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MISSION STATEMENT

Advancing Industry By Excellence
In Research To Improve Productivity

PRINCIPAL OBJECTIVE

To increase productivity, profitability and sustainability of the industry by producing high yielding disease resistance varieties and by facilitating efficient technology transfer systems.

New Promising Variety LF91-1925. Ready For Release in 2006

RESEARCH CENTRE PROFILE

The Fiji Sugar Corporation's Research Centre is situated within the vicinity of Lautoka City. It was established in 1904 as the Agricultural Experiment Station based at Rarawai Mill, Ba. It then was relocated in Lautoka in 1958 by the Colonial Sugar Refineries with its core function to breed and release new varieties of cane. So far the variety programme has produced about 15 commercial varieties that are currently being grown.

The Research Centre also conducts research into other aspects of cane growing. These include:

- Detection and control of pests and diseases in the cane fields
- Screening new varieties for resistance to disease
- Determining the nutritional requirements of cane
- The use of herbicides, pesticides and other agricultural chemicals

In addition to conducting research, the Centre offers various services to growers such as:

- Analysis of soil, leaf and cane samples for sucrose content, and preparation of fertilizer recommendation through Fertilizer Advisory Service.
- A specialist advisory service for growers with particular problems who require assistance in areas such as soil conservation, drainage, fertilizer advice, weed control and new farm development.

Through its principle objective of breeding high yielding disease resistance varieties, and facilitating an efficient extension services, the Research Centre is committed to improving productivity, profitability of growers by increased communication between station staff and extension services which has been re-established to ensure the adoption of sound farm management practices.

First agricultural experiment station site

STAFF 2004-2005

MANAGEMENT STAFF

STAFF

Jai S Gawander	Research Manager
Hemraj Mangal	Manager Extension Services
Sanjay N Prakash	Finance and Administration Manager
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Jeetendra Patel	Scientific Officer / Chemist
Matrishwa Chand Rao	Scientific Officer, Penang
Desmond V Kumar	Scientific Officer Estate
Karuna Garan	Technical Officer, Rarawai
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RESEARCH MANAGER'S REPORT

The tide of changes to occur in the preferential market prices in the multi million-dollar sugar industry in EU requires small producers to take the "next big step" to improve performance right across the sugar industry at all levels by lowering cost of production and improving efficiency. In Fiji, the sugar industry has significant plans with aims to achieve the above with assistance from Sugar Technical Team from India. The plans for research calls for unprecedented change and reform.

A key factor in contributing to the sustainability of the Fijian sugar industry is research, development and extension. In the "next big step" that the industry is about to embark upon to make it-self internationally competitive, profitable and sustainable warrants a much improved financial and human resource support for research, development and extension. The first step to achieve the above has been activated that is to create an independent research institution. The other key element in promoting the sustainability of the sugar industry is the provision of an effective information transfer unit. Whilst, some progress has taken place but major gaps needs to be filled to make it an effective and efficient sub unit of research to deliver the necessary technology to the stakeholders.

It is essential to note that technology and science on its own will not be able to bring about the desired change for a viable industry. Thus the need to have an integrated approach that promotes the growers to adopt total solution systems so they achieve there desired economic and social benefits by following best management practices is to be introduced.

Some of the achievements reported by the research and development staff during the year are: 68% clones were found to be moderately resistant to Downy mildew, variety Mans appears to be less affected by ***Leifsonia xyli*** subspecies ***xyli***, the number of Fiji leaf gall disease eradicated has also reduced to 1 977 stools during the year, three varieties in plant crop in the final breeding stage performed well, a few varieties recorded high fibre with one having high fibre and high sugar yields, improved production and reduced cost by spraying weeds at 2 -3 leaf stage, lodged cane reduced %pocs and cane yield by 7% and 6%, respectively and erosion result indicated increased ratoon cane yield where appropriate management practices have been used

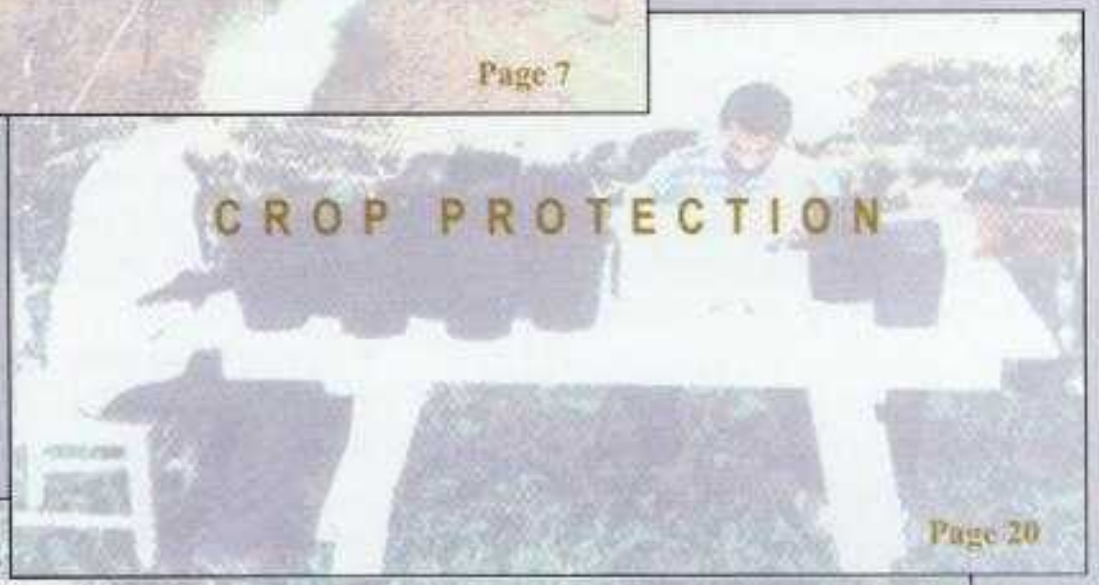
All the four estates under the management of Sugarcane Research Centre has improved the total production per unit area however the cost of production is still high due to many years of neglect in the management of crop and the high cost of harvesting. In the next three years a major challenge is to decrease the cost of production and mechanization is one of the ways preferred to achieve this important factor.

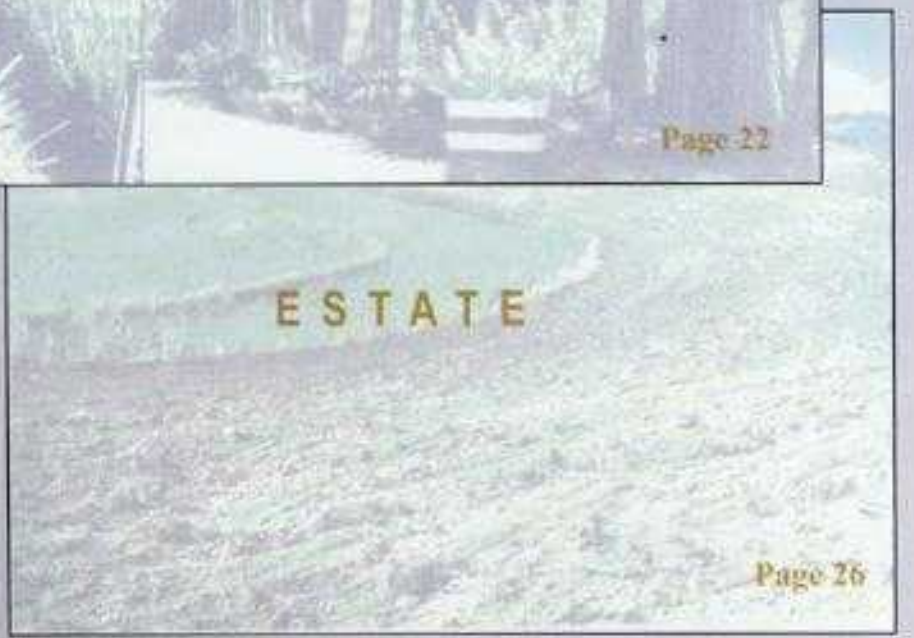
Sugarcane Research Centre has ties with University of South Pacific and local research organization but these needs to be enhanced and past cooperation with Thailand, Taiwan, Landcare Research (NZ) and India needs to be renewed and with other institution like BSES, SASEX, MSIRI and others are to be initiated. It is essential to develop these collaborative efforts if we are to broaden our expertise and attract financial support for future research activities.

With the threat of losing preferential prices and declining world market prices for sugar coupled with escalating cost of production and decreasing productivity one of the alternative action is to improve research, development and extension. This would provide the industry with total solutions systems to be sustainable provided the Sugarcane Research Centre is positioned and given the opportunity to play a meaningful role in the future challenges facing the industry.

Jai S Gawander
Research Manager

SECTIONAL REPORT





The information derived from this section's diverse research projects will assist the industry in improving productivity, profitability and sustainability of sugarcane production.

The program focuses on nutritional practices, soil conservation practices, green manuring, weed control, cane deterioration, green cane trash blanket, maturity pattern, lodging, fertilizer advisory services and meteorology.

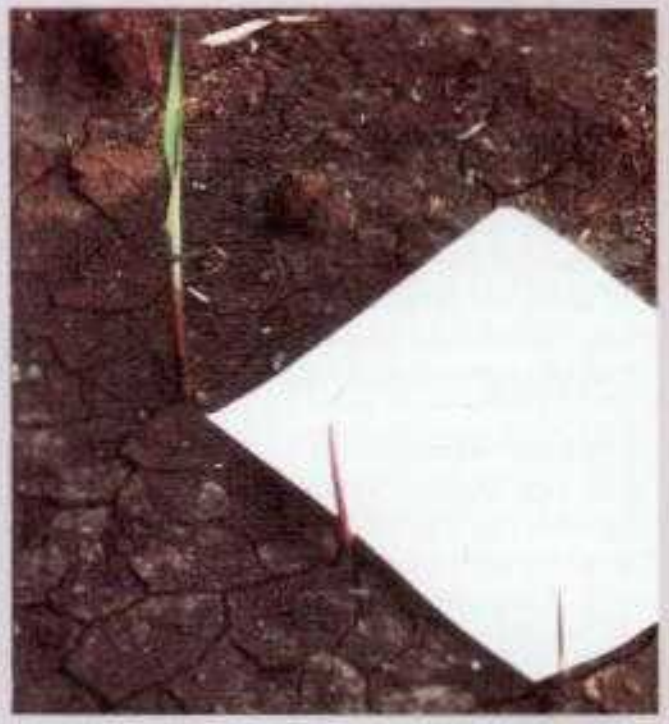


Figure 1: Primary shoots.

Project 1

Crop nutrition

Nitrogen

Plants require and must take up essential nutrients from the environment in order to successfully survive, grow, maintain and reproduce (that is, to complete their life cycle). They take carbon dioxide (CO_2) and oxygen (O_2) from the air, hydrogen (H) from water (H_2O) and the other 13 essential mineral nutrients from the soil. Of all mineral nutrients, N is quantitatively the most important for plant growth. Positive response to nitrogen fertilizer has been obtained in different soil types for all commercial varieties in plant and various ratoons.

Two nitrogen fertilizer trials that were established in 1996 and 1998 on alluvial soil at Rarawai were continued into seventh and fifth ratoon respectively. Both trials showed that effect of different rates of N produced significant ($P<0.05$) increase in cane and sugar yield. There was a clear trend towards increased cane and sugar yield with increasing rates of N application.

At Legalega, the N trial was evaluated for fifth ratoon crop for the variety Naidiri on poor soil. The results showed that cane and sugar yield were significant at 5% and 1% respectively.

Potassium

The demand for potassium by different crops varies substantially. In comparison with most crops, sugarcane has a great demand for potassium. In Fiji, sugarcane soils, which may have deficiency in potassium, are nigrescent, humic and ferruginous latosols. A trial was established in 2000 on humic latosol to compare the effects of different amounts of potassium fertilizer (0, 50, 100, 150 and 200 kg/ha).

At Penang, the calculated amount of potassium required to produce maximum cane yield in third ratoon crop was 103 kg K/ha as illustrated graphically in Figure 2. This would then equate to 19 bags/ha or 950 kg of Blend C fertilizer to produce an economical yield.

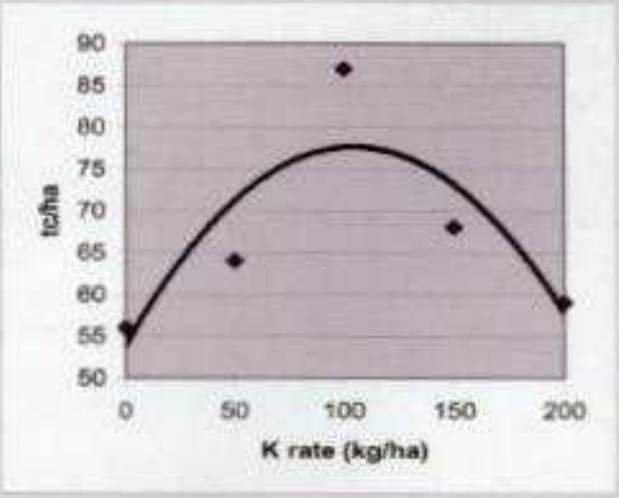


Figure 2: Effect of potassium on cane yield

Project 2

Calcium silicate slag

Silica (Si) is one of the most plentiful elements in the earth's crust. In the soil, Si is generally abundant as mineral quartz and clays, but its concentration in a soluble form is highly variable. Soluble Si (monosilicic acid) increases the plants' resistance against attack by insects and diseases, and it enhances plant tolerance to water stress. Increasing soil silica can result in increased P uptake by plants, while decreasing the soil concentration of some toxic elements.

Three Si trials were established at Seaqaqa, Legalega and Drasa on poor and medium soils respectively to compare the effects of different amounts of calcium silicate slag (0, 3, 6, 9 and 12 t/ha).

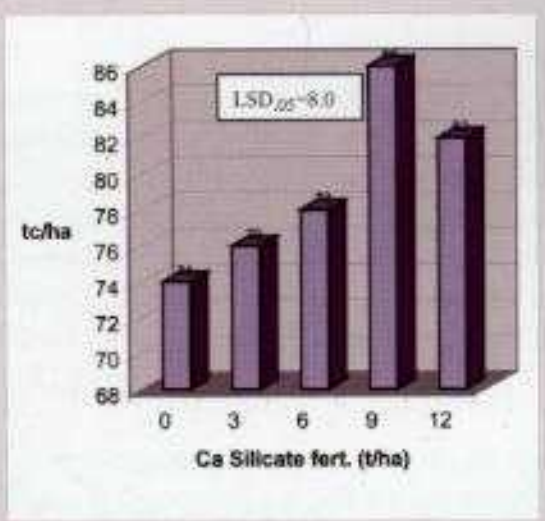


Figure 3: Effect of calcium silicate on cane yield

The results from the study at Seaqaqa showed that mixing 9 t/ha of silicate fertilizer into soil before planting resulted in a significant ($P<0.05$) increase (16%) in cane yield compared to treatment with no calcium silicate slag added (Figure 3). However, results at Legalega and Drasa showed that calcium silicate treatments did not affect cane and sugar yield.

Project 3
High density planting (HDP)

The standard row spacing used by growers in Fiji is 1.37m. This, over the years, has suited the tractor/trailor, portable line and lorry transport gangs in harvesting and haulouts.

Trials conducted at Lautoka, Rarawai and Penang has confirmed that high density planting does have the potential for at least 10-15% increase in cane yield. This was achieved without additional input of fertilizer per unit area.

Project 4
Erosion

The erosion trial at Navoli, Ba showed that the most appropriate method of sugarcane cultivation on sloping land was to conserve trash and practice minimum cultivation in the ratoon crop. Treatment where trash was conserved in the plot produced 20-31 % more cane than other three treatments without trash cover.

In the experiment, soil loss was 2.5 t/ha/yr in the treatment where cane was planted across slope and least from the treatment that had trash retained as mulch (0.22 t/ha/yr).The resultsbraphically in Figure 4 clearly indicated that trash cover acts as the cushion against the impact of raindrops and reduces runoff and soil erosion.

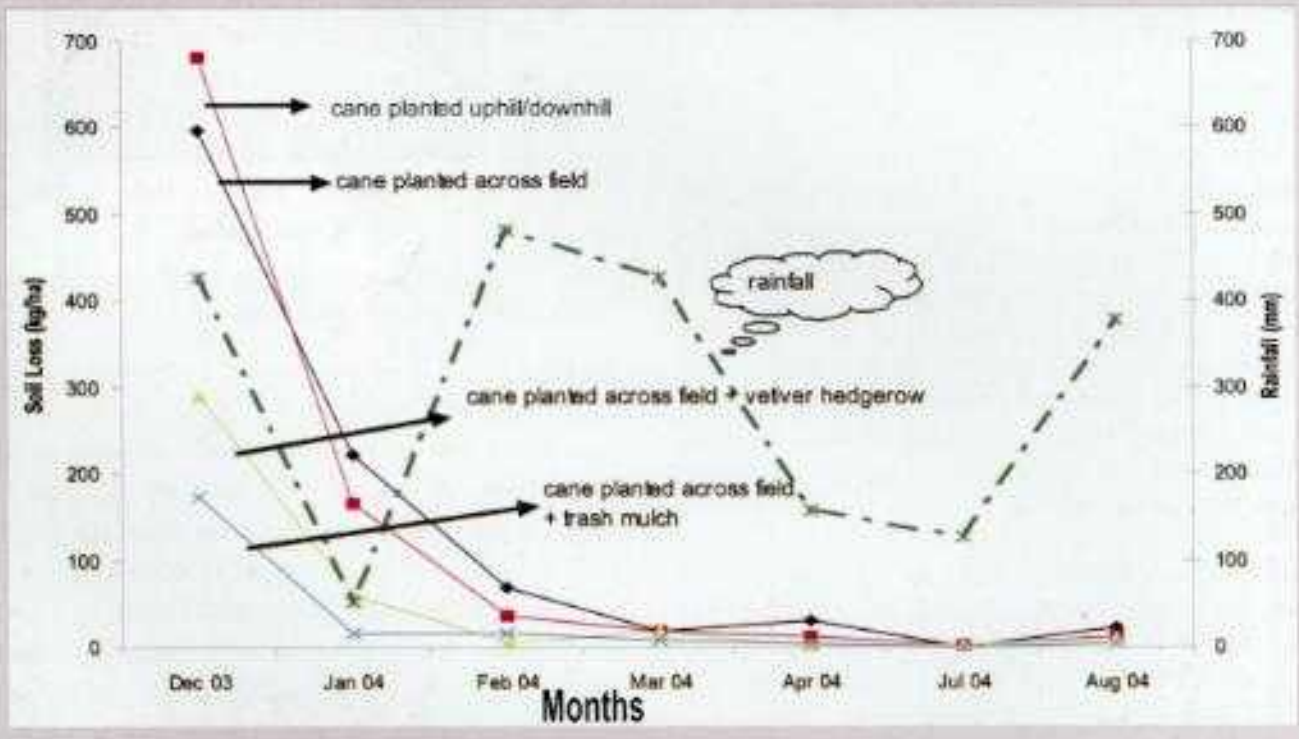


Figure 4: Soil erosion affected by conservation practice on a sloping cane farm

Figure 4 shows that soil loss continued to decrease over period of time. High rainfall (>400mm in December 2003) after harvest in
October 2003 washed away the loose soil that may have resulted from harvesting operations. In January 2004 soil loss decreased in all plots due to low rainfall (<100mm), however, high rainfall in February and March (>400mm) did not result in excessive soil loss due to establishment of canopy.

It is important to conserve trash on hilly lands because farms which are harvested late in the season are exposed to high rainfall in wet season. This unnoticed practice may be contributing to decline in cane yield and necessitates use of high rates of fertilizer to sustain production level.

Lodging

Lodging is described as falling of crops due to stem or root failure.

The trial established in 2001 at Rarawai on alluvial soil was continued and evaluated for second ratoon crop. In the experiment, lodging in Mana variety was found to cause 0.2 unit decrease in %pocs, 6% loss in cane yield and 7% decline in sugar yield (Figure 5 and 6).

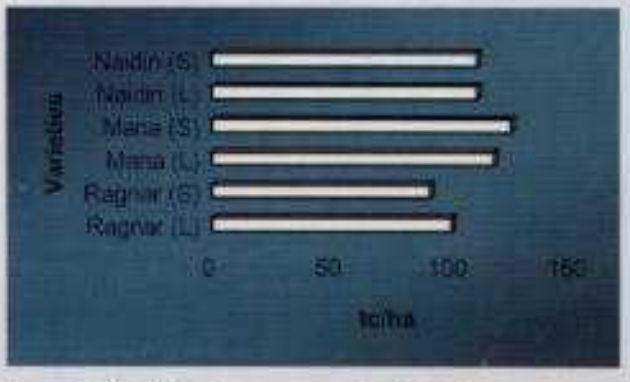


Figure 5: Effect of lodging on cane yield S - Scaffold L - lodged

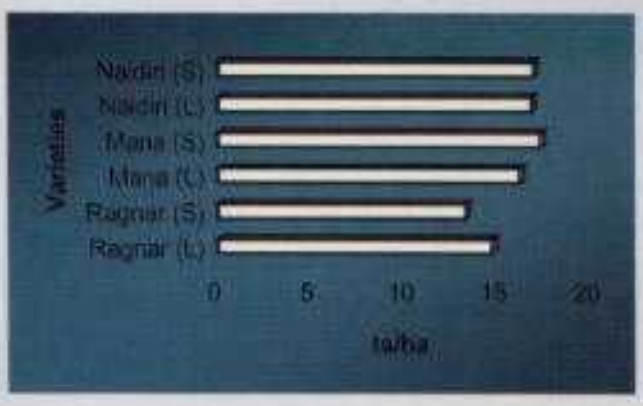


Figure 6: Effect of lodging on sugar yield S - Scaffold L - lodged

These costs are additional to known harvesting losses and increased extraneous matter brought in with lodged cane. Thus, the overall cost to the industry of lodging is probably much greater than was previously thought. It is suggested that Mana should be controlled and growers be encouraged to plant early and mid maturing varieties on their farms.

Project 6

Green manuring

Legumes in sugarcane cropping systems have been severely neglected over the years. Legumes intercropped with sugarcane have continued to be used by some growers, mainly for home consumption and any surplus sold to generate income. Those who still practice some sort of crop rotation, the general level of legume management and species suitability have been seriously neglected. No doubt growers have time and again questioned the value of including a legume fallow in their farming system.

A preliminary trial was planted to study the impact of legumes on ratoon crop yield. The results show that cane yield increased by 15% compared with the control plot. The soil analysis results show that organic matter levels increased in plots with cowpea during fallow plant. This to some extent may have increased cane yield in the ratoon crop. Organic matter is important in soils as it maintains soil structure and water holding capacity.

The long-term monoculture that has emerged as a result of the plough-out/re-plant strategy may be linked to yield decline. Further studies need to be carried out to confirm the link between sugarcane monoculture and yield decline.

Project 7

Agronomic characters and maturity pattern of promising varieties

The two trials established in May 2002 at Legalega Research Station and Drasa on poor and medium fertility soil were evaluated for agronomic characteristics and maturity patterns in the first ratoon crop.

Figures 7 and 8 clearly indicated that Naidiri is an early maturing variety. Naidiri had comparable sucrose content to Aiwa. Ragnar is a mid maturing variety and had the highest sucrose

content in November, and sucrose content in Mana and LF82-2244 were affected due to high rainfall in August 2004.

LF83-998 is early maturing and had higher %pocs compared with LF82-2244. Field observation showed that this particular variety was high flowering (beginning of the season) and would therefore need to be harvested early in the season in order to recover maximum sugar in cane.

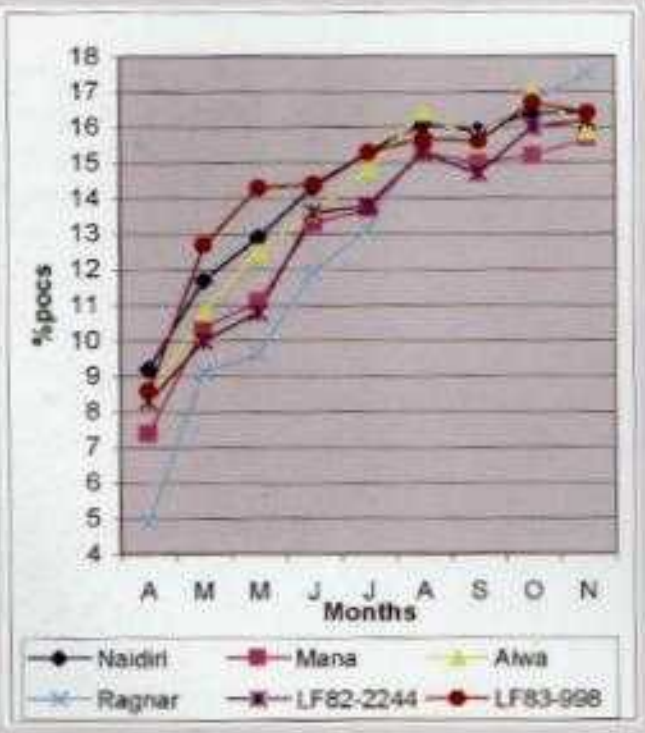


Figure 7: Maturity trend of six varieties at Drasa on medium soil

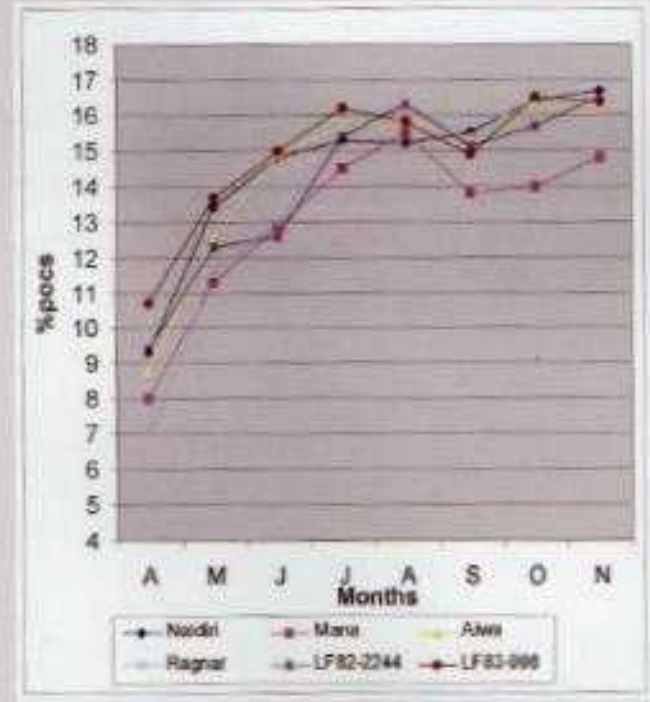


Figure 8: Maturity trend of six varieties at Legalega on poor soil

Project 8

Weed control

Weeds in sugarcane fields are a major problem. The lack of know-how and improper use of herbicides restricts potential benefit of appropriate herbicide usage.

The two herbicide trials established at Waqadra were evaluated for ratoon crop. The results show that weeds need to be controlled early, at two to three leaf stages to get good yield. This not only reduces expenses of the grower but also increases his return ($) from a unit area. Untimely application will have reduced effect over weeds.

Figure 9: Poor harvesting.

Project 9

Central Laboratory

The Analytical Laboratory of Sugar Cane Research Centre (SCRC) carries out soil and leaf analysis for fertilizer recommendations for advisory and research purposes. Cane analysis to determine percent pure obtainable cane sugar (%pocs) is conducted for research trials. The laboratory is also a member of South Pacific Agricultural Chemistry Laboratory Network (SPACNET) which exchanges samples with

Soil and Leaf Analysis

A total of 2405 soil and leaf samples were analyzed for advisory and research purposes. Out of which 331 samples were for Fertilizer Advisory Services for plant and ratoon recommendation. The number of soil and leaf samples received from each district is shown in Table 1.

Table 1: Total number of soil and leaf samples analyzed in 2004

Lautoka	46	361	407	111	423	534	941
Ba/Rarawai	101	557	658	90	344	434	1092
Labasa	105	34	139	90		90	229
Penang	67	20	87	48		48	135
Others		8	8				8
Total	319	980	1299	339	767	1106	2405

There has been a decline in the number of samples received from the farmers. This could be due to expiring land leases and resettlement of new farmers or other unknown reasons. Hence an educational program is needed to be conducted especially in sampling of soil and leaf samples, since fertilizer usage is a major expense for the growers.

Figure 9: Soil analysis

Table 2: Leaf and soil samples analysis from 1999 - 2004

Year	Soil			Leaf			Total Samples
		P					
1999	4097	1155	5252	3230	708	3938	9190
2000	2565	1456	4021	1629	413	1942	5963
2001	1092	1229	2321	500	1047	1547	3868
2002	964	1640	2604	315	779	1094	3698
2003	545	1081	1626	120	749	869	2495
2004	319	980	1299	339	767	1106	2405

A total of 327 leaf samples were collected from the 36 sectors from four districts to assess the micronutrients level in three different (rich, medium, poor) soil types.

Cane Analysis

A total of 3363 sugarcane samples were analyzed in the Small Mill in year 2004. The brix, pol and fibre results are used to calculate the %pocs. The Small Mill data is an integral part of cane selection for Crop Improvement Section.

A preliminary study was conducted to study the effect of burning on cane deterioration. The treatments were:

(a) Burnt cane billets (mechanically harvested)
(b) Burnt cane whole stalk
(c) Green cane billets (mechanically harvested)
(d) Green cane whole stalk
(e) Burnt standing

The study was conducted for a period of eight days to study the deterioration of cane in the above treatments over this period.

The data showed that mechanically harvested cane (both green and burnt) and standing burnt cane deteriorated faster than whole stalk cane. Deteriorated cane affects the sugar making process in the mill.

Table 3: Cane deterioration - % reducing sugar

GW	0.44	0.85	2.68	3.44	3.55	3.73
GB	0.96	1.73	2.66	5.13	5.09	6.36
BW	0.43	1.47	1.57	2.05	2.11	4.02
BB	1.80	2.99	3.32	4.72	4.37	5.40
BSC	*	0.78	.69	2.57	2.97	3.03

GW- Green whole stalk GB-Green Billeted BSC- Burnt Standing
BW- Burnt whole stalk BB - Burnt Billeted

The Analytical Laboratory also studied different mixing method for fibre analysis. The mixing methods used were Cone and Quartering and by mixing with hand. The data obtained shows that the coefficient of variation of Coning method is below 5 % and lower than hand mix method. Hence the reproducibility of data is much greater than mixing by hand as the probability of obtaining a homogenous mixture is higher in case of cone and quartering method.

Occupational and Health Safety

Safety measures regarding OHS regulations implemented in the Analytical Laboratory and Small Mill continued satisfactorily.

Training

The Sugarcane Research Centre continues to send its employees for training sessions to improve their OHS and analytical skills.

Addition to this there were at least 20 trainee students who were attached to the Analytical Laboratory for 6 weeks each, to get some insight in the activities of the laboratory.

Quality Assurance System

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 Analytical Laboratory adheres to Quality Control (QC) checks by having two QC samples where one is kept as standard QC (sugarcane) and another chosen at random from three other QC samples for leaf analysis. A similar protocol is followed for the soil analysis. Blank and duplicates samples are also included when analysis are carried out.

In May, Mr. Brian Daly (Lab Manager of Landcare Research NZ Limited) assisted in upgrading the laboratory quality assurance system in the Analytical Laboratory with NZAid Support.

A half-day seminar on Laboratory QA system for the mill employees was also conducted.

The Analytical Laboratory sent 4 soils and leaf samples each to Koronivia Research station as part of the exchange sample scheme between the SPACNET members. The results obtained validated the methods used to carryout analysis in the Analytical Laboratory, due to the reproducibility of data.

Project 10

Rainfall

All the mills recorded well below average rainfall for the month of January, May and October to December. Drought like conditions prevailed during these months. There were occasional heavy downpours due to frequent passage of troughs across Fiji in February, March and late January. Therefore average to above average rainfall was recorded in February and March. None of the cyclones (Heta, Ivy, Grace and Judy) caused any severe damages to the Fiji Groups except for afternoon showers in the region. Due to formation of two tropical depressions in the first half of April, there was some heavy downpour across the central and upper western division. The mills recorded below average to above average rainfall in April and June. After the transition period (from April to May), cool and dry weather prevailed mostly over the Fiji Group.

In late July, due to extensive band of clouds over the Fiji Group brought some heavy showers over the Western and Northern Division. August was unexceptionally wet for a dry season. This was due to frequent passage of trough of low pressure and cold fronts over the Fiji Group. The abnormal weather pattern had a dominant effect on the country's weather. Almost all the mill recorded well above average rainfall for the third quarter.

The mobile ridge of high pressure extending over the Fiji Group mostly dominated the weather from October to December. Only occasional presence of weak trough or fronts caused some afternoon showers over the Fiji Group. Well below average rainfall was recorded in the last quarter of the year in the mill areas, except for some of the sectors in Labasa mill area.

The progress towards dry El Nino status in year 2004 slowed down over the months, as a consistent pattern of Pacific wind and clouds patterns has failed to materialize, the Southern Oscillation Index was only weakly negative as informed by Fiji Meteorological Services.

Lautoka

A total of 645mm of rainfall were recorded for the first quarter, which is lower than the long-time mean (LTM) of 926mm for the same period. Above average rainfall was recorded for the month of February (366mm) whereas dry conditions prevailed in January (34mm) due to low rainfall and around average rainfall was recorded for the month of March (245 mm). Below the LTM rainfall was recorded in the second quarter. But the rainfall received was slightly higher than what was recorded in year 2003 for the same period. A total of 459mm of rainfall were recorded for the third quarter, which is unusually higher than the long-time mean of 190mm for the same period. A similar pattern was also seen in almost all the sector rainfall readings in Lautoka mill area. Well below average rainfall was recorded in the last quarter indicating drought like conditions prevailing. In May and November most of the sectors in western division recorded below 10mm of rainfall.

Rarawai

Like Lautoka, Rarawai also recorded well below average rainfall for the month of January (51mm) whereas above average rainfall was recorded for the month of February (481mm) and March (427mm). A total of 960mm was recorded which is lower than the LTM of 1063mm for the same period. Below average rainfall was recorded for the month of April and May. Rarawai recorded well above average rainfall from June to August, but below average for the month of September. Only 121mm of rainfall was recorded in last quarter compared to LTM of 608mm for the same period. Drought like conditions prevailed in areas like Navatu, Varavu, Tagitagi, Drumasi and Tavua from October to November as hardly any rainfall was recorded.

Labasa

Labasa recorded a total of 745 mm of rainfall for the first quarter, which is lower than the LTM of the same period. Above average rainfall was recorded for the month of March (392mm) whereas below average in February (312 mm) and January (40 mm). Labasa recorded below average rainfall in April whereas well below average rainfall in May. Like Rarawai, Labasa recorded well above average rainfall from June to August. A total of 205mm of rainfall were recorded near Labasa Mill area for the 3rd quarter. Well above average rainfall was recorded due to the abnormal weather pattern in 3rd quarter. Below 50% rainfall was recorded from September to December when compared to the respective months LTM. A meteorology drought like conditions was prevailing. Unlike Lautoka and Ba districts, sectors in Labasa area recorded some rainfalls due to occasional passage of troughs through Vanua Levu and Lau groups in the last quarter.

Penang

Like all the other mills, Penang recorded above average rainfall in February (371mm). A total of 717mm rainfall was recorded for the first quarter. Penang recorded well below average rainfall in January and May while below average rainfall from March to April. Like Lautoka, Penang also recorded well above average rainfall from June to September. A total of 370mm of rainfall was recorded in 3rd quarter. Like rest of the mills, Penang also recorded well below average rainfall from October to December.

Relative Humidity

The relative humidity based on dry and wet bulb thermometer readings differ on day-to-day basis. The overall humidity was below the 47-year average for all the month except for August. The humidity in August was 77% due to the abnormal weather pattern. The month of February, March, April and June were the only months where the relative was more than 70% other than August. During the drought like condition the relative humidity was in 60's. November recorded the lowest humidity of 61% for the year.

Sunshine

The monthly average sunshine hours were below average for the month of February and March indicating cloudy and occasional overcast conditions prevailing whereas above average sunshine hours (8.9hrs) were recorded for the month of January. The monthly average

sunshine hours were average to above average from April to May whereas well below average in June. The monthly mean average sunshine hours were average to below average for the 3rd quarter. It was well below the LTM in August where an average 4.4hrs of sunshine was recorded indicating cloudy conditions prevailed due to low-pressure system. The average sunshine hour differed in the last quarter but was above the 47-year average in November.

Earth Temperature

Earth thermometers recorded temperatures at the depth of 5cm, 10cm and 20cm. The temperature recorded at 5cm was above the 47-year average (> 0.4°C) throughout the year for the respective month except for August. The earth temperature at 5cm follows the similar trend as LTM where it decreases from January to July and starts to rise again after that. Similarly the temperature at 10cm was above the long-time mean (> 0.3°C) throughout year except from July to September. The earth temperature at 20cm varied from below average to above average LTM, but was mostly below 47 year mean value for February and July to September. During these months well above average rainfall was recorded in Lautoka.

Soil Moisture

The Transeau ratio calculated for soil moisture status indicated that mostly dry condition prevailed in January. The soil moisture status was from good to moderate for the month of February and March providing sufficient moisture for plant growth and uptake of nutrients. The Transeau ratio calculated for soil moisture status varied in the second quarter. Moderate condition existed for sufficient growth in April whereas drought like condition prevailed mostly in May. In June soil moisture status was dry limiting. This is evident with the amount of rainfall and evaporation in respective months as well as the transition from the rainy season to cool and dry weather.

The soil moisture status varies on day-to-day basis. The Transeau ratio calculated for soil moisture status indicates slow cane growth, as the soil moisture conditions were dry-limiting for the month of July and September. The soil moisture was limiting to dry for most of the month of July except towards the end it became ample to moderate in Western part of the Viti Levu whereas excessive to moderate soil moisture status existed in the Vanua Levu. There was sufficient moisture for plant and ratoon growth in the soil for the month of August. The P.E ratio indicates that drought like condition prevailed from October to November whereas very dry-limiting conditions in December.

Air Temperature

The monthly mean maximum temperature was higher than the LTM throughout the year except for the month for August and September. Warm night-time (mean) temperatures were recorded throughout the year except for January, April, September and November. The highest maximum temperature of 34.3oC was recorded for the month of January while the coolest nighttime temperature (6.1°C) was recorded in September at Research Centre.

Evaporation

High sunken pan evaporation of 195mm was recorded for the month of January, which is also evident with the low relative humidity in the atmosphere and long hours of sunshine at the time. The sunken pan evaporation was above the LTM in the 2nd quarter except for the month of June. This was noticeable as mostly cloudy appearance prevailed in June. Like in June, the sunken pan evaporation was below the LTM from August to September and December. Above average monthly raised pan evaporation was recorded throughout the year except from August to October.

Figure 10: Weighing soil for moisture analysis

Table 4: Rainfall (mm) for all mills - 2004

Mills	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Lautoka Mill													
Monthly Rainfall	34.1	366.0	245.4	179.7	21.9	59.8	97.5	276.6	84.1	5.9	37.5	80.0	**1488.5**
No. of rain days	10	18	21	9	4	8	3	15	5	4	5	13	**115**
95 years average	293.1	319.3	314.1	180.5	98.7	65.2	49.7	70.8	69.5	89.0	121.7	189.7	**1861.3**
% of average	11.6	114.6	78.1	99.6	22.2	91.7	196.2	390.7	121.0	6.6	30.8	42.2	**80.0**
Ranawai Mill													
Monthly Rainfall	51.6	480.9	427.2	156.8	54.3	99.5	127.7	378.1	62.6	20.6	3.0	97.1	**1959.6**
No. of rain days	9	18	18	7	4	8	3	12	6	6	3	10	**104**
118 years average	347.0	356.5	359.7	297.5	78.0	35.2	27.5	101.1	103.1	148.0	221.7	238.4	**2313.7**
% of average	14.9	134.9	118.8	52.7	69.6	282.7	464.4	374.1	60.9	13.9	1.4	40.7	**84.7**
Labasa Mill													
Monthly Rainfall	40.2	312.2	392.2	166.7	31.3	163.2	91.9	113.2	47.6	46.8	52.9	109.4	**1567.6**
No. of rain days	12	16	21	11	11	15	5	10	4	6	11	12	**134**
114 years average	361.8	357.6	360.9	237.6	110.5	64.4	46.9	50.8	101.0	101.5	203.6	250.7	**2267.1**
% of average	11.1	87.3	103.0	70.2	28.3	253.5	195.9	223.1	47.1	46.1	26.0	43.6	**69.1**
Penang Mill													
Monthly Rainfall	54.0	371.1	292.3	253.7	11.4	148.9	94.5	196.4	79.3	1.3	29.5	40.7	**1573.1**
No. of rain days	13	20	21	12	5	14	6	15	4	2	3	12	**127**
106 years average	429.6	351.1	415.3	391.6	122.3	68.8	52.6	94.7	83.6	148.8	149.4	237.1	**2544.9**
% of average	12.6	105.7	70.4	64.8	9.3	216.6	179.7	207.5	94.9	0.9	19.8	17.2	**61.8**

Table 5: Transeau ratio moisture status of soil 2004

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

Table 6: Rainfall data(mm) for Lautoka, Nadi and Sigatoka Districts 2004

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Drasa	71.0	429.6	330.6	160.0	21.0	79.8	92.6	309.2	66.0	57.0	17.8	52.0	**1686.6**
No. of rain days	6	11	13	7	1	5	4	9	3	2	1	4	**66**
Lovu	88.5	462.7	295.2	185.2	34.0	54.3	78.0	259.2	88.6	9.4	14.6	81.9	**1651.6**
No. of rain days	6	18	16	8	2	6	3	12	7	4	5	13	**100**
Sawem	92.5	381.5	227.0	156.0	7.0	50.0	33.0	183.0	85.0	8.0	18.0	50.0	**1291.0**
No. of rain days	4	13	14	4	1	2	3	10	4	1	2	4	**62**
Narova	104.6	475.6	287.4	123.0	18.0	62.0	49.5	265.0	62.6	17.0	36.4	61.6	**1563.3**
No. of rain days	8	12	18	6	1	5	3	11	3	1	1	6	**75**
Legalega	51.2	292.8	165.8	171.0	0.0	44.8	65.8	219.2	20.0	0.0	6.0	29.2	**1065.8**
No. of rain days	5	11	14	9	0	2	2	9	2	0	1	4	**59**
Melgunyah	100.0	460.0	258.0	169.0	0.0	62.0	74.4	247.8	71.0	16.0	17.0	31.0	**1506.2**
No. of rain days	5	14	20	10	0	7	4	12	4	1	3	5	**85**
Qeleloa	32.0	384.5	213.7	168.5	5.5	21.0	64.7	224.5	49.3	7.0	0.0	15.0	**1185.7**
No. of rain days	4	15	15	5	1	4	3	9	2	1	0	2	**61**
Yako	55.0	338.0	214.0	116.0	0.0	51.0	66.0	216.0	55.0	8.0	4.0	16.0	**1143.0**
No. of rain days	7	18	20	10	0	6	4	14	2	2	2	3	**88**
Malolo	74.0	378.0	278.0	101.0	0.0	67.0	76.0	240.4	65.0	4.4	1.0	12.0	**1296.8**
No. of rain days	5	14	15	5	0	6	2	13	2	2	1	2	**67**
Navo	33.0	403.6	250.6	87.0	4.0	58.0	73.0	239.0	61.0	7.2	3.0	14.4	**1233.8**
No. of rain days	5	18	21	7	1	7	3	14	2	3	2	3	**86**
Lomawai	0.0	256.5	110.5	64.5	0.0	56.5	61.0	164.2	15.0	17.5	0.0	9.0	**754.7**
No. of rain days	0	13	11	6	0	5	2	9	2	3	0	1	**52**
Cuvu	21.2	463.9	129.5	78.6	0.0	169.0	89.8	266.6	22.5	24.3	4.5	11.0	**1280.9**
No. of rain days	7	15	9	8	0	9	3	10	2	4	2	1	**70**
Olosara	5.4	110.7	55.4	45.5	4.0	58.2	30.2	95.3	12.0	20.5	0.0	18.0	**455.2**
No. of rain days	3	13	10	9	1	8	2	11	2	3	0	1	**63**
Natadola	6.3	459.3	214.4	74.4	34.7	72.0	165.4	276.1	37.8	46.8	5.9	49.6	**1442.7**
No. of rain days	3	19	15	12	2	10	6	14	4	5	2	6	**98**
Nawaicoba	15.0	337.2	271.0	104.2	0.0	51.6	68.4	190.5	62.0	4.4	2.0	13.8	**1120.1**
No. of rain days	1	13	17	8	0	5	3	12	2	2	1	2	**66**

Table 7: Rainfall data (mm) for Rarawai mill 2004

Sector	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Varoko (Sarava)	21.0	426.0	260.0	116.0	28.0	113.0	93.0	392.0	42.0	10.0	0.0	85.0	**1586.0**
No. of rain days	4	14	17	5	1	6	2	10	2	1	0	5	**67**
Mota	0.0	568.0	292.0	143.0	18.0	103.0	142.0	515.0	111.0	13.0	83.0	132.5	**2140.5**
No. of rain days	0	9	13	5	1	4	2	9	3	1	1	8	**56**
Koronubu	2.0	414.0	276.0	162.0	0.0	80.0	117.0	423.0	38.0	41.0	38.0	135.0	**1728.0**
No. of rain days	2	13	13	5	0	2	2	12	2	2	1	8	**62**
Rarawai	20.1	535.0	414.4	192.9	51.2	91.6	126.1	375.6	56.6	20.6	3.0	96.6	**1983.7**
No. of rain days	6	20	16	8	2	5	2	13	3	6	3	9	**93**
Navatu	66.0	426.0	309.0	225.0	0.0	45.0	108.0	387.0	26.0	0.0	0.0	110.0	**1702.0**
No. of rain days	4	10	13	5	0	3	2	8	2	0	0	9	**56**
Varavu	12.0	229.0	226.0	129.0	0.0	41.0	88.0	325.0	6.0	0.0	0.0	25.0	**1081.0**
No. of rain days	4	10	11	2	0	2	2	11	1	0	0	3	**46**
Tagi Tagi	17.0	406.0	195.0	212.0	0.0	133.0	86.0	260.0	26.0	0.0	8.0	15.0	**1363.0**
No. of rain days	3	9	10	3	0	4	1	7	2	0	1	3	**43**
Drumasi	67.0	406.0	273.0	236.0	0.0	121.0	87.0	331.0	8.0	0.0	9.0	21.0	**1559.0**
No. of rain days	2	8	9	2	0	4	1	7	1	0	1	2	**37**
Tavua	31.0	362.0	298.0	349.0	0.0	120.0	95.0	231.0	22.0	0.0	1.0	40.0	**1549.0**
No. of rain days	3	11	10	5	0	4	1	7	2	0	1	3	**47**
AES	51.6	480.9	427.2	156.8	54.3	99.5	127.7	378.1	62.8	20.6	3.0	97.1	**1959.6**
No. of rain days	9	18	18	7	4	8	3	12	6	6	3	10	**104**
Nukuloa(Naloto)	38.0	314.0	196.0	112.0	0.0	90.0	95.0	373.0	34.0	5.0	30.0	61.6	**1350.6**
No. of rain days	5	20	13	5	0	4	2	14	2	1	1	5	**72**

Table 8: Rainfall(mm) data for Labasa mill - 2004

Sector	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Waigele	98.2	402.8	402.8	198.6	37.1	277.2	138.3	127.7	40.0	147.2	56.6	85.5	**2011.8**
No. of rain days	7	14	14	6	4	11	4	10	3	9	9	10	**101**
Wailevu	39.3	340.8	800.2	173.0	321.1	385.0	341.6	214.2	60.5	148.1	146.4	97.9	**3068.3**
No. of rain days	7	17	20	8	6	12	4	9	4	8	11	15	**121**
Vunimoli	114.4	247.4	340.4	122.1	12.7	144.5	82.0	134.5	37.0	33.1	12.2	319.3	**1599.6**
No. of rain days	6	12	17	5	2	7	2	5	1	3	1	6	**67**
Korowiri (Labasa M)	40.2	312.2	392.2	166.7	31.3	163.2	91.9	113.2	47.6	46.8	52.9	109.4	**1567.6**
No. of rain days	12	16	21	11	11	15	5	10	4	6	11	12	**134**
Nagigi (Bucalau)	73.0	320.0	429.0	118.0	49.0	205.0	96.0	104.0	73.0	76.0	40.4	96	**1679.4**
No. of rain days	4	14	17	4	3	11	1	5	2	4	6	10	**81**
Wainikoro	41.8	254.0	526.0	182.8	63.2	217.1	107.8	68.6	35.4	28.3	80.1	67.8	**1672.7**
No. of rain days	7	14	20	10	7	13	3	8	3	6	9	8	**108**
Vunivutu	63.6	274.4	423.9	61.7	57.0	252.4	97.3	51.0	34.5	14.7	34.5	72.6	**1437.6**
No. of rain days	11	17	16	10	3	12	4	4	2	4	5	7	**95**
Papalagi	36.8	106.4	355	155.2	51.8	137.8	55	45.6	70.6	5.8	9.2	29.2	**1058.4**
No. of rain days	8	13	21	14	5	14	7	8	9	2	3	5	**109**
Kuru Kuru	43.7	244.1	356.9	173.7	85.7	205.6	78.1	46.4	29.7	48.6	60.8	68.8	**1442.1**
No. of rain days	1	16	17	11	7	12	6	5	2	5	7	7	**96**
Daku	102.3	261.5	357.6	113.6	65.6	210.4	98.5	56.7	26.3	40.5	37.6	81	**1451.8**
No. of rain days	8	13	17	9	5	15	4	6	3	4	6	9	**99**
Natua (Seaqaqa)	88.7	253.9	347.9	110.4	66.5	142.2	113	110.6	59.5	50.1	114.6	209.8	**1667.2**
No. of rain days	13	20	22	9	10	16	6	14	3	9	13	15	**150**
Seaqaqa Sub. St.	152.8	427.6	391.4	140.6	35.4	151.2	93.2	95.4	69.6	68.8	142.3	103.6	**1872.3**
No. of rain days	7	15	19	7	8	10	5	9	4	7	9	9	**109**
Rokosalase	80.0	341.8	330.3	109.3	0.0	156.8	61.7	91.3	56.8	28.5	108.7	119.3	**1484.5**
No. of rain days	4	15	11	11	0	7	1	3	2	2	3	6	**65**
Naravuka	120.6	339.9	446.8	117.3	61.9	258.9	58.9	118.4	51	86.6	93.7	197.8	**1951.8**
No. of rain days	5	11	14	7	2	10	3	8	5	5	2	12	**84**

Table 9: Rainfall data(mm) for Penang mill - 2004

Sector	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Nanuku	3.4	413.4	214.6	252.0	0.0	106.0	99.0	201.8	97.4	0.0	0.2	3.0	**1390.8**
No. of rain days	1	14	14	5	0	5	2	11	4	0	1	1	**58**
Ellington	51.6	366.7	162.3	452.2	3.9	210.8	139.1	254.8	162.9	19.2	8.5	169.3	**2001.3**
No. of rain days	5	20	22	10	2	16	8	12	5	8	2	17	**127**
Penang	54	371.1	292.3	253.7	11.4	148.9	94.5	196.4	79.3	1.3	29.5	40.7	**1573.1**
No. of rain days	13	20	21	12	5	14	6	15	4	2	3	12	**127**

Table 10: Meteorological data for Sugar Cane Research Centre, Lautoka - 2004

Measurements	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Relative humidity (%)												
Humidity	64	75	76	72	69	72	66	77	67	66	61	68
47 years average	76	77	80	77	80	80	75	73	70	69	73	73
Air temperature (°C)												
Mean maximum	31.8	31.4	31.2	30.7	29.9	29.6	28.7	27.6	28.3	29.8	30.7	31.3
Mean max 48 years	31.2	31.6	31.0	30.4	29.3	28.8	28.5	28.5	29.2	29.4	30.3	31.4
Mean minimum	23.3	24.4	24.2	22.7	21.7	21.9	20.0	21.1	20.1	21.8	22.0	24.2
Mean min 48 years	23.8	22.5	24.1	23.2	21.3	21.0	19.7	20.4	20.9	21.2	23.0	23.7
Mean	27.8	27.9	27.7	26.7	25.8	25.8	24.4	24.4	24.2	25.8	26.4	27.8
Highest maximum	34.3	33.5	32.6	32.7	32.1	32.1	30.6	29.9	30.7	31.9	33.4	33.0
Lowest minimum	20.1	22.8	20.7	20.7	19.4	18.8	16.9	17.4	15.3	18.6	18.5	22.0
Evaporation (mm)												
Sunken pan	194.5	143.8	123.6	135.3	124.5	89.2	118.0	87.7	116.2	159.9	185.8	176.4
Sunken pan 47 years	164.7	122.4	133.6	128.0	108.2	94.4	117.6	136.2	143.8	179.8	163.2	192.8
Raised pan	234.0	166.5	149.3	158.4	145.0	109.9	142.7	108.0	138.5	184.7	204.8	200.3
Raised pan 47 years	160.6	143.1	146.8	134.6	114.7	106.0	136.1	153.4	165.1	200.1	182.3	203.4
P:E ratio	0.15	2.20	1.64	1.13	0.15	0.54	0.68	2.56	0.61	0.03	0.18	0.40
Earth temperature (°C)												
5 cm	32.3	30.1	29.1	28.1	27.0	25.7	24.1	24.5	26.6	26.5	31.9	31.4
10 cm	30.6	29.1	28.7	27.6	26.8	25.6	24.2	24.6	25.7	28.9	30.5	30.2
20 cm	30.3	29.0	28.7	27.8	27.4	26.0	24.7	24.5	25.6	27.5	30.9	30.7
100 cm	25.3	24.5	24.1	23.7	23.6	22.1	21.4	20.2	21.0	23.0	24.4	24.7
47 year mean 5 cm	28.9	28.2	27.6	27.2	26.1	24.4	23.6	24.6	26.2	28.1	30.2	31.0
47 " " 10 cm	28.2	28.5	27.5	26.8	24.7	24.6	24.6	24.6	26.6	27.2	28.2	29.9
47 " " 20 cm	28.9	30.0	28.8	28.2	26.9	25.9	26.7	25.9	27.0	28.3	30.0	30.7
Sunshine (hours)												
Mean	8.9	5.5	5.8	6.9	7.9	5.5	7.6	4.4	6.2	7.5	8.0	6.4
46 years mean	6.4	6.3	6.8	7.0	5.7	8.3	7.6	7.6	7.3	8.3	6.6	7.8

CROP PROTECTION

The main objective of the section is to minimize the economic losses caused by sugarcane diseases and pests in the sugar industry through vigilant inspections of farms against diseases; release of pest and disease resistant varieties of sugarcane; and adoption of appropriate pest and disease management practices by growers.

Diseases

There are two major sugarcane diseases, namely Downy mildew ***(Perenosclerospora sacchari Miyake)*** and Fiji leaf gall (formerly known as Fiji disease) diseases, the latter being the serious of the two from thirty-one known sugarcane disease in Fiji that have been recorded since the inception of the sugar industry since the 1880s. . The only current sugarcane disease studied is Ratoon stunting disease

Downy mildew disease

Since the first record of Downy mildew disease ***(P. sacchari)*** in the 1940s, it became a very serious disease on commercial cane in Fiji up till the 1980s when it was concentrated in Olosara sector in Sigatoka district because of the farming of maize, an alternate host of this disease. By 1997, Downy mildew was eradicated from this area and has not been recorded since. The control of this disease has been attributed to planting of maize and sugarcane varieties that are resistant to downy mildew and vigorous rouging. Screening for resistance to Downy mildew disease was conducted at the downy mildew disease nursery at Tavakubu, Lautoka.

A total of 114 clones belonging to the LF96 and LF2000 series were screened for downy mildew disease resistance. In the trial conducted, a high percentage of clones were moderately resistant (68%), compared with susceptible (30%) and resistant clones (2%), as shown in Table 1.

Table 1: Resistance of clones screened for Downy mildew disease

Series/ Number Screened	Clone Resistance (%)		
	Resistant	Moderate	Susceptible
LF 96 / 8	0	6	2
LF 2000 / 106	2	72	34

Ratoon stunting disease

Out of all the commercial cane screened for resistance to RSD, a few varieties such as Vomo showed physical stunting in the field as shown in figure 1.

The stalks were very thin and the plants were stunted. It was observed that, Mana out of all the varieties seemed to have grown normally and did not seem to be affected by ***Leifsonia xyli*** subspecies ***xyli.***

Figure 1: RSD infected 12 month old Vomo variety in the RSD screening trial.

Disease Control

The priority of the Disease Control Unit remained as that of previous years with emphasis on inspection of farms with a history of Fiji leaf gall disease incidence as this disease was spreading. Due to the latency of Fiji leaf gall, greater emphasis on ratoon cane inspection was done because the symptoms of the disease shows up clearly in the ratoon crop compared to the plant crop.

A total of 13305 hectares of cane were inspected for major diseases and pests of which 1807 ha were plant cane and 11498 ha were ratoon cane in 2004 (Table 2).

Table 2: Summary of inspections for all mills

	LAUTOKA		RARAWAI		LABASA		PENANG	
MONTH	PLT	RAT	PLT	RAT	PLT	RAT	PLT	RAT
JAN	12	329	13	175	16	211	27	52
FEB	30	521	29	232	38	349	21	95
MAR	40	714	27	203	34	394	9	140
APR	30	488	44	195	25	200	2	109
MAY	65	473	44	259	82	175	34	129
JUN	32	395	55	198	133	63	29	134
JUL	93	394	60	221	31	5	6	164
AUG	87	375	49	203	56	108	15	117
SEP	62	468	84	336	44	171	36	119
OCT	36	345	68	251	17	242	29	134
NOV	30	333	47	193	43	378	7	132
DEC	11	195	3	85	15	203	5	93
TOTAL	528	5030	523	2551	536	2499	220	1418
Mth mean		463		256		253		137
Avarea/Person/mth		42		43		32		46

The performance of the Disease Control Unit in the Lautoka, Rarawai and Penang mills area has been encouraging compared to the Labasa mill area due to vehicle unavailability. Fiji leaf gall disease was detected in all the mill areas (Table 2). The continued inspection in affected fields from January to December resulted in a total of 1977 stools of Fiji leaf gall disease being removed (Table 3). The general decrease in the number of stools removed from the fields is an indication that this disease is decreasing due to the vigorous rouging by the Disease Control unit and also the growers' education on diseases. On the other hand, the disease is spreading to other mill areas due to infected seed cane. The presence of infected ***Sacchrum edule***, an alternate host of Fiji leaf gall disease increase the chance of spreading the disease because it is cultivated near sugarcane farms from where the insect vector, ***Perkinsiella vitiensis*** transmits the disease to sugarcane.The unsupervised movement of sugarcane planting material from one farm to another has been seen as the main cause of the spread of Fiji leaf gall disease. Infected farms were quarantined with a one kilometre radius area and all the farms inspected in this vicinity to curb the spread of the disease. Compared to previous years, other varieties including Mana such as Galoa and Mali have been infected with Fiji leaf gall disease as shown in Table 3. The varieties Vomo, Yasawa and Ono were not recorded as being inspected and this may show the non-preference of growers to these varieties. Another reason is that most growers are now planting Naidiri which has increased from last season.

Table 3: Varietal inspection summary for all mills

VARIETY	NO. OF FARM	PLT (Ha)	RAT (Ha)	DOM Plt	DOM Rat	FID Plt	FID Rat
AIWA	71	7	98	0	0	0	0
BEQA	38	10	47	0	0	0	0
GALOA	219	22	217	0	0	2	1
HOMER	2	0	3	0	0	0	0
KABA	519	99	464	0	0	0	0
MALI	276	44	296	0	0	0	2
MANA	7065	899	8027	0	0	40	1932
NAIDIRI	567	523	238	0	0	0	0
RAGNAR	534	126	938	0	0	0	0
VATU	510	119	759	0	0	0	0
VOMO	0	0	0	0	0	0	0
WAYA	333	36	397	0	0	0	0
RES.	7	1	3	0	0	0	0
UNAPPR.	8	0	11	0	0	0	0
TOTAL	**10150**	**1866**	**11498**	**0**	**0**	**42**	**1935**

A total of sixteen sectors were infected with Fiji leaf gall disease. These sectors included Drasa, Natova, Legalega, Meigunyah, Qeleloa, Malolo, Yako, Nawaicoba, Lomawai, Cuvu and Olosara in the Lautoka mill area; Rarawai sector in the Rarawai mill area; Wailevu, Vunimoli and Wainikoro in the Labasa mill area and; Malau in the Penang mill area. The disease incidence is under control but, the spread is something that is being addressed. Downy mildew disease has been successfully eradicated but we continue to monitor cane farms that are planting maize near the cane fields in sectors that are prone to downy mildew disease. Fiji leaf gall disease continues to be our major disease as it continues to spread to other mill areas. With vigorous rouging and increased awareness programme, the disease can be kept at manageable levels.

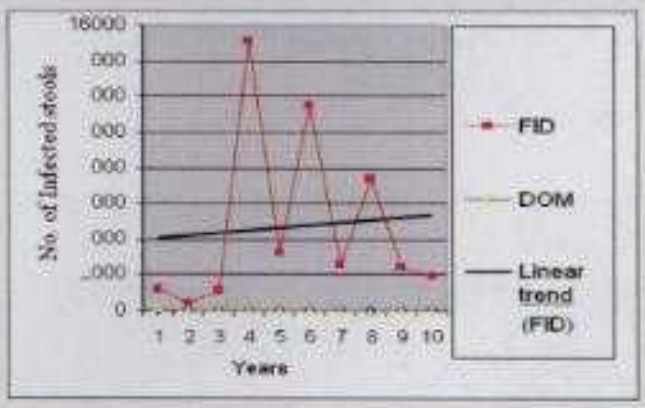


Figure 2 Disease trend in the last 10 years1995-2004

CROP IMPROVEMENT

This section is responsible for breeding and selection of high sugar yielding and disease resistant varieties of sugarcane.

Table 1 below outlines the number of clones under each series and their respective stages in the breeding program.

Table 1: Summary of all series currently under research with number of clones

Stage / Series	I	II	III	IV	V
LF92	17889	3402	400	25	8
LF93	14427	1995	400	27	6
LF94	30504	3165	300	28	9
LF95	39504	1297	300	55	7
LF96	25614	1708	355	39	-
LF97	30918	1795	132	28	-
LF98	9012	1388	205	32	-
LF99	32000	2582	291	60	-
LF00	14346	1203	240	127	-
LF01	13791	497	154	-	-
LF02	21419	1209	128	-	-
LF03	23420	1429	-	-	-
LF04	15070	-	-	-	-

Germplasm Collection

The number of varieties in the Germplasm collection is approximately 4350. The germplasm collection comprises of mostly local hybrids, some foreign clones and few pure species. The germplasm collection was in the fifth ratoon in 2004.

Flowering Beds

There were five flowering beds with a total of 970 clones that produced flowers for crossing. A new arrowing bed was planted with 194 varieties in early November

Project 1 - BREEDING

Crossing

The 2004-crossing season commenced on 12th May and ended on 15 July. 864 crosses were set-up (727 bi-parental and 137 poly) using 210 female and 251 male parents.

Fuzz Sowing and Raising Seedlings

Fuzz sowing commenced on 1st July and ended on 30th July 2004. A total of 613 packets of fuzz was sown that included fuzz from the past five years. 298 packets germinated (48.6 %) and produced 15900 seedlings.

LF04 Series

The LF2004 series was planted as single stool from 7th to 17th December 2004. 15,070 varieties (95%) of the total potted (15900) were transplanted in an area of 1.65 hectare. Due to the dry weather conditions, this field was irrigated before and after planting.

Project 2 - SELECTION

LF03 Series

A total of 1,429 cultivars of LF 2003 series were advanced and planted in stage 2 as single lines. This was 6.1% of the total planted (23,420). The selection was done 10 months after planting and was based on brix, vigor and disease incidence.

Figure 1: Brixing & Selection in Stage 1

Table 2: Brix range for selected varieties and standards

Standard Varieties	Standards Average Brix	Selection Range (Brix)	No of Varieties Selected
Kaba	24.0	≥ 24.0	55
Naidin	23.0	23.0 – 23.9	176
Ragnar	22.6	22.6 – 22.9	66
Aiwa	20.9	20.9 – 22.5	764
		18.0 - 20.9	368
Total			1429

Note: standard brix range 17.1 – 25.0 and selected varieties' brix range 18.0 – 24.8

Project 3

LF02 Series

In the past four years, selection of clones for advancement to stage 3 was based mainly on the bio chemical data but this year an integrated approach focusing on recurrent selection was applied. In the integrated approach, data (preliminary brix and bio-chemical) and field visit observations were used in making the final selection. Selection is based mainly on sucrose content (%pocs). There were 1209 clones in stage 2, out of which 128 were selected for advancement to stage 3. The sucrose content of the selected varieties ranged between 9.03 - 17.36 % and the standards from 10.54 - 15.56%. The sucrose content of 25 varieties was better than the best standard variety Beqa (15.56%). The fibre content of the selected varieties ranged between 6.85 - 13.86% and the standards from 6.34 - 11.84%. The fibre content of 12 varieties was greater than 11.84%.

Project 4

LF01 Series

Previously selection was based mainly on the bio chemical data but this year additional information such as growth, height and stand of cane were considered during selection. There were 154 clones planted in four rows by four-meter plots out of which 27 varieties were selected on sucrose content, %fibre and advanced to stage 4 seedbed. The sucrose content of the selected varieties ranged between 10.79 - 16.17 % and the standards from 13.03 - 14.88%. The sucrose content of 15 varieties was better than the best standard variety Aiwa (14.88%). The fibre content of the selected varieties ranged between 7.61 - 13.88% and the standards from 7.96 - 10.97%.

Project 5

LF99 Series

The %pocs of the test varieties ranged between 14.01 - 16.35 and the standards from 13.98 - 16.01. The ts/ha (sucrose yield) of the test varieties ranged between 13.10 - 18.14 and the standards from 11.46 - 16.47 ts/ha. The sugar yield of three test varieties LF99-1254, 1126 and 777 were higher than the best performing standard Beqa. Table 3 below lists the selected test varieties that have better sugar yield than the standards at different locations in descending order. The performance of the test variety LF99-1254 was outstanding and amongst the top five varieties in three different locations. The test varieties will be further evaluated in the ratoon crop.

Table 3: List of varieties performing well at different locations

Labasa - Dreketi Exp.	Trt No.	Rakiraki - Rarawai Exp.	Trt No.
LF99-1254* **	1	LF99-1913**	13
LF99-654	2	LF99-1502**	11
LF99-193	3	LF99-1904**	12
LF99-252	4	**LF99-1254*** **	1
LF99-951**	5	LF99-897**	14
LF99-2340	6	LF99-17	15
LF99-1101	7	LF99-159**	10
LF99-777**	8	LF99-191	16
LF99-444**	9	LF99-1126**	17
LF99-159**	10	LF99-422	18
LF99-1502**	11		
LF99-1904**	12		

** and *** denotes varieties performing well at two and three locations respectively

Table 3 cont'd: List of varieties performing well at different locations

Labasa - Dreketi Exp.	Trt No.	Rakiraki - Rarawai Exp.	Trt No.
LF99-1126**	17	LF99-777**	8
LF99-1861	19	**LF99-1254*** **	1
LF99-623	20	LF99-947	26
LF99-1592	21	LF99-897**	14
LF99-1662	22	LF99-1865	27
LF99-2007	23	LF99-2234	28
LF99-504	24	LF99-102	29
LF99-913	25	LF99-1901	30
LF99-444**	9	LF99-951**	5
		LF99-075	31
		LF99-1913**	13

** and *** varieties performing well at 2 and 3 locations respectively

Project 6

LF98 Series

The %pocs (sucrose content) of the test varieties ranged between 12.67 - 15.37 and the standards from 12.61 - 14.81. The ts/ha (sucrose yield) of the test varieties ranged between 12.75 - 17.24 ts/ha and the standards from 13.05 - 17.55 ts/ha. The fibre content of the test varieties ranged between 9.3 - 12.40% and the standards from 9.12 - 10.59%. Two test varieties (LF98-229 and 136) had high %fibre (>11) but low %pocs, cane and sugar yields. The performance of the test

variety LF98-1116 was very encouraging in two locations. Table 4 below lists the selected test varieties that have better sugar yield than the standards at two locations in descending order.

Table 4: List of varieties performing well at different locations

Drasa	Trt No	Rarawai	Trt No
LF98-419	1	LF98-19	9
LF98-1116**	**2****	LF98-210	10
LF98-31**	**3****	LF98-225	11
LF98-1018	4	**LF98-224****	**8****
LF98-284**	**5****	**LF98-31****	**3****
LF98-1175**	**6****	**LF98-1116****	**2****
LF98-1177	7	**LF98-1175****	**6****
LF98-224**	**8****	LF98-949	12
		LF98-284**	**5****
		LF98-111	13

**Varieties performing well in both locations of the trial.

Project 7

LF97 Series

The %pocs of the test varieties ranged between 11.42 - 14.63 and the standards from 12.24 - 14.56. The ts/ha of the test varieties ranged between 14.85 - 18.74 and the standards ranged from 14.54 - 19.17 ts/ha. The fibre content of the test varieties ranged between 10.02 - 13.85% and the standards from 9.31 - 11.41%. Two test varieties (LF97-382 and 793) that had high %fibre (>13). The test variety LF97-382 performed well and was amongst the top 4 varieties in two locations.

Table 5: List of varieties performing well at different locations

Drasa	Trt No	Rarawai	Trt No
LF97-881**	1	LF97-303**	12
LF97-382**	2	LF97-315	13
LF97-622**	3	**LF97-382****	2
LF97-679	4	LF97-29	14
LF97-310**	5	LF97-793	15
LF97-958**	6	LF97-316**	10
LF97-334	7	LF97-881**	1
LF97-381	8	LF97-958**	6
LF97-1069	9	LF97-37	16
LF97-316**	10	LF97-622**	3
LF97-308**	11	LF97-310**	5
LF97-303**	12	LF97-308**	11

**Varieties performing well in both locations of the trial.

Project 8

LF96 Series

The test variety LF96-288 was only planted in one location (Legalega) which is classed as poor soil and astoundingly this variety was the best out of all other test varieties. LF96-288 produced 8% more sugar compared to the best performing standard Aiwa.

Table 6: List of varieties performing well at different locations

Legalega	trt	Rarawai	trt	Labasa	trt
LF96-288	1	**LF96-191****	6	**LF96-154**	11
LF96-70	2	**LF96-839****	3	**LF96-305**	12
LF96-839**	3	**LF96-1269****	7	**LF96-523****	10
LF96-892	4	**LF96-65**	8	**LF96-1269****	7
LF96-314	5	**LF96-1273**	9	**LF96-191****	6
		LF96-523**	10	**LF96-950**	13

**Varieties performing well in two locations of the trial.

Table 6 lists the selected test varieties that have better sugar yield than the standards at three different locations in descending order. There are 3 varieties (LF96-1269, LF96-191 and LF96-523) that performed well at two locations while the rest had good results at specific sites.

Project 9

LF94 and LF95 Series

The %pocs of the test varieties ranged between 14.74 - 15.94 and the standards from 14.03 - 15.80. The tc/ha of the test varieties ranged between 78 - 140 tc/ha and the standards from 85 - 119 tc/ha. The tc/ha of the test variety LF94-694 was 17% higher than the best standard. The performance of seven test varieties (LF94-694, LF95-28, LF94-3090, LF94-332, LF94-828, LF95-1212 and LF94-2764) had been very encouraging. The test variety LF94-694 produced outstanding result at all the 4 different locations, maintaining its high sucrose-yielding characteristic.

Table 7: List of varieties performing well at different locations

Lautoka Drasa Estate	Rarawai Rarawai Est.	Ba Mill Malaki Est.	Labasa Naisa
LF94 – 694 ****	LF94– 694 ****	LF94 – 865 **	LF94–694 ****
LF94 – 2952	LF95 – 28 ****	LF94 – 694 ****	LF94–2764 ****
LF94 – 332	LF94 – 828 ***	LF94– 2764 ****	LF95–28 ****
LF94 – 828 ***	LF94–2764 ****	LF95 – 1212 **	LF94–828 ***
LF95 – 28 ****	LF94 – 865 **	LF95 – 28****	
LF94 - 2764 ****			
LF95- 316			
LF95 – 1212 **			

****, *** and ** denotes varieties performing well at four, three

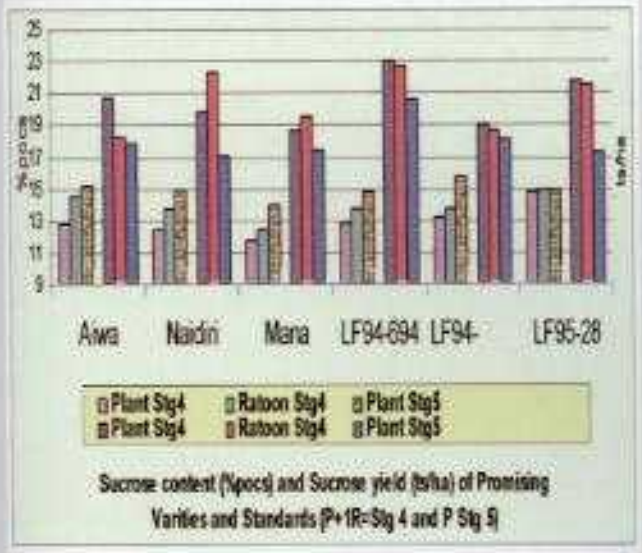
Table 7 shows the list of test varieties that produced good results at the four mill locations. Table 8 shows the comparison between the three best standards against the top three varieties with promising results

Table 8: %pocs and ts/ha of promising varieties from stage 4 and 5 trials

Variety/STD	%pocs			ts/ha		
	Plant Stg4	Ratoon Stg4	Plant Stg5	Plant Stg4	Ratoon Stg4	Plant Stg5
Aiwa	12.9	14.6	15.15	20.8	18.2	17.89
Naidiri	12.4	13.7	14.9	19.9	22.4	17.03
Mana	11.8	12.4	14.03	18.7	19.6	17.48
LF94-694	12.8	13.8	14.85	23.0	22.8	20.58
LF94-2764	13.2	13.7	15.75	19.1	18.7	18.13
LF95-28	14.8	14.9	14.92	21.8	21.5	17.33

Chart 1 gives a visual representation of three test varieties, LF94-694, LF95-28 and LF94-2764 against the 3 standards Aiwa, Naidiri and Mana in terms of %pocs and ts/ha in 3 crop seasons.

Chart 1: Promising Varieties and Standards Sugar yield (ts/ha) and sucrose content (%pocs)



Project 10
LF92&93 Series

Based on the individual location assessment of the above series trial, there are no promising varieties in this series but there is one variety LF93-475 which has performed on par with the standards. The trials will be further evaluated.

Promising Variety

The promising variety LF91-1925 will be tested in the Large Mill Trial in 2005 and if this test is successful then it will be released for commercial cultivation. LF91-1925 is from the cross between Kaba and Yasawa, both of which are commercial cane varieties of Fiji.

Fig 2: Germination of LF91-1925 plant crop.

Fig 3: Promising variety, LF91-1925 (stool and trashed stalks).

ESTATE

The Sugarcane Research Centre manages all four estates producing approximately 20,000 tonnes of cane with an average yield of 71.0t/ha. We have improved the total production compared to previous years but our production costs have increased accordingly. Increasing inflation and the decreasing power of local currency over the years has put major constraints on the estate cost. Every effort is been made to curb down these costs to acceptable levels. However, unless harvesting cost is reduced, it is almost impossible to make major reduction in cost of production. With the declining sugar prices and diminishing profits due to fluctuations in world market prices for this commodity, compounded with escalating production costs, a business like attitude towards sugarcane farming is needed to remain competitive in the international arena.

This can only be achieved through appropriate research and investment in the estates with mechanization and modern farming systems to reduce costs and realize optimum profit margin.

With the above in view and research to play an important role in the future of the estates, a careful assessment is needed to assess challenges of the sugarcane sector to conduct research with the concept of total industry solutions systems. It is important to realize that mechanization is essential as this will ultimately reduce the cost of production. As a result, estates will be able to finance its own activities and will become a business centre. We will also be able to set up model farms and gear up for the role to indicate to the growers the benefit of best farming practices.

Table1: Cane production in the estates for 2004 season

Estate	Total Production (tonnes)	Total Area (ha)	Tonnes Cane/Hectare (t/ha)
Drasa	7017	105.0	66.8
Waqadra	4577	57.5	79.6
Rarawai	6248	86.1	72.6
Labasa	1573	25.0	62.9
Total	**19415**	**273.6**	**71.0**

Figure 1: Dual row planting

In 2004, the number of registrations were 20392 with the registered cane area of 89258 hectares. The total area cultivated was 80150 hectares. A crop of 3001189 tonnes of cane was harvested from an area of 60080 hectares and 315343 tonnes of sugar was produced. There was improvement in cane yield from 42.8 tonnes per hectare in 2003 to 50.0 tonnes per hectare in 2004.

The sugar yield was 5.39 tonnes 94NT per hectare. The yield continues to decline due to changes in seasonal rainfall distribution and lack of best farming cultural practices. The burnt cane was 34.3 percent of total cane crushed. Mana was the dominant variety crushed at all Viti Levu mills accounting for 88.0 percent of the crop harvested and 64 percent of the total crop.

The rainfall at the mills centres during the growing period (May 03 - April 04) was 77, 83, 65 and 64 percent of the LTM for Lautoka, Rarawai, Labasa and Penang mill respectively. The monthly rainfall for the four mill centres from May 2003 to April 2004 comparison to LTM is shown in Table 1.

Fertilizer usage

The NPK usage (kg/hectare) in all mill areas (1997 - 2005 crop) is shown in Table 2. There has been a significant decline in fertilizer usage at all mills in the last five years. This is mainly due to growers reluctance to invest in cane farming due to uncertainty of renewal of cane leases and declining cane price.

Table 1: Rainfall (mm) for all mills from May 2003 to April 2004

Mills	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
Lautoka Mill													
Monthly Rainfall	53.3	81.9	12.8	134.4	5.9	76.2	52.3	185.2	34.1	366.0	245.4	179.7	**1427.2**
No. of rain days	7	4	3	6	3	5	9	18	10.0	18.0	21.0	9.0	**113**
94 years avg.	99.5	65.3	49.2	68.6	69.4	89.9	122.6	190.9	293.1	319.3	314.1	180.5	**1862.4**
Rarawai Mill													
Monthly Rainfall	127.6	40.6	6.1	72.3	1.6	62.6	63.6	426.7	51.6	480.9	427.2	156.8	**1917.6**
No. of rain days	9	6	3	4	2	2	8	19	9.0	18.0	18.0	7.0	**105**
117 years avg.	78.0	34.7	26.6	98.7	103.4	149.1	223.6	239.6	347.0	356.5	359.7	297.5	**2314.4**
Labasa Mill													
Monthly Rainfall	134.0	16.2	19.0	16.1	15.0	25.1	85.8	261.3	40.2	312.2	392.2	166.7	**1483.8**
No. of rain days	12	3	3	3	5	9	12	21	12.0	16.0	21.0	11.0	**128**
113 years avg.	111.2	63.5	46.5	50.2	101.5	102.0	204.9	251.9	361.8	357.6	380.9	237.6	**2269.6**
Penang Mill													
Monthly Rainfall	128.6	28.6	25.0	41.3	6.1	45.9	82.4	296.7	54.0	371.1	292.3	253.7	**1625.7**
No. of rain days	19	8	7	5	2	2	11	20	13.0	20.0	21.0	12.0	**140**
105 years avg.	123.4	68.0	52.2	93.7	83.6	150.2	150.5	239.0	429.6	351.1	415.3	391.6	**2548.2**

Table 2: N, P, K fertilizer usage (kg/ha) in all mills (2002-2005)										
Mill	Fertilizer	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lautoka	N	87.5	93.8	111.6	87.6	51.1	68.9	79.0	75.5	82.1
	P	15.9	16.6	22.2	15.0	8.9	11.9	13.6	13.1	13.9
	K	60.6	63.2	76.6	60.7	35.4	47.7	56.0	53.8	59.0
Rarawai	N	86.5	98.7	102.4	89.1	60.3	72.8	82.5	81.7	72.0
	P	15.4	17.1	21.4	15.6	12.3	11.6	13.5	14.0	12.6
	K	59.7	65.7	69.9	62.5	40.9	53.1	58.6	57.5	55.0
Labasa	N	85.6	119.6	120.3	99.4	94.7	87.4	96.5	66.9	113.8
	P	15.4	24.0	24.8	19.6	18.5	18.1	19.3	13.7	22.8
	K	59.1	80.3	83.0	69.3	74.6	61.0	68.0	47.3	81.2
Penang	N	93.3	101.0	111.7	84.8	73.6	89.4	82.4	68.0	103.7
	P	16.9	17.3	21.6	14.3	12.5	15.2	14.8	13.9	18.6
	K	65.7	67.3	78.9	61.0	52.8	64.3	59.5	56.3	76.6
All mill avg.	N	93.7	103.5	112.2	91.4	67.7	76.8	85.2	74.4	89.9
	P	17.8	19.0	22.8	16.5	12.9	13.8	15.2	13.6	16.4
	K	64.9	69.4	77.2	63.8	49.2	49.5	60.4	53.4	65.6

The data given in Table 3 shows the total N:P:K usage in the Fiji Sugar Industry since 1986. There has been a marked decline in N usage in the last five years.

Table 3: Area Harvested and amounts of N, P, K used in the Fiji Sugar Industry, 1986 – 2005 crop.							
Year	Harvested Area	Nutrients Applied in Tonnes			Proportions		
	ha	N	P	K	N	P	K
1986	66270	7855	765	1408	10.3	1.0	1.8
1987	66511	6769	501	1154	13.5	1.0	2.3
1988	63817	8002	733	1426	10.9	1.0	1.9
1989	71158	10141	885	2382	11.5	1.0	2.7
1990	69666	7777	649	1774	12.0	1.0	2.7
1991	72709	6347	643	1886	13.0	1.0	2.9
1992	72649	6551	870	3336	8.5	1.0	3.8
1993	75089	6844	1186	4506	5.8	1.0	3.8
1994	74388	7158	1380	4945	5.2	1.0	3.6
1995	73977	7660	1335	5315	5.7	1.0	4.0
1996	73981	7520	1413	5193	5.3	1.0	3.7
1997	73312	7050	1339	4885	5.3	1.0	3.6
1998	57039	7050	1351	1885	5.2	1.0	3.6
1999	64535	7852	1597	5406	4.9	1.0	3.4
2000	66943	6902	1249	4821	5.5	1.0	3.9
2001	66305	4710	901	3427	5.2	1.0	3.8
2002	62825	4811	864	3101	5.6	1.0	3.6
2003	60912	5187	927	3681	5.6	1.0	4.0
2004	60080	4471	816	3206	5.5	1.0	3.9
2005	62204	5591	1020	4079	5.5	1.0	4.0

Appendix 1 : Main features of 2004 season compared with 2003

	Lautoka		Rarawai		Labasa		Penang		All mills	
	2003	**2004**	2003	**2004**	2003	**2004**	2003	**2004**	2003	**2004**
Total registrations	7574	**7529**	5889	**5808**	4851	**4765**	2379	**2290**	20693	**20392**
Total farm basic allotments (tonnes)	1343315	**1352945**	1138930	**1135982**	1053228	**1037851**	331013	**324566**	3866486	**3851344**
Total registered area (hectares)	31236	**31069**	25109	**24699**	22880	**22593**	11179	**10897**	90404	**89258**
Total area cultivated (hectares)	31880	**31743**	21581	**20750**	22064	**22137**	5590	**5520**	81115	**80150**
Total area harvested (hectares)	20459	**20148**	18742	**18466**	16722	**16481**	4989	**4985**	60912	**60080**
Total farm harvest quotas (tonnes)	Open	**Open**	Open	**Open**	Open	**Open**	Open	**Open**	Open	**Open**
Sugar make actual(tonnes)	99801	**107168**	99037	**98223**	68308	**85967**	26507	**23985**	293653	**315343**
Tonnes 94 N.T sugar	103202	**110684**	101324	**100664**	75830	**87802**	25453	**24716**	305809	**323866**
Yield tonnes 94 N.T.sugar per hectare	5.04	**5.41**	5.41	**5.45**	4.53	**5.20**	5.10	**4.81**	5.02	**5.39**
Tonnes cane per tonnes sugar 94 N.T.	8.63	**9.32**	8.27	**8.70**	8.42	**9.70**	9.57	**9.8**	8.53	**9.38**
%pocs	12.13	**11.28**	12.84	**12.09**	12.97	**11.12**	12.81	**11.29**	12.69	**11.45**
Cane purity average for season	82.20	**81.90**	84.10	**85.90**	83.10	**81.10**	85.80	**83.70**	83.80	**83.15**
Tonnes cane harvested	890499	**1032127**	836728	**878121**	638851	**848533**	243602	**242408**	2609680	**3001189**
Tonnes cane crushed	890396	**1032127**	837098	**878323**	638934	**848503**	243583	**242287**	2610011	**3001240**

Appendix 2: Monthly rainfall(mm) for 2003 compared with average since commencement of records (to nearest mm)

Mills	No. of years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Lautoka	**2004 actual**	**34.1**	**366.0**	**245.4**	**179.7**	**21.9**	**59.8**	**97.5**	**276.6**	**84.1**	**5.9**	**37.5**	**80.0**	**1488.5**
	95 yrs average to 2003	293.1	319.3	314.1	180.5	98.7	65.2	49.7	70.8	69.5	89.0	121.7	189.7	**1861.3**
Rarawai	**2004 actual**	**51.6**	**480.9**	**427.2**	**156.8**	**54.3**	**99.5**	**127.7**	**378.1**	**62.8**	**20.6**	**3.0**	**97.1**	**1959.6**
	118 yrs average to 2003	347.0	356.5	359.7	297.5	78.0	35.2	27.5	101.1	103.1	148.0	221.7	238.4	**2313.7**
Labasa	**2004 actual**	**40.2**	**312.2**	**392.2**	**166.7**	**31.3**	**163.2**	**91.9**	**113.2**	**47.6**	**46.8**	**52.9**	**109.4**	**1567.6**
	114 yrs average to 2003	361.8	357.6	380.9	237.6	110.5	64.4	46.9	50.8	101.0	101.5	203.6	250.7	**2267.3**
Penang	**2004 actual**	**54.0**	**371.1**	**292.3**	**253.7**	**11.4**	**148.9**	**94.5**	**196.4**	**79.3**	**1.3**	**29.5**	**40.7**	**1573.1**
	106 yrs average to 2003	429.6	351.1	415.3	391.6	122.3	68.8	52.6	94.7	83.6	148.8	149.4	237.1	**2544.9**

Appendix 3: Crop production details

	Lautoka		Rarawai		Labasa		Penang		All mills	
	2003	**2004**	**2003**	**2004**	**2003**	**2004**	**2003**	**2004**	**2003**	**2004**
Areas harvested (hectares)										
Plant	1183	**1272**	1129	**916**	1067	**1035**	648	**573**	4026	**3796**
First ratoon	1248	**1214**	1173	**1252**	1354	**1145**	575	**603**	4349	**4214**
2nd ratoon	612	**1156**	1327	**1235**	1136	**1429**	367	**507**	3442	**4327**
Other ratoons	17417	**16506**	15112	**15063**	13165	**12872**	3400	**3302**	49095	**47743**
Total	20459	**20148**	18742	**18466**	16722	**16481**	4989	**4985**	60912	**60080**
Proportion of crop harvested according to area										
Plant	5.8	**6.3**	6.0	**5.0**	6.4	**6.3**	13.0	**11.5**	6.6	**6.3**
First ratoon	6.1	**6.0**	6.3	**6.8**	8.1	**6.9**	12.0	**12.1**	7.1	**7.0**
2nd ratoon	3.0	**5.7**	7.1	**6.7**	6.8	**8.7**	7.0	**10.2**	5.7	**7.2**
Other ratoons	85.1	**82.0**	80.6	**81.5**	78.7	**78.1**	68.0	**66.2**	80.6	**79.5**
Total	100	**100**	100	**100**	100	**100**	100	**100**	100	**100.0**
Yield tonnes per hectare harvested										
Plant	60.7	**66.5**	57.9	**61.2**	48.0	**64.6**	56.9	**53.7**	55.9	**62.7**
First ratoon	57.5	**59.9**	53.6	**56.6**	50.1	**62.3**	57.5	**52.8**	54.1	**57.9**
2nd ratoon	48.6	**56.2**	47.1	**51.2**	42.8	**56.3**	48.2	**50.3**	46.1	**54.1**
Other ratoons	41.2	**49.1**	42.7	**45.7**	35.8	**48.9**	45.9	**46.7**	40.5	**47.8**
Average yield/ha	43.5	**51.2**	44.6	**47.6**	38.2	**51.5**	48.8	**48.6**	42.8	**50.0**
Main varieties crushed according to tones (%)										
Ragnar	0.5	**0.6**	1.1	**0.8**	25.9	**26.3**	0.3	**0.3**	6.9	**7.9**
Aiwa	1.5	**1.0**	1.4	**0.9**	0.6	**0.6**	0.5	**0.5**	1.1	**0.8**
Beqa	0.0	**-**	0.2	**0.0**	2.1	**1.6**		**-**	0.6	**0.5**
Galoa	0.2	**-**	0.0	**-**	4.3	**5.2**	0.1	**-**	1.1	**1.5**
Kaba	4.3	**4.0**	6.3	**5.6**	0.4	**0.4**	1.0	**0.9**	3.7	**3.2**
Mali	0.3	**-**	0.1	**0.0**	23.7	**21.7**	2.6	**2.5**	6.2	**6.4**
Mana	90.1	**89.9**	86.9	**88.6**	0.1	**0.0**	89.9	**85.5**	67.0	**63.8**
Naidiri	2.9	**4.0**	1.7	**2.6**	2.1	**3.8**	4.9	**9.4**	2.5	**3.9**
Vatu	0.0	**-**	0.0	**-**	32.0	**30.9**	0.7	**0.8**	7.9	**8.8**
Waya	0.0	**-**	2.2	**1.3**	8.9	**9.3**		**-**	2.9	**3.0**
Expt./Others	0.3	**0.4**	0.1	**0.1**	0.1	**0.0**	0.1	**0.0**	0.2	**0.2**
Total	100	**100**	100	**100**	100	**100**	100	**100**	100	**100**

Early - From 1st to 10th of the month Mid - From 11th to 20th of the month Late - From 21st to end of the month

Appendix 4: Rainfall (mm) at mill centres

Mill	For 12 months ending 31st December					For 12 months ended 30th September				
	2000	2001	2002	2003	**2004**	2000	2001	2002	2003	**2004**
Lautoka	3008	2044	1704	1459	**1489**	3089	2474	2106	1289	**1670**
Rarawai	3412	1821	1677	1919	**1960**	3175	2380	2065	1499	**2393**
Labasa	3655	2147	2418	1834	**1568**	3805	2309	2830	1748	**1731**
Penang	3748	2115	1862	1889	**1573**	3881	2412	2418	1657	**1927**

Appendix 5: Rainfall distribution affecting 2004 crop(mm)

Month	Period	[illegible]	[illegible]	[illegible]	[illegible]
July '03	Early	2.8	-	-	-
	Mid	4.0	2.1	10.6	14.0
	Late	6.0	4.0	8.4	11.0
August '03	Early	6.8	1.5		
	Mid	126.8	70.8	16.1	40.3
	Late	0.8	-	-	1.0
September '03	Early	2.5	1.6	4.8	6.1
	Mid	Nil	-	8.7	-
	Late	3.4	-	1.5	-
October '03	Early	Nil	-	4.6	-
	Mid	74.8	62.6	18.9	45.9
	Late	1.4	-	1.6	-
November '03	Early	13.8	15.4	26.2	39.8
	Mid	29.1	25.1	34.5	18.8
	Late	9.4	23.1	25.1	23.8
December '03	Early	77.1	58.4	50.6	165.1
	Mid	77.2	99.4	75.7	29.1
	Late	30.9	268.9	135.0	102.5
January '04	Early	12.0	2.0	5.5	6.1
	Mid	8.0	7.3	18.8	9.0
	Late	14.1	42.3	15.9	38.9
February '04	Early	41.7	92.4	58.0	62.4
	Mid	262.5	314.1	215.5	232.2
	Late	61.8	74.4	38.7	76.5
March '04	Early	27.2	38.4	41.4	25.4
	Mid	54.8	116.7	51.9	69.4
	Late	163.4	272.1	298.9	197.5
April '04	Early	107.5	122.4	108.2	169.6
	Mid	72.2	34.4	53.8	83.9
	Late	-	-	4.7	0.2
May '04	Early	10.2	51.2	12.6	8.0
	Mid	11.4	2.8	1.6	-
	Late	0.3	0.3	17.2	3.4
June '04	Early	4.2	22.1	145.6	44.4
	Mid	20.7	31.2	6.2	23.6
	Late	34.9	46.2	11.4	80.9
July '04	Early	-	-	-	2.0
	Mid	-	1.6	2.9	8.1
	Late	97.5	126.1	89.0	84.4
August '04	Early	123.8	193.0	35.2	99.5
	Mid	21.1	53.0	23.8	4.7
	Late	131.7	132.1	54.2	92.2
September '04	Early	0.6	-	1.2	6.2
	Mid	56.8	35.0	8.9	60.1
	Late	26.7	27.8	37.5	13.0
October '04	Early	1.9	0.1	20.4	0.7
	Mid	3.0	1.2	26.4	0.6
	Late	1.0	19.3	-	-
November '04	Early	13.6	0.7	16.0	28.0
	Mid	0.2	2.0	22.0	1.5
	Late	23.7	0.3	14.9	-
December '04	Early	2.2	0.5	3.3	3.3
	Mid	29.8	73.4	34.1	22.1
	Late	48.0	23.2	72.0	15.3
Total		**1955.3**	**2592.5**	**1990.0**	**2070.5**

Appendix 6: Hectares harvested

		1976/80	1981/85	1986/90	1991/95	1996/00	2000	2001	2002	2003	2004
Lautoka	Plt	5962	5904	4007	3634	2944	2764	658	1245	1183	**1272**
	Rtn	15370	18108	19743	20580	19701	19214	21879	20396	19276	**18876**
	Total	21332	24012	23750	24214	22645	21978	22537	21641	20459	**20148**
Rarawai	Plt	4122	4463	3574	2899	3164	4653	916	1267	1129	**916**
	Rtn	12256	13836	14805	17360	14613	13935	18820	17449	17613	**17550**
	Total	16378	18299	18379	20259	17777	18588	19737	18716	18742	**18466**
Labasa	Plt	2736	2365	2512	3120	2597	2070	1092	1341	1067	**1035**
	Rtn	11300	16306	17181	19604	18348	18289	17479	15745	15655	**15446**
	Total	14036	18671	19693	22724	20945	20359	18571	17086	16722	**16481**
Penang	Plt	1474	1697	1396	1386	1120	1157	354	623	647	**573**
	Rtn	2903	4036	5029	4958	4674	4861	5105	4559	4342	**4412**
	Total	4377	5733	6425	6344	5794	6018	5459	5182	4989	**4985**
All mills	Plt	14294	14429	11489	11039	9825	10644	3020	4476	4026	**3795**
	Rtn	41829	52286	56758	62502	57336	56299	63283	58149	56886	**56285**
	Total	56123	66715	68247	73541	67161	66943	66303	62625	60912	**60080**

Appendix 7 : Tonnes of cane harvested

	1976/80	1981/85	1986/90	1991/95	1996/2000	2000	2001	2002	2003	2004
Lautoka	1213388	1254266	1048942	1283569	1216597	1301752	906743	1137123	890499	**1032127**
Rarawai	890130	984244	1006366	1017374	957507	1251282	844411	1071579	836728	**878121**
Labasa	707813	980634	1015166	1166055	1017061	911370	865444	938450	638851	**848533**
Penang	243115	310406	332592	291206	309205	322475	208183	275431	243602	**242408**
All mills	3054446	3529550	3403066	3758204	3500370	3786879	2824781	3422583	2609680	**3001189**

Appendix 8 : Tonnes of cane per hectare harvested

		1976/80	1981/85	1986/90	1991/95	1996/2000	2000	2001	2002	2003	2004
Lautoka	Plt	65.6	61.7	65.4	64.7	64.2	72.4	54.3	73.3	60.8	**66.5**
	Rtn	52.5	48.0	54.2	51.2	51.4	57.3	45.4	56.8	49.1	**50.2**
	Total	56.1	51.4	55.5	52.4	53.7	59.2	40.2	52.5	43.5	**51.2**
Rarawai	Plt	66.1	65.1	64.3	61.2	62.1	75.2	51.6	69.0	57.9	**61.2**
	Rtn	49.7	51.3	52.0	48.1	52.9	64.7	43.6	58.2	47.8	**46.8**
	Total	54.4	53.3	54.2	50.1	53.9	67.2	42.8	57.3	44.6	**47.6**
Labasa	Plt	61.7	63.9	58.9	59.3	56.5	55.4	56.2	66.8	48.0	**64.6**
	Rtn	47.3	50.8	51.5	50.4	47.4	43.6	48.9	59.8	42.9	**50.6**
	Total	50.4	52.5	51.5	51.3	48.6	44.7	45.5	54.9	38.2	**51.5**
Penang	Plt	61.5	63.3	63.1	57.2	62.6	63.0	42.9	65.2	56.9	**53.7**
	Rtn	48.4	50.5	48.6	43.1	51.2	51.3	39.7	54.4	50.5	**47.9**
	Total	52.7	54.3	51.1	46.0	53.3	53.6	38.1	53.2	48.8	**48.6**
All	Plt	64.7	63.5	62.6	61.2	61.8	69.3	52.8	69.0	55.9	**62.8**
mills	Rtn	48.8	49.5	55.8	48.1	50.0	54.2	43.8	54.7	42.2	**46.0**
	Total	53.0	52.6	53.3	50.2	52.1	56.6	42.3	54.7	42.8	**50.0**

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

Mills	2004 Hectares (ha)			Hectares harvested as % of 2004 Contract and Cultivated areas	
	Contract (1)	Cultivated (2)	Harvested	(1)	(2)
Lautoka	31069	31743	20148	65	63
Rarawai	24699	20750	18466	75	89
Labasa	22593	22137	16481	73	74
Penang	10897	5520	4985	46	90
Total	89258	80150	60080	67	75

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

Mills	Rough average for period of five seasons					Last five seasons and 2004				
	1976/80	1981/85	1986/90	1991/95	1996/2000	2000	2001	2002	2003	2004
Lautoka	28	26	17	15	13	13	3	6	6	**6**
Rarawai	25	24	19	14	18	25	5	7	6	**5**
Labasa	20	11	13	14	12	10	6	8	6	**6**
Penang	34	29	22	23	19	19	7	12	13	**11**
All mills	26	21	17	18	15	16	5	7	8	**6**

Appendix 11: Plant and ratoon yields and percentage of total area harvested (2004 crop)

Mills	Plant		First ratoon		Other ratoons		All crops	
	tc/ha	% Area	tc/ha	% Area	tc/ha	% Area	tc/ha	% Area
Lautoka	66.5	6	59.9	6	41.2	88	43.5	100
Rarawai	61.2	5	56.6	7	52.7	88	51.2	100
Labasa	64.6	6	62.3	7	52.6	87	51.5	100
Penang	53.7	12	52.8	12	48.5	76	48.6	100
All Mills	62.8	6	58.5	14	51.0	80	50.0	100

Appendix 12 : Seasonal %pocs in cane

Mills	Rough average for period of five seasons					Last five seasons and 2004				
	1976/80	1981/85	1986/90	1991/95	1996/2000	2000	2001	2002	2003	2004
Lautoka	13.00	12.19	12.00	12.50	11.42	9.98	11.35	10.95	12.13	**11.28**
Rarawai	13.10	12.12	12.09	12.90	11.35	9.19	11.66	11.29	12.84	**12.09**
Labasa	12.47	12.20	12.37	12.12	11.07	10.86	11.30	11.42	12.97	**11.12**
Penang	13.00	12.28	12.15	12.59	11.13	9.75	11.84	11.18	12.81	**11.29**
All Mill Avg.	12.90	12.15	12.27	12.51	11.24	9.95	11.54	11.21	12.69	**11.45**

Appendix 13: Weekly pocs in cane 2004 season					
Week no	Date reaction	Variety	Variety	Variety	Variety
1	21-Jun-03	-	11.35	-	-
2	28-Jun-03	11.03	11.30	10.37	-
3	05-Jul-03	11.13	11.53	10.02	-
4	12-Jul-03	11.37	12.10	9.99	12.02
5	19-Jul-03	11.84	12.46	10.32	12.05
6	26-Jul-03	11.98	12.48	10.50	12.00
7	02-Aug-03	12.14	13.02	10.58	12.52
8	09-Aug-03	11.54	12.69	11.02	11.62
9	16-Aug-03	12.04	12.92	10.64	12.44
10	23-Aug-03	12.35	13.01	11.18	12.47
11	30-Aug-03	11.80	12.58	10.86	11.10
12	06-Sep-03	12.21	12.56	10.96	11.60
13	13-Sep-03	11.88	12.64	11.32	11.35
14	20-Sep-03	11.89	12.38	11.12	11.18
15	27-Sep-03	11.83	12.40	11.79	10.62
16	04-Oct-03	11.87	12.28	11.61	10.64
17	11-Oct-03	11.67	11.93	11.83	10.46
18	18-Oct-03	11.73	11.73	11.25	10.57
19	25-Oct-03	11.06	11.34	11.77	10.47
20	01-Nov-03	11.04	11.45	11.98	10.55
21	08-Nov-03	11.07	11.35	11.51	10.39
22	15-Nov-03	10.98	11.51	12.04	11.15
23	22-Nov-03	11.34	11.63	11.85	11.89
24	29-Nov-03	11.62	11.86	11.28	-
25	06-Dec-03	11.12	11.88	11.02	-
26	13-Dec-03	11.42	-	11.16	-
27	20-Dec-03	9.85	-	-	-
28	27-Dec-03	9.30	-	-	-
29	03-Jan-04	8.81	-	-	-
30	10-Jan-04	9.12	-	-	-
Seasonal average		**11.28**	**12.09**	**11.12**	**11.29**

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

Mills	Tonnes (94 N.T. equivalent)						
	1998	1999	2000	2001	2002	2003	2004
Lautoka *	86214	139059	118280	96290	103867	103202	**110684**
Rarawai	50809	102838	110294	94036	118667	101324	**100664**
Labasa	94486	111868	92383	87544	90315	75830	**87802**
Penang	28228	30090	27716	20371	25691	25453	**24716**
All mills	259737	383855	348673	298241	338540	305809	**323866**

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

Mills	Average for period of five crushings					Last five seasons in succession				
	1976/80	1981/85	1986/90	1991/95	1996/2000	2000	2001	2002	2003	**2004**
Lautoka	7.63	5.97	6.55	6.15	5.61	5.38	4.25	4.80	5.04	**5.41**
Rarawai	6.64	6.38	6.36	6.29	5.61	5.93	4.89	6.34	5.41	**5.45**
Labasa	6.07	6.20	6.20	6.00	4.95	4.50	4.60	5.20	4.53	**5.20**
Penang	6.91	6.34	5.70	5.47	5.42	4.43	3.58	4.74	5.10	**4.81**
Average	6.75	6.21	6.28	6.05	5.39	5.21	4.54	5.27	5.02	**5.39**

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

Mills	Average for period of five seasons					Last five seasons in succession				
	1976/80	1981/85	1986/90	1991/95	1996/2000	2000	2001	2002	2003	**2004**
						31.1	25.0	33.5	25.7	**28.1**
Lautoka	32.4	29.3	28.8	28.0	29.7	Jun 21	Jun 15	Jun 21	Jun 25	**Jun 22**
						Jan 30	Dec 01	Feb 11	Dec 22	**Jan 04**
						36.9	22.9	29.9	23.3	**23.9**
Rarawai	32.9	26.4	26.2	25.3	26.5	May 16	Jun 15	Jun 11	Jun 18	**Jun 16**
						Jan 29	Nov 20	Jan 06	Nov 28	**Dec 01**
						25.0	21.0	25.1	20.0	**25.2**
Labasa	33.5	27.9	26.6	29.4	30.7	Jun 23	Jun 12	Jul 09	Jul 22	**Jun 22**
						Dec 6	Nov 4	Jan 01	Dec 08	**Dec 08**
						28.4	20.5	24.4	19.1	**19.5**
Penang	30.3	28.1	25.5	21.5	26.2	Jun 26	Jun 05	Jun 18	Jun 18	**Jul 06**
						Jan 10	Oct 26	Dec 06	Oct 30	**Nov 20**
All mills	32.3	28.4	26.8	26.1	28.2	30.4	22.4	28.2	22.0	**24.2**

Appendix 17 : Varietal performance

Varieties	Percent of hectares harvested									
	Lautoka		Rarawai		Labasa		Penang		All Mills	
	2003	**2004**	2003	**2004**	2003	**2004**	2003	**2004**	2003	**2004**
Ragnar	0.5	**0.6**	0.9	**0.8**	25.9	**26.3**	0.3	**0.3**	8.1	**7.9**
Waya	-	-	2.4	**1.3**	8.8	**9.3**	-	-	4.7	**3.0**
Mali	0.3	-	0.1	-	23.6	**21.7**	2.6	**2.6**	7.3	**6.4**
Homer	-	-	-	-	-	-	-	-	-	-
Spartan	-	-	-	-	0.1	-	-	-	-	-
Galoa	0.2	-	-	-	4.3	**5.2**	0.1	-	1.2	**1.5**
Aiwa	1.5	**1.0**	1.1	**0.9**	0.6	**0.6**	0.5	**0.5**	1.3	**0.8**
Ono	-	-	-	-	-	-	-	-	-	-
Yasawa	-	-	-	-	-	-	-	-	-	-
Vomo	-	-	-	-	-	-	-	-	-	-
Mana	90.1	**89.9**	88.8	**88.7**	0.1	**0.1**	89.9	**85.5**	64.4	**63.8**
Kaba	4.2	**4.0**	5.4	**5.6**	0.4	**0.4**	1.0	**0.9**	4.0	**3.2**
Vatu	-	-	-	-	31.9	**30.9**	0.6	**0.8**	7.9	**8.8**
Beqa	-	-	0.1	**0.1**	2.1	**1.6**	-	-	0.8	**0.5**
Naidiri	2.9	**4.0**	1.1	**2.6**	-	**3.8**	4.9	**9.5**	0.1	**3.9**
Exp.	0.2	-	-	-	2.1	-	-	-	-	-
Other var.	0.1	**0.5**	0.1	**0.1**	0.1	**0.1**	0.1	**0.0**	0.2	**0.2**

Appendix 18 : Planting - areas

Mills	Hectares planted (A)					As percentage of registered area					As percentage of area cultivated				
	2000	2001	2002	2003	**2004**	2000	2001	2002	2003	**2004**	2000	2001	2002	2003	**2004**
Lautoka	631	1017	1266	1343	**881**	2	3	4	4	**3**	2	3	4	4	**3**
Rarawai	1619	1146	1241	1116	**1078**	6	5	5	4	**4**	7	5	6	5	**5**
Labasa	1248	1329	1176	1276	**1504**	5	6	5	6	**7**	5	6	5	6	**7**
Penang	428	597	775	603	**525**	4	5	7	5	**5**	4	9	14	11	**10**
Total	3926	4089	4458	4338	**3988**	4	5	5	5	**4**	4	6	6	5	**5**

Appendix 19: Planting - varieties (percentage of total acreage planted)						
Year	Varieties	Lautoka	Rarawai	Labasa	Penang	All mills
2002	Ragnar	0.5	0.8	15.5	0.1	4.5
2003	Ragnar	0.5	1.5	11.6	0.1	3.7
2004	Ragnar	**0.3**	**0.9**	**15.5**	**-**	**6.2**
2002	Waya	-	5.8	9.9	-	4.2
2003	Waya	-	1.5	8.7	-	4.1
2004	Waya	-	0.5	3.9	-	**1.6**
2002	Mana	77.3	74.2	-	67.1	54.3
2003	Mana	73.4	78.7	-	51.6	49.7
2004	Mana	**73.4**	**77.2**	**-**	**64.6**	**45.6**
2002	Galoa	0.1	-	1.0	-	0.3
2003	Galoa	-	-	4.9	-	1.4
2004	Galoa	**0.3**	**-**	**5.0**	**-**	**1.8**
2002	Vatu	-	-	37.6	0.3	10.0
2003	Vatu	0.1	-	37.0	-	10.6
2004	Vatu	**0.1**	**-**	**24.1**	**0.3**	**9.2**
2002	Mali	0.1	-	16.0	3.3	4.8
2003	Mali	0.2	-	11.3	0.1	3.3
2004	Mali	**0.2**	**-**	**8.8**	**0.6**	**3.4**
2002	Aiwa	1.4	1.1	0.0	0.1	0.7
2003	Aiwa	1.1	0.5	0.9	0.1	0.9
2004	Aiwa	**0.7**	**0.2**	**0.7**	**-**	**0.5**
2002	Beqa	-	0.1	5.6	-	1.5
2003	Beqa	-	-	0.9	-	0.3
2004	Beqa	**0.1**	**-**	**0.5**	**-**	**0.2**
2002	Kaba	4.6	6.8	0.8	0.1	3.4
2003	Kaba	6.1	5	0.4	0.1	3.9
2004	Kaba	**5.5**	**6.1**	**0.7**	**0.1**	**3.2**
2002	Naidiri	15.1	11.1	1.7	29.0	12.9
2003	Naidiri	17.5	12.8	24.2	48.0	21.8
2004	Naidiri	**19.2**	**14.7**	**40.7**	**34.4**	**28.1**
2002	O/varieties	0.9	0.1	11.9	-	3.4
2003	O/varieties	1.1	-	0.1	-	0.3
2004	O/varieties	**0.2**	**0.4**	**0.1**	**-**	**0.2**

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		Road transport direct to mill carrier		Total	
		Tonnes	% of Total	Tonnes	% of Total	Tonnes	% of Total	Tonnes	% of Total
Lautoka	2000	109631	8	537664	41	654457	50	1301752	100
	2001	48548	5	395604	44	462591	51	906743	100
	2002	40495	4	438555	39	658073	57	1137123	100
	2003	40059	4	305169	34	545271	61	890499	100
	2004	**34226**	**3**	**279657**	**27**	**718244**	**70**	**1032127**	**100**
Rarawai	2000	119316	10	516334	41	615632	49	1251282	100
	2001	76933	9	366972	43	400506	47	844411	100
	2002	79113	7	416235	39	576231	54	1071579	100
	2003	54763	7	331956	40	450009	54	836728	100
	2004	**47430**	**5**	**310315**	**35**	**520376**	**59**	**878121**	**100**
Labasa	2000	41049	5	299719	33	570602	63	911370	100
	2001	32642	4	274907	33	537895	64	845444	100
	2002	45782	5	282607	30	610061	65	938450	100
	2003	18693	3	206198	32	413960	65	638851	100
	2004	**22651**	**3**	**272006**	**32**	**553876**	**65**	**848533**	**100**
Penang	2000	26714	8	71366	22	224395	70	322475	100
	2001	16358	8	45980	22	145845	70	208183	100
	2002	22577	8	63237	23	189617	69	275431	100
	2003	17996	7	52153	21	173453	71	243602	100
	2004	**15118**	**6**	**49799**	**21**	**177491**	**73**	**242408**	**100**
All mills	2000	296710	8	1425083	38	2065086	55	3786879	100
	2001	174481	6	1083463	39	1546837	55	2804781	100
	2002	187967	5	1200634	36	2033982	59	3422583	100
	2003	131511	5	895476	36	1582693	59	2609680	100
	2004	**119425**	**5**	**911777**	**36**	**1969987**	**59**	**3001189**	**100**

Appendix 21: Percentage burnt cane of total tonnes crushed					
Year	Labuke	Renawai	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	6.2	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**

APPROVED CANE VARIETIES

Sugarcane varieties approved for planting during 2003 are:- Mana, Aiwa, Beqa, Galoa, Kaba, Mali, Ragnar, Vatu, Yasawa, Waya, Spartan, Ono, Vomo, Homer and Naidiri. 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.

Sector	Lautoka	
	Soil	Variety
Olosara	Rich alluvial soils	Ragnar, Yasawa, Aiwa, Beqa, Vomo, Kaba, Naidiri
	Medium soils	Kaba, Mali, Beqa, Ragnar, Mana, Aiwa, Naidiri
	Poor soils	Mana, Mali, Kaba, Naidiri
Cuvu	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Mali, Beqa, Ragnar, Mana, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Naidiri
	Sandy soils	Kaba, Mana, Galoa, Naidiri
Lomawai	Flat : Fertile soils	Ragnar, Yasawa, Kaba, Vomo, Aiwa, Beqa, Naidiri
	Medium soils	Kaba, Mali, Beqa, Ragnar, Mana, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Naidiri
	Sandy soils	Kaba, Mana, Galoa, Naidiri
Yako	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
	Sandy soils	Kaba, Mana, Galoa, Naidiri
Nawaicoba	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa,Mana, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
	Sandy soils	Kaba, Mana, Galoa, Naidiri
Malolo	Flat : Fertile soil	Ragnar, Yasawa, Vomo, Vatu, Kaba, Aiwa, Beqa, Naidiri
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Mana, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Qeleloa	Rich alluvial soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Mana,Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Naidiri
Meigunyah	Flat : Fertile soils	Ragnar, Kaba, Yasawa, Vomo, Vatu,Aiwa,Beqa, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Legalega	Flat : Fertile soils	Ragnar, Yasawa,Vomo, Vatu, Aiwa,Beqa, Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri
	Poor soils	Kaba, Mali, Galoa, Homer, Naidiri

Sector	Lautoka	
	Soil	Variety
Natova	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
	Sandy soils	Kaba, Mana, Galoa, Naidiri
Lautoka	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Saweni	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Vomo, Aiwa, Beqa,Kaba,Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Mana,Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidin
	Sandy soils	Kaba, Mana, Galoa, Naidiri
Lovu	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa,Mana, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Drasa	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Kaba, Aiwa, Beqa, Naidiri
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Mana,Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
	Sandy soils	Kaba, Mana, Galoa, Naidiri

Sector	Rarawai	
	Soil	Variety
Varoko	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Mota	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Naloto	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri

Sector	Rarawai	
	Soil	Variety
Koronubu	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Veisaru	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Rarawai	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Aiwa, Beqa,Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Varavu	Flat : Fertile soils	Ragnar, Yasawa, Spartan, Aiwa, Beqa,Kaba, Naidiri
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
Tagitagi	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Mali, Vatu, Beqa, Ragnar, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Homer, Naidiri
	Salt affected areas	Kaba, Mana, Galoa, Naidiri
Yaladro	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Mali, Vatu, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Waya, Homer, Naidiri
	Salt affected areas	Kaba, Mana, Galoa, Naidiri
Drumasi	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Kaba, Ragnar, Mali, Vatu, Beqa, Aiwa, Naidiri
	Poor soils	Kaba, Mali, Mana, Waya, Vatu, Homer, Naidiri
	Salt affected areas	Kaba, Mana, Galoa, Naidiri

Sector	Labasa	
	Soil	Variety
Waiqele	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa,Beqa,Kaba, Naidiri
	Medium soils	Spartan, Kaba, Mali, Aiwa, Beqa, Naidiri
	Poor soils	Mali, Kaba, Homer, Naidiri
Wailevu	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Spartan, Kaba, Mali, Aiwa, Beqa, Naidiri
	Poor soils	Mali, Kaba, Homer, Naidiri
	Saline soils	Mali, Galoa, Vatu, Naidiri
Vunimoli	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Spartan, Kaba, Mali, Aiwa, Beqa, Naidiri
	Poor soils	Mali, Kaba, Homer, Naidiri

Sector	Labasa	
	Soil	Variety
Labasa	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Spartan, Kaba, Mali, Aiwa, Beqa, Naidiri
	Poor soils	Mali, Kaba, Homer, Naidiri
	Saline soils	Mali, Galoa, Vatu, Naidiri
Bucaisau	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Spartan, Kaba, Mali, Waya, Aiwa, Beqa, Naidiri
	Poor soils	Mali, Kaba, Waya, Homer, Naidiri
	Saline soils	Mali, Galoa, Waya, Vatu, Naidiri
Wainikoro	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Spartan, Kaba, Mali, Waya, Aiwa, Beqa, Naidiri
	Poor soils	Mali, Kaba, Waya, Homer, Naidiri
	Saline soils	Mali, Galoa, Waya, Vatu, Naidiri
Daku	Flat : Fertile soils	Ragnar, Yasawa, Vomo, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Spartan, Kaba, Mali, Waya, Aiwa, Beqa, Naidiri
	Poor soils	Mali, Galoa, Waya, Vatu, Homer, Naidiri
Seqaqa	Poor soils	Ragnar, Mali, Ono, Kaba, Aiwa, Beqa, Homer, Naidiri

Sector	Penang	
	Soil	Variety
Nanuku	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Waya, Kaba, Mali, Vatu, Aiwa, Naidiri
	Poor soils	Waya, Mana, Kaba, Mali, Homer, Naidiri
	Salt affected areas	Mana, Kaba, Galoa, Naidiri
	Viti Vanua area	Mana, Kaba, Mali, Ragnar, Naidiri
Malau	Rich alluvial soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Waya, Ragnar, Kaba, Mali, Vatu, Beqa, Aiwa, Naidiri
	Poor soils	Mana, Kaba, Mali, Homer, Naidiri
	Salt affected areas	Galoa, Kaba, Mana, Naidiri
Ellington I&II	Flat : Fertile soils	Ragnar, Yasawa, Vatu, Aiwa, Beqa, Kaba, Naidiri
	Medium soils	Waya, Ragnar, Kaba, Mali, Vatu, Beqa, Aiwa, Naidiri
	Poor soils	Mana, Kaba, Mali, Homer, Naidiri
	Salt affected areas	Galoa, Mana, Kaba, Naidiri

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