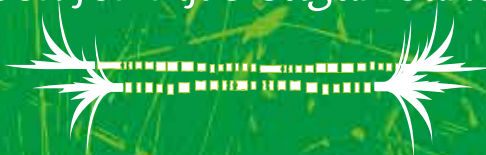


Establishing and Implementing a Farmer Field School

A handbook for Fiji's sugar cane industry



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Making a difference to
Fiji's sugarcane communities



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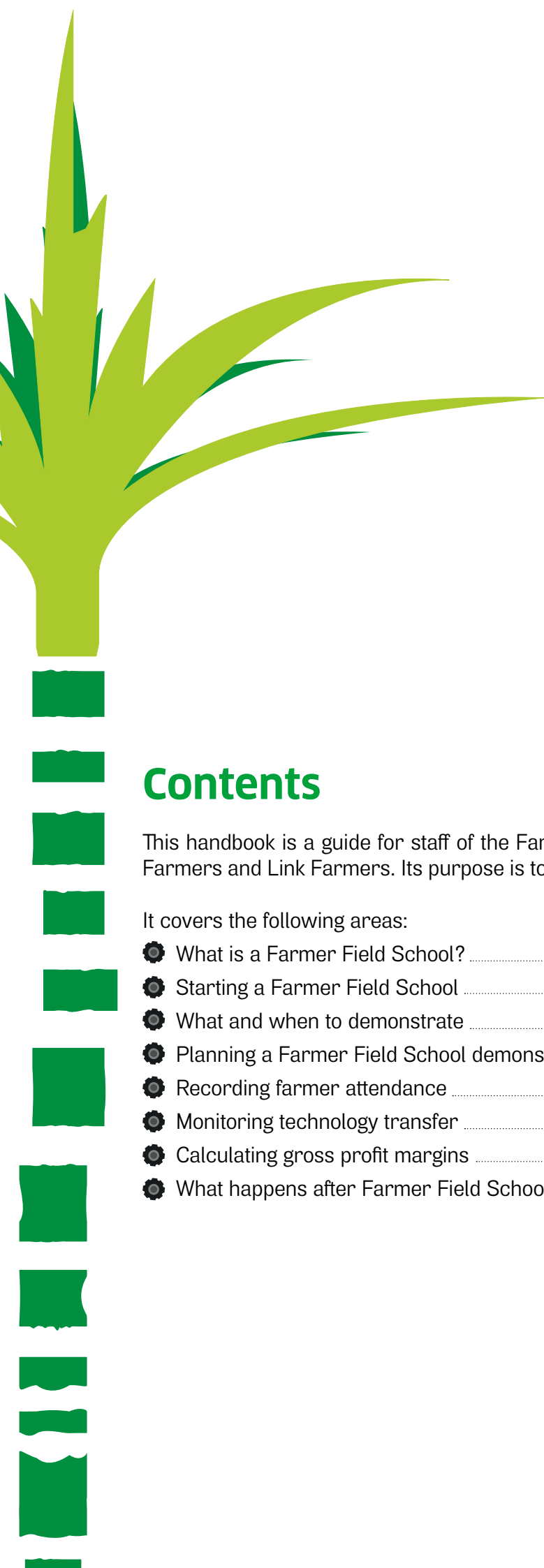


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Contents

This handbook is a guide for staff of the Farm Advisory Services of Fiji's sugar industry, Leader Farmers and Link Farmers. Its purpose is to explain how Farmer Field Schools are implemented.

It covers the following areas:

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What is a Farmer Field School (FFS)?

A farmer field school (FFS) consists of a group of farmers and a farm to demonstrate, practice and learn new farming technologies. An FFS is led by a Leader Farmer who has been trained in 'best practices' in sugarcane cropping as well as in subjects such as leadership, communication and farming-as-a-business. The FFS runs for a period of two years during which best practices in fallow management, plant and ratoon cane are covered. The Leader Farmer is supported by the Farm Advisory Services (FAS), notably FAS team leaders within the Fiji Sugar Corporation (FSC).



Leader Farmers in training and graduating from Leader Farmer training

Farmers who are interested in learning new sugarcane production technologies, and who are community members, can join an FFS to learn farming techniques from the Leader Farmer. Group members of an FFS are called Link Farmers.

The FAS Team Leader often assists with establishing an FFS, but Leader Farmers can also establish their own FFS group, although they should inform the FAS Team Leader of their intent.

The learning environment of the FFS is a farmer's field, which may belong to the Leader Farmer or one of the Link Farmers. In this field, the Leader Farmer shows Link Farmers how to practice new sugarcane husbandry technologies by using a 'hands on' approach, which enables group members to learn by doing.

FFS members meet on a regular basis, usually in their FFS field. Meetings are timed to follow the sugarcane cropping calendar. During these meetings, group members assess and discuss the progress of a previously demonstrated technology, and demonstrate new technologies.



Starting a Farmer Field School (FFS)

The Leader Farmer starts an FFS by inviting his or her Link Farmers for a first meeting. This meeting involves discussions and planning and therefore, may take place at a more convenient meeting place than in the FFS field. During this meeting, FFS group members talk about their cane farming business and make a list of the problems they encounter on their farms.



While sharing and discussing their problems, farmers analyse:

- ⚙ Why is something a problem?
- ⚙ Has it always been a problem?
- ⚙ What are the consequences of the problem if it is not solved?



First meeting of a farmer field school in which farmers list and discuss the problems they encounter

Using their own knowledge, and the knowledge that the Leader Farmer received in his or her training, the group identifies solutions for each problem. The group also decides which field they will use for their FFS, and which of the solutions they are going to try in their FFS field.

Following this meeting, the Leader Farmer informs the FAS Team Leader about the location of the FFS field and the technologies that he or she plans to demonstrate to the FFS group.

The FAS Team Leader collects details of every FFS in his or her sector,¹ and, with the Leader Farmers, prepares a programme to support practical implementation of each FFS. Together, the Team Leader and Leader Farmers decide when the Team Leader will visit their FFS for the first demonstration.

¹The 'Sugar Belt', the area where cane farming takes place in Fiji, is divided into 23 sectors. Each sector is headed by an FSC Team Leader who is responsible for providing advisory services to cane farmers. He or she advises farmers about best practices to increase cane production.



Farmers engaged in analysing the problems on their farms

What and when to demonstrate

Demonstrations are planned according to two sugarcane cropping calendars: the fallow and plant cane management calendar, and the ratoon² management calendar. Annexes 1 and 2 present the two calendars.

Each calendar is broken down into activities:

- Six activities for fallow and plant cane management, and
- Three activities for ratoon management.

The calendars clearly show which activity should be demonstrated during which month of the year. The technologies related to each activity are also indicated.

Each activity in the calendars corresponds to an FFS demonstration session. Only those technologies related to that activity should be demonstrated during the demonstration day.

FFS group members are free to demonstrate all of the technologies related to the activity, or to choose just those that will address their immediate problems.

However, it is often beneficial for FFS group members to demonstrate a broad range of technologies, because group members may discover new ways to improve their farming to increase cane production.

²Ratoon cropping is growing a fresh crop from the stubbles or suckers of the plant crop without replanting.

Planning a Farmer Field School demonstration session

A demonstration session is a meeting of the FFS group during which the Leader Farmer demonstrates different technologies that are appropriate during that time and in line with the cropping calendar. After the demonstration, Link Farmers practice the technologies in the FFS field. During the days following the demonstration Link Farmers will apply the technologies on their own farms.

Invite the FAS Team Leader

If necessary, the Leader Farmer invites the FAS Team Leader to provide back-up support during the FFS demonstration session (e.g. a Leader Farmer might want an expert present when demonstrating the mixing and application of a weedicide).

If an FAS Team Leader knows that he or she is unable to attend the demonstration days of each individual FFS in the sector, all of the Leader Farmers of the sector can be invited to attend the first demonstration session. This way, Leader Farmers can familiarise themselves with how to run a demonstration session, after which they can conduct their own demonstrations on their own farms, and with their own group members.

Invite Link Farmers

If the FFS group is working on fallow and plant cane management, the Leader Farmer invites all of his or her Link Farmers. **Note:** those Link Farmers who intend to plant cane during the coming weeks must attend.

If the FFS group is working on ratoon management, all of the Link Farmers must attend because this husbandry practice concerns everyone.

The Leader Farmer makes sure to indicate the place and time of the FFS and encourages farmers to arrive on time.



Farmer field school demonstrations



Checklist

For proper planning, the Leader Farmer should prepare a checklist of materials needed for the demonstration. An example checklist is given below.

Activity	Materials needed	Who will provide
Opening the drills	Tractor	Farmer who has a tractor
Fertilisation	Aglime, Blend A	Leader Farmer Leader Farmer
Planting	Knives Seed material	All farmers Leader Farmer

Recording farmer attendance

Farmer attendance is recorded to help the Leader Farmer monitor the interest of Link Farmers. The attendance record may help to explain why some farmers have, or have not adopted certain technologies. The Leader Farmer uses the 'attendance sheet' (see Annex 3) to record who was present during demonstration sessions. On the sheet, the Leader Farmer records the names and farm numbers of each of the Link Farmers. After a demonstration session the Leader Farmer:

- Fills in the date of the session in the column next to the corresponding activity, and
- Marks the boxes of each Link Farmer (i.e. a tick for present, and a cross for absent).

The attendance sheet is used for the whole year; therefore, the attendance sheet should be protected from rain and dust, and kept in a safe place.

Monitoring technology transfer

Technology transfer, or whether farmers adopt farming technologies, is recorded by the FAS Team Leader, using two monitoring forms (see Annex 3). There are separate forms for fallow and plant cane management, and for ratoon management. The monitoring forms correspond with the technologies listed for each activity in the calendars. To monitor technology transfer, the FAS Team Leader:

- Visits the FFS group some days or weeks after the FFS demonstration session;
- Records a technology as 'adopted', only when it was seen to be practiced by the Link Farmer on his or her farm.

By monitoring technology transfer, the FAS Team Leader is able to measure achievements against annual targets.

The FAS Team Leader may also request the Leader Farmer to do the monitoring although this should only be done after a thorough explanation of how to fill out the form.



Calculating gross profit margins

Farm gross margins are a tool used by farmers to determine how profitable their farming business is. They are also used as a planning tool to determine how profitable a farm could potentially be. The gross margin for cane is the difference between the cost of producing the cane and the income earned after the cane is sold.

Leader Farmers have been trained in gross profit margin calculation, and can help Link Farmers to calculate their gross margins.

To calculate gross margins, a farmer must know all the costs and expenditures of his or her farming operations. Therefore, it is important for farmers to keep records of all their financial transactions, including receipts and invoices from input providers, and records of payments for labour.

Templates for calculating profit margins for 'plant cane' and 'ratoon cane' are presented in Annexes 6 and 7.

What happens after Farmer Field School graduation?

Link Farmers graduate from the FFS when they have participated in all FFS demonstration sessions, covering each activity in both fallow and plant cane management, and ratoon management, and have adopted the technologies on their own farms. Link Farmers can graduate two years after a FFS was started.

Link Farmers can now become Leader Farmers. For this they need to establish their own FFS group by identifying 10–15 other farmers who are interested in learning cane production technologies, and inform the FAS Team Leader. The FAS Team Leader will plan for the new Leader Farmer to join the training programme.

When all of his or her Link Farmers have graduated, the Leader Farmer decides whether to retire, or to continue as a Leader Farmer by establishing a new FFS group with new Link Farmers. The possibility of establishing a new FFS depends on the interest of other farmers in the community.

If a Leader Farmer retires, he or she can continue to interact with the FAS Team Leader to obtain new knowledge and identify new opportunities to improve his or her own cane farm.

Conclusion

There are many cane farmers and only a few farm advisory officers in the sugarcane industry. When Leader Farmers join forces with the sugar industry to teach other farmers about new knowledge and practices in cane farming, messages can be spread quickly and effectively. Farmer field schools are a way to help increase national cane production in Fiji in a short span of time.



Annex 1: The Farmer Field School

Calendar for fallow and plant cane management

No.	Activity	Timing	Technologies/ practices	What to demonstrate
1	First land preparation	June to November	Conventional ploughing	Shallow ploughing
				Harrowing (to be done after six to eight weeks when weeds have come up)
			Minimum tillage	Removing old stumps and stools
			Zero tillage	No ploughing
			First cover crop	Sowing of legumes
			Seed cane variety	Selecting variety in accordance with recommendations of the Fiji Sugar Corporation (FSC), and soil test results
			Seed cane nursery	Site selection and planting. Seed cane will be used next planting season (mid-March to June).
			Soil sampling	How to take a soil sample. The results will indicate pH (Aglime requirement) and nutrient levels (fertiliser requirements).
2	Fallow management	October to March	Second cover crop	Sowing of legumes, green manure
			Weed control	Eliminating or reducing weeds
			Pest control	Seeking assistance from Ministry of Agriculture for pests in cover crop
			Seed cane nursery weed control	Eliminating/reducing weeds
			Seed cane prefertilisation	Applying side dressing
			Drain maintenance	Cleaning, clearing, deepening
3	Second land preparation	January to March	Conventional ploughing (without cover crop)	Deep ploughing
				Harrowing
			Minimum tillage (with cover crop)	Ploughing in the leguminous crop
				Harrowing
			Zero tillage	Eliminating or reducing weeds
			Erosion control on hills and slopes	Contour ploughing with Vetiver planting

No.	Activity	Timing	Technologies/ practices	What to demonstrate
4	Planting	Mid-March to June	Field preparation	Harrowing to break the clods and even out the field
			Row spacing	Spacing for mechanisation
			Drill preparation	Single and/or dual drills
			Intra-row subsoiling	Breaking the hard pan
			Cutting and transportation of seed cane	Handling to avoid damage to the eye buds
			Soil conditioning	Applying Aglime (if recommended following soil test)
			Fertilisation	Applying Blend A in the drills at recommended rates
			Planting	Planting in single/dual row drills, overlapping three eye setts
			Intercropping	Choosing the intercrop, why and how to plant (weed control, income)
			Pre-emergence weed control	Applying as soon as possible after planting
			Nursery for gapfilling	Planting left-over seed cane in a nursery for future filling of gaps
5	Maintenance	End of July to end of August	Gap filling	Using nursery materials to fill gaps in the cane crop
			Weed control	Using mechanical means
				Controlling manually
				Applying chemicals (early in the morning when leaves are moist)
			Off-barring	Shallow ploughing away from the stool while avoiding root damage
			Fertilisation	Applying side dressing of Blend B at recommended rates (six to eight weeks after planting)
			On-barring	Ploughing towards the stool to cover the fertiliser
6	Pre-harvest operations	September to May	Irrigation	Operating sprinklers if necessary and resources available
			Weed control	Using cane knives to remove weeds around the base of the cane plant, mainly vines
			De-trashing	Removing excessive leaves to increase sugar content

Annex 2: The Farmer Field School

Calendar for ratoon management

No.	Activity	Timing	Technologies/ practices	What to demonstrate
1	Post-harvest operations	Mid-June to end of harvest	Trash conservation	Leaving 'blanket trash'
				Practicing 'alternate row trash' to allow for inter-row tilling and intercropping
			Stump slashing	Using the cane knife
				Using the mechanical slasher
			Gap filling	Using existing large stumps to fill the gaps
			Off-barring	Deep ploughing away from the stool to reduce the stump size (where trash is burned or alternate-row cultivation is practiced)
			Fertilisation	Applying side dressing of Blend C, at recommended rates
			Soil conditioning	Applying side dressing of Aglime (if recommended following soil test)
			On-barring	Ploughing towards the stool to cover the Aglime
			Intercropping	Choosing the intercrop, why and how to plant (for weed control, for income)
2	Maintenance	Mid-June to May	Gap filling	Using material from existing large stumps
			Weed control	Using mechanical means
				Controlling manually
				Applying chemicals (early in the morning when leaves are moist)
			Headland maintenance	Applying chemicals to keep the area free of weeds
3	Pre-harvest operations	Mid-March to mid-May	Leaf sampling	Taking leaf samples to establish fertiliser requirements
			Weed control	Using cane knives to remove weeds around the base of the cane plant, mainly vines
			De-trashing	Removing excessive leaves to increase sugar content

Annex 3: Attendance register

Attendance register												
Leader Farmer name							Farm N°		Year			
Link Farmer name												
Farm N°												
Fallow and plant cane management												
	Date	Present/absent										
Activity 1: First land preparation												
Activity 2: Fallow management												
Activity 3 : Second land preparation												
Activity 4 : Planting												
Activity 5: Maintenance												
Activity 6: Pre-harvest operations												
Ratoon management												
	Date	Present/absent										
Activity 1 : Post-harvest operations												
Activity 2 : Maintenance												
Activity 3 : Pre-harvest operations												

Annex 4: Monitoring form for fallow and plant cane management

Fallow and plant cane management monitoring form Measuring 'best practice' adoption												
Leader Farmer name											Farm N°	Year
Link Farmers' names												
Farm nos												
Land preparation - conventional (ac)												
Land preparation - minimum tillage (ac)												
Land preparation - zero tillage (ac)												
Selection seed cane - Variety												
Selection cover crop - variety												
Seed cane nursery (Y/N)												
Soil sampling (Y/N)												
Seed cane nursery fertilisation (no. of bags)												
Drainage (no. of meters)												
Contours (no. of meters)												
Vetiver planting (no. of meters)												
Widening interrows (Y/N)												
Drilling - single rows (ac)												
Drilling - dual rows (ac)												
Interrow ripping (ac)												
Aglime/Cement (no. of bags)												
Blend A (no. of bags)												
Overlapping seed cane (ac)												
Intercropping (ac)												
Pre-emergent weed control - chemical (Y/N)												
Gap filling (ac)												
Glyphosate (headland, drains, etc) (Y/N)												
Second weed control - manual (Y/N)												
Second weed control - mechanical (Y/N)												
Second weed control - chemical (g/l)												
Blend B (no. of bags)												
Irrigation (Y/N)												
De-trashing (ac)												
Third weed control - manual (Y/N)												
Third weed control - chemical (g/l)												
TOTAL												

Annex 5: Monitoring form for ratoon management

Ratoon management monitoring form Measuring 'best practice' adoption												
Leader Farmer name	Farm N°					Year						
Link Farmers' names												
Farm nos												
Trash conservation - blanket (ac)												
Trash conservation - alternate row (ac)												
Slashing of stumps (ac)												
Off-barring (ac)												
Filling the gaps (ac)												
First weed control - manual (Y/N)												
First weed control - mechanical (Y/N)												
First weed control - chemical (g/l)												
On-barring (ac)												
Fertilisation - Blend C (no. of bags)												
Aglime/cement (no. of bags)												
Intercrop (ac)												
Plough out/harrow if necessary (ac)												
Second weed control - manual (Y/N)												
Second weed control - chemical (g/l)												
Glyphosate (headland, drains, etc) (Y/N)												
Third weed control - manual (Y/N)												
Third weed control - chemical (g/l)												
De-trashing (ac)												
Leaf sampling (Y/N)												
TOTAL												

Annex 6: Gross margin template for plant cane with intercrop

Gross margin analysis Plant cane and intercrop							
Plot id.							Total
Plot area (ac)							
Cultivated area (ac)							
Harvested area (ac)							
Production (tonnes)							
Yield (tonnes/ac)							
Variety of cane							

	Plot...		Plot...		Plot...		
Land prep and planting	Date	Cost	Date	Cost	Date	Cost	Total
Conventional land preparation							
Land clearing							
1st ploughing							
1st harrowing							
2nd ploughing							
2nd harrowing							
Minimum tillage							
Zero tillage							
Seed cane harvesting							
Seed cane transportation							
Drill opening							
Subsoiling (drill)							
Planting (labour)							
Gap filling (labour)							
Irrigation							

Interrow cropping							Total
Shallow ploughing							
Planting							
Other (specify)							

Fertilisation							Total
Blend A cost							
Blend A application (labour)							
Blend B cost							
Blend B application (labour)							
Aglime/cement cost							
Aglime/cement application (labour)							

Gross margin analysis Plant cane and intercrop							
Weedicide							Total
Pre-emergence weedicide cost							
Pre-emergence labour cost							
First post-emergence weedicide cost							
First post-emergence weedicide labour cost							
Second post-emergence weedicide cost							
Second post-emergence weedicide labour cost							
Third post-emergence weedicide cost							
Third post-emergence weedicide labour cost							
Detrashing (labour)							
Glyphosate cost							
Glyphosate (labour)							

Other weed control							Total
Manual (labour)							
Mechanical (tiller cost)							

Harvesting and transport							Total
Labour cost							
Truck/tractor charges							

Other costs							Total
Specify							

Analysis

Plant cane	
Total income	
Total operating costs	
Operating profit/loss	

Intercrop	
Total income	
Total operating costs	
Operating profit/loss	

Annex 7: Gross margin template for ratoon cane with intercrop

Gross margin analysis Ratoon cane and intercrop							
Plot id.							Total
Plot area (ac)							
Cultivated area (ac)							
Harvested area (ac)							
Production (tonnes)							
Yield (tonnes/ac)							
Variety of cane							

	Plot...		Plot...		Plot...		
Ratoon maintenance	Date	Cost	Date	Cost	Date	Cost	Total
Trimming of stools (labour)							
Off barring (labour, tractor)							
On barring (labour, tractor)							
Tilling costs							
Alternate row trash conservation (labour)							
Filling the gaps (labour)							
Other (specify)							

Interrow cropping							Total
Shallow ploughing							
Planting							
Other (specify)							

Fertilisation							Total
Blend C cost							
Blend C application (labour)							
Aglime/cement cost							
Aglime/cement application (labour)							

Weedicide							Total
Post-emergence weedicide cost							
Post-emergence application (labour)							
De-trashing (labour)							
Glyphosate cost							
Glyphosate application							

Other weed control							Total
Manual (labour)							
Mechanical (tiller cost)							

Harvesting and transport							Total
Labour cost							
Truck/tractor charges							

Analysis

Plant cane	
Total income	
Total operating costs	
Operating profit/loss	

Intercrop	
Total income	
Total operating costs	
Operating profit/loss	

Notes

This image shows a single sheet of white paper with horizontal green ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



Making a difference to
Fiji's sugarcane communities



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