SUGAR RESEARCH INSTITUTE OF FIJI

ANNUAL REPORT 09

SUGAR RESEARCH INSTITUTE OF FIJI
SRIF

MISSION STATEMENT

To advance the industry by excellence in technology transfer emanating from research results through science that supports innovative activities in sugar related industries and to make the Fiji Sugar Industry productive and sustainable

BOARD MEMBERS

The board members in office for the reporting period were:

Philip G. Atherton	Chairman
Prof. John R. Morrison	Member
Dr. Krishnamurthi	Member
Apisai Ucuboi	Member
Seru Vularika	Member
Jain Kumar	Member
Suresh Patel	Member

SCIENCE AUDIT COMMITTEE

The SAC members during the reporting period were:

Dr. Krishnamurthi	Chairman
Prof. John R. Morrison	Member
Seru Vularika	Member
Jain Kumar	Member
Philip G. Atherton	Member

SRIF BOARD 2009

(L-R) Dr. Krishnamurthi, Seru Vularika, Jain Kumar, Jai Gawander (CEO), Suresh Patel, Apisai Ucuboi, Philip Atherton (Chairman), Sanjay Prakash (Board Secretary), Prof. John Morrison

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Forward 2009

The year 2009 was one of the better years for the Institute due to the financial support from the European Commission (EC). The funds were utilized in two very critical areas, namely training and replacement of some old equipment. For many years, the Institute neglected staff development due to limited funds, a situation which would have continued without the EC funds. This much needed financial support is absolutely vital for the future of the Institute, particularly in view of the recent decline in cane and sugar production. The poor mill performance, adverse weather conditions, increased fertilizer prices, rapid demographic growth and urbanization have all contributed to cane production decline. However, it is increasingly evident that the government is providing almost unconstrained support to the industry. The government's proposed reform on land issues with regard to long-term leases for arable land for sugarcane and other agricultural products could help restore the confidence of growers in the industry. The acquisition of long-term leases and the use of science and technology at the farm level could be the two most important parameters to mitigate declining cane and sugar yields. The Institute continues to focus on its key strategic areas of cane improvement, crop protection and management through various research projects. However, this year a more multi-disciplinary approach was taken with work programs. This appears to have improved cohesion and encouraged increased interaction amongst the researchers. Thus, inter-departmental barriers have been reduced, which augers well for a small institution that needs to have multi-skilled staff. In addition, the preparation of research projects has assisted in ensuring that the research is relevant to our stakeholders and more targeted to industry needs. The Institute aims to provide the industry with high performing varieties, well adapted to the agro-ecological conditions in Fiji. Breeding of sugarcane varieties is a complex and lengthy process involving many intricate and difficult procedures. Each step plays an important role and, during the year, the researchers with the assistance of Dr Krishnamurthi were able to study the pollen viability period and also improved the fuzz germination of poly crosses significantly to 59%. The crossing team also made a number of experimental crosses with a different genera ***Erianthus arundinaceous*** which is closely related to the saccharum species***.*** A number of varieties from various stages of selection were progressed to the next stage of selection. The variety Kiuva was released for commercial planting during the year. The release of varieties for commercial planting is based mainly on high sugar yield per unit area, longer ratoonability and resistance to diseases. The protection of the industry against diseases and pest incursions is a high priority for the Institute and warrants a proactive approach. The Institute has so far managed to keep the industry reasonably free of most of the major pests and diseases. However, to

continue to enjoy the same protection will require advances in biotechnology. The industry needs to be prepared for financial support to develop this aspect of the Institute by providing sufficient funds. Routine screening of Fiji leaf gall (FLG) disease continued during the year and some preliminary progress has been made in isolating a fungus that appears to parasitize the cane weevil borer *Rhabdoscelus obscurus* larvae and adults. The rouging unit inspected 10 830 hectares and eradicated 2791 FLG stools. During the year, two Hot Water Treatment (HWT) plants were also constructed under EC funding. Due to delays in construction, only 80 hectares of seed cane were established. The primary nursery consisted of 6 hectares and the distribution nursery was established on 72 hectares. It is essential to encourage growers to take up seed cane from the nurseries next year. Steady progress has been made on nematode studies and various types of nematodes have been identified in almost all soil types. It is evident from the studies that plant parasitic nematodes are much higher than the non-plant parasitic nematodes. This project will be continued into the new year by looking at management technologies to reduce the levels of nematodes. This year, due to the financial support from the EC, the Institute was able to commence studies on nitrogen replacement, weed control and soil compaction. The preliminary results from compaction studies indicate that farms which have been worked with harvesters for several years have significant compaction below 25 cm depth. The financial support provided by the EU made it possible to plant 164 intercrop trials and the results of these are very significant. If the intercrop is well managed, the grower is able to make a small profit after taking out the cost of establishment of cane and intercrop per unit area. However, with only a moderate production of intercrop, the grower should be able to recover up to 70% of the cost of establishment of cane and intercrop. The Institute needs to remain focused to become a centre of excellence which is cost effective and produces marketable products for the industry. The Institute has fostered close relationships with the EC and Bureau of Sugar Experimental Station Limited in Australia.

This year I would like to put on record thanks and appreciation to our entire network of staff from all categories in our substations and main office for their support and commitment to the Institute. The industry is well served by this group of dedicated and loyal individuals, who undertake wide-ranging duties under difficult situations for the industry for which they receive almost no or little gratitude. The SRIF staff work collectively by providing technical guidance to protect and advance the sugar industry on issues affecting its ability to be sustainable and profitable. I would also like to thank the outgoing Chairman and two other board members who have completed their tenure on the Board for their useful contribution.

Jai S Gawander
Chief Executive Officer

CROP IMPROVEMENT

Germplasm
Crossing
Selection program
Promising varieties
New released variety
Tissue Culture

Germplasm

The germplasm collection is located in Lautoka at Drasa Estate and near Sugar Research Institute office at Drasa Avenue. It contains pure species of sugarcane, wild cane and hybrids. Table 1 gives a summary of the collections.

Table 1: Germplasm Collection

Name	Type	Number
Drasa	Hybrids Noble cane Wild canes	3108
China Garden	IJ/IK/IS Hybrids	1179
KT &BT	Wild canes Hybrids	330
JRP	Pure sponts Robustums	324
Total		4941

A sub collection of 182 varieties were selected from the germplasm collection and planted in the breeding plots in Dobuilevu. These varieties were selected with a view to make experimental crosses and development of parental lines. A germplasm collection expedition was carried out from 23-26 September, 2009 and 76 noble canes, 1 hybrid and 4 wild canes were collected. These varieties have been planted in breeding plots at Dobuilevu. The characterization of the germplasm has been initiated to recognize the important varieties and isolate them for future use as parents in crossing.

Flowering beds

There were five flowering beds located in Dobuilevu that provided flowers for crossing in 2009. Details of the flowered varieties are provided in table 2.

Table 2: Flowering Bed details

Number of varieties	454
Varieties flowered	323
% flowered	71
Female varieties	112
Male varieties	144
Male/Female varieties	67

Three new flowering beds were planted in 2009 and 2 old beds were retained. A total of 699 varieties are present in these Beds for 2010 crossing season.

Crossing

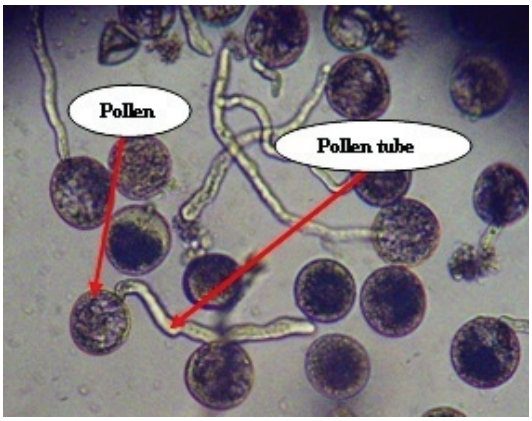
A temporary crossing shed (picture 1) was constructed with lighting system which was used to accommodate male flowers for poly crosses as well as some bi-parental crosses. The crossing season started on 01 May and continued till 15 July 2009. The detials of the crosses made is given in table 3.

Table 3: Types of crosses made

Type of Cross	No. of crosses	% Total crosses
Polycrosses	561	69
Bi-parental	180	22
Experimental	77	9
Total	818	100

Picture 1: Temporary crossing house with lights

Some of the bi-parental crosses were set outdoors and supported on the posts. The female varieties for poly crosses were labeled in the field and on-stool pollination was carried every morning after collecting pollen in the shed. Pollen viability tests were carried out for pollen from *Erianthus spp., S. robustum;* commercials Kaba, Yasawa, Vatu, Spartan, hybrids LF94-694, LF99-777, LF00-201, LF01-30 and LF97-273. The number of pollen tube that grows on a sample of pollen cultured on the microscope slide will indicate its viability.



Picture 2: Pollen tube growth

Pollen from *Erianthus arundinaceous, S. robustum,* commercial variety Kaba and advanced hybrid LF97-273 were also collected and studied at different time intervals. The results showed that as time progresses from dawn, the pollen viability decreases. Pollen viability is best early in the morning. The pollen from *S. robustum* and Kaba lost its viability two hours after dawn while *Erianthus arundinaceous*, LF97-273 and Kaba maintained its viability for four to five hours. The results from the viability tests will be used to compare seed sett in respective crosses.

Table 4: Pollen Viability

Time	Erianthus	Robustum
5-5.30a.m.	70-80%	–
6-6.30a.m.	40-75%	50%
8-8.30a.m.	45-50%	35-45%
12.30-1p.m.	1-2%	20-35%
3-3.30p.m.	–	0%
5.30-6p.m.	0%	–

Note: – no pollen shedding

Fuzz Sowing

Fuzz sowing commenced on 21st July and ended on 29th September. A total of 785 packets of fuzz was sown that included fuzz from the past five years. 331 packets germinated (42.2 %) and produced 32396 seedlings. The number of seedlings that germinated per cross varied substantially from as low as 1 to as high as 1095. The percentage germination for the fuzz collected during the 2009 crossing season is presented in table 5.

Table 5: Fuzz germination

Type of cross	% germination
Polycrosses	59
Bi-parental	15
Experimental	46

2009 Experimental Crosses

During the 2009 fuzz sowing season 66 experimental crosses were sown which included 11 crosses from 2008 crossing season and 55 crosses from 2009 crossing season. Only 25 of the 2009 crosses germinated and the number of seedlings ranged between 5-500 per cross and most of these were crosses made with robustum .

Selection Program

Stage 1

This year LF2008 series seedlings were evaluated and LF2009 series seedling planted. A total of 10527 varieties were brixed in LF2008 Stage 1 and 926 clones (8.7%) were selected and planted as Stage 2. A total of 28952 seedlings were planted as LF2009 Stage 1 of which 2181 were seedlings from experimental crosses. The LF2009 Stage 1 trials have been planted in Waqadra, Nadi Estate and Lautoka.

Stage 2

LF2007 Series Evaluated

The brixing of the LF2007 series varieties were done in early July and a preliminary selection of 282 varieties were made that was based on brix values and the agronomic desirability. Physical observations of these varieties were recorded and sampled for small mill analysis. Based on the bio-chemical data and the observations recorded, 76 varieties were selected primarily on sucrose (%POCS) and fibre content. These varieties were advanced to stage 3observation plots and were planted on 11/09/09.

Table 6: %POCS Range

Selection Range (%POCS)	Varieties Selected
≥ 16	7
15.00 ≤ 15.99	22
14.00 ≤ 14.99	37
13.00 ≤ 13.99	9
≤ 13.00	1
Total	76

LF2008 Series Planted

A total of 926 LF2008 series varieties were planted in Stage 2 single line plots at Field 9 in Waqadra, Nadi Estate. The varieties in this trial will be evaluated in 2010.

Stage 3

LF2006 series

The LF2006 series varieties were evaluated in mid September when the cane was 12 months old. A total of 86 varieties were sampled for the small mill analysis. Based on the bio chemical data, 14 varieties were selected and advanced to the stage 4 seedbed at Drasa in October. Out of the 14 varieties planted, 11 are high POCS varieties and 3 are high fibre varieties. Table 6 shows the 14 varieties that were advanced to stage 4 seedbed.

Table 7: LF06 Varieties Advanced

Variety	Brix	Pol	Fibre	Pocs
Naidiri	20.2	81	10.4	16.0
Aiwa	19.5	76.4	10.2	15.0
LF91-1925	19.1	74.1	8.6	14.8
Ragnar	18.7	71.5	8.8	14.1
Test Varieties				
LF06-433	21.2	84.1	11.6	16.2
LF06-372	20.8	82.4	10.9	16.0
LF06-539	20.5	81.4	10.2	16.0
LF06-381	21.6	84.9	12.9	15.9
LF06-566	21.6	85.5	13.9	15.9
LF06-525	20.6	81.1	10.3	15.8
LF06-353	20.2	79.9	10.5	15.6
LF06-426	20.7	81.4	11.7	15.6
LF06-499	20.1	78.6	10.3	15.3
LF06-320	19.9	78.9	11.5	15.3
LF06-591	20	78.6	10.9	15.3
LF06-336	19.8	76.8	13.4	14.4
LF06-529	20.1	75.7	12.0	14.1
LF06-165	19.4	73.5	12.5	13.8

Stage 4

LF2005 series planted

Eleven varieties from LF2005 series were planted in stage 4 trial at Drasa in field 10. The trial was planted in mid September and the seedcane was 12 months old at the time of planting. The trial received above average rainfall. Due to poor quality seedcane, some gaps were noted in the plots and supplying was carried out in the trial. The plant crop of these trials will be analyzed in 2010.

LF2004 Series evaluated

Large Population Trial

Introduction

The large population trial was planted for the first time in 2008. This trial was established taking into account the sampling and weighing problems encountered with small plot trials. The idea behind the large plot trials was to plant one trial on a poor soil that could be mechanically harvested and weighed at the mill weighbridge so that an improved assessment of the yield could be obtained. It was also assumed that varieties that would perform well on poor soils would also perform well on the rich soils.

Results and Discussion

This trial was planted in June 2008 at Legalega Research Station. There were 16 test varieties and two standards (Ragnar and LF91-1925) planted in long rows that ranged from 150 to 340 meters in length. Arsonists burnt this trial on two separate occasions and in the second fire, substantial damage was done as more than 80% of the trial was destroyed.

Pre-harvest cane samples were taken from all the varieties and from whatever cane that was left after burning. The cane samples were analyzed to get some indication of the biochemical data. This trial was harvested over a period of 10 days in mid October and the cane was 16 months old at the time of harvest. Due to the damage caused by the fire, the plots could not be weighed as initially planned. The plot weight of three varieties (LF04-116, 615 and 448) that were not damaged when the trial was burnt was recorded.

The stand of the varieties LF04-116 and 615 were poor. LF04-116 has tall stalks but the stool population is low while LF04-615 has short stalks (stunted) with poor physical appearance. LF04-448 has tall stalks (2-2.5m) and stood out among all the varieties because of its height and erect stand. It gave a yield of 20.2 tonnes from 3 rows that were 340m long. The biochemical results of this variety are presented in table 7.

Table 8: LF04-448 laboratory data

Rep	Brix	pol	Fibre	%pocs
1	21.6	80.3	13.5	14.5
2	21.6	80.3	14.6	14.3
3	21.4	83.3	14.0	15.4
4	22.0	81.3	12.2	14.7
Avg.	21.7	81.3	13.6	14.7

Picture 1: Promising variety LF04-448

One promising variety LF04-448 has been identified from the stage 4 large population trial. This variety will be further evaluated in the G x E interaction trials at the mill centres from 2011. Another promising variety LF94-694 was planted in the large mill trial that will be conducted at Rarawai in 2010. This variety is high yielding with moderate sugar.

Development of high fibre varieties

One high fibre variety LF02-541 was planted in Rarawai for Large mill trial in 2010.

Large Mill Trial

The high fibre variety LF97-382 was tested in the large mill trial in 2009. This variety does not have a positive agronomic desirability and is very trashy. It is unlikely to be accepted by the growers.

Promising Varieties

One promising variety LF94-694 was planted in the large mill trial that will be conducted at Rarawai in 2010.

Newly Released Variety Kiuva

One variety Kiuva that was bred from the cross between Mana and Vatu was released in 2009. A field day was held in August 2009 to launch this variety. The Prime Minister was the chief guest and a wide cross section of the sugar industry personnel was present during the launching. A display of the research work conducted by the Institute was put up for the benefit of the invited guests.

Picture 2: Prime Minister addresses guests at launch of Kiuva

Tissue culture

Tissue culture work re-commenced during the year and some basic training on culture-medium preparation, lamina flow set-up and aseptic techniques of callus culture, was conducted. The aim of tissue culture project is to produce varieties that can mask unfavorable characteristics like; disease and pests resistance, high sugar yield and many others.

ANALYTICAL LABORATORY

Soil & Leaf Samples
Cane Samples
Dextran Analysis
Quality Assurance System

Introduction

SRIF's Analytical Laboratory provides Fertilizer Advisory Services to the growers and further analytical services required for research projects within the institute. Leaf samples are analyzed for major nutrients (Ca, Mg, K, Na, P and N) while soil samples are analyzed for soil pH and major nutrients. Soil and leaf samples are mostly analyzed for blended fertilizer recommendations and to determine the status of each nutrient in the sample. Cane samples are mainly analyzed to determine %POCS (pure obtainable cane sugar) and % fibre for research trials conducted by the respective sections in four mill area. Soil sampling for nitrogen mineralization and phosphorus absorption index project were carried out in Drasa, Saweni, Lovu and Lautoka sector.

Soil salinity and sodicity assessment are carried out by the laboratory when requested by the Sugar Industry Tribunal to determine the suitability of reclaimed area for economical cane cultivation. Other analysis the laboratory conducts on request, are cation exchange capacity, soil texture, organic matter and total nitrogen. The laboratory also provides training attachment opportunities to graduates.

Soil and Leaf Samples

The number of soil, leaf and cane samples received and analyzed for year 2009 is shown in Table 1. There has been a reduction in number of leaf and soil samples received and a total of 500 were analyzed for research and advisory purposes. A total of 101 soil and 30 leaf samples were analyzed for Fertilizer Recommendations.

Soil salinity and sodicity analysis were carried out on 138 farms that were affected during the January floods and the assessment reports were discussed with respective farms.

Cane samples

A total of 2461 cane samples were analyzed for brix, pol, and fibre to determine %pocs in the small mill. The cane samples were from plant breeding program trials and field audit. The field audit samples were taken from farms to observe cane weevil borer damage. Three stalk samples per sector were taken from four farms on hilly terrain; three stalk samples from four farms on slopes (rolling) terrain and; three samples from four farms on flat terrain were analyzed in small mill. Dextran analysis was conducted on 61 burnt cane samples from Lautoka mill yard.

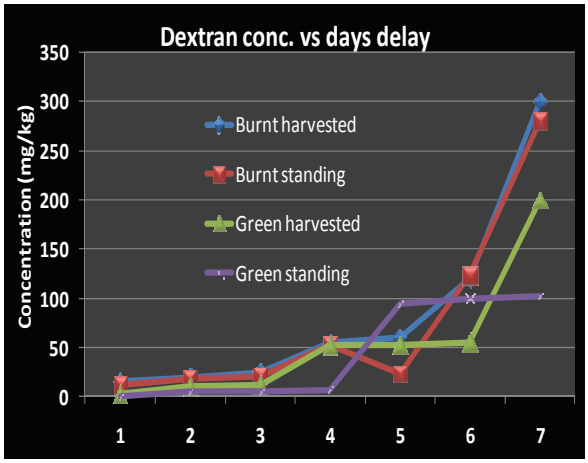
Table 1: Total number of Soil, Leaf & Cane Samples analyzed in 2009

District	Soil		Total
	Advisory	Research	
Lautoka	47	276	323
Rarawai	20	36	56
Labasa	18	24	42
Penang	16	14	30
Total	101	350	451
	Leaf		
Lautoka	30	19	49
Total	131	369	500
	Cane Samples		
	Disease	Variety	
Routine		1139	1139
Field Audit	331	991	1322
Total	331	2130	2461

Dextran – Alcohol Haze Method

Dextran are glucose polymers with basic straight chains of linked glucose units and are formed by the action of bacteria (*Leuconostoc mesenteriodes)* on sucrose which create slimes and increases the viscosity of cane juice. Leuconostoc mesenteriodes enters exposed cane tissues caused by mechanical harvesting, burning, cutting, disease and pests. The presence of dextran creates problems during sugar manufacture and affects the quality of the final product. The Alcohol haze method has been used to analyze dextran in burnt cane. Green cane was used as a control for the analysis. Four sets of analysis were done with standards and the results were used to plot the graph of dextran concentration against the number of days.

Upon analysis, it became apparent that the delay in processing harvested cane results in higher dextran levels. When compared, burnt harvested cane showed higher dextran values compared to burnt standing, green standing and green harvested cane.



Quality Assurance System

The Analytical Laboratory continues to upgrade its instrumentation and services on a regular basis. The internal quality control program is well established due to set up of quality assurance program with members of SPACNET for accreditation of our laboratory to international standards.
The laboratory conducts the QC checks by having standard as well as random control samples and referring to the accepted range of values for QC samples. Any value out of the range is investigated and corrective measures are under taken to ensure the criteria set for quality assurance is followed.

The laboratory also carries out its internal quality assurance on calibration of laboratory equipment and instruments, quality control checks, training and documentation. Daily calibration checks of room temperature, balance and other instruments are carried out as scheduled and recorded.

The analytical laboratory joined the Australasian Soil and Plant Analysis Council exchange sample proficiency under SPACNET funding three years ago and has received certification in most of elements analyzed and assessed. Under the SPACNET program, four leaf and soil samples will be sent thrice annually to ASPAC members for analysis using different methods and the results will be assessed and certified.

METEOROLOGY

Rainfall – Mill Centres
ENSO event
Relative Humidity
Sunshine
Earth Temperatures
Soil Moisture
Air Temperatures
Evaporation
Rainfall Tables

Introduction

The Sugar Research Institute of Fiji maintains well-equipped daily climatological recording (DCR) stations and forty-three rainfall recording sites in the cane growing areas. Basic observations of temperatures (Dry, Wet, Max, Min, Earth), rainfall, amount of clouds, visibility, sunshine, wind direction, wind force, evaporation are recorded at the DCR station at 9am daily. At the end of the month the data is compiled and forwarded to Fiji Meteorological Station. The daily climatiological data plays a vital role in predicting weather forecast, producing climate summary and quarterly climate outlook for the sugarcane belt.

Rainfall

The enhanced South Pacific Convergence Zone (SPCZ) brought heavy rainfall and wetter than normal conditions were experienced around the country from January to March. Several sites recorded new daily and monthly rainfall in the first quarter of 2009. Heavy rainfall from 6th to 14th January resulted in severe flooding on the main islands and caused major damages in the cane belt. The transition months (April to May) saw considerable variation in rainfall activity as the SPCZ gradually migrated north and gave way to migrating mid-latitude systems. While some sites experienced drier or wetter than normal conditions, majority of the sites experienced normal rainfall during this period. The dry season (June to August) rainfall was marked by passage of upper troughs and frontal systems which saw Fiji receiving near normal rainfall with a few sites receiving above normal rainfall. There were some parts of Fiji that received considerably low rainfall and experienced short dry spells over the dry season. There was noticeable change in the climate with an early stage of El Niño development that was apparent in June. The transition months from dry to wet (September to October) was marked by high variability in rainfall especially in September when the country was influenced by a series of eastward moving frontal systems.

October was considerably drier than normal as weak to moderate El Niño started to impact the country's rainfall.

There were several sites that recorded significantly below average rainfall and were in a drought condition and many into warning status. Although the El Niño phenomena appeared around June to August period, its lagged effect did not affect Fiji's rainfall until October. Large areas in the north-western parts of Viti Levu, southern Vanua Levu and parts of the Eastern Central Divisions received well below average rainfall and were in a state of Meteorological drought at the end of November.

The country experienced its first Tropical Cyclone "Mick" on December 13. Torrential rainfall associated with the cyclone caused flooding in low lying areas and major rivers of Nadi, Ba and Rewa. The drought conditions that existed eased but some parts of the Eastern Division continued to experience drought conditions.

Earth Temperature

The earth temperatures at all depths (5cm, 10cm & 20cm) were slightly less than or equal to the long time mean values throughout the year.

El Niño Southern Oscillation (ENSO)

The 2009 El Niño event, which started around June 2009, became well established across the tropical Pacific in October 2009. Until mid-October, the event had maintained only a weak magnitude but intensified to moderate strength over the November to December period. The major contributing factor for intensification in magnitude was the strong and persistent westerly wind anomalies especially in October.

Relative Humidity

Relative Humidity values were average to above average in most parts of the country for January ,March & November and average to below average for February, April, May & June. Below average to above average humid condition prevailed for July to October.

Sunshine

Generally the sunshine hours varied from below average to average at the four recording sites (Nadi, Suva, Rotuma and Nacocolevu. In January & April, sunshine hours were below average and later the sunshine hours recorded were average.

Soil Moisture

From January to March, the soil moisture was moderate to sufficient for good growth of cane. The rest of the months, the soil moisture status was dry-limiting while drought like conditions prevailed from July-November which is very dry with limiting cane growth.

Air Temperature

The maximum and minimum air temperatures were near average across most of the country in February. A new monthly mean air temperature of 31.6ºC was recorded at Ono-i-Lau during this month. From March to June the maximum and minimum air temperatures were average or above average across most of the country. Two new daily high minimum and a new low minimum air temperature record were established during July. The two new high minimum air temperatures records were 25.3^{o}C at Lautoka and 23.8^{o}C at Rarawai (Ba). Maximum and minimum air temperatures were below average at most sites in October. Six air temperature records were broken during the month. Both maximum and minimum air temperatures were cooler than normal at most sites in November. Seven daily and seven mean monthly air temperature records were broken during the month.

Evaporation

The sunken pan evaporation readings were below average throughout the year and varied from month to month. The raised pan evaporation was above average throughout the year except in January it was below average. The precipitation to evaporation ratios were generally low throughout the year except for the months of January and March (refer table 6).

Table 1: Rainfall (mm) for all mills – 2009

Mills	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Lautoka Mill													
Monthly Rainfall	1280	262	384	110	116	72	34	65	223	42	52	237	2875
No. of rain days	24	22	26	14	9	8	2	4	7	12	6	10	144
*40yrs Avg (1970-2009)	374	309	309	188	85	71	55	73	77	100	133	187	1960
% of average	342	85	124	58	135	102	62	89	291	42	39	127	147
Rarawai Mill													
Monthly Rainfall	944	358	353	91	150	77	28	27	237	57	48	223	2591
No. of rain days	14	19	24	12	8	8	4	6	12	5	7	6	125
*40yrs Avg (1970-2009)	380	351	376	205	94	82	43	68	78	103	147	238	2163
% of average	248	102	94	44	160	93	66	40	305	56	33	94	120
Penang Mill													
Monthly Rainfall	1255	305	184	188	276	79	68	52	114	22	28	493	3064
No. of rain days	24	19	24	16	11	12	7	12	12	6	8	12	163
*40yrs Avg (1970-2009)	426	335	384	255	153	97	55	73	91	105	147	256	2376
% of average	295	91	48	74	180	81	124	71	126	21	19	193	129
Labasa Mill													
Monthly Rainfall	805	454	259	211	94	111	93	16	153	14	106	163	2479
No. of rain days	26	22	22	16	15	12	8	5	8	3	7	11	155
*40yrs Avg (1970-2009)	407	357	361	247	111	76	53	49	78	114	178	258	2288
% of average	198	127	72	85	85	147	176	33	197	12	59	63	108

*Note: The long term average rainfall data presented has been standardized to 40 years average for all the mill recording sites.

Table 2: Rainfall data (mm) for Lautoka, Nadi and Sigatoka Districts 2009

Sector	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Drasa	1535	360	261	193	100	43	29	34	227	54	43	227	3105
No. of rain days	18	17	18	7	5	2	1	3	5	1	5	7	89
Lovu	1569	332	291	184	82	65	28	95	214	58	58	165	3141
No. of rain days	17	15	12	6	5	4	1	2	6	3	5	6	82
Saweni	1335	307	344	138	104	103	33	9	118	61	39	198	2790
No. of rain days	15	16	14	6	5	3	1	1	3	1	5	4	74
Natova	1268	280	329	87	132	91	48	56	185	59	96	230	2861
No. of rain days	14	18	16	5	5	4	1	3	5	1	4	5	81
Legalega	1412	282	220	74	188	52	65	18	182	51	64	223	2830
No. of rain days	13	18	12	4	6	4	2	2	4	1	4	5	75
Meigunyah	813	187	271	40	149	62	70	26	198	51	56	196	2119
No. of rain days	11	16	11	4	6	4	2	2	5	1	5	5	72
Qeleloa	343	224	221	75	158	64	69	59	261	38	61	169	1742
No. of rain days	10	16	14	5	6	4	2	2	4	1	4	4	72
Navo Dist/Office	622	336	490	117	251	156	150	138	304	44	44	289	2942
No. of rain days	12	17	14	7	8	4	3	3	5	1	3	5	82
Malolo	362	348	426	126	157	143	189	66	315	42	140	269	2583
No. of rain days	11	17	14	7	7	4	3	2	5	1	4	5	80
Nawaicoba	402	355	413	29	90	114	106	65	231	54	41	161	2059
No. of rain days	11	15	16	4	6	4	4	2	5	1	4	4	76
Yako	465	167	169	51	94	94	89	43	257	64	37	99	1629
No. of rain days	9	12	6	2	4	4	4	2	4	1	3	4	55
Lomawai	514	200	258	66	151	72	82	77	139	98	52	81	1787
No. of rain days	9	15	13	6	5	5	4	4	4	2	2	5	74
Cuvu	431	261	238	88	155	84	98	107	165	70	4	92	1791
No. of rain days	9	15	13	9	5	4	6	4	7	2	1	3	78
Olosara	423	282	188	100	179	72	88	109	178	60	5	115	1799
No. of rain days	10	16	9	8	5	4	5	3	5	2	1	2	70

Table 3: Rainfall data (mm) for Rarawai Mill 2009

Sector	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Varoko (Sarava)	1396	259	412	138	115	64	40	15	186	60	30	147	2862
No. of rain days	18	14	14	4	4	5	2	2	5	2	5	3	78
Mota	1069	394	469	110	132	97	42	25	244	49	75	165	2871
No. of rain days	17	16	15	4	5	5	2	2	6	3	6	3	84
Naloto (Nukuloa)	1029	343	550	115	109	81	65	15	287	135	64	148	2941
No. of rain days	18	14	14	3	4	4	3	1	5	2	5	3	76
Rarawai	944	280	337	60	131	75	56	26	187	51	44	169	2360
No. of rain days		13	14	3	4	5	2	3	5	1	5	4	59
AES - Rarawai	944	358	353	91	150	77	28	27	237	57	48	223	2591
No. of rain days		19	24	12	8	8	4	6	12	5	7	6	111
Koronubu	1774	337	313	127	112	59	45	2	240	46	49	178	3282
No. of rain days	19	15	12	5	4	5	4	1	6	3	6	4	84
Veisaru (Navatu)	1261	290	321	142	97	69	40	9	158	34	37	192	2650
No. of rain days	17	15	13	5	4	5	2	2	5	1	4	4	77
Varavu	1383	199	203	92	148	61	15	14	169	20	50	189	2543
No. of rain days	17	16	12	6	6	4	2	3	6	1	5	3	81
Tagi Tagi	1393	306	162	41	161	53	39	5	175	43	14	211	2603
No. of rain days	11	12	11	3	4	3	2	1	4	1	3	3	58
Yaladro (Tavua)	1539	301	370	122	172	47	29	5	220	30	11	145	2991
No. of rain days	11	12	11	3	4	3	1	1	4	1	2	3	56
Drumasi	1077	410	421	128	120	144	29	2	158	24	20	105	2638
No. of rain days	11	14	11	3	4	3	2	1	4	1	4	3	61

Table 4: Rainfall data (mm) for Penang Mill – 2009

Sector	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Nanuku	1128	375	156	195	262	42	26	14	105	18	9	70	2401
No. of rain days	10	10	6	7	3	3	1	2	4	2	2	3	53
Malau	1255	305	184	188	276	79	38	52	114	22	28	493	3034
No. of rain days	24	19	24	16	11	13	6	12	12	6	8	12	163
Ellington I	547	85	162	93	56	4	0	0	98	6	47	103	1201
No. of rain days	16	10	17	8	3	1	0	0	13	6	19	16	109
Ellington II	1785	841	324	243	249	186	117	134	0	23	78	228	4209
No. of rain days	16	18	17	13	8	7	6	7	0	3	6	12	113

Table 5: Rainfall data (mm) for Labasa Mill 2009

Sector	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Rokosalase (Solove)	691	310	297	167	71	53	123	15	126	3	15	114	1983
No. of rain days	27	15	13	11	12	5	6	5	9	1	5	6	115
Naravuka (Bulivou)	496	259	353	230	90	69	257	60	147	29	34	165	2188
No. of rain days	16	9	16	13	7	5	12	6	9	4	3	8	108
Natua (Seaqaqa)	919	334	361	184	148	94	163	20	113	42	27	33	2438
No. of rain days	27	20	22	14	15	9	8	6	9	7	5	5	147
Seaqaqa Sub. St.	1060	341	310	284	139	163	80	35	176	6	189	117	2899
No. of rain days	24	17	16	11	13	8	6	5	6	2	9	5	122
Waiqele	952	338	323	161	115	177	99	21	151	8	164	144	2654
No. of rain days	18	15	18	8	10	6	6	4	9	1	9	12	116
Wailevu	838	449	245	240	117	113	83	16	157	8	99	149	2514
No. of rain days	28	16	16	10	12	7	5	6	9	2	7	8	126
Vunimoli	1249	549	335	211	104	117	181	37	175	26	126	172	3282
No. of rain days	20	18	18	12	11	5	7	4	7	4	6	13	125
Korowiri	805	454	259	211	94	111	93	16	153	14	106	163	2479
No. of rain days	26	22	22	16	15	12	8	5	8	3	7	11	155
Nagigi (Bucaisau)	777	470	321	222	127	71	77	57	193	12	80	187	2595
No. of rain days	17	16	18	9	10	7	4	5	7	1	4	8	106
Daku	773	288	275	300	140	81	43	31	169	35	44	318	2497
No. of rain days	17	15	17	15	7	4	4	5	10	2	4	10	110
Kuru Kuru (Daku)	726	279	256	185	106	110	53	39	127	17	43	239	2178
No. of rain days	17	18	14	10	11	9	5	6	6	2	5	10	113
Wainikoro	871	333	285	253	104	101	73	31	156	36	45	322	2610
No. of rain days	15	12	15	13	14	8	5	3	9	3	4	7	108
Vunivutu (Wainikoro)	766	256	284	244	130	100	24	18	168	27	60	288	2365
No. of rain days	16	10	12	12	10	8	8	10	8	3	4	11	112
Papalagi (Wainikoro)	1241	783	707	179	92	51	47	17	241	2	17	365	3739
No. of rain days	16	17	14	8	10	10	3	2	6	1	3	12	102

Table 6: Meteorological data for Sugar Research Institute of Fiji, Lautoka 2009

Measurements	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Relative humidity (%)	80	75	80	75	75	73	72	70	71	67	67	68
√ 40yrs Avg (1970-2009)	75	77	77	75	74	75	72	70	69	69	70	71
Air temperature (°C)												
Mean maximum	30.5	30.9	30.9	31.0	29.6	28.3	28.5	28.5	28.4	28.4	30.1	30.2
√ 40yrs Avg (1970-2009)	31.0	31.1	31.0	30.6	29.6	28.9	28.3	28.4	28.8	29.6	30.4	31.1
Mean minimum	23.7	23.5	24.2	23.0	22.1	20.4	20.3	19.8	20.3	20.4	21.7	22.3
√ 40yrs Avg (1970-2009)	23.8	24.0	23.9	23.0	21.6	20.8	20.0	20.0	20.7	21.6	22.7	23.4
Mean	27.1	27.2	27.5	27.0	25.9	24.3	24.4	24.1	24.3	24.4	25.9	26.3
Highest maximum	33.1	32.1	33.0	32.6	31.3	30.3	30.7	30.1	30.2	30.2	33.3	35.3
Lowest minimum	21.9	20.8	22.9	20.3	19.2	15.4	16.1	15.9	16.1	16.9	18.9	19.8
Evaporation (mm)												
Sunken pan	101.8	114.1	100.8	102.1	99.3	82.7	77.6	113.1	116.4	132.0	160.8	179.8
39yrs Avg (1970-2008)	161.8	121.5	132.6	126.4	108.2	94.7	116.3	135.9	142.3	176.3	162.1	189.6
Raised pan	150.6	160.4	156.9	182.3	217.8	224.5	284.3	316.1	376.8	565.5	561.4	477.6
√ 39yrs Avg (1970-2008)	172.0	146.2	149.1	135.0	125.4	113.4	129.0	142.5	156.5	189.2	188.8	188.8
P:E ratio	8.50	1.63	2.44	0.60	0.53	0.32	0.12	0.21	0.59	0.07	0.09	0.50
Earth temperature (°C)												
5 cm depth	28.8	28.5	28.4	27.1	25.8	24.0	24.3	24.7	26.4	28.7	30.8	29.3
√ 40yrs Avg (1970-2009)	29.9	29.5	29.1	28.1	26.5	25.0	24.3	25.2	27.3	29.5	30.8	30.8
10 cm depth	28.3	28.5	28.6	27.0	26.0	24.0	24.4	24.7	25.7	27.5	29.4	28.3
√ 40yrs Avg (1970-2009)	29.2	28.9	28.6	27.8	26.4	25.1	24.5	25.1	26.6	28.2	29.4	29.7
20 cm depth	28.9	29.3	29.5	28.4	27.6	26.1	26.2	26.3	26.7	28.6	30.2	29.1
√ 40yrs Avg (1970-2009)	29.3	29.9	29.6	29.0	27.8	26.6	26.1	26.6	27.8	29.1	30.1	30.4
100 cm depth	22.2	23.3	23.5	22.9	22.1	20.9	20.4	20.1	20.0	21.2	32.2	22.9
Mean Sunshine (hours)	5.5	6.5	5.5	6.0	6.1	5.6	7.6	6.6	7.0	7.4	7.4	7.0
√ 40yrs Avg (1970-2009)	6.8	6.7	6.3	6.7	6.9	6.9	7.1	7.4	7.0	7.5	7.4	7.1

Table 7: Transeau Ratio (Precipitation/Evaporation) and Moisture Status of Soil 2009

P.E	Moisture status	Months
<0.25	Drought conditions	July, August, October, November
0.26-0.50	Very dry - limiting moisture. Slow growth.	June, December
0.51-1.00	Dry - limiting moisture. Slow growth.	April, May, September
1.10-2.00	Moderate - sufficient moisture for moderate growth.	February
>2.00	Good - sufficient moisture for good growth.	January, March

CROP PROTECTION

Fiji Leaf Gall Disease
Downy Mildew Disease
Ratoon Stunting Disease
Cane Weevil Borer
Disease Control (Rouging)
Nematology

Fiji Leaf Gall Disease (FLGD)

The varieties from the stage two selection of the breeding program were screened for resistance to FLGD. A total of 102 clones were screened together with the recommended 10 standards. These clones were from the LF2007 series. The leaf hopper, *Perkensiella vitiensis* established a reasonable population in early parts of April that existed till the middle of July. The declining population of the leaf hopper is attributed to the increasing use of herbicides in the sugar cane farms. The use of herbicides has increased sharply in recent years. Moreover, the low population densities of the leaf hopper can also be attributed to the low rainfall during the months of May, June and July. The leaf hoppers require young lush growing sugar cane crop for breeding.

After collection the leaf hoppers are bred in captivity in cages that contain *Erianthus maximus* (Fiji 10) varieties which are extremely susceptible to FLGD. The ratio of leaf hoppers that are kept in cage is 1 male to 2 females. The life cycle of a leaf hopper from egg to adult is 39 days. The most crucial stage is the 2nd to the 4th instar stages, because during these stages the nymphs transmit the virus. After breeding in captivity, the nymphs were released to the test clones and the standards. They were kept in insectary for 14 days for the virus to get transmitted. The varieties were inspected on alternate days from the 15th day onwards.

The definitive diagnostic symptom of Fiji disease is raised whitish enations (galls) on the abaxial (back) side of the leaf blade and midrib. The galls are the results of hypertrophy (expansion and multiplication) of the phloem and xylem cells in the vascular bundle resulting from viral infection and multiplication in the cells. Galls generally measure from a few millimeters to 5cm, although some can be observed extending most of the length of the leaf. Other symptoms associated with Fiji disease can also be noted. These symptoms include death of the apical meristem, side shooting, a knife cut appearance to the edge of newly emerged leaves, stunting and death of the plant. Growth of the stalk slows and the newly formed leaves are shorter and stiffer. The top of the plant becomes fan like, and in some instances it appears as if the top of the plant has been bitten off. Plants grown from infected setts are usually stunted, with small, stiff, dark green leaves and often die relatively quickly. Control relies upon the use of resistant cultivars, planting of disease free seed material, inspection and rouging of diseased stools. Fiji disease virus is not mechanically transmittable. Out of the 102 LF2007 clones that were screened, majority of the varieties were resistant. The table below shows the screening results.

Table 1: Resistance of clones screened for Fiji leaf gall disease

Series	LF 07
Resistant	77
Moderate resistant	11
Susceptible	14

Downy Mildew Disease (DOM)

Downy mildew is caused by fungus ***Perenosclerospora saccahari*** and has been successfully eradicated and not recorded since 1996 but regular monitoring of farms is still done. Farms that still grow maize near cane fields are prone to downy mildew. The disease control unit keeps a vigil over any signs and symptoms of Downy mildew disease outbreak. There was no screening for DOM resistance in 2009.

Ratoon Stunting Disease (RSD)

Ratoon stunting disease is caused by bacteria ***Leifsonia xyli*** subsp. ***xyli*** which affects the water transporting vessel (xylem) of the sugarcane plant. Yield losses are higher when the cane is suffering moisture stress. The screening of clones for resistance to ratoon stunting disease was put on hold as the micro plate reader used for ELISA was not working.

Cane weevil borer (CWB)

A new experiment was initiated to study the impact of insect pathogen as a bio-pesticides on *Rhabdoscelus obscurus* larvae and adult.

The main objective of this project was to isolate fungus from the infected cane weevil borer in potato dextrose agar, malt extract agar and to study its effects on cane weevil borer larvae. In addition another objective was to subculture the desired fungus for further experiment and to control cane weevil borer in a trial. Fungus culturing was conducted to find out the exact pathogen to control cane weevil borer. The experiment shows that the cultured fungus that appears green in colour is effective on cane weevil borer larvae and adult.

Currently, fungus culturing is in progress for further trials. The future plan is to control cane weevil borer by using pathogens. The graph given below shows the fungus effectiveness on ***Rhabdoscelus obscurus*** larvae in laboratory trial.

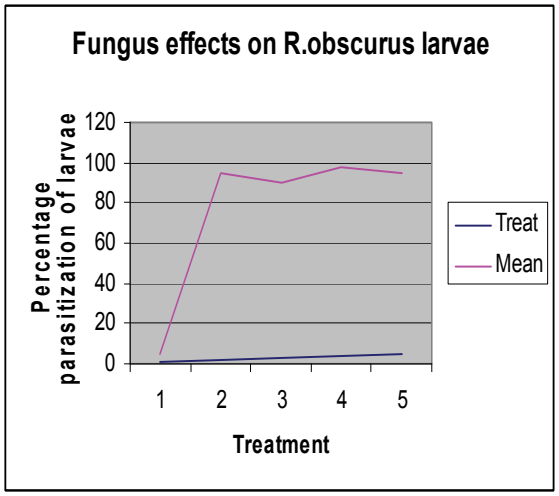
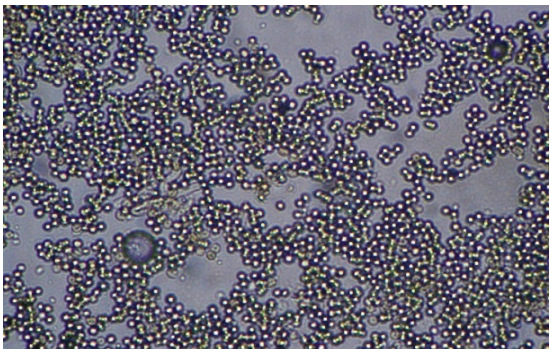


Figure 1: Parasitization of larvae

Table 1: CWB Treatments

T1	Control
T2	5 larvae & 100ml of fungus
T3	10 larvae & 100ml of fungus
T4	15 larvae & 100ml of fungus
T5	20 larvae & 100ml of fungus



Picture 1: Fungus conidia observed under 2000x magnification

Disease Control

The disease control unit is involved in intensive rouging programme to eradicate all traces of Fiji leaf gall disease (FLGD) from commercial fields. However the disease remains endemic in wild canes and **Saccharum edule** (Duruka) in the neighbourhood of commercial plantings and is always transmitted to the cultivated crop by the Fijian sugarcane leaf hopper, *Perkensiella vitiensis*.

The rouging inspections are carried out on all planted cane and in some ratoon crop. Table 2 summarizes the rouging inspection in all the cane district. It has been observed that in some cases FLGD is latent in the plant crop and shows signs in early ratoon stage. A total of 10820 hectares of cane were inspected during the year of which 1320 ha were plant and 9500 ha were ratoon crop (Table 3).

Table 2: Summary of rouging inspections in 2009

Mill District	No. of Farms Inspected	Area Rouged (Ha)		No. of FLGD stools Rouged
		Plant	Ratoon	
Lautoka	446	72.53	1088.82	1067
Ba/Tavua	621	279.28	592.92	333
Labasa	734	645.37	3117.7	0
Penang	977	110.33	1013	0
Nadi	762	124.14	2533.8	857
Sigatoka	470	89.45	1154.3	534
Total	4010	1321.1	9500.54	2791

Table 3: Cane varieties inspected in 2009

Varieties	No. of Farms	Plant (Ha)	Ratoon (Ha)	FLGD Infected Stools
Aiwa	16	0.88	25.58	0
Galoa	158	33.46	167.34	0
Homer	4	0	5.99	0
Kaba	151	42.03	116.60	0
Mali	235	61.73	265.82	0
Mana	5044	543.45	5659.95	2789
Naidiri	794	358.84	852.21	0
Ono	1	0	0.99	0
Ragnar	351	39.72	610.93	0
Research	25	11.75	2.80	0
Unapproved	49	16.18	53.32	0
Vatu	358	41.36	608.90	1
Waya	255	56.52	325.40	1
Total	4010	1321.1	9500.54	2791

Nematology

Preliminary investigation was carried out to determine the level of nematodes found in major soil types in different sectors. Initially 16 sectors have been covered from Lautoka, Nadi and Sigatoka districts and 134 soil samples collected and analyzed. The extracting tray method was used to extract the nematodes. Ten genera of plant parasitic nematodes were identified in the 16 sectors. They were Lesion *(Pratylenchus sp),* Spiral *(Helicotylenchus sp),* Root knot *(Meloidogyne sp),* Reniform *(Rotylenchulus sp),* Ring *(Criconemella sp),* Dagger *(Xiphinema sp),* Stubby *(Paratrichodorus sp),*Lance*(Hoplolaimus sp),* Pin (*Paratylenchus sp)* and Stunt *(Ttylenchorhynchus sp).* Table 4 summarizes the nematodes found in the surveyed samples. The Lesion and Root knot are the most devastating nematodes followed by Dagger, Stubby, Stunt and Ring with moderate causes and the least damaging are; Spiral and Reniform. The proportion of plant parasitic nematodes in the soil samples collected was higher than the non plant parasitic nematodes. The high population density of the plant parasitic nematodes is attributed to the monocropping farming practice that is prevalent in the cane belt. The nematode damage and its effect on crops can be minimized by practicing crop rotation and intercropping with a leguminous plant. Further sampling in other districts should be carried out and analyzed to determine nematode levels in Fiji's sugarcane belt.

Table 4. Nematodes found in Lautoka, Nadi and Sigatoka districts

Sectors	Common Soil Type	Destructive Nematodes present in the sectors				
		Lesion	Root Knot	Ring	Spiral	Reniform
Drasa	Clay	550	30	300	860	240
Lovu	Clay Loam	628		293	902	220
Lautoka	Silt Clay loam	1007	386	207	1152	66
Saweni	Sandy Clay Loam	990	90	360	460	130
Legalega	Silty Clay Loam	780	580	820	1340	1340
Meigunyah	Clay	759	134	274	2053	1335
Qeleoa	Clay Loam	953	220	593	867	667
Yako	Clay Loam	1770	1350	810	690	930
Malolo	Clay Loam	1050	260	530	1720	110
Nawaicoba	Clay Loam	1710	870	750	660	90
Waqadra	Clay	1400		340	1200	700
Lomawai	Clay Loam	440	370	230	880	1180
Cuvu	Silty Clay Loam	1140	660	540	150	900
Olosara	Sandy Clay Loam	899	221	692	911	833
Natova	Clay Loam	2013	686	948	1475	439
Total		16089	5857	7687	15320	9180
% of total		23	11	14	28	17

CROP PRODUCTION

Seed Cane Nursery
Early Weed Control
Nitrogen Replacement
Zonal Tillage
Soil Compaction
Intercropping
Model Farm
GIS
Estates
Rehabilitation of abandoned Farms
FACP Tables
Approved Varieties

Seed Cane Nursery Program (SCN)

The establishment of a healthy sugarcane crop is dependent on good seed cane quality and proper management practices. The seed cane should be free from diseases and have a good germination capacity. The use of heat treatment to cure diseases of sugarcane was first used to control Sereh disease in sugar cane. The seed material has to undergo heat treatment to ensure that most of the sugarcane disease is eliminated from the seed cane. The first commercial use of heat treatment was for controlling chlorotic streak in 1935. Heat treatment has become an important measure for control of ratoon stunting disease and can be used in an integrated system of disease management.

The establishment of the hot water treatment plants in Rarawai and Drasa has allowed the Sugar Research Institute to establish seed cane nursery plots from which seedcane will be made available to farmers. The HWT plant for Labasa will be established in 2010 and should be functional during the replanting season. A total of 79.1 ha of seed cane were established in the major estates of which 6.3ha is mother plots (primary nursery) and 72.8ha as distribution plots (secondary nursery).
The Institute plans to establish 100ha of seed cane at the major estates with mother plots and distribution plots. The long term plan of SRIF is to produce and provide premium quality disease free seed cane to the entire cane belt through the millers extension services.

Early weed control

One of the major factors contributing to the yield decline of sugarcane is weed infestation on sugarcane farms. A herbicide trial was established in 2009 at Lautoka. The tillering assessments carried out at 3 and 5 months shows that the treatment combination of velper K4 (4kg/ha) with amine 720 mixture applied at 4 weeks after planting had more tillers and better stalk height compared to other treatments. This assessment indicates that weeds need to be controlled at an early stage of its growth to get better yields.

Picture 2: Sprayed at four weeks.

Nitrogen replacement methods

Fertilizer recommendation is given by the analytical laboratory after the leaf and soil analysis. Nitrogen is the most important mineral which should be applied in correct amount to obtain maximum yield in different soil types.
Two nitrogen replacement trials were established in 2009 and are currently being evaluated for the ratoon crop. The nitrogen replacement recommendation from the lab was based on leaf analysis and 1.3kg nitrogen replaced on every tonne harvested from previous season.

The growth assessment done at 3 and 5 months shows that there is not much difference in tillers and stalk height of the two major treatments applied but the conclusion can only be made after the yield from both treatment is obtained.

Zonal tillage

Mechanical harvesting and excessive tillage causes soil compaction which leads to the decline in sugarcane yield.
A zonal tillage trial was established in 2009 at Drasa estate that will be evaluated for plant crop in year 2010.
The ratoon cane that grew after harvest was sprayed with glyphosate 360 and zonal tillage was applied before and after wet season as the cane dried out. Cotton king (set of serated discs) was used to till the zones on the raised beds. Zonal tillage reduces farm input cost and soil compaction and this new cane farming system can be useful for the farmers.

Soil compaction

A preliminary study was carried out at Drasa estate on plant cane to see the compaction rate. This study indicates that there is substantial compaction of the soil layer below 25cm depth. This is expected due to the plough pan that forms after years of cultivation using a tractor. The introduction of mechanical harvesters 10 years ago has also contributed to the compaction. The cane fields in Fiji have not been designed to accommodate the mechanical harvesters and the haul out trucks as there are no specifically marked out traffic zones. The compaction of the soil has been more pronounced and silently going on for the past decade and its effects are now evident. Further studies will be carried out on soil compaction.

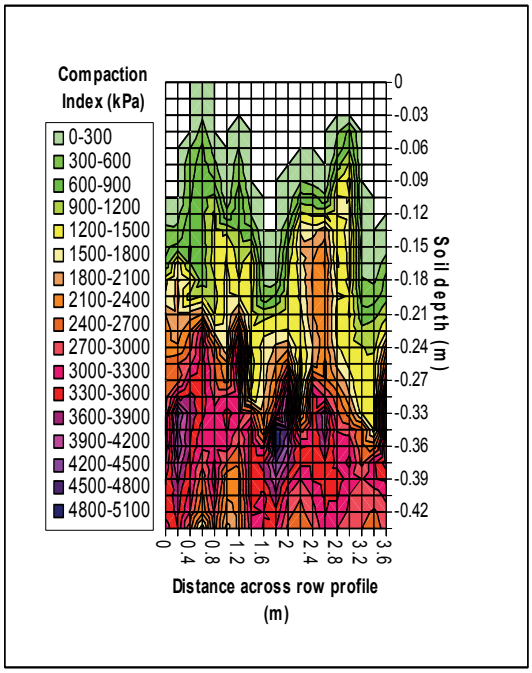


Figure1: Graph showing compaction at different depths.

Figure 2: Ploughing compacted field.

Intercropping

Introduction

This project was funded by the European Union. The report briefly covers the outcomes of inter cropping trials carried out by the Extension Officer's who were involved in selecting at random and laying of inter-crop demonstration trials in farmer's fields in the cane growing areas in Fiji.

Intercropping is a farming practice where two or more crops are grown simultaneously on the same land. Intercropping is associated with sustainable agriculture. The advantages of inter-cropping are many such as recovering cane and inter-crop establishment cost per unit area, generate added farm income, maximum land utilization, weed control – reduced labour cost, reduces hill side soil erosion, retains moisture and improves soil health. The total number of demonstration trials planted was 164 out of which 8 trials were abandoned because of drought, insect/pest damage, disease and vandalism.

After planting cane the intra rows were sprayed with Diuron to control weeds (2kg/ha). As soon as the young cane shoots emerged after 9 to 12 days, selected inter-crop seeds were planted manually in the inter-rows by the farmer under the guidance of the extension officers. Cow peas, long bean, cucumber, okra seeds germinated in 3-5 days and watermelon 12 days. Three weeks after germinating the inter-crops were fertilized with blend B at 1 bag per hectare. On the first sight of insect infestation the crop was sprayed with lannate at 2 litres per hectare and 2 rounds of application was done. Upon maturity the fruits were harvested and sold in the markets, roadsides and in the community.

Inter-cropping can form an integral part of the farming system and can be practiced in both plant and ratoon cane and in any type of terrain. Eight field days were held with the theme "**Intercropping: Potential & Benefit**" to promote this concept. It is anticipated that intercrop trials will serve as a catalyst to stimulate growers and make them more productive.

Table 1: District distribution of crops

District	Trials	Cowpea	Long bean	Watermelon	Cucumber	Okra
Sigatoka	11	2		3	3	3
Nadi	29	3	1	14	9	2
Lautoka	21	9	5	7		
Rarawai	33	9	6	18		
Tavua	18	7	1	9	1	
Penang	18	9	3	6		
Labasa	21	9	2	10		
Seqaqa	13	6		7		
Total	164	54	18	74	13	5

Picture 1: Intercrop planting

Picture 2: Manual weed control

Picture 3: Flowering stage

Picture 4: Fruiting stage (Cowpea)

Picture 5: EU funded project

Picture 6: Field day presentation

Picture 7: Early weed control

Picture 8: Field visit Lautoka

Model Farm

Sugarcane farming in Fiji is monocropped and is a long term income generator. Due to declining prices and increasing costs, there is a need to diversify to sustain farm income.

The Sugar Research Institute of Fiji has established nine Model Farms in the cane belts of Fiji with financial assistance from the European Union. Integrated farming system is the possible solution to meet the continuous increase of all commodities at present.
The benefits of diversification or integrated farming are many such as stability of income, food security, maximum land usage, self sufficiency and improve the life style of small holding farmers in Fiji who have limited resources.

The model farms were set up to serve as an educational tool to motivate the growers so that they could increase the total income from the farm. Productive utilization of land through integration of crops, livestock's and agriculture can give the best optimum production per unit area. In other words integrated farming system is a resource management strategy to achieve economic and sustained production to meet the diverse requirement of farm household.

Eight model farms were set up in the various districts and are still ongoing. The intention was to complete the model farms over a 3 year period and provide technical advice that would motivate the farmers to become self reliant on as many commodities they could produce.

The farmers selected for the model farms were provided financial assistance together with a combination of selected commodities. The Extension officers regularly visited the farms to monitor the progress and technical guidance was provided to the growers. Two field days were held to demonstrate the potential and likely benefits by adopting recommended farming practices on the model farms.

Picture 9: Model Farm

Picture 10: Model farm layout

Picture 11: Stone Banks to control soil erosion

Geographical Information System

Status:

With the appointment of a GIS officer in late 2008, the Drasa Pilot project was carried on as a guide to complete the remaining sectors of the sugar industry. Using satellite imagery, cadastral boundaries and lease data, combined with the knowledge of extension officers and the growers; approximately 650 growers were identified and verified within Varoko and Rarawai sector. This gave 81% completion of Varoko and Rarawai. The achievement of this has been a tedious task as the there are high inaccuracies with cadastral and lease data, hence with the future collaboration of all stakeholders, greater targets can be achieved as repetitive work will be reduced.

The use of geospatial technology was also initiated for other projects undertaken by SRIF such as; nematode study, intercropping trials, seed cane nursery development and rehabilitation of abundant farms. This incorporated the use of a Global Positioning System (GPS) to collect field data for record keeping, identification and mapping. Thus, the soil series of 1400 samples was identified with ease and accuracy for nematode study. The Institute plans to purchase more GPS units to assist with other projects in the coming year.

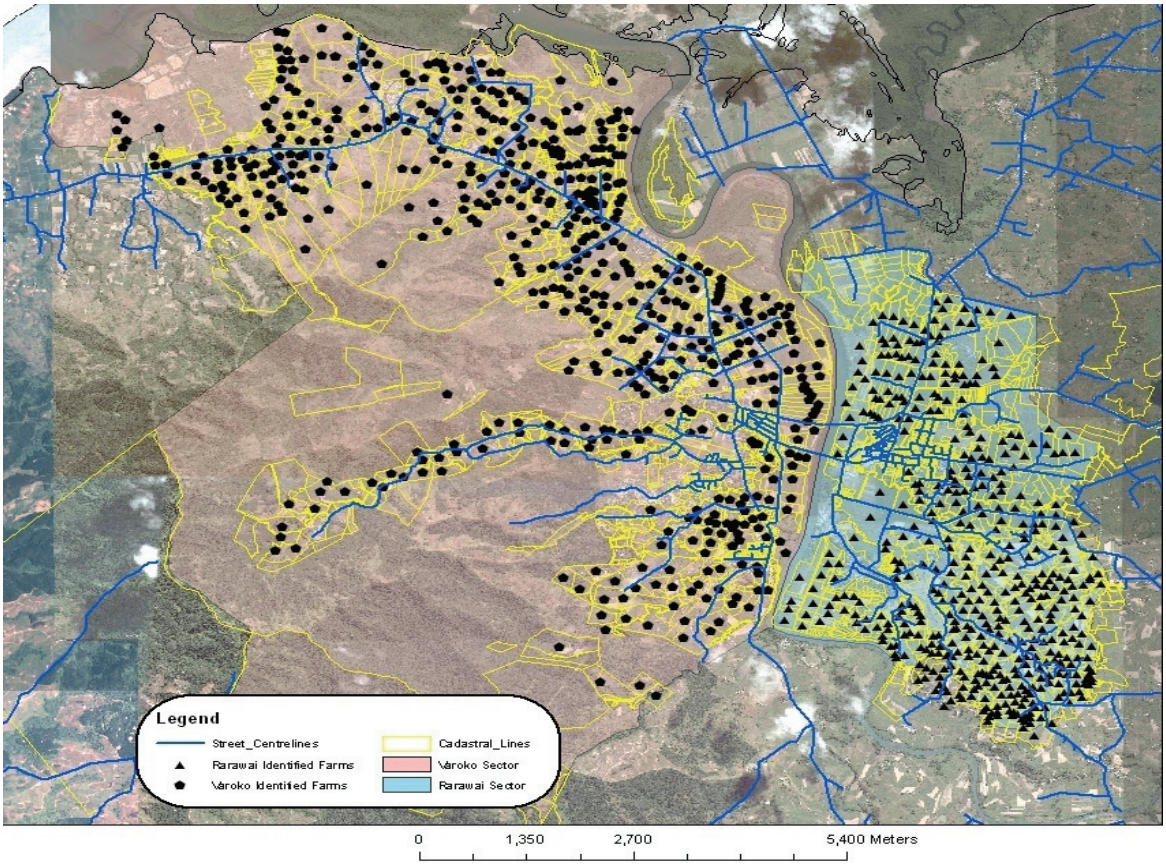


Figure 1: Extent of GIS work with completed sectors

Estates

The five millers owned estates that were managed by the Institute produced a total of 17,769 tonnes of cane from 258.2 hectares and the combined average yield was 68.8tpha.

Table 1: Estates production in 2009

Estate	Area under cane	Cane Produced	tpha
Drasa	94.4	6344	67.2
Waqadra	55.4	4743	85.6
Rarawai	76.6	4750	62
Labasa	28.0	1623	57.9
Penang	3.8	309	81.3
Total	258.2	17769	68.8

Drasa Estate

Drasa Estate has a total area of 127.5 hectares available for cane planting. The total cane production at Drasa Estate in 2009 season was 6344 tonnes from an area of 94.4 hectares that gave a yield of 67.2 tonnes per hectare.

There was an increase in yield from 62tpha in 2008 to 67tpha in 2009. Table 2 summarizes the cane production at Drasa estate in 2009. There was an increase in burnt cane by 15% compared to 2008. The major weather event of the year was the devastating floods in January that caused a lot of damage to the cane crop. In spite of the flooding, the cane had recovered considerably and cane production per hectare increased by 5.2 tpha compared to 2008 season. Primary and secondary hot water treated seed cane nurseries were established on 23 hectares under the European Union funding and raised bed dual row planting on 7.8hectares. All cultivation, fertilization and harvesting was given out on contract.

All the cane was harvested mechanically. The increase in the percentage of burnt cane is a serious problem because of the penalty imposed on deteriorating cane that results in loss of revenue. Rainfall received at Drasa Estate from January to December 2009 was 3105 mm and this was 414 mm more compared with 2009 season. Above average rainfall was received in the month of January, February March and May. Bulk of the rainfall (1535mm) was recorded in January that resulted in flooding in most of the fields.

Table 2: Drasa Estate Cane Production 2009

Crop	Research			Commercial			Total		
	ha	tonnes	tpha	ha	tonnes	tpha	ha	tonnes	tpha
Plant	1.6	180	112.5	3.0	291	97.0	4.6	471	102.4
1R	0.8	76	95.0	8.1	620	76.5	8.9	696	78.2
2R	1.2	93	77.5	2.6	181	69.6	3.8	274	72.1
OR	9.5	476	50.1	67.6	4427	65.5	77.1	4903	63.6
Total	13.1	825	62.9	81.3	5519	67.9	94.4	6344	67.2

Table 3: Drasa Estate production figures (2005-2009)

Year	Area	Burnt		Green		Total	Yield
	ha	Tonnes	%	Tonnes	%	Tonnes	tpha
2005	105.7	4082	49	4163	51	8245	78.0
2006	113.5	5523	67	2701	33	8224	72.5
2007	104.8	2819	38	4523	62	7343	70.1
2008	114.8	2864	40	4254	60	7118	62.0
2009	94.2	3262	46	3082	54	6344	67.0

Waqadra Estate

Nadi Estate has a total area of 64.9 hectares available for cane planting. The total production of cane in 2009 was 4743 tonne from 55.4 hectare that gave a yield of 85.6 tpha. Table 4 below summarizes the cane production of 2009. A total of 4243 tonnes of cane was harvested and delivered to the mill from 48.6 hectare, 20 tonnes were given as seed cane to 17 growers, 30 tonnes was used for planting in the estate and 450 tonnes was burnt and rejected. There was an increase in the yield for commercial cane from 70 tpha in 2008 to 90 tpha in 2009 but it still remains lower than the potential of 120 tpha. The increase in yield was mainly due to improved inter row cultivation and wide spread rainfall (1310mm) received during cane growing period from January to April 2009. The timing and implementation of activities like planting, fertilization and weed control is very important and any adverse weather conditions during such practices have detrimental effect on the yield.

Table 4: Waqadra Estate Cane Production 2009

Crop	Research			Commercial			Total		
	ha	tonnes	tpha	ha	tonnes	tpha	ha	tonnes	tpha
Plant	3.1	154	49.7	1.4	128	91.4	4.5	282	62.6
1R				11.2	1010	90.1	11.2	1010	90.1
2R				8.0	696	87.0	8.0	696	87.0
OR				31.7	2101	84.3	31.7	2755	86.9
Total	3.1	154	49.7	52.3	3935	86.4	55.4	4743	85.6

Table 5: Waqadra Estate production figures (2005-2009)

Year	Area	Burnt		Green		Total	Yield
	ha	Tonnes	%	Tonnes	%	Tonnes	Tpha
2005	57.9	3223	75.7	1033	24.3	4256	73.5
2006	61.3	4242	73.8	1502	26.2	5744	93.7
2007	56.6	2971	71.6	1176	28.4	4147	73.3
2008	59.6	2971	69.8	1176	30.2	4252	69.6
2009	55.4	2844	59.9	1899	40.1	4743	85.6

Rarawai Estate

The Rarawai Estate produced 4536 tonnes of cane with average yield of 62t/ha. Approximately 230 t of cane was used to establish hot water treated seed cane nursery. Despite the damages caused by the flood in January, there was a slight increase in yield. The cost of production also increased due to high harvesting costs, burnt cane penalties and rehabilitating the crop damaged by the flood.

Picture 1: Cane damaged in January 2009 flood

Table 6: Rarawai Estate Cane Production 2009

Crop	Research			Commercial			Total		
	ha	tonnes	tpha	ha	tonnes	tpha	ha	tonnes	tpha
Plant	4.2	319	76	7.8	655	84	12.0	974	81
1R	2.6	153	59	6.6	508	77	9.2	661	72
2R	3.3	198	60	8.6	540	63	11.9	738	62
OR	9.8	452	46	33.7	1925	57	43.5	2377	55
Total	19.9	1122	56	56.7	3628	64	76.6	4750	62

Table 7: Rarawai Estate production figures (2005-2009)

Year	Area	Burnt		Green		Total	Yield
	ha	Tonnes	%	Tonnes	%	Tonnes	Tpha
2005	88.8	2160	32.9	4414	67.1	6574	74
2006	83.2	6033	74.7	2041	25.3	8074	97
2007	79.5	2797	55.0	2292	45.0	5089	64
2008	74.6	2206	50.1	2194	49.9	4400	59
2009	76.6	1583	33.3	3167	66.7	4750	62

Picture 2: Bed former for dual row planting

Labasa Estate

Labasa estate received a total of 2479mm rainfall this season, 329mm less rainfall than previous season. Below average rainfall was recorded between July to November which affected cane re-planting in Labasa mill sectors. Sixty one percent of rainfall was received in the first quarter of the year. Harvesting commenced in the estate on the 7th of June, the day mill commenced crushing. The estate harvested 1623 tonnes of cane, 391 tonnes more than the previous year giving a yield of 59.7tonns per hectare. All cane was harvested green. A total of 10.0ha cane was planted under the hot water seedcane nursery project. This seedcane will be distributed to the growers during the 2010 planting season. A lot of emphasis was placed on weed control as weeds have been a major concern in the estate and with regular flooding the estate fields are infested with weeds that are dormant in the soils and keep growing periodically. All cultivation work was done manually and mechanically.

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Table 8: Labasa Estate Cane Production 2009

Crop	Research			Commercial			Total		
	ha	tonnes	tpha	ha	tonnes	tpha	ha	tonnes	tpha
Plant	nil	nil	nil	2.0	123	61.5	2.0	123	61.5
1R	nil	nil	nil	4.0	225	56.3	4.0	225	56.3
2R	nil	nil	nil	5.6	340	60.7	5.6	340	60.7
OR	nil	nil	nil	16.4	934	57.0	16.4	934	57.0
Total	nil	nil	nil	28.0	1623	58.0	28.0	1623	58.0

Table 9: Labasa Estate production figures for the last five years (2005-2009)

Year	Area	Burnt		Green		Total	Yield
	ha	Tonnes	%	Tonnes	%	Tonnes	tpha
2005	36.4	nil	nil	3210	100.0	3210	88.2
2006	30.0	357	18.7	1556	81.3	1913	63.8
2007	28.4	318	16.9	1567	83.1	1885	66.4
2008	27.6	778	63.0	454	37.0	1232	44.6
2009	28.0	nil	nil	1623	10.0	1623	58.0

Penang Estate

Penang estate has an area of 4.1hectares that is divided into four blocks that are planted with commercial varieties. In 2009, 309 tonnes of cane was harvested from an area of 3.78ha and sent to the mill and 1tonne of LF91-1925 was given to one farmer in Ellington 1 sector. The seed cane was given to him free of charge to plant and promote this new variety. All cane was harvested green and trash was kept to retain moisture in the soil and to suppress the growth of weeds.

Spot weeding and spraying the inter rows and road around the estate was done on time and fertilization was delayed because of late delivery of the fertilizers.

There were two main problems faced in the maintaining the estate: (1) during heavy rain the whole field gets flooded (2) there was no contractor to harvest the cane and makeshift arrangements were made to harvest the cane.

Table 10: Penang Estate production figures (2005-2009)

Year	Area	Burnt		Green		Total	Yield
	ha	Tonnes	%	Tonnes	%	Tonnes	Tpha
2005				238	100	238	63
2006		30	7.8	353	92.2	383	95
2007	4.01	20	8.0	237	92.0	257	67
2008	4.01			337	100	337	84
2009	3.69			309	100	309	84

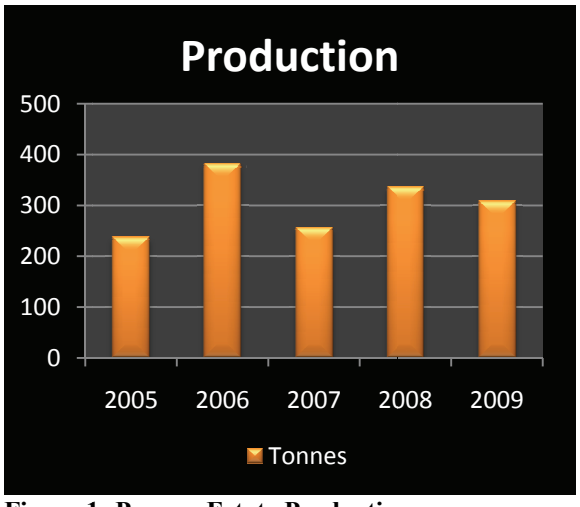


Figure 1: Penang Estate Production

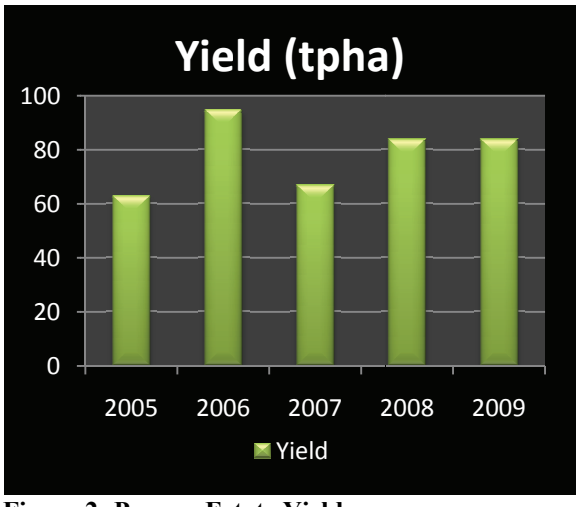


Figure 2: Penang Estate Yield

Rehabilitation of abandoned farms

The drastic decline in annual cane production from 4.2 million tonnes to 2.2 million tones within the last decade raises many questions as to the survival of the sugar industry in Fiji. Expiry of leases, the exodus of skilled workers and farmers, high cost of production, poor farm management practices and the ageing generation of growers are factors that have contributed to the decline in production.

The Institute embarked upon a project "Rehabilitation of Abandoned Farms (RAF) to revive the production. With assistance from the European Union and support of the government, this project was launched at Nasolo village, Ba by the Prime Minister, Commodore Frank Bainimarama on the 14th of August, 2009. The objective of this project was to bring under cane production the abandoned cane land, contribute towards increasing the cane and sugar production and motivate the growers.

The four (4) pilot farms selected were at Sosolevu Flats, Moto Sector in Ba.

These farms were covered with flood debris, silt and vaivai trees (raintree) of girth measuring 20 cm to more than 40 cm in diameter, smaller shrubs such as castor bean plant, African Tulip (waqa), rattle pod, prickly solanum and broom weed. The most problematic was guinea grass, itch grass, para-grass and Johnson grass which were more than 6ft high. This was compounded by dense creepers, especially giant sensitive plants, centro, morning glory, red convulvus and calopo vines. The debris from the land was removed and the land prepared by ploughing and harrowing 3 times. The farm area of 12ha has been planted with Kaba, Kiuva and Naidiri which will be harvested in 2010 and an estimated yield of 110/ha is expected from these farms. The four farms in Nasolo should produce over 1500 tons annually once they are all replanted. By undertaking this program SRIF will provide the incentive for farmers to stay in sugarcane farming by producing yields that are economically viable for a sustainable livelihood.

The rehabilitation of the abandoned farms at Nasolo by the Institute should boost the farmers morale and the continuation of this program will contribute towards increasing the cane production. The response from the growers has been overwhelming and more growers are approaching the institute to rehabilitate their farms. The rehabilitation project has demonstrated the services offered by SRIF to farmers in transferring technology, better farm management practices, reutilization of unutilized land into productive use and bringing about resurgence amongst growers in the ailing sugar industry, backed by the "hands on" approach.

Picture 1: plant cane on abandoned land

APPENDICES

Field Activities &
Crop Production Tables
(FACP Tables)
Approved Varieties

Appendix 1: Main features of 2009 season compared with 2008

	Lautoka		Rarawai		Labasa		Penang		All mills	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Total registrations	6650	5678	5488	5261	4239	4057	2306	1891	18683	16887
Total farm basic allotments (tonnes)	1066915	979058	1115010	797382	884890	910744	326996	301164	2390391	2988348
Total registered area (hectares)	27726	24534	23229	21267	19897	19079	10918	8924	81555	73804
Total area cultivated (hectares)	18030	15914	20403	17959	17977	16989	5101	4410	71207	
Total area harvested (hectares)	15267	14461	15722	15140	15515	15140	4403	4262	50907	49003
Total farm harvest quotas (tonnes)	Open	Open	Open	Open	Open	Open	Open	56700	Open	
Sugar make actual(tonnes)	72672	50114	62117	40382	51341	55666	21837	21449	207967	
Tonnes 94 N.T sugar	77311	53313	63954		53160	57548	23231	22126	217656	
Yield tonnes 94 N.T.sugar per hectare	5.06	3.69	4.06		3.43	3.80	5.28	5.19	4.45	
Tonnes cane per tonnes sugar 94 N.T.	10.07	13.95	10.99		11.37	11.81	10.16	9.91	42.59	
%POCS	10.7	10.2	10.8		11.0	10.8	10.5	10.6	43.1	
Cane purity average for season	81.4	79.4	79.9		80.8	79.8	80.8	80.0	80.7	
Tonnes cane harvested	770569	726046	732165	659351	604314	679584	214572	181650	2321620	2246631
Tonnes cane crushed	770569	726046	732361	659351	604314	679597	214572	181193	2321816	2246187

Appendix 2: Monthly rainfall(mm) for 2009 compared with average since commencement of records

Mills	No. of years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Lautoka	2009 actual	1280	262	384	110	116	72	34	65	223	42	52	237	2875
	101 yrs avg. to 2009	306	320	317	182	98	65	50	69	73	90	125	190	1884
Rarawai	2009 actual	944	358	353	91	150	77	28	27	237	57	48	223	2591
	124 yrs avg. to 2009	354	359	366	293	78	36	28	98	105	146	222	239	2324
Labasa	2009 actual	805	454	259	211	94	111	93	16	153	14	106	163	2479
	121 yrs avg. to 2009	364	361	379	237	110	65	47	50	104	100	203	253	2274
Penang	2009 actual	1255	305	184	188	276	79	68	52	114	22	28	493	3064
	112 yrs avg. to 2009	437	351	411	384	123	69	52	92	86	144	152	243	2543

Appendix 3: Crop production details

	Lautoka		Rarawai		Labasa		Penang		All mills	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Areas harvested (hectares)										
Plant	665	888	894	1038	1366	990	334	272	3259	3188
First ratoon	517	634	968	843	1008	1392	403	303	2896	3172
2nd ratoon	711	463	1533	930	1323	982	394	336	3961	2711
Other ratoons	13374	12477	12327	12329	11818	11776	3272	3352	40791	42645
Total	15267	14461	15722	15140	15515	15140	4403	4262	50907	49003
Proportion of crop harvested according to area										
Plant	4.3	7.9	5.7	9.4	8.8	8.2	7.6	7.3	6.4	8.2
First ratoon	3.4	5.1	6.2	6.8	6.5	11.7	9.2	7.5	5.7	7.8
2nd ratoon	4.7	3.4	9.8	6.5	8.5	7.2	8.9	7.9	7.8	6.3
Other ratoons	87.6	83.6	78.3	77.4	76.2	72.9	74.3	77.4	80.1	77.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yield tonnes per hectare harvested										
Plant	65.7	64.9	57.9	59.4	47.2	56.1	53.9	48.6	54.6	57.3
First ratoon	59.8	58.8	55.5	53.2	50.7	57.1	49.8	44.8	53.8	53.5
2nd ratoon	55.9	52.7	50.0	45.9	44.0	49.8	49.1	42.5	49.0	47.7
Other ratoons	49.1	48.6	44.6	41.4	36.4	42.1	48.0	41.9	44.0	43.5
Avg. yield/ha	50.5	50.2	46.6	43.6	38.9	44.9	48.7	42.6	45.6	45.3
Main varieties crushed according to tonnes (%)										
Ragnar	0.4	0.4	0.5	0.3	22.2	20.3	0.1		6.1	5.3
Aiwa	0.5	0.6	0.5	0.1	0.3	0.3	0.3	0.1	0.5	0.3
Beqa	0.1				0.5	0.3			0.1	0.1
Galoa	0.1	0.1			4.8	5.9			1.3	1.5
Kaba	2.7	2.2	5.1	3.4	0.3	0.3	0.8		2.7	1.5
Mali					12.9	12.7	0.9	0.4	3.4	3.3
Mana	93.5	94.2	90.2	93.5		0.1	92.8	94.6	68.1	70.6
Naidiri	2.2	1.8	2.3	1.5	27.1	28.5	4.8	4.2	9.0	9.0
Vatu					24.6	20.7	0.3	0.1	6.4	5.2
Waya			1.1	0.8	6.7	8.2			2.1	2.3
LF91-1925	0.2	0.3	0.1	0.2		0.1				0.2
Expt./Others	0.3	0.2	0.2	0.3	0.6	2.5			0.3	0.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Appendix 4: Rainfall (mm) at mill centres

Mill	For 12 months ended 31st December					For 12 months ended 30th September				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Lautoka	1580	1844	2363	2502	2875	1281	1924	2054	2714	2983
Rarawai	1745	2162	2805	3020	2591	1328	2111	2663	3115	2932
Labasa	1803	2153	2786	2448	2479	1411	2452	2208	2815	2709
Penang	1516	1824	2618	3384	3064	1330	1776	1991	3673	3165

Appendix 5: **Rainfall distribution affecting 2009 crop(mm)**

Month	Period	Lautoka	Rarawai	Labasa	Penang
Jul 08	Early	73.8	40.9	7.2	16.6
	Mid	0.0	0.0	0.8	2.5
	Late	48.0	11.2	1.7	0.0
Aug 08	Early	0.7	8.2	2.0	60.0
	Mid	0.3	0.0	0.0	1.0
	Late	0.1	1.0	0.6	13.6
Sep 08	Early	0.0	3.3	6.4	14.8
	Mid	20.0	13.2	39.0	1.2
	Late	6.4	4.2	0.0	22.3
Oct 08	Early	2.8	57.0	2.9	14.6
	Mid	41.2	21.0	33.0	5.0
	Late	59.3	2.9	10.6	0.9
Nov 08	Early	48.0	132.7	58.0	19.2
	Mid	42.7	8.3	56.3	45.7
	Late	125.5	233.8	53.6	316.5
Dec 08	Early	56.3	48.8	57.3	100.2
	Mid	42.2	40.4	92.6	71.5
	Late	20.8	91.2	148.7	70.6
Jan 09	Early	635.3	65.1	285.6	637.2
	Mid	522.6	29.9	485.5	523.2
	Late	122.0	111.9	33.5	67.3
Feb 09	Early	93.8	81.6	215.1	187.9
	Mid	112.7	235.9	174.5	71.9
	Late	55.5	40.2	64.7	45.2
Mar 09	Early	45.1	70.9	12.3	42.3
	Mid	137.6	160.4	136.2	58.6
	Late	200.9	122.0	104.7	83.5
Apr 09	Early	45.1	69.5	152.6	99.1
	Mid	137.6	20.1	41.9	88.2
	Late	200.9	1.1	16.1	1
May 09	Early	58.2	2.5	183.6	0.4
	Mid	44.4	9.3	366.5	192.0
	Late	7.3	137.9	315.9	83.5
Jun 09	Early	13.2	0	23.2	0
	Mid	3.6	55.7	136.7	20.8
	Late	98.7	20.8	788.7	57.7
Early - 1st to 10th of the month		Mid - 11th to 20th of the month		Late - 21st to end of the month	

Appendix 6: Hectares harvested

Mills		Average for period of five seasons					Last five seasons individually				
		1981/ 1985	1986/ 1990	1991/ 1995	1996/ 2000	2001/ 2005	2005	2006	2007	2008	2009
Lautoka	Plt	5904	4007	3634	2944	1042	854	850	507	1009	888
	Rtn	18108	19743	20580	19701	19730	18220	16275	15869	14258	13573
	Total	24012	23750	24214	22645	20772	19074	17125	16376	15267	14461
Rarawai	Plt	4463	3574	2899	3164	1055	1045	1651	975	894	1038
	Rtn	13836	14805	17360	14613	17585	16496	15476	15916	14828	14102
	Total	18299	18379	20259	17777	18640	17541	17127	16891	15722	15140
Labasa	Plt	2365	2512	3120	2597	1269	1808	1341	797	1366	990
	Rtn	16306	17181	19604	18348	15911	15232	15169	13839	14149	14150
	Total	18671	19693	22724	20945	17180	17040	16510	14636	15515	15140
Penang	Plt	1697	1396	1386	1120	542	515	457	411	334	272
	Rtn	4036	5029	4958	4674	4568	4418	4218	4244	4069	3990
	Total	5733	6425	6344	5794	5110	4933	4675	4655	4403	4262
All mills	Plt	14429	11489	11039	9825	3908	4222	4298	2690	3603	3188
	Rtn	52286	56758	62502	57336	57794	54366	51140	49868	47304	45815
	Total	66715	68247	73541	67161	61702	58588	55438	52558	50907	49003

Appendix 7 : Tonnes of cane harvested

Mills	Average for period of five seasons					Last five seasons individually				
	1981/ 1985	1986/ 1990	1991/ 1995	1996/ 2000	2001/ 2005	2005	2006	2007	2008	2009
Lautoka	1254266	1048942	1283569	1216597	971454	890779	1051097	741231	770569	726046
Rarawai	984244	1006366	1017374	957507	878509	761704	1039474	738478	732165	659351
Labasa	980634	1015166	1166055	1017061	840388	910663	871031	769138	604314	679584
Penang	310406	332592	291206	309205	239044	225594	264498	229844	214572	181650
All mills	3529550	3403066	3758204	3500370	2929395	2788740	3226100	2478691	2321620	2246631

Appendix 8 : Tonnes of cane per hectare harvested

Mills		Average for period of five seasons					Last five seasons individually				
		1981/ 1985	1986/ 1990	1991/ 1995	1996/ 2000	2001/ 2005	2005	2006	2007	2008	2009
Lautoka	Plt	61.7	65.4	64.7	64.2	63.9	64.4	81.9	65.6	65.7	64.9
	Rtn	48.0	54.2	51.2	51.4	45.9	45.9	59.1	43.5	49.1	49.2
	Total	51.4	55.5	52.4	53.7	46.8	46.7	61.4	45.3	50.5	50.2
Rarawai	Plt	65.1	64.3	61.2	62.1	59.6	58.1	72.7	55.4	57.9	59.4
	Rtn	51.3	52.0	48.1	52.9	46.4	42.5	57.7	41.6	44.6	42.4
	Total	53.3	54.2	50.1	53.9	47.1	43.4	60.2	43.7	46.6	43.6
Labasa	Plt	63.9	58.9	59.3	56.5	59.7	63.1	64.1	65.5	47.2	56.1
	Rtn	50.8	51.5	50.4	47.4	47.6	52.3	49.2	49.2	36.4	44.1
	Total	52.5	51.5	51.3	48.6	48.9	53.4	52.7	52.6	38.9	44.9
Penang	Plt	63.3	63.1	57.2	62.6	54.2	52.2	63.8	60.2	53.9	48.6
	Rtn	50.5	48.6	43.1	51.2	46.4	47.1	56.4	47.1	48.0	42.2
	Total	54.3	51.1	46.0	53.3	46.8	45.7	56.6	49.4	48.7	42.6
All	Plt	63.5	62.6	61.2	61.8	58.3	60.8	71.1	61.1	54.6	59.0
Mills	Rtn	49.5	55.8	48.1	50.0	46.0	46.6	55.9	44.7	45.0	44.9
	Total	52.6	53.3	50.2	52.1	47.5	47.6	58.2	47.2	45.6	45.8

Appendix 9 : Hectares harvested in relation to registered area and cultivated area (ha)

Mills	2009 hectares (A)			Hectares harvested as % of various categories "A"	
	Registered (1)	Cultivated (2)	Harvested	(1)	(2)
Lautoka	24534	15914	14461	59	91
Rarawai	21267	17959	15140	71	84
Labasa	19079	16989	15140	79	89
Penang	8924	4410	4262	48	97
Total	73804	55272	49003	66	89

Appendix 10 : Plant cane harvested as percentage of total area harvested

Mills	Average for period of five seasons				Last five seasons individually				
	1986/ 1990	1991/ 1995	1996/ 2000	2001/ 2005	2005	2006	2007	2008	2009
Lautoka	17	15	13	5	4	7	3	4	6
Rarawai	19	14	18	6	6	12	6	6	7
Labasa	13	14	12	7	11	10	5	9	7
Penang	22	23	19	11	10	11	9	8	6
All mills	17	16	15	7	7	10	5	6	7

Appendix 11: Plant and ratoon yields and percentage of total area harvested - 2009 Crop

Mills	Plant		First ratoon		Other ratoons		All cane	
	tc/ha	% Area	tc/ha	% Area	tc/ha	% Area	tc/ha	% Area
Lautoka	64.9	6.1	58.8	4.4	48.8	89.5	50.2	100
Rarawai	59.4	6.9	53.2	5.6	41.7	87.5	43.6	100
Labasa	56.1	6.5	57.1	9.2	42.7	84.3	44.9	100
Penang	48.6	6.4	44.8	7.1	42.0	86.5	42.6	100
All Mills	59.0	6.5	55.2	6.5	44.2	87.0	46.0	100

Appendix 12 : Seasonal %POCS in cane

Mills	Rough average for period of five seasons					Last five seasons individually				
	1981/85	1986/90	1991/95	1996/00	2001/05	2005	2006	2007	2008	2009
Lautoka	12.19	12.00	12.50	11.42	11.45	11.52	10.65	11.25	10.70	10.19
Rarawai	12.12	12.09	12.90	11.35	11.87	11.46	11.49	11.60	10.71	NA
Labasa	12.20	12.37	12.12	11.07	11.54	10.93	11.38	10.44	11.02	10.75
Penang	12.28	12.15	12.59	11.13	11.88	12.29	11.85	11.45	10.54	NA
All Mill Avg.	12.15	12.27	12.51	11.24	11.69	11.54	11.34	11.19	10.74	

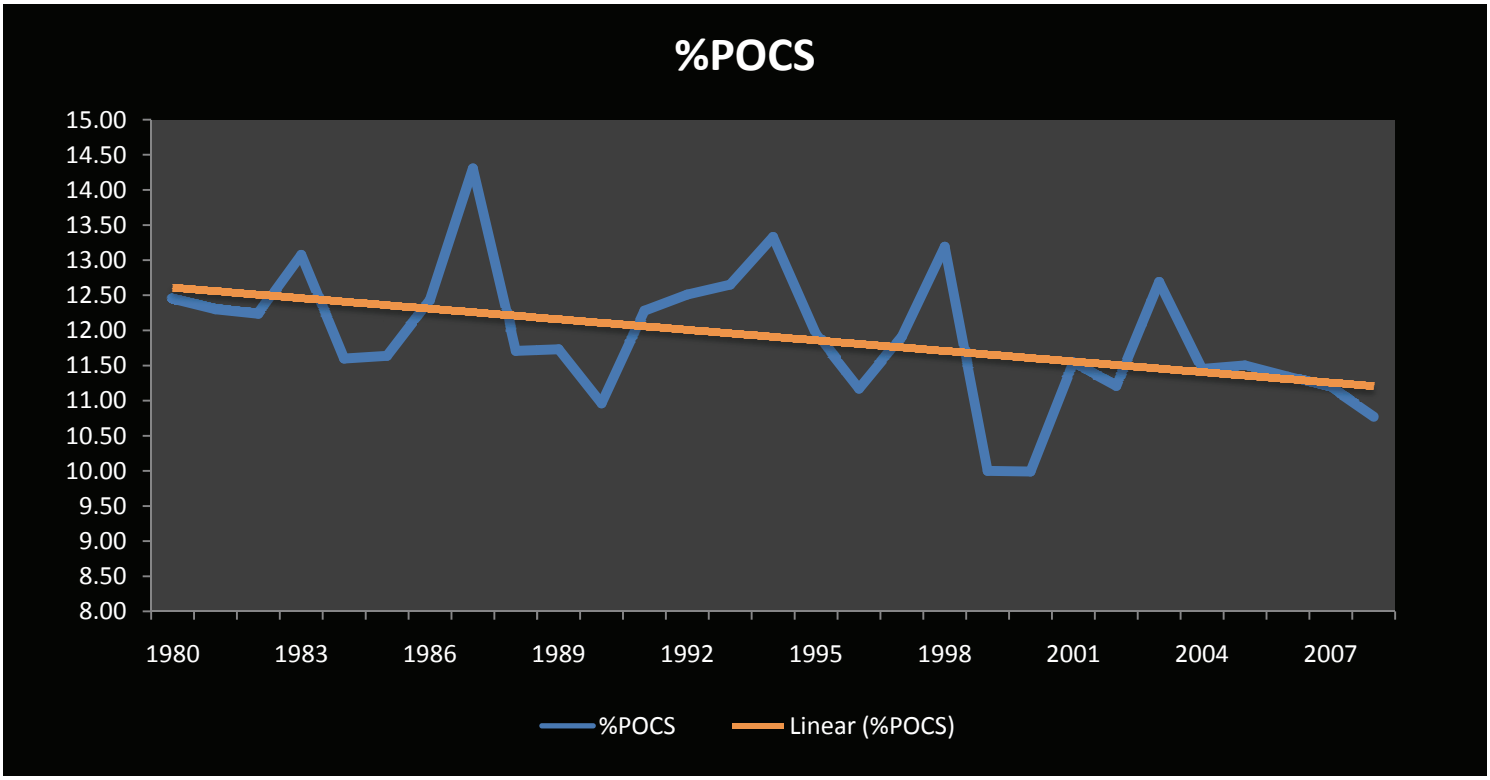


Figure 1: Seaonal POCS 1981 – 2007.

Appendix 13: Weekly POCS in cane 2009 season

Week no.	Week ending	Lautoka	Rarawai	Labasa	Penang
1	25-May-09				
2	1-Jun-09				
3	8-Jun-09				
4	15-Jun-09			10.53	NA
5	22-Jun-09	7.46		9.83	NA
6	29-Jun-09	9.90		10.34	NA
7	6-Jul-09	10.37	NA	10.57	NA
8	13-Jul-09	10.26	NA	10.93	NA
9	20-Jul-09	10.04	NA	11.02	NA
10	27-Jul-09	11.35	NA	11.21	NA
11	3-Aug-09	11.14	NA	10.80	NA
12	10-Aug-09	10.54	NA	10.98	NA
13	17-Aug-09	10.31	NA	11.05	NA
14	24-Aug-09	10.69	NA	11.28	NA
15	31-Aug-09	10.14	NA	11.01	NA
16	7-Sep-09	10.92	NA	11.11	NA
17	14-Sep-09	11.07	NA	10.73	NA
18	21-Sep-09	10.07	NA	11.11	NA
19	28-Sep-09	10.92	NA	11.23	NA
20	5-Oct-09	10.69	NA	10.54	NA
21	12-Oct-09	10.46	NA	10.91	NA
22	19-Oct-09	9.33	NA	11.39	NA
23	26-Oct-09	10.46	NA	11.45	NA
24	2-Nov-09	10.74	NA	11.43	
25	9-Nov-09	10.10	NA	11.48	
26	16-Nov-09	10.57	NA	10.93	
27	23-Nov-09	10.58	NA	9.65	
28	30-Nov-09	9.73	NA	7.97	
29	7-Dec-09	9.65	NA	9.56	
30	14-Dec-09	9.41	NA	9.48	
31	21-Dec-09	8.41	NA	9.18	
32	28-Dec-09	8.22	NA	9.46	
33	4-Jan-10	10.07	NA		
34	11-Jan-10	8.36	NA		
35	18-Jan-10	9.83	NA		
36	25-Jan-10	9.97	NA		
37	03-Feb-10		NA		
Season Average		10.19	NA	10.59	NA

Appendix 14 : Sugar produced (tonnes 94 N.T. equivalent) from area harvested

Mills	Tonnes sugar 94 N.T equivalent						
	2003	2004	2005	2006	2007	2008	2009
Lautoka	103202	110684	97315	96875	75656	77311	53313
Rarawai	101324	100664	84258	106781	78786	63954	
Labasa	75830	87802	90347	83970	68255	53160	57548
Penang	25453	24716	24733	30937	21858	23231	
All mills	305809	323866	296653	318563	244555	217656	

Appendix 15 : Sugar per hectare harvested (tonnes 94 N.T equivalent)

Mills	Average for period of five seasons					Last five seasons individually				
	1981/ 1985	1986/ 1990	1991/ 1995	1996/ 2000	2001/ 2005	2005	2006	2007	2008	2009
Lautoka	5.97	6.55	6.15	5.61	4.92	5.10	5.60	4.62	5.06	3.68
Rarawai	6.38	6.36	6.29	5.61	5.38	4.80	6.23	4.66	4.06	
Labasa	6.20	6.20	6.00	4.95	4.97	5.30	5.09	4.66	3.43	3.80
Penang	6.34	5.70	5.47	5.42	4.65	5.01	6.63	4.70	5.28	
Average	6.21	6.28	6.05	5.39	5.06	5.06	5.75	4.65	4.28	

Appendix 16 : Length of season (weeks) - Start and finish of crushing (date)

Mills	Rough average for period of five seasons					Last five seasons individually				
	1981/ 1985	1986/ 1990	1991/ 1995	1996/ 2000	2001/ 2005	2005	2006	2007	2008	2009
Lautoka	29.3	28.8	28.0	29.7	27.6	25.6	32.4	24.0	23.9	31.2
						07 Jun	05 Jun	07 Jun	10 Jun	22 Jun
						03 Dec	11 Jan	18 Nov	21 Nov	25 Jan
Rarawai	26.4	26.2	25.3	26.5	24.2	20.9	30.8	23.8	25.7	31.5
						01 Jun	31 May	18 Jun	23 Jun	03 Jul
						25 Oct	01 Jan	18 Nov	15 Dec	03 Feb
Labasa	27.9	26.6	29.4	30.7	24.1	29.1	29.0	29.1	26.0	28.1
						01 Jun	06 Jun	06 Jun	30 Jun	09 Jun
						15 Dec	25 Dec	25 Dec	22 Dec	18 Dec
Penang	28.1	25.5	21.5	26.2	20.4	18.3	21.4	22.1	22.2	22.4
						28 Jun	20 Jun	06 Jun	11 Jun	19 May
						11 Nov	16 Nov	06 Nov	13 Nov	22 Oct
All mills	28.4	26.8	26.1	28.2	24.1	23.5	28.4	24.8	24.5	28.3

Appendix 17 : Varieties Percent of hectares harvested

Varieties	Lautoka		Rarawai		Labasa		Penang		All Mills	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Ragnar	0.4	0.4	0.5	0.3	22.2	20.3	0.2	-	5.8	5.3
Waya	-	-	1.1	0.8	6.7	8.2	-	-	3.9	2.3
Mali	-	-	-	-	12.9	12.7	0.9	0.4	6.9	3.3
Homer	-	-	-	-	-	-	-	-	-	-
Spartan	-	-	-	-	-	-	-	-	-	-
Galoa	0.1	0.1	-	-	4.8	5.9	-	-	2.5	1.5
Aiwa	0.5	0.6	0.5	0.1	0.5	0.3	0.3	0.1	0.5	0.3
Ono	-	-	-	-	-	-	-	-	-	-
Yasawa	-	-	-	-	-	-	-	-	-	-
Vomo		-	-	-	-	-	-	-	-	-
Mana	92.8	94.2	90.2	93.5	-	0.1	92.8	94.6	91.9	70.6
LF 91 - 1925	-	0.3	0.1	0.2	-	0.1	-	-	0.1	0.2
Kaba	3.3	2.2	5.1	3.4	0.3	0.3	0.8	0.6	2.4	1.6
Vatu	-	-	-	-	24.6	20.7	0.3	0.1	12.5	5.2
Beqa	-	-	-	-	0.3	0.3	-	-	0.3	0.1
Naidiri	2.5	1.8	2.3	1.5	27.1	28.5	4.8	4.2	9.2	9.0
Exp.	0.2	-	-	-	-	-	-	-	0.2	-
Other var.	0.2	0.2	0.2	0.3	0.6	2.5	-	-	0.3	0.8

Appendix 18: Area planted in hectares as % of registered and cultivated areas

Mills	Hectares planted		Hectares planted as % of registered area		Hectares planted as % of cultivated area	
	2008	2009	2008	2009	2008	2009
Lautoka	1009	767	4	3.1	7	5.3
Rarawai	1247	1251	5	5.9	6	7.0
Labasa	1365	1337	8	7.0	8	7.9
Penang	295	208	3	2.3	6	4.7
Total	3916	3563	5	5.0	6	6.2

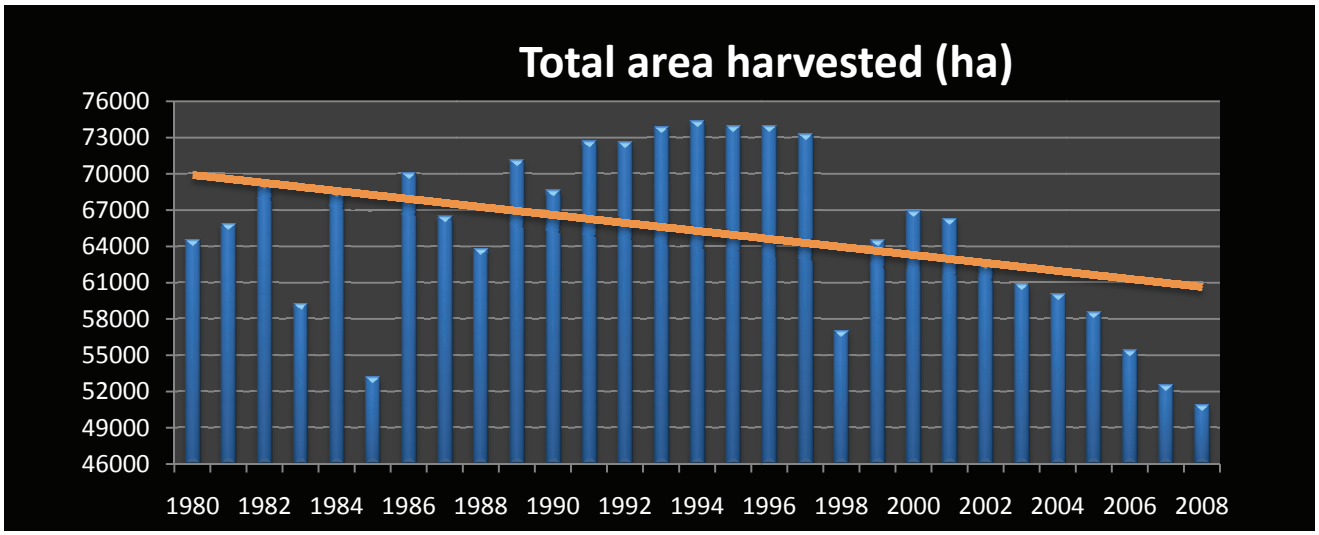


Figure 2: Declining production area

Appendix 19: Planting of varieties as percentage of total area planted over three years

Year	Varieties	Lautoka	Rarawai	Labasa	Penang	All mills
2007		-	0.2	6.9	-	3.0
2008	Ragnar	0.4	0.1	8.4	-	-
2009		6.3	-	10.4	-	-
2007		-	1.3	5.4	-	2.6
2008	Waya	-	-	7.1	-	-
2009		-	0.4	9.3	-	-
2007		90.8	88.8	-	84.8	51.4
2008	Mana	93.5	91.2	-	94.4	-
2009		80.2	91.4	-	98.7	-
2007		0.2	-	4.4	-	1.9
2008	Galoa	0.1	-	7.7	-	-
2009		-	-	5.1	-	-
2007		-	-	7.5	-	3.2
2008	Vatu	-	-	7.6	-	-
2009		0.2	-	7.7	-	-
2007		-	-	6.6	0.2	2.8
2008	Mali	-	-	9.8	0.9	-
2009		-	-	13.8	0.3	-
2007		0.5	-	0.2	-	0.2
2008	Aiwa	0.5	-	0.4	-	-
2009		0.4	-	2.0	-	-
2007		1.0	-	0.1	-	0.3
2008	Beqa	0.1	-	-	-	-
2009		0.3	-	-	-	-
2007		3.9	5.8	0.1	-	2.3
2008	Kaba	2.7	5.4	0.3	-	-
2009		0.1	5.7	-	-	-
2007		2.3	2.4	68.1	15.0	31.6
2008	Naidiri	2.2	2.1	57.7	4.4	-
2009		1.9	1.3	50.1	-	-
2007		-	-	-	-	-
2008	Homer	-	-	-	-	-
2009		-	-	-	-	-
2007		-	-	-	-	-
2008	Kiuva	-	-	-	-	-
2009		1.3	-	-	-	-
2007		-	-	-	-	-
2008	LF-91-1925	0.3	0.4	-	-	-
2009		1.7	-	1.0	-	-
2007		1.3	1.5	0.7	-	0.7
2008	O/Varieties	-	0.8	0.9	0.2	-
2009		1.0	1.2	0.6	1.0	-

Appendix 20 : Cane transport in Fiji (tonnes of cane harvested and actual method of delivery)

Mills	Year	Delivered portable line		Winch trailer or lorry to mainline		Lorry direct to mill carrier		Total	
		Tonnes	% of Total	Tonnes	% of Total	Tonnes	% of Total	Tonnes	% of Total
Lautoka	2005	16695	2	202130	23	671954	75	890779	100
	2006	11854	1	174057	17	865186	82	1051097	100
	2007	13652	2	158002	21	569577	77	741231	100
	2008	15915	2	179905	24	574754	74	770567	100
	2009	12464	2	168852	23	544730	75	726046	100
Rarawai	2005	40601	5	223857	29	497246	66	761704	100
	2006	44731	4	239872	23	754871	73	1039474	100
	2007	32927	5	184605	25	520946	70	738478	100
	2008	38797	5	184094	25	509470	70	732165	100
	2009	23827	4	164490	25	471034	71	659351	100
Labasa	2005	18563	2	249669	27	642431	71	910663	100
	2006	3391	1	238591	27	629049	72	871031	100
	2007	2910		233371	31	532847	69	769138	100
	2008	1275		179815	30	423224	70	604314	100
	2009			230735	34	448849	66	679584	100
Penang	2005	1191.3	5	38421	17	175260	78	225594	100
	2006	3681	1	63499	24	197318	75	264498	100
	2007	3010	1	55450	24	171378	75	229838	100
	2008	3026	1	48285	23	163261	76	214572	100
	2009	11145	6	30977	17	139528	77	181650	100
All mills	2005	87772	3	714077	26	1986891	71	2788740	100
	2006	63657	2	716019	22	2446424	76	3226100	100
	2007	52509	2	128061	16	2298115	82	2478685	100
	2008	59013	3	592099	26	1670704	72	2321620	100
	2009	47436	2	595054	26	1604141	71	2246631	100

Appendix 21: Percentage burnt cane of total tonnes crushed

Year	Lautoka	Rarawai	Labasa	Penang	Average
1969	14.9	17.8	0.5	11.0	11.1
1970	8.7	8.9	0.6	4.7	5.7
1971	18.7	26.1	6.4	12.9	16.0
1972	10.7	13.4	0.9	8.9	8.5
1973	17.0	22.4	2.7	4.6	11.7
1974	24.9	36.5	5.1	20.7	21.8
1975	18.2	29.1	3.6	14.1	16.3
1976	12.9	28.0	4.9	15.1	15.2
1977	17.7	28.9	6.9	11.8	16.3
1978	19.1	25.3	9.6	8.2	15.6
1979	14.9	25.9	9.6	15.0	16.4
1980	21.5	27.4	16.0	18.0	20.7
1981	17.6	21.2	19.4	17.0	18.8
1982	23.2	24.8	13.6	13.2	18.7
1983	18.3	18.4	18.0	12.0	16.7
1984	25.1	8.2	12.9	10.0	14.1
1985	28.6	25.2	22.4	16.2	23.1
1986	29.5	15.1	15.1	11.3	17.8
1987	23.8	34.2	20.9	19.0	24.5
1988	37.7	15.2	16.0	19.2	22.0
1989	20.6	13.6	12.7	10.0	14.2
1990	24.3	30.4	13.7	14.6	20.8
1991	42.5	46.4	32.0	27.6	37.1
1992	52.5	52.1	44.4	41.1	47.5
1993	35.6	33.4	29.2	19.4	29.4
1994	39.0	36.0	27.0	19.8	30.5
1995	43.4	42.5	37.6	28.7	38.1
1996	54.8	48.1	39.9	33.2	44.0
1997	50.7	49.1	33.5	34.8	42.0
1998	67.0	67.7	54.5	44.6	58.5
1999	41.6	39.8	17.0	26.3	32.4
2000	56.1	54.6	37.8	49.0	50.6
2001	56.7	50.3	18.9	49.5	42.9
2002	46.8	41.8	21.4	33.9	37.1
2003	40.1	32.8	29.3	22.0	33.4
2004	42.7	39.5	18.3	35.5	34.3
2005	44.4	38.4	25.0	34.9	35.7
2006	60.5	58.5	34.4	46.5	51.7
2007	39.0	40.5	39.1	53.5	40.8
2008	50.9	53.6	49.1	48.5	51.1
2009	43.5	33.3	18.6	28.8	31.8

Approved Varieties

Sugarcane varieties approved for planting during 2010 are: - Mana, Aiwa, Beqa, Galoa, Kaba, Mali, Ragnar, Vatu, Yasawa, Waya, Spartan, Ono, Vomo, Homer, Naidiri, LF91-1925 and Kiuva varieties are recommended to growers based on their soil type, giving a choice of at least three varieties as laid down in the Master Award.

Lautoka

Sectors	Soil types	Varieties
Olosara	Rich alluvial soils	Ragnar, Yasawa, Aiwa, Beqa, Vomo, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Beqa, Ragnar, Mana, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mana, Mali, Kaba, Naidiri, LF91-1925
Cuvu	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Beqa, Ragnar, Mana, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Naidiri, LF91-1925
	Sandy soils	Kaba, Mana, Galoa, Naidiri, LF91-1925
Lomawai	Flat : Fertile soils	Ragnar, Yasawa, Kaba, Vomo, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Beqa, Ragnar, Mana, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Naidiri, LF91-1925
	Sandy soils	Kaba, Mana, Galoa, Naidiri, LF91-1925
Yako	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
	Sandy soils	Kaba, Mana, Galoa, Naidiri, LF91-1925
Nawaicoba	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa,Mana, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
	Sandy soils	Kaba, Mana, Galoa, Naidiri, LF91-1925
Malolo	Flat : Fertile soil	Ragnar, Yasawa, Vomo, Vatu, Kaba, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Mana, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Qeleloa	Rich alluvial soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Mana,Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Naidiri, LF91-1925
Meigunyah	Flat : Fertile soils	Ragnar, Kaba, Yasawa, Vomo, Vatu, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Legalega	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Galoa, Homer, Naidiri, LF91-1925
Natova	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
	Sandy soils	Kaba, Mana, Galoa, Naidiri, LF91-1925
Lautoka	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri, LF91-1925,Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925

Sectors	Soil types	Varieties
Saweni	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Vomo, Aiwa, Beqa,Kaba,Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
	Sandy soils	Kaba, Mana, Galoa, Naidiri, LF91-1925
Lovu	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa,Mana, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Drasa	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Kaba, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Mana,Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
	Sandy soils	Kaba, Mana, Galoa, Naidiri, LF91-1925

Rarawai

Sectors	Soil types	Varieties
Varoko	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Mota	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri, LF91-1925,Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Naloto	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Koronubu	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri,LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Veisaru	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri,LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Rarawai	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Varavu	Flat : Fertile soils	Ragnar, Yasawa, Spartan, Aiwa, Beqa,Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
Tagitagi	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri,LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri, LF91-1925
	Saline areas	Kaba, Mana, Galoa, Naidiri, LF91-1925
Yaladro	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri,LF91-1925, Kiuva
	Medium soils	Kaba, Mali, Vatu, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Kaba, Mali, Mana, Waya, Homer, Naidiri, LF91-1925

Labasa

Sectors	Soil types	Varieties
Waiqele	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba,Naidiri, LF91-1925,Kiuva
	Medium soils	Spartan, Kaba, Mali, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mali, Kaba, Homer, Naidiri, LF91-1925
Wailevu	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Spartan, Kaba, Mali, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mali, Kaba, Homer, Naidiri, LF91-1925
	Saline soils	Mali, Galoa, Vatu, Naidiri, LF91-1925
Vunimoli	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Spartan, Kaba, Mali, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mali, Kaba, Homer, Naidiri, LF91-1925
Labasa	Flat : Fertile soils	Ragnar, Yasawa, Vomo,Vatu, Aiwa, Beqa,Kaba,Naidiri, LF91-1925,Kiuva
	Medium soils	Spartan, Kaba, Mali, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mali, Kaba, Homer, Naidiri, LF91-1925
	Saline soils	Mali, Galoa, Vatu, Naidiri, LF91-1925
Bucaisau	Flat : Fertile soils	Ragnar,Yasawa,Vomo, Vatu, Aiwa,Beqa, Kaba, Naidiri, LF91-1925,Kiuva
	Medium soils	Spartan, Kaba, Mali, Waya, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mali, Kaba, Waya, Homer, Naidiri, LF91-1925
	Saline soils	Mali, Galoa, Waya, Vatu, Naidiri, LF91-1925
Wainikoro	Flat : Fertile soils	Ragnar, Yasawa,Vomo, Vatu, Aiwa,Beqa, Kaba,Naidiri, LF91-1925,Kiuva
	Medium soils	Spartan, Kaba, Mali, Waya, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mali, Kaba, Waya, Homer, Naidiri, LF91-1925
	Saline soils	Mali, Galoa, Waya, Vatu, Naidiri, LF91-1925
Daku	Flat : Fertile soils	Ragnar,Yasawa,Vomo,Vatu, Aiwa, Beqa,Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Spartan, Kaba, Mali, Waya, Aiwa, Beqa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mali, Galoa, Waya, Vatu, Homer, Naidiri, LF91-1925
Natua	Poor soils	Ragnar, Mali, Ono, Kaba, Aiwa, Beqa, Homer, Naidiri, LF91-1925
Solove	Poor soils	Ragnar, Mali, Ono, Kaba, Aiwa, Beqa, Homer, Naidiri, LF91-1925
Bulivou	Poor soils	Ragnar, Mali, Ono, Kaba, Aiwa, Beqa, Homer, Naidiri, LF91-1925

Penang

Sectors	Soil types	Varieties
Nanuku	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Waya, Kaba, Mali, Vatu, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Waya, Mana, Kaba, Mali, Homer, Naidiri, LF91-1925
	Salt affected areas	Mana, Kaba, Galoa, Naidiri, LF91-1925
	Viti Vanua area	Mana, Kaba, Mali, Ragnar, Naidiri, LF91-1925
Malau	Rich alluvial soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925,Kiuva
	Medium soils	Waya, Ragnar, Kaba, Mali, Vatu, Beqa, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mana, Kaba, Mali, Homer, Naidiri, LF91-1925
	Salt affected areas	Galoa, Kaba, Mana, Naidiri, LF91-1925
Ellington I & II	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri, LF91-1925, Kiuva
	Medium soils	Waya, Ragnar, Kaba, Mali, Vatu, Beqa, Aiwa, Naidiri, LF91-1925, Kiuva
	Poor soils	Mana, Kaba, Mali, Homer, Naidiri, LF91-1925
	Salt affected areas	Galoa, Mana, Kaba, Naidiri, LF91-1925

Varieties released in the last decade

Picture 1: Naidiri (2000)

Picture 2: LF91-1925 (2006)

Picture 3: Kiuva (2009)

Staff Listing 2009

Name	Designation	Name	Designation
Jai Gawander	Chief Executive Officer	Baskaran Pillay	Field Worker
Sanjay Namal Prakash	Finance & Admin Manager	Chandra Segra Pillay	Rouger
Abinesh Chand	Extension Officer	Dhirendra Chand Rao	Field Worker
Amit Raj Singh	Scientific Officer	Dinesh Dutt	Rouger
Andreen Astika Kiran	Technical Assistant/Grower Services	Ilimeleki Katuba	Field Worker
Atish Chand	Extension Officer	Jai ram Mudliar	Office Attendent/Driver
Deepak Nilesh Naidu	Finance Assistant	Jonetani Talemaitoga	Field Worker
Desmond Vinod Kumar	Technical Officer/Grower Services	Kailas Kumar H.	Field Worker
Devendra Kumar Sharma	Extension Officer	Kamal Nabi	Estate Driver
Doreen Ram Ram	Senior Technical Assistant/Grower Services	Krishan Chandra	Rouger
Jainesh Anish Ram	Junior Technical Officer/Grower Services	Lachman	Field Worker
Jeetendra Patel	Scientific Officer	Lognadan	Head Rouger
Josese Lomani	Extension Officer	Madho	Esate Driver
Karishma Mala	Senior Technical Assistant/Grower Services	Manoj Datt	Rouger
Karuna Garan	Technical Officer	Mosese Turaga	Rouger
Maciu Talebulamaimaleya	TFO Clerk	Naleen Krishna	Lab Assistant
Matishwar Chand Rao	Scientific Officer	Permal Samy	Rouger
Muni Sangeeta Goundar	Senior Technical Assistant	Pushp Chand	Research Hand
Nalini Shartika Prasad	Senior Technical Assistant/Grower Services	Rahimat Ali	Rouger
Nemani Soli Sugubati	Technical Officer/Grower Services	Raj Kumar	MV Driver
Nitika Natasha Pravashni	Corporate Assistant	Raj Kumar d	Field Worker
Parmen Prakash Verma	Extension Officer	Raja Ram	Rouger
Pedro Rounds	Scientific Officer	Rajendra Prasad	Rouger
Prema Nadan Naidu	Research Officer	Ram Kumar R.S	Security
Rajendra Krishna	Technical Officer	Ramesh Chand	Head Rouger
Rajnesh Prasad	Extension Officer	Rohil Dutt Ram	Rouger
Renil Ritesh Kumar	Senior Technical Assistant/Grower Services	Salendra Naidu	Rouger
Rizwan Haque	ICT/GIS Officer/Grower Services	Sanmogam Gounder	Field Worker
Ronal Rajnil Kumar	Junior Corporate Officer	Sat Narayan Samy	Ground Attendent
Sada Sivan Swamy	Technical Officer/Grower Services	Satendra Singh	Head Rouger
Saimone Sabakera Johnson	Senior Scientific Officer	Semesa Narara	Rouger
Samuel Dyer Work	Junior Technical Officer/Grower Services	Serevi Nauvi	Rouger
Sanmogam Gounder	Senior Technical Assistant/Grower Services	Shiu Nadan	Security
Satye Vijay Raj	Extension Officer	Solomoni Tusasa	Field Worker
Shireen Shabrina Sattar	Senior Technical Assistant/Grower Services	Subhas Chand	Head Rouger
Shiva Ram	Extension Officer	Subram Naidu	General Hand
Ajay Anand Prasad	Field Worker	Surendra Kumar	Rouger
Aporosa Rasavulu	Security	Suresh Mani	MV Driver
Arvind Mani	Estate Driver	Surindar Singh	Rouger
Ashok Kumar	Field Worker	Suruj Kumar.	Estate Sirdar/Headman
Ashwin Prasad	Rouger	Tarun Sami	Security
Aven Lal	Field Worker	Vijay Datt	Rouger
Avinesh Kumar	Rouger	Vijay Nand Sharma	Head Rouger

Sugar Research Institute of Fiji

Financial Statements

For the year ended

31 December 2009

Sugar Research Institute of Fiji

Contents

Sugar Research Institute of Fiji

Board report

The Board members present their report together with the financial statements of the Institute for the year ended 31 December 2009 and the auditor's report thereon.

Board members

The Board members in office at the date of this report are:

Dr John Morrison - Chairman
Sundresh Chetty
Viliame Gucake
Dr. Krishnamurthi
Suresh Patel
Mangaiya Reddy
Seru Vularika

State of affairs

In the opinion of the Board the accompanying statement of financial position gives a true and fair view of the state of affairs of the Institute as at 31 December 2009 and the accompanying statement of comprehensive income and statement of cash flows give a true and fair view of the results and cash flows of the Institute for the year then ended.

Principal activity

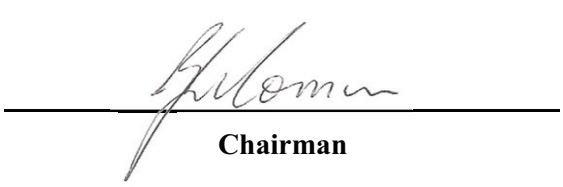
The functions of the Institute are outlined under the Sugar Research Institute of Fiji Act No 14 of 2005, which includes promoting by means of research and investigation, the technical advancement, efficiency and productivity of the sugar industry, and to provide its functions, powers, administration and finance and for related matters.

Events subsequent to balance date

There has not arisen in the interval between the end of the year and the date of this report any item, transaction or event of a material and unusual nature likely, in the opinion of the Board members, to affect significantly the operations of the Institute, the results of those operations or the state of affairs of the Institute in subsequent financial years.

Dated at Lautoka this 25th day of September 2010.

Signed in accordance with a resolution of the Board.



Chairman

Board member

Honourable Commodore Josaia Voreqe Bainimarama
Minister responsible for the Sugar Industry
PO Box 2212
Government Buildings
Suva

Dear Minister,

Report of the independent auditor for Sugar Research Institute of Fiji

Scope

We have audited the financial statements of Sugar Research Institute of Fiji for the financial year ended 31 December 2009, consisting of the statement of financial position, statement of comprehensive income, statement of cash flows and accompanying notes, set out on pages 3 to 19. The Board members are responsible for the preparation and presentation of the financial statements and the information they contain. We have conducted an independent audit of these financial statements in order to express an opinion on them to you.

Our audit has been conducted in accordance with Section 12 of the Sugar Research Institute Act 2005 and Fiji Standards on Auditing, to provide reasonable assurance as to whether the financial statements are free of material misstatement. Our procedures included examination, on a test basis, of evidence supporting the amounts and other disclosures in the financial statements, and the evaluation of accounting policies and significant accounting estimates. These procedures have been undertaken to form an opinion as to whether, in all material respects, the financial statements are presented fairly in accordance with International Financial Reporting Standards so as to present a view which is consistent with our understanding of the Institute's financial position, the results of its operations and its cash flows.

The audit opinion expressed in this report has been formed on the above basis.

Audit opinion

In our opinion, the accompanying financial statements give a true and fair view of the financial position of the Institute for the year ended 31 December 2009 and of the results of its operations and its cash flows for the year then ended in accordance with International Financial Reporting Standards.

25 September 2010
Nadi, Fiji Islands

KPMG
KPMG
Chartered Accountants

Sugar Research Institute of Fiji
Statement of comprehensive income
For the year ended 31 December 2009

	Note	2009 $	2008 $
Contributions and grants	5	1,872,481	1,544,081
Estate income		1,203,413	1,122,490
Other income		14,246	6,355
Total income		3,090,140	2,672,926
Cost of operations		(2,226,955)	(1,437,441)
Administrative expenses		(859,347)	(1,233,470)
Surplus from operations	6	3,838	2,015
Finance expense	7	(3,838)	(2,015)
Surplus before tax		-	-
Income tax expense		-	-
Surplus after income tax		-	-
Other comprehensive income net of income tax		-	-
Total comprehensive surplus for the year		-	-

The above statement of comprehensive income is to be read in conjunction with notes to the financial statements set out on pages 6 to 19.

Sugar Research Institute of Fiji
Statement of financial position
As at 31 December 2009

	Note	2009 $	2008 $
Assets			
Non-current assets			
Property, plant and equipment	8	1,719,825	831,816
Total non-current assets		1,719,825	831,816
Current assets			
Cash and cash equivalents	9	774,040	2,105,699
Inventories	10	-	1,953
Receivables and prepayments	11	14,126	134,655
Receivable from related parties	15(b)	3,502,060	2,802,060
Total current assets		4,290,226	5,044,367
Total assets		6,010,051	5,876,183
Current liabilities			
Deferred income	12	3,052,836	3,064,783
Payable to related parties	15(c)	2,455,415	2,174,457
Employee benefits	13	35,108	49,538
Trade and other payables	14	466,692	587,405
Total current liabilities		6,010,051	5,876,183
Total liabilities		6,010,051	5,876,183

Signed on behalf of the board

Chairman **Board Member**

The above statement of financial position is to be read in conjunction with notes to the financial statements set out on pages 6 to 19.

Sugar Research Institute of Fiji
Statement of cash flows
For the year ended 31 December 2009

	Note	2009 $	2008 $
Operating activities			
Receipts from stakeholders and donors		3,902,062	3,452,800
Payment to suppliers and employees		(3,977,535)	(1,994,541)
Cash flows (used in) from operating activities		(75,473)	1,458,259
Investing activities			
Proceeds from sale of property, plant and equipment		10,300	1,380
Acquisition of property, plant and equipment		(1,066,487)	(278,471)
Cash flows used in investing activities		(1,056,187)	(277,091)
Financing activities			
Repayment of related party advance		(200,000)	(200,000)
Cash flows used in financing activities		(200,000)	(200,000)
Net increase in cash and cash equivalents		(1,331,659)	981,168
Cash and cash equivalents at the beginning of the year		2,105,699	1,124,531
Cash and cash equivalents at 31 December	9	774,040	2,105,699
Material non cash investing activities	16		

The above statement of cash flows is to be read in conjunction with notes to the financial statements set out on pages 6 to 19.

Sugar Research Institute of Fiji
Notes to the financial statements
For the year ended 31 December 2009

1. Reporting entity

Sugar Research Institute of Fiji ("the Institute") is a body corporate domiciled in Fiji, established under the Sugar Research Institute of Fiji Act 2005. The address of the Institute's registered office is Drasa Avenue, Lautoka, Fiji.

The functions of the Institute are outlined under Sugar Research Institute of Fiji Act No 14 of 2005, which includes promoting by means of research and investigation, the technical advancement, efficiency and productivity of the sugar industry, and to provide its functions, powers, administration and finance and for related matters.

2. Basis of preparation

(a) Statement of compliance

The financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS) adopted by International Accounting Standards Board.

The financial statements were authorised for issue by the Board on _____.

(b) Basis of measurement

The financial statements have been prepared on the historical cost basis except where stated. The accounting policies have been consistently applied by the Institute and are consistent with those used in the previous period.

(c) Functional and presentation currency

The financial statements are presented in Fiji dollars which is the Institute's functional currency.

(d) Use of estimates and judgments

The preparation of financial statements requires management to make judgments, estimates and assumptions that affect the application of accounting policies and the reported amount of assets, liabilities, income and expenses. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised and in any future period affected.

In particular, information about significant areas of estimation uncertainty and critical judgments in applying accounting policies that have the most significant effect on the amount recognised in the financial statements are described in the following notes:

(i) Note 5 - Contributions and grants
(ii) Note 8 - Property, plant and equipment
(iii) Note 12 - Deferred income
(iv) Note 13 - Employee benefits
(v) Note 14 - Trade payables and other payables

3. Significant accounting policies

The principal accounting policies adopted by the Institute are stated to assist in a general understanding of the financial statements. These policies have been consistently applied except where otherwise indicated.

(a) Income tax

Income tax expense comprises current and deferred tax. Income tax expense is recognised in the profit or loss except to the extent that it relates to items recognised directly in equity, in which case it is recognised in equity.

Current tax is the expected tax payable on the taxable income for the year, using tax rates enacted or substantively enacted at the reporting date, and any adjustments to tax payable in respect of previous years.

Deferred tax is recognised using the balance sheet method, providing for temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is measured at the tax rates that are expected to be applied to the temporary difference when they reverse, based on the laws that have been enacted or substantively enacted by the reporting date.

A deferred tax asset is recognised to the extent that it is probable that future taxable profits will be available against which the temporary differences can be utilised. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realised.

(b) Foreign currency transactions

Transactions in foreign currencies are translated to Fiji dollars at exchange rates at the dates of the transactions. Monetary assets and liabilities denominated in foreign currencies at the reporting date are translated to the functional currency at the exchange rate at that date. The foreign currency gain or loss on translation are recognised in profit or loss.

(c) Property, plant and equipment

Recognition and measurement

Items of property, plant and equipment are measured at cost less accumulated depreciation and impairment losses.

Cost includes expenditure that is directly attributable to the acquisition of the asset. Purchased software that is integral to the functionality of the related equipment is capitalised as part of that equipment. When parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

3. Significant accounting policies (continued)

(c) Property, plant and equipment (continued)

Subsequent expenditure

The cost of replacing part of an item of property, plant and equipment is recognised in the carrying amount of the item if it is probable that the future economic benefits embodied within the part will flow to the Institute and its cost can be measured reliably. The costs of the day-to-day servicing of property, plant and equipment are recognised in the profit or loss as incurred.

Depreciation

Depreciation is recognised in the profit or loss on a straight-line basis over the estimated useful lives of each part of an item of property, plant and equipment. The estimated useful lives are as follows:

Computers	5 years
Fixtures and fittings	10 years
Motor vehicles	6.67 years
Plant and Equipment	6.67 - 10 years

Depreciation methods, useful lives and residual values are reassessed at reporting date.

(d) Impairment

(i) Financial assets

A financial asset is considered to be impaired if objective evidence indicates that one or more events have had a negative effect on the estimated future cash flows of the asset.

An impairment loss in respect of a financial asset measured at amortised cost is calculated as the difference between its carrying amount, and the present value of the estimated future cash flows. Individually significant financial assets are tested for impairment on an individual basis. All impairment losses are recognised in the profit or loss.

(ii) Non-financial assets

The carrying amounts of the Institute's non-financial assets, other than inventories and deferred tax assets, are reviewed at each reporting date to determine whether there is an indication of impairment. If any such indication exists, then the assets recoverable amount is estimated.

An impairment loss is recognised if the carrying amount of an asset or its cash-generating unit exceeds its recoverable amount. A cash-generating unit is the smallest identifiable asset group that generates cash flows that are largely independent from other assets and groups. Impairment losses are recognised in the profit or loss.

3. Significant accounting policies (continued)

(d) Impairment (continued)

(ii) Non-financial assets (continue)

The recoverable amount of an asset or cash-generating unit is the greater of its value in use and its fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset.

Impairment losses recognised in respect of cash-generating units are allocated first to reduce the carrying amount of any goodwill allocated to the units and then to reduce the carrying amounts of the other assets in the unit (group of units) on a pro rata basis.

An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would be determined, net of depreciation of amortisation, if no impairment loss had been recognised.

(e) Inventories

Inventories are measured at the lower of cost and net realisable value. Cost is based on the first-in-first-out principle and includes expenditure incurred in acquiring the inventories and bringing them to their existing condition and location.

(f) Financial instruments

Non derivative financial instrument

Non-derivative financial instruments comprise trade and other receivables, cash and cash equivalents and trade and other payables.

Financial instruments are recognised when the Institute becomes a party to the contractual provisions of the instrument. Financial assets are derecognised if the Institute's contractual rights to the cash flows from the financial assets expire or if the Institute transfers the financial asset to another party without retaining control or substantially all risks and rewards of the asset. Financial liabilities are derecognised if the Institute's obligations specified in the contract expire or are discharged or cancelled.

3. Significant accounting policies (continued)

(f) Financial instruments (continued)
Non derivative financial instrument (continued)

Cash and cash equivalents
Cash and cash equivalents comprise cash at bank and on hand for the purposes of the statement of cash flows.

Receivables and other assets
Receivables and other assets are measured at initial recognition at fair value. Subsequently, appropriate allowances for estimated irrecoverable amounts are recognised in the profit or loss when there is objective evidence that the asset is impaired.

Financial liabilities
Financial liabilities are classified according to the substance of the contractual arrangements entered into. The Institute's financial liabilities include trade and other payables. All financial liabilities, except for derivatives, are recognised initially at their fair value plus transaction costs that are directly attributable to the acquisition or issue of the financial liability and subsequently measured at amortised cost, using effective interest method, unless the effect of discounting would be insignificant, in which case they are stated at cost.

(g) Trade payables and other payables
Trade and other payables are non-interest-bearing and are stated at cost. A provision is recognised in the statement of financial position when the Institute has a legal or constructive obligation as a result of a past event, and it is probable that an outflow of economic benefits will be required to settle the obligation. If the effect is material, provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and, where appropriate, the risks specific to the liability.

(h) Revenue
Grant income
Grants are recognised in the statement of financial position initially as deferred income when there is reasonable assurance that it will be received and that the Institute will comply with the conditions attaching to it. Grants that compensate the Institute for expenses incurred are recognised as revenue in the profit or loss on a systematic basis in the same periods in which the expenses are recognised. Grants that compensate the Institute for the cost of an asset are recognised in the profit or loss as other operating income on a systematic basis over the useful life of the asset.

3. Significant accounting policies (continued)

(i) Employee benefits

Superannuation

Obligations for contributions to the Fiji National Provident Fund (FNPF) are recognised as an expense in the profit or loss when they are incurred.

Short-term benefits

Short-term employee benefit obligations are measured on an undiscounted basis and are expensed in the profit or loss as the related service is provided.

(j) Finance expenses

Finance expense comprise bank charges.

(k) Comparative information

Where necessary, comparative figures have been adjusted to conform to changes in current year presentation.

4. Financial risk management

Overview

The Institute has exposure to the following risks:

(i) Credit risk
(ii) Liquidity risk
(iii) Market risk
(iv) Operational risk

This note presents information about the Institute's exposure to each of the above risks, the Institute's objectives, policies and processes for measuring and managing risk. Further quantitative disclosures are included throughout these financial statements.

Risk management framework

The Board members have overall responsibility for the establishment and oversight of the Institute's risk management framework.The Board is responsible for developing and monitoring the Institute's risk management policies. The Institute's risk management policies are established to identify and analyse the risks faced by the Institute, to set appropriate risk limits and controls, and to monitor risks and adherence to limits. Risk management policies and systems are reviewed regularly to reflect changes in market conditions and the Institute's activities. The Sugar Research Institute of Fiji, through its training and management standards and procedures, aims to develop a disciplined and constructive control environment in which all employees understand their roles and obligations.

4. Financial risk management policies (continued)

The Board oversees how management monitors compliance with the Institute's risk management policies and procedures, and reviews the adequacy of the risk management framework in relation to the risks faced by the Institute.

(i) Credit risk

Credit risk is the risk of financial loss to the Institute if a stakeholder to a financial instrument fails to meet its contractual obligations, and arises principally from the Institute's receivables from industry related entities.

Trade and other receivables

The Institute's exposure to credit risk is influenced mainly by the individual characteristics of each party. However, management also considers the demographics of the Institute's stakeholders, including the default risk of the industry as these factors may have an influence on credit risk, particularly in the currently deteriorating economic circumstances.

The Institute establishes an allowance for impairment that represents its estimate of incurred losses in respect of trade and other receivables. The main components of this allowance are a specific loss component that relates to individually significant exposures, and a collective loss component established for groups of similar assets in respect of losses that have been incurred but not yet identified. The collective loss allowance is determined based on historical data of payment statistics for similar financial assets.

The maximum exposure to credit risk is as follows:

	2009	2008
	$	$
Cash and cash equivalents	774,040	2,105,699
Other receivables	297	119,975
Receivables from related parties	3,502,060	2,802,060
	4,276,397	5,027,734

4. Financial risk management policies (continued)

(ii) Liquidity risk

Liquidity risk is the risk that the Institute will not be able to meet its financial obligations as they fall due. The Institute's approach to managing liquidity is to ensure, as far as possible, that it will always have sufficient liquidity to meet its liabilities when due, under both normal and stressed conditions, without incurring unacceptable losses or risking damage to the Institute's reputation.

	2009 $	2009 $	2008 $	2008 $
	Less than 1 year	More than 1 year	Less than 1 year	More than 1 year
Financial assets				
Cash and cash equivalents	774,040	-	2,105,699	-
Receivables	297	-	119,975	-
Receivable from related parties	3,502,060		2,802,060	
	4,276,397	-	5,027,734	-
Financial liabilities				
Payable to related parties	2,455,415	-	2,174,457	-
Employee benefits	35,108	-	49,538	-
Trade and other payables	466,692	-	587,405	-
	2,957,215	-	2,811,400	-

(iii) Market risk

Market risk is the risk that changes in interest rates will affect the Institute's income or the value of its holdings of financial instruments. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while optimising the return.

Fair value interest risk arises from the potential for a change in interest rates to cause a fluctuation in the fair value of financial instruments. The objective is to manage the interest risk to achieve stable and sustainable net interest earnings in the long term. In managing the risk, the Institute seeks to achieve a balance between reducing risk to earnings and market value from adverse interest rate movements, and enhancing net interest income through correct anticipation of the direction and extent of interest rate changes.

4. Financial risk management policies (continued)

(iv) Operational Risk

Operational risk is the risk of direct or indirect loss arising from a wide variety of causes associated with the Institute's processes, technology and infrastructure, and from external factors other than credit, market and liquidity risks such as those arising from legal and regulatory requirements and generally accepted standards of corporate behaviour. Operational risks arise
from all the Institute's operations.

The Institute's objective is to manage operational risk so as to balance the avoidance of financial losses and damage to the Institute's reputation with overall cost effectivness and to avoid control procedures that restrict initiative and creativity.

The primary responsibility for the development and implementation of controls to address operational risk is assigned to senior management. The responsibility is supported by the development of overall standard for the management of operational risks in the following areas:

- requirements for apprporiate segregation of duties, including the independent authorisation of transactions
- requirements for the reconciliation and montoring of transactions
- compliance with regulatory and other legal requirements
- requirements for the periodic assessment of operational risks faced, and the adequacy of controls and procedures to address the risks identified
- requirements for the reporting of operational losses and proposed remedial action
- development of contingency plans
- training and professional development
- ethical and business standards
- risk mitigation, including insurance where this is effective.

5. Contributions and grants

Contributions from stakeholders and grants that compensate the Institute for revenue and capital expenditure are recognised from deferred income as follows:

	2009	2008
	$	$
AusAid	75,390	38,589
Contribution from the Fiji Government	501,004	315,434
European Union	421,833	600,773
Fiji Sugar Corporation (FSC)	441,851	315,434
Sugar Cane Growers Council	432,403	273,851
	1,872,481	1,544,081

Sugar Research Institute of Fiji
Notes to the financial statements
For the year ended 31 December 2009

6. Surplus from operations

(a) Surplus from operations has been arrived at after including the following items:

	2009	2008
	$	$
Auditors remuneration - audit	8,500	8,500
- other services	4,172	6,275
Board allowances	832	1,450
Board fees	31,480	52,619
Depreciation	178,478	119,909
FSC costs	208,134	573,513
Gain on sale of property, plant and equipment	10,300	194
Insurance	57,064	42,700
Legal fees	11,311	29,784
Professional fees	-	67,458
Travel	61,990	54,205

(b) Personnel expenses

Fiji National Provident Fund contributions	58,111	59,628
Training and Productivity Authority of Fiji	6,206	6,061
Key management compensation - short term benefits	145,913	188,541
Wages and salaries	468,464	396,665
	678,694	650,895

The average number of employees for the year ended 31 December 2009 was 31 (2008: 31)

7. Finance expense

Bank charges	3,838	2,015

8. Property, plant and equipment

	Fixtures & fittings	Plant & equipment	Motor vehicles	Computers	Work in progress	Total
	$	$	$	$	$	$
Cost						
Balance at 1 January 2009	5,227	115,727	722,319	139,926	125,867	1,109,066
Acquisitions	28,438	440,220	268,860	98,111	230,858	1,066,487
Disposals	-	(4,000)	-	-	-	(4,000)
Balance at 31 December 2009	33,665	551,947	991,179	238,037	356,725	2,171,553
Depreciation						
Balance at 1 January 2009	649	60,520	185,988	30,093	-	277,250
Depreciation charge	2,094	20,780	122,107	33,497	-	178,478
Disposals	-	(4,000)	-	-	-	(4,000)
Balance at 31 December 2009	2,743	77,300	308,095	63,590	-	451,728
Carrying amount						
At 31 December 2008	4,578	55,207	536,331	109,833	125,867	831,816
At 31 December 2009	30,922	474,647	683,084	174,447	356,725	1,719,825

		2009	2008
		$	$
9.	**Cash and cash equivalents**		
	Cash at bank	773,838	2,105,611
	Cash on hand	202	88
	Cash and cash equivalents in the statement of cash flows	774,040	2,105,699
10.	**Inventories**		
	Inventories- glassware, chemicals and tools	-	1,953
11.	**Receivables and prepayments**		
	Receivable from AusAid	-	119,400
	Other receivables	297	575
	Prepayments	13,829	14,680
		14,126	134,655
12.	**Deferred income**		
	Balance at the beginning of the year	3,064,783	1,027,481
	Funds received or receivable during the period	1,860,534	3,581,383
	Utilised during the period	(1,872,481)	(1,544,081)
	Balance at 31 December	3,052,836	3,064,783
	This is comprised as follows:		
	Contribution from stakeholders	2,336,241	1,838,883
	AusAid grant	-	87,472
	European Union grant	716,595	1,138,428
		3,052,836	3,064,783
13.	**Employee benefits**		
	Accrued annual leave	35,108	49,538

	2009	2008
	$	$
14. Trade and other payables		
Trade payables	73,847	37,614
Other payables	104,952	110,196
VAT payable	287,893	439,595
	466,692	587,405

15. Related parties

Related parties of the Institute include key stakeholders in the Fiji Sugar Industry, namely, the Government of Fiji, Fiji Sugar Corporation, South Pacific Fertilizers Limited, Sugar Cane Growers Fund and Sugar Cane Growers Council.

Transactions with these parties and outstanding balances at year end are disclosed below.

(a) Board members

The following were Board members of the Institute until 30 September 2009:
Philip Atherton - Chairman
Dr. Krishnamurthi
Jain Kumar
Dr John Morrison
Suresh Patel
Apisai Ucuboi
Seru Vularika

The following are the current Board members of the Institute:
Dr John Morrison - Chairman
Sundresh Chetty
Viliame Gucake
Dr. Krishnamurthi
Suresh Patel
Mangaiya Reddy
Seru Vularika

Board members emoluments and board expenses are disclosed under Note 6.

	2009	2008
	$	$
(b) Amounts receivable from related parties		
Fiji Sugar Corporation	2,795,366	2,095,366
Sugar Cane Growers Council	706,694	706,694
	3,502,060	2,802,060

15. Related parties (continued)

	2009	2008
	$	$
(c) Amounts payable to related parties		
Fiji Sugar Corporation	2,455,415	1,974,457
Sugar Cane Growers Fund	-	200,000
	2,455,415	2,174,457
(d) Transactions with related parties		
Revenue		
Grant income - Fiji Sugar Corporation	441,851	315,434
Grant income - Fiji Government	501,004	315,434
Grant income - Sugar Cane Growers Council	432,403	273,851
Estate income - Fiji Sugar Corporation	1,203,413	1,122,490
	2,578,671	2,027,209
Expenses		
Fiji Sugar Corporation costs	208,134	573,513

(e) Key management personnel

Key management personnel include the chief executive officer and finance and administration manager of the Institute.

Transactions with key management personnel are no favourable than those available, or which might be reasonably be expected to be available, on similar transactions to third parties on an arm's length.

Key management compensation is disclosed under Note 6(b).

	2009	2008
16. Non cash investing activities	$	$
Motor vehicles received in kind from European Union	-	243,000

17. Capital commitments and contingencies

Capital commitments and contingent liabilities as at 31 December 2009 amounted to $Nil (2008: $Nil).

18. Events subsequent to balance date

There has not arisen in the interval between the end of the year and the date of this report any item, transaction or event of a material and unusual nature likely, in the opinion of the Board members, to affect significantly the operations of the Institute, the results of those operations or the state of affairs of the Institute in subsequent financial years.

Disclaimer

The additional financial information presented on pages 21 to 23 is in accordance with the books and records of Sugar Research Institute of Fiji which have been subjected to the auditing procedures applied in our statutory audit of the Institute for the year ended 31 December 2009. It will be appreciated that our statutory audit did not cover all details of the additional financial information. Accordingly, we do not express an opinion on such financial information and no warranty of accuracy or reliability is given.

In accordance with our firm policy, we advise that neither the Firm nor any member or employee of the Firm undertakes responsibility arising in any way whatsoever to any person (other than the Institute) in respect of such information, including any errors or omissions therein, arising through negligence or otherwise however caused.

25 September 2010
Nadi, Fiji Islands

KPMG
KPMG
Chartered Accountants

Sugar Research Institute of Fiji
Statement of Operations
For the year ended 31 December 2009

	2009	2008
	$	$
Income		
Contribution from the Fiji Government	501,004	315,434
Fiji Sugar Corporation (FSC) contribution	441,851	315,434
Grant received from AusAid	75,390	38,589
Grant received from European Union	421,833	600,773
Sugar Cane Growers Council contribution	432,403	273,851
Estate income	1,203,413	1,122,490
Gain on sale of property, plant and equipment	10,300	194
Sundry income	3,946	6,161
Total income	3,090,140	2,672,926
Less cost of operations		
Bank charges	3,838	2,015
Depreciation	178,478	119,909
Electricity	1,534	1,034
EU Cost	536,964	-
General supplies	6,395	12,994
Comunication expenses	19,729	7,843
Material costs	224,469	86,737
Meal allowance	-	1,556
Miscellaneous expenses	245	4,816
Motor vehicle running expenses	205,691	148,799
Other maintenance costs	-	3,655
Overhead expenses	520	12,842
Other running costs	284	2,186
Postage	277	1,117
Rent	16,100	10,627
Repairs and maintenances	35,257	80,877
Subcontract expenses	567,020	507,369
Travel	9,429	1,501
Wages and salaries	424,563	433,579
Total cost of operations	2,230,793	1,439,456
Balance carried forward	2,230,793	1,439,456

The above detailed statement of operations is to be read in conjunction with the disclaimer report set out on page 20.

Sugar Research Institute of Fiji
Statement of Operations
For the year ended 31 December 2009

	2009	2008
	$	$
Balance brought forward	2,230,793	1,439,456
Administrative expenses		
Accommodation and meals	31,965	23,045
Auditors remuneration - audit	8,500	8,500
- other services	4,172	6,275
Board fees	31,480	52,619
Board allowances	832	1,450
Business licenses	310	-
Electricity	3,271	3,000
Fees- Science Audit Committee	2,000	28,778
Fiji National Provident Fund contributions	58,111	59,628
FSC costs	208,134	573,513
General expenses	12,552	4,233
Hire of services	23,498	6,159
ICT consumables	5,404	5,113
ICT license	8,345	745
Communication expenses	18,277	17,341
Insurance	57,064	42,700
Legal fees	11,311	29,784
Medical expense	8,055	1,160
Media and publication	572	13,224
Freight	10,267	933
Professional fees	-	67,458
Rent	29,603	30,845
Repairs and maintenance	34,304	15,463
Stationery	9,678	8,846
Subscriptions	2,842	9,705
Subsistence allowance	-	2,139
Training	1,340	2,455
Balance carried forward	581,887	1,015,111

The above detailed statement of operations is to be read in conjunction with the disclaimer report set out on page 20.

Sugar Research Institute of Fiji
Statement of Operations
For the year ended 31 December 2009

	2009 $	2008 $
Balance brought forward	581,887	1,015,111
Training and Productivity Authority of Fiji	6,206	6,061
Travel	61,990	54,205
Tuition fees	4,838	-
Visa permit	1,145	141
Water	13,467	6,325
Wages and salaries	189,814	151,627
Total administrative expense	859,347	1,233,470
Total expenditure	3,090,140	2,672,926
Surplus for the year	-	-

The above detailed statement of operations is to be read in conjunction with the disclaimer report set out on page 20.

CORPORATE INFORMATION

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