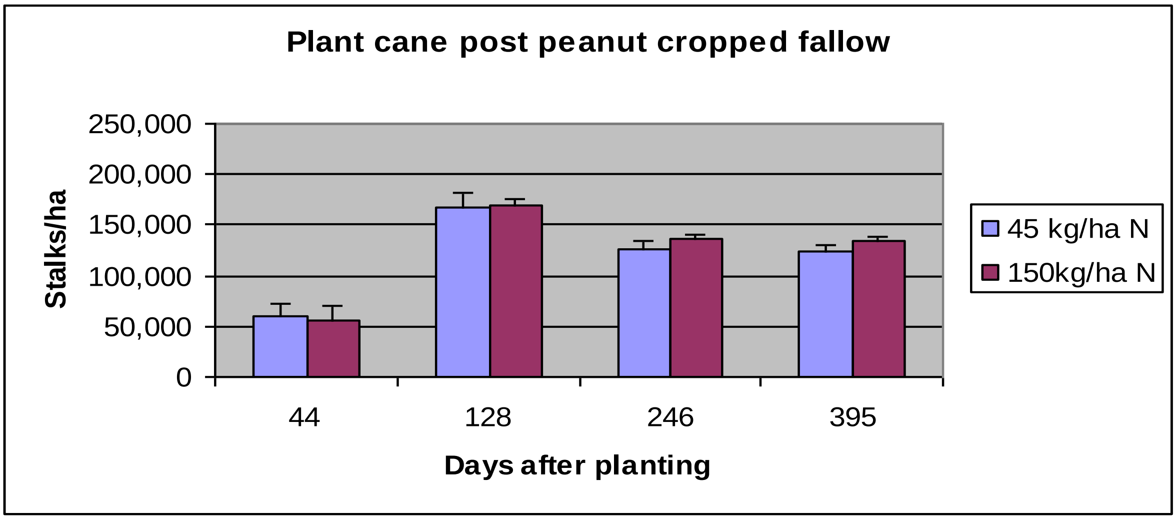
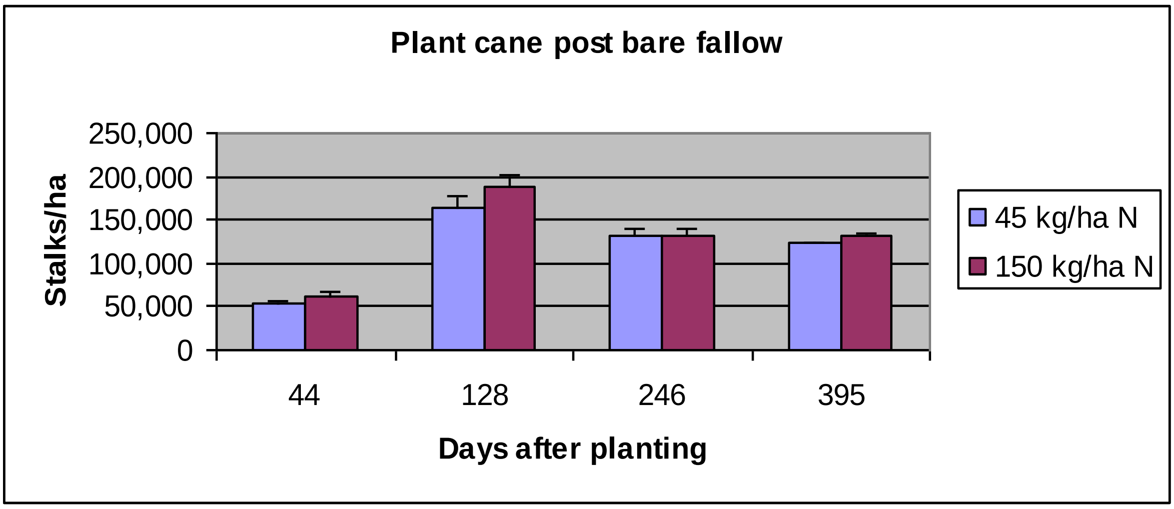


Figure3b: Stalks per hectare in plant cane following a bare fallow at two nitrogen rates (45 and 150 kgs/ha)



Nitrogen treatments (kg/ha nitrogen)	Average stalk count/m²			
Peanut	44 DAP	128 DAP	246 DAP	395 DAP
45	5.9	16.7	12.7	12.3
150	5.6	16.9	13.7	13.5
Bare fallow				
45	5.4	16.4	13.1	12.4
150	6.1	18.7	13.2	*13.2

- *Based on two replications*

Table 3: Average stalk counts over time in plant cane following the and peanut cropped fallow and a bare fallow

Machine harvest- Cane Yield, CCS and Sugar Yield

Both trial plots were machine harvested on the 27/09/2007 utilising the BSES weigh truck (Figure 4).

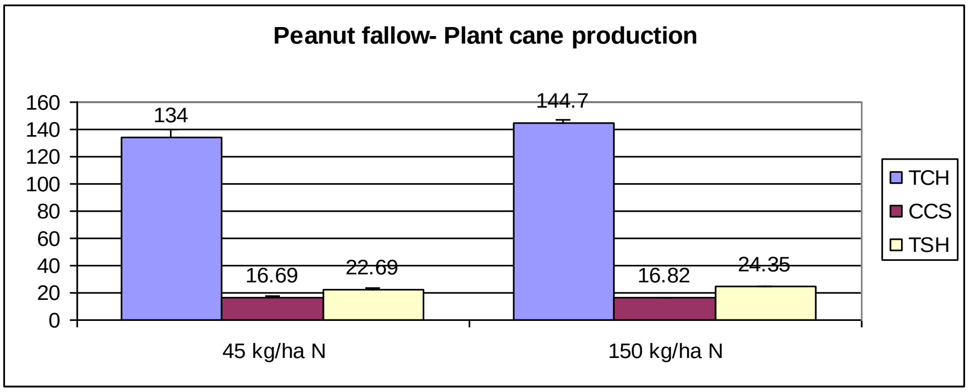
Figure 4: Blackburn Harvesting with the BSES weigh truck cutting the trial plots

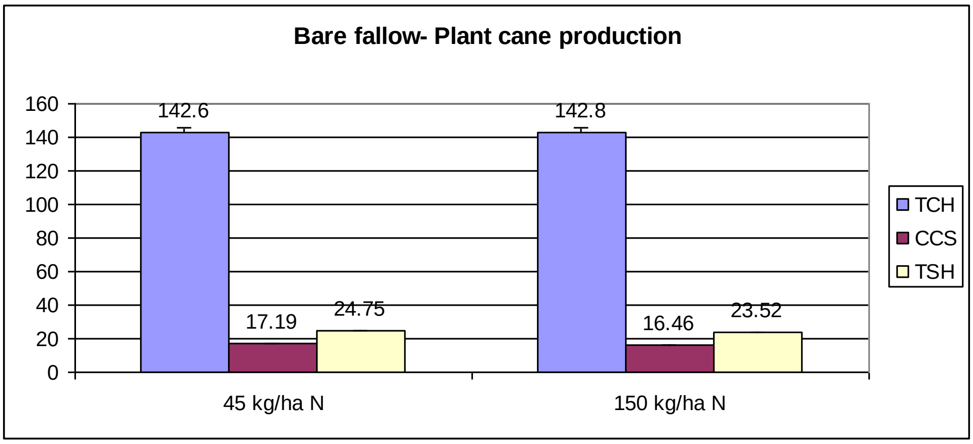
In the peanut cropped fallow trial, tonnes of cane per hectare (TCH), CCS and tonnes of sugar (TCH) values were all higher in the 150 kg/ha N treatments. However statistically there were no significant differences in TCH, CCS or TSH between the two nitrogen treatments. Similarly there were no significant differences in TCH or TSH in the bare fallow trial, but the 45 kg/ha nitrogen rate produced a significantly higher CCS (*p=0.039*) than the 150kg/ha nitrogen treatment (Table 4 and Figure 5). However this result was based on two replicates (the third replicate of the two treatments was harvested for smut resistant planting material)

Nitrogen treatments (kg/ha nitrogen)	Replicate averages		
Peanut cropped	**TCH**	**CCS**	**TSH**
45	134	16.69	22.69
150	144.7	16.82	24.35
Significance	*nsd p= 0.123*	*nsd p=0.774*	*nsd p=0.259*
Bare fallow			
45	142.6	*****17.19	24.75
150	142.8	16.46	23.52
Significance	*nsd p=0.314*	******p=0.039*	*nsd p=0.164*

Table 4: Plant cane yield (TCH), CCS (%) and sugar yield (TSH) for two nitrogen rates in a peanut cropped and bare fallow management system

Figure 5: Graphic representation of plant cane yield (TCH), CCS (%) and sugar yield (TSH) for two nitrogen rates in a peanut cropped and bare fallow management options

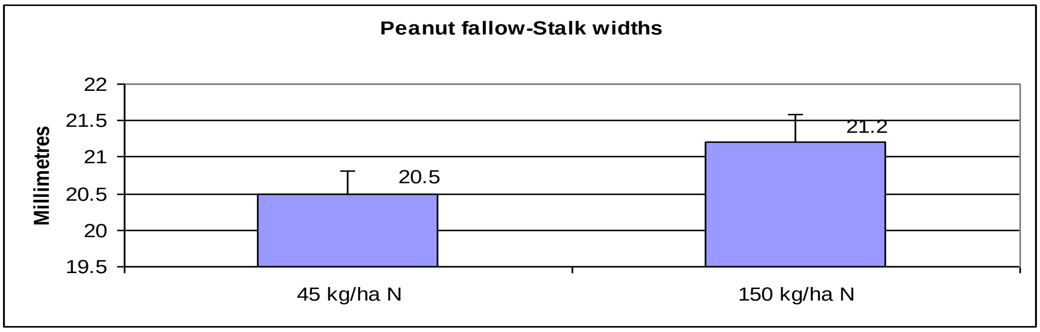


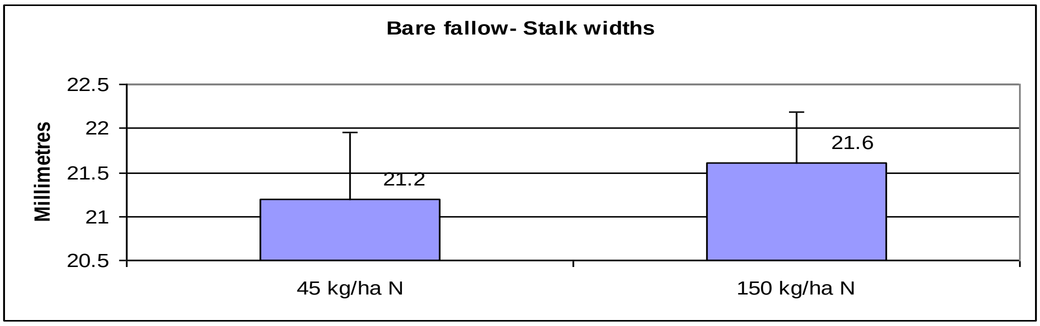


Stalk widths at harvest

Six stalks were randomly selected from the permanent measurement areas in each replicate and from both trials (plant cane following peanut and bare fallow systems); callipers were used to measure stalk widths between notches at height of 90 cm. Although average stalk widths were greater in the 150 kg/ha nitrogen treatments in both trials, statistically there was no significant difference in stalk widths in either of the trials (Figure 6)

Figure 6: Graphic representation of average plant cane stalk widths by treatment (45 and 150 kg/ha nitrogen) in both peanut and bare fallow management systems





Economic analysis of peanut and bare fallow management systems

Economic evaluation based on the trial results have been confined to a gross margin analysis of the peanut cropped fallow management system and a tabulation of the costs associated with management of the bare fallow (Table 5). Gross margins were not calculated for plant cane crops grown after the respective fallow management systems as there was no significant yield responses to the nitrogen treatments (45 and 150 kgs/ha) in either of the trials. However, in the case of fallow peanut cropping the additional expenses associated with the extra workings and herbicide costs necessary for the planting of cane and management of weeds was considered in the peanut gross margin (Tables 6 and 7)

VARIABLE COSTS ($/ha)		**GST exclusive**						
Machinery Ops (F.O.R.M)		**Ops**			**Price $/unit**			**$/ha**
	Disc	2			$20.99	/ha		$41.98
	Ripping	1			$26.79	/ha		$26.79
	Rotary Hoe	1			$56.09	/ha		$56.09
	Bedform	1			$19.58	/ha		$19.58
								$ 144.44
Weed control		**App(s)**		**Rate**				
	Glyphosate	3	@	4.00	Lt @	$8.50	/Lt	$102.00
	Boomsprays	3	@			$3.24	/ha	$9.72
								$111.72
TOTAL EXPENSES								**$256.16**

Table 5: Expenses related to the management of the bare fallow

GST exclusive

INCOME							**PER HA**
Market Price					$820.00	/tonne	
less: Freight					$100.00	/tonne	
ON-FARM PRICE (clean & dry)					$720.00	/tonne	
YIELD (uncleaned)					5.00	t/ha	
PAYMENT YIELD					4.40	t/ha	
GROSS INCOME / ha							**$3,168.00**

VARIABLE COSTS ($/ha)

Item	Applns	@	Rate/ha	Unit	Price $/unit	Per	PER HA
Machinery Operations (F.O.R.M)			**Applns**		**Price $/unit**		
Ripping			1		$26.79	/ha	$26.79
Rotary Hoe			2		$56.09	/ha	$112.18
Bedform			1		$ 19.58	/ha	$19.58
							$ 158.55
Additional land prep for plant cane post threshing							
Ripping			*1*		*$ 26.79*	/ha	*$26.79*
Zonal hoe					*$ 56.09*	/ha	*$56.09*
							$82.88
Planting							
Seed			133	kg	$2.27	/kg	$301.91
Planter			1	ha @	$68.00	/ha	$5.00
Freight in			1	@	$7.52		$7.52
							$377.43
Fertilizer			**Rate/ha**				
MPO			110.00	kg/ha	$431.00	/tonne	$47.41
Gypsum			1000.00	kg/ha	$130.00	/tonne	$130.00
Spreader			1	@	19.45	/ha	$19.45
Soil test			1	@	$ 60.00	/ha	$60.00
							$256.86
Herbicide	**Applns**		**Rate/ha**				
Mag Sulfate	3	@	1.00	kg	$1.40	/kg	$4.20
Flame	1	@	0.40	Lt	$131.00	/Lt	$52.40
Wetter	1	@	1.00	Lt	$5.60	/Lt	$5.60
Sod moly	1	@	0.20	Lt	$18.00	/Lt	$3.60
Man Sulfate	3	@	1.00	kg	$1.37	/kg	$4.11
Solubor	1	@	5.00	kg	$4.00	/kg	$20.00
Copper Sulfate	3	@	1.00	kg	$1.80	/kg	$5.40
Zinc Sulfate	6	@	1.00	kg	$0.71	/kg	$4.26
Boomsprays	5	@			$3.24	/ha	$16.20
							$115.77
Additional herbicide required for plant cane due to peanut fallow cropping							
Glyphosate	*1*	*@*	*4.00*	Lt	*$ 8.50*	/Lt	*$34.00*
Atradex	*1*	*@*	*1.50*	kg	*$ 9.80*	/kg	*$14.70*
Starane	*1*	*@*	*1.50*	Lt	*$ 21.65*	/Lt	*$32.48*
Boomsprays	*2*	*@*			*$3.24*	/ha	*$9.72*
							$90.90
Disease control							
Bravo (fungicide)	7	@	1.2	Lt	$22.80	/Lt	$191.52
Alto	1	@	0.4		$134.00	/Lt	$53.60
Boomsprays	8	@			$3.24	/ha	$25.92
							$271.04
Irrigation							
Water Part B			1.00	ML	$47.43	/ML	**$47.43**
TOTAL GROWING EXPENSES - $277.88/tonne							**$1,227.08**
Harvesting:							
Pull and rake	1	@			$50.00	/ha	$50.00
Peanut threshing	1	@			$80.30	/tonne	$401.50
Cleaning/drying	1	@			$20.00	/tonne	$100.00
Consultancy	1	@			$68.00	/ha	$68.00
TOTAL HARVESTING EXPENSES @ 4.40 tonnes/ha							**$619.50**
TOTAL VARIABLE EXPENSES - $419.68/tonne							**$1,847.00**
Additional plant cane costs associated with peanut fallow cropping							***$173.78***
GROSS MARGIN / ha							**$1,321.00**
Adjusted gross margin with additional costs associated with peanut cropping							***$1,147.22***

Table 6: Variable costs and gross margin analysis of the peanut cropped fallow including additional plant cane costs associated with peanut cropping within a cane production system

Fallow management system	Growing costs/ha	Harvesting costs/ha	Total variable costs/ha	Gross margin	Extra costs accrued to plant cane	Revised gross margin
Peanuts (4.4 ton/ha)	$1,227.08	$619.50	$1,846.58	$1,321.42	$173.78	$1,147.22
Bare	Nil	Nil	$256.16	-$256.16	Nil	Nil

Table 7: Variable costs and gross margins associated with peanut production and the management of a bare fallow

Conclusion

The absence of plant cane yield response to the nitrogen treatments (45 and 150/kg/ha) following the peanut and bare fallow management systems may be attributed to the trial block's history of mill mud application and a traditionally generous nitrogen application regime on previous plant and ratoon crops. The results of the soil and leaf tissue analysis confirmed the high residual levels of macronutrients in the trial block

The trial results indicate that nitrogen rates on plant cane may be significantly reduced in certain soil types especially those with a long history of mill mud applications. However, verification should be sought through soil and plant tissue analysis. Further nitrogen trials in plant cane following peanut cropped cane fallows may be required to determine nitrogen requirements in a range of soil types. This may be of particular importance in the more sandy soil types ideally suited to peanut production

Good record keeping of input costs and yield data has enabled the determination of accurate gross margins and confirms the ability of a well grown fallow peanut crop to improve cash flow in a cane production system

Intellectual Property and Confidentiality:

(If there is any protected Project Technology, eg information that has been kept confidential, such as equipment specifications, patentable knowledge please outline. Is there anything in this report that should be treated as confidential, and if so under what circumstances?)

Nil

Capacity Building:

(How has the Group's capacity to conduct R&D and implement better farming systems been enhance?)

The Blackburn group has determined that an increased understanding in trial design data collection was achieved. They have also developed better understanding of collecting information from an economics perspective to determine if a gross margin is achievable which has allowed for better decision making within their business. The project has enabled the group to understand the impact of the rotational crops such as peanuts and the benefits to the following cane crops.

Outcomes:
(What benefits have been achieved or are expected from the project, and what more has to happen to get the full benefit from the project? How do the expected benefits compare with those predicted at the start of the project, as outlined in the Application?)

The different layers of information collected has allow for increased understanding to better manage at the block level the nutrient requirements.
The Blackburn group has adopted block specific management to increase gross margins as well as the adoption into a controlled traffic farming system.
Clear understanding of the advantages of precision agriculture and the practical benefits of utilising the technology

Environmental Impact:
(Outline any adverse or beneficial environmental impacts of conducting the Project and/or implementing its findings)

The main environmental benefit of this project is the ability to manage to nutrient application to the crop requirements while maintaining yield. All the benefits of a controlled traffic system has been achieved, minimising soil disturbance, compaction , reduced traffic and increase soil biology.

Communication and Adoption of Outputs:
(Outline any communication activities that have been conducted and any that are planned. How has SRDC been acknowledged or involved? Have any lessons from the project been applied by members of the Group, or others?)

Communication strategy

On the 24 April a information bus trip with 54 growers look at the trial site and a discussion on the trail was conducted. They were also able to have a look at our rotational crop of peanuts which was ready for harvesting on the next block which was planted on guidance.
Information field day was conducted at Gerry Deguara's farm with 27 attending. The final yield results and trail data was presented.
A presentation was delivered at the GIVE DAY in Mackay on the 27-28 February. 284 growers and industry people attended.
A bus trip after the give day was held which 26 people attended they look at trail results and also had a look at our farm system which includes peanut trails of the latest varieties. John Hughes (Future Cane) gave a presentation at a Industry Trail Information day on the 22 of January held in Mackay were industry bodies attended.

Recommendations:
(What recommendations would you make as a result of the project, including suggestions for further research and development?)

Precision agriculture offers a wide range of benefits to the Australian sugar industry and environment credentials will be achieved, supporting research in this area will deliver benefits, it is the group's recommendation that further research is conducted within site specific management.

Publications:
(List and attach copies (electronically if possible) of all articles, newsletters and other publications from the project.)

Canegrowers article: Mackay Newsletter.

WORKING SMARTER, NOT HARDER IN THE SUGAR INDUSTRY
Being successful in the sugar industry is not about working harder, but working smarter and Mackay region growers are leading the way in innovative practices which lead to better crop yields.
The Blackburn family of Eton have been involved in the cane industry since the mid 1940s and contrary to many young people, the sons of the family are looking for ways to stay in the industry, rather than moving off to other work.
As Blackburn Harvesting, they are using new technology to build their cane business, but needed to marry the technologies together with better yields to make the investment worthwhile.
“We are utilizing GPS and satellite technology in our harvesting and planting but realised we had to manage the soil better to get better yields from the same amount of hectares,” Lee Blackburn said.
So Lee and his brother Chris put together a plan to study their use of fertilizer combined with a break crop of peanuts, grown out to harvest on fallow ground.
“We knew we needed to do some very accurate soil mapping to get an accurate result from our trials and enlisted the help of Joe Muscat from Grower Group Services and John Hughes of Future Cane to design our trial areas,” Lee said.
“We divided a trial site of three hectares into sections and the soil mapping was duplicated four times over three years to get the variable results,” Chris said.
“It did take some extra effort, almost three times as long, to prepare and plant the whole paddock, but we had to be sure the results would be accurate.”
In the first two test sections cane was planted into fallow ground with no fertilizer added, and into ground with normal rates of fertilser added.
In the third section cane was planted into ground in which peanuts had been grown to harvest with no extra fertilizer added and in the fourth section, cane was planted into ground where peanuts had been grown and fertilizer added.
“At harvest, some sticks were hand cut and weighed while other sticks were measured and weighed by the BSES weigh truck, and the bins of cane were also measured and weighed at the mill,” Lee said.
“So there were three lots of measurements and weights to match up at the end of the trial.”
“There were some surprises in the results,” Chris said.
“We found there was no real yield benefit in top dressing with nitrogen over the site where peanuts had been grown and although the soil lost more nitrogen in the unfertilized site, the nett returns were still better than we had expected.
“Our conclusions were that a light top dressing with nitrogen on cane planted into soil where there had been a legume crop, gave only a very slight yield benefit.”
The other interesting result was that though the cane sticks grown on the fallow land were thinner, there was no loss of yield.
“The main thing affecting the yield was the amount of water added,” Lee said.
“The fertilized cane had thicker sticks, but a rain event took the fertilizer off the soil and the sticks lost nutrient anyway,” Chris said.
The research was funded by SRDC in conjunction with the Blackburn Family and results were presented for other farmers to evaluate at a recent GIVE day.