

# 1982 SITUATION SURVEY: NORTH COAST EXTENSION AREA

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## Abstract

A detailed situation survey of farms in an extension area provides useful information from which a work programme can be prepared. It is particularly beneficial to an Extension Officer moving into a new area. Levels of production and management techniques are established, with growers' views on where extension emphasis should be placed. The results of a survey conducted on 25% of the farms in the North Coast extension area are given, together with some of the conclusions which were drawn.

## Introduction

A suitable method of obtaining reliable and up to date information about the North Coast extension area had to be found when the Extension Officer was transferred there in January 1982. The geographic factors such as soils, climate and topography; past, present and potential production; agronomic factors such as crop nutrition, weed control and choice of varieties; and the sociological considerations which included training and education, had to be studied and opinion leaders identified.

The information obtained was necessary for the implementation of a meaningful extension programme for the benefit of sugarcane growers. A situation survey was the quickest and most effective way of gathering the information needed for this programme.

## Method

The sugarcane farms in the North Coast extension area were divided into four parts based on environmental factors such as climate and soil parent material. A group which consisted of large cane farming enterprises (LG) spanned more than one of these areas which were as follows was also included:

- Group I (GI) The strip immediately along the coast where soils are derived mostly from Recent Sands. Topography is rolling and rainfall is fairly high.
- Group II (GII) The coastal hinterland where rainfall is low and the soils are derived mostly from Dwyka and Eccca shales. Topography ranges from rolling to steep.
- Group III (GIII) The hinterland with steep topography and where soils are derived mostly from Table Mountain Sandstone (TMS) (ordinary) and rainfall is high.
- Group IV (GIV) The inland plateau with mistbelt climate, where soils are predominantly TMS (mistbelt) and topography is flat to undulating.

The responses obtained from the questionnaires (Appendix I), which a random sample of 25% of the growers in each area was asked to complete, were analysed. The topographic, soil and rainfall data obtained during the survey, are given in Appendix II.

## Results

### Farm statistics

The average size of farms in each area is shown in Table 1 while in Table 2, the area of cane that was harvested each season (expressed as a percentage of the total area) is shown. Table 3 contains details of the age at which cane was cut for each season.

Growers in GI, GIII and LG have become aware that the age of sugarcane at harvest affects productivity (see Figure 1) and that the extent of damage to sugarcane by eldana is also

TABLE 1  
Average area of farms

Group	GI	GII	GIII	GIV	LG
Average area of farm (ha)	379	237	157	323	3 523
Average area under cane (ha)	350	204	136	313	2 722

TABLE 2

Average area harvested, as a percentage of total area under cane

Area	Season						Recommended percentages*
	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	
GI	72	53	73	69	91	86	70
GII	55	51	51	39	55	56	70
GIII	66	57	65	54	72	65	65
GIV	-	-	-	-	58	57	61
LG	69	52	65	48	76	70	-

\* recommended by the Local Pest & Disease Control Committee

TABLE 3

Average age at which cane is cut (months)

Area	Season					
	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
GI	16,7	22,6	16,4	17,4	13,2	14,0
GII	21,7	23,8	23,5	31,1	22,0	21,3
GIII	18,1	21,1	18,5	22,3	16,8	18,3
GIV	-	-	-	-	20,7	21,1
LG	17,4	22,9	18,4	24,9	15,8	17,0

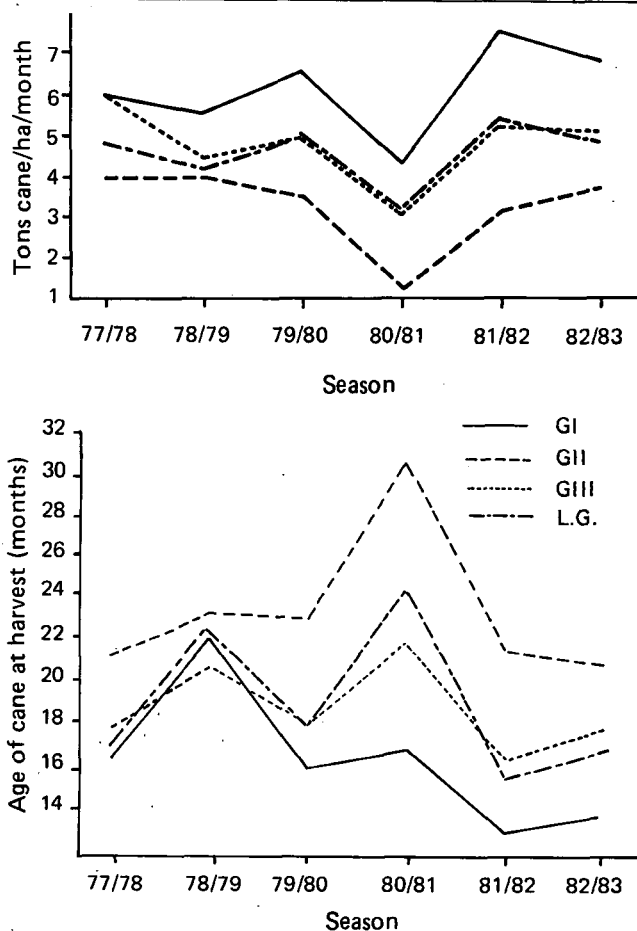


FIGURE 1 Actual yield relative to age of cane at harvest

influenced by the age of the cane and have, during the past two years, adjusted their management practices accordingly.

This example has not been followed in Group II, which, because of the nature of the soil and rainfall, is particularly prone to infestation by eldana. Group IV is a cooler area and little affected by eldana which explains why the cane is harvested when it is on average about 21 months old.

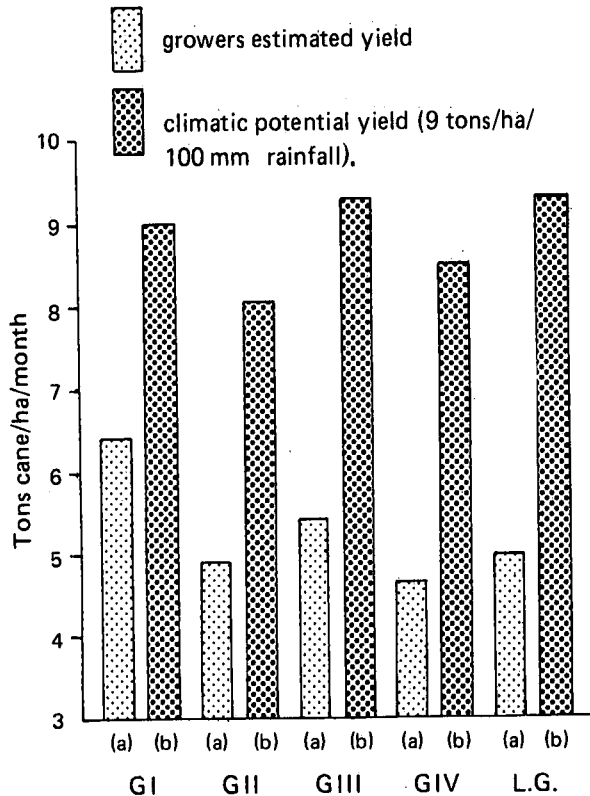
The average yield (tons cane/ha/month) on farms in Group I was better than that of Group III (see Table 4), despite a higher rainfall in Group III. Soil type (Red Recent Sands and Middle Eccas as opposed to TMS (ord)) and especially the age of cane when it is harvested probably account for this difference in yield.

**TABLE 4**  
Tons cane/ha/month

Area	Season					
	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
GI	6,03	5,48	6,52	3,83	6,91	6,15
GII	4,03	3,97	3,51	1,24	3,05	3,73
GIII	6,01	4,52	4,87	3,96	5,24	5,01
GIV	-	-	-	-	5,47	4,47
LG	4,82	4,16	4,93	3,37	5,20	4,87

**Yield potential**

In Figure 2, the attainable yield as estimated by the grower (a) is plotted against the potential yield (b) which is considered to be 9 tons/ha/100 mm rain.



**FIGURE 2** Potential yield as estimated by growers compared with climatic potential yield

In most cases the potential yield was more than double the yield estimated by the grower as being attainable. However a number of growers are approaching the potential yield of 9 tons of cane per hectare per 100 mm of rain. This indicates that management expertise varies widely from one farm to another and that a significant increase in the crop from the North Coast extension area is still possible.

**Crop eradication**

Mouldboard ploughing is still widely used to eradicate a crop but increasing use is being made of Roundup. Many growers use hand chipping on steep fields (Table 5). A ground wheel or skid mounted on the plough are not used in shallow ploughing and in GI it is surprising that rotavators are not used in the predominantly sandy soils.

**TABLE 5**  
Methods of crop eradication

Method	GI*	GII	GIII	GIV	LG
Normal ploughing	54%	57%	62%	75%	25%
Shallow ploughing	50%			25%	13%
Ripping		14%	12%		19%
Rotavating		14%	25%	25%	6%
Roundup	100%	14%	12%	59%	38%
Hand chipping			25%	75%	

\* All growers in this group use some Roundup but 50% and 54% also use shallow and normal ploughing respectively

Crop eradication is generally done in winter (see Table 6), although many fields are ploughed in spring and summer. Most of the growers who use Roundup to kill sugarcane realise that it must only be sprayed when cane is growing actively.

**TABLE 6**  
Timing of crop eradication

Time of plough-out	GI	GII*	GIII	GIV	LG*
Spring	25%	14%	25%		14%
Summer		14%		25%	29%
Autumn		14%	12%		
Winter	75%	86%	63%	75%	100%

\* Growers in these two areas ploughed out their fields during more than one season. Roundup was used mostly in summer.

**Varieties**

Growers are very dependent on variety NCo 376 (see Table 7) but about 30% of them intend reducing the area planted to this variety. Most growers indicated that they were dissatisfied with N55/805 and N8 and of the newly released varieties, N13 was the most popular.

**TABLE 7**  
Varieties grown on the North Coast

Varieties	GI	GII	GIII	GIV	LG
NCo 376	71,3%	80%	87%	96%	88,0%
N55/805	19,1%	15%	9%	2%	7,0%
N8	4,6%				0,6%
N12	0,4%	+	0,9%	+	0,6%
N13	0,5%	1%	0,3%	+	0,5%
NCo 382	3,8				
NCo 310		4%	1%	+	0,8%
N11			0,6%	+	0,8%
N52/219			+		
CB36/14			0,5%		
N7			0,4%		
Mixed					1,9%

The attitude towards newly released varieties appears to be positive (Table 8) except for growers in GII who claim the disappointing performances of N55/805 and/or N8 have put them off trying new varieties.

**TABLE 8**  
Growers' opinions of newly released varieties

Growers' opinions	GI	GII	GIII	GIV	LG
(a) Like to try them as soon as they are released	75%		37%	75%	71%
(b) Like to wait until they have proved themselves commercially	25%	100%	63%	25%	29%

*Crop nutrition*

Fifty percent of the growers in GI and 25% in GIV apply lime at planting regardless of what soil analyses indicate. The fertilizer programmes of growers in LG are so varied that they could not be summarized adequately but they nevertheless follow the FAS recommendations closely (see Table 9).

**TABLE 9**  
Nutrients applied to crops

Group	Kg N	Kg P	Kg K
<b>GI:</b>			
Plant crop (average)	155	76	199
Range	(94-264)	(55-113)	(94-339)
Ratoons (average)	134	25	157
Range	(76-170)	(15-46)	(76-170)
<b>GII:</b>			
Plant crop (average)	135	79	151
Range	(131-141)	(56-137)	
1st ratoon (average)	140	11	
Range	(124-153)	(0-25)	(124-153)
2nd ratoon+ (average)	140	33	167
Range	(124-156)	(25-50)	(124-250)
<b>GIII:</b>			
Plant crop (average)	142	55	165
Range	(115-185)	(32-72)	(118-216)
1st ratoon (average)	133	25	133
Range	(121-156)	(0-31)	(121-156)
2nd ratoon+ (average)	149	30	149
Range	(121-162)	(24-31)	(121-162)
<b>GIV:</b>			
Plant crop (average)	138	82	165
Range		(80-85)	(83-284)
1st ratoon (average)	85	28	124
Range	(57-114)	(19-38)	(95-190)
2nd ratoon+ (average)	85	28	124
Range	(57-114)	(19-38)	(95-190)

Very few growers consider nutrients in terms of the amounts required per ton of cane and only some modified their programmes according to soil type or to the potential production of a particular area. Mixtures containing N and P, or N, P and K applied in the planting furrow were the most commonly used.

*Information regarding fertilization*

A survey was carried out to establish the extent to which growers in each area use the FAS and commercial representatives (reps). The findings were as follows:

- GI: 25% use FAS as a guide  
50% use FAS and commercial reps  
25% use commercial reps only
- GII: 33% use FAS only  
33% use both FAS and commercial reps  
17% use commercial reps only  
17% do their own estimates
- GIII: 63% use FAS at least as a guide  
25% use commercial reps only  
12% do their own estimates
- GIV: 50% use FAS only  
50% use commercial reps only
- LG: 43% use FAS only  
43% use FAS and an agronomist  
14% use commercial reps

The above figures show that recommendations are well accepted but growers feel that nitrogen, and to a lesser extent, potassium recommendations from the FAS are too low.

*Method of fertilizer application*

About 50% of all fertilizer is applied by hand, 30% by wheelbarrow (mainly for in-furrow applications) and only 20% with a tractor spreader despite the fact that more than half the land in the areas, except for GIII, is flat or undulating.

*Weed control*

Herbicides are applied either with knapsack sprayers (95%) or boomsprayers (5%). One grower is using an ultra low volume sprayer successfully. The weed control programme for both the short and long term for all groups, is shown in Table 10, while the degree of control for each area is shown in Table 11.

**TABLE 10**  
Weed control programme

Group	Post-emergence		Pre-emergence
	Short term	Long term	Long term
GI	75%	25%	25%
GII	86%		14%
GIII	100%	12% (plant)	
GIV	50%	25% (plant)	25%
LG	100%	57% (plant & burnt)	

Note: One grower may use more than one weed control programme

**TABLE 11**  
Degree of weed control in all areas

Ratings	GI	GII	GIII	GIV	LG
Free of weeds	25%	57%	75%	100%	14%
Satisfactory control	50%	29%	12%	-	86%
Poor control	25%	14%	12%	-	-

*Harvesting*

At present, a surprisingly high proportion of the crop is being trashed. Not many growers are taking full advantage of scattering tops after burning. The details of trashing and burning at the time of harvesting in all areas are listed in Table 12.

**TABLE 12**  
Trashing or burning at harvest

Group	GI	GII	GIII	GIV	LG
Trash except at plough-out	100%	58%	67%	75%	71%
Trash except wet fields	75%	29%	25%	25%	43%
Burnt tops lined				25%	
Burnt tops scattered		14%			43%
Burnt tops reburned					14%
Burn lodged fields		14%			43%
Burn old ratoons		14%			
Trash and burnt trash on ground			12%		

Note: Totals exceeding 100% indicate that the grower uses more than one method of dealing with trash.

The different harvesting systems used by each of the groups are shown in Table 13 while the delay in getting the cane to the mill after cutting, is shown in Table 14.

**TABLE 13**  
Harvesting systems used

Group	GI	GII	GIII	GIV	LG*
Cut and stack by hand	75%	29%	100%	100%	86%
Cut hand - stack grab					14%
Hand cut - hand loaded					14%
Hand cut - grab loaded	25%	71%			29%

\* Growers use more than one harvesting system

**TABLE 14**  
Delay between cutting and crushing  
(estimated by grower)

Group	Average hours	Range
GI	37	24-48
GII	38	24-48
GIII	48	24-72
GIV	62	48-72
LG	54	24-72

#### Use of ripeners

The percentages of growers in each area who tried Polado during the year are as follows:

GI, 50%; GII, 15%; GIII, 25%; GIV, 50%; and LG, 86%. In total about 350 hectares were treated with this chemical.

**TABLE 15**  
Growers' opinions on training of labour

Group	GI	GII	GIII	GIV	LG
(a) Like it as it is	75%	14%	38%	75%	85%
(b) Would like a permanent local venue for courses		29%	20%		
(c) Do their own training	25%	29%	22%	25%	14%
(d) Trained labour do not stay on farm		28%	20%		

#### Labour training

Growers' opinions on the training of labour (Table 15) were found to be somewhat at odds with the number of labourers that have been trained in various agricultural techniques (Table 16).

**TABLE 16**  
Labourers trained by the Experiment Station

Group	GI	GII	GIII	GIV	LG
Cane cutting	25%	14%	13%	0	14%
Herbicide application	29%	16%	25%	0	43%
Fertilizer application	25%	17%	12%	0	57%
Nursery inspection	0	0	0	0	53%

Table 16 shows that except for the LG which includes the miller-cum-planters, only about 25% of growers are making use of the courses offered by the Training department. Growers tend to have their supervisors rather than their operators trained in the various agricultural techniques.

#### Agricultural education for growers

Most growers would like to improve and update their own agricultural education (Table 17) but less than 25% of them have done so by attending courses offered by the Experiment Station. Most of the larger enterprises (LG) are making an effort to improve the agricultural education of their senior field staff.

**TABLE 17**  
Attitude of growers towards updating in agriculture

Group	GI	GII	GIII	GIV	LG
A*	100%	100%	87%	75%	100%
B**	25%	14%	25%	0	86%

A\* = would like to update their agricultural education  
B\*\* = attended courses offered by the Experiment Station

#### Social structure of the North Coast extension area

##### Identification of opinion leaders

Six major and 17 minor opinion leaders were identified in the area.

##### Improvements to extension service

The response to the question of how the service could be improved was as follows:

- 58% of the growers are fully satisfied with the service
- 22% requested a reduction in the number of growers to each Extension Officer
- 11% felt the Extension Officer should be more involved in the economics of sugarcane farming
- 9% requested that extension initiate a standardized farm record system.

##### Suggested improvements to services offered by Experiment Station were:

- 84% of the growers are fully satisfied with the present service
- 7% wished for an improvement in feedback
- 9% complained about delays in getting FAS recommendations.

The North Coast growers are generally satisfied with the services offered by the Experiment Station. The few complaints which have been received are matters of detail rather than of fundamental policies.

#### Conclusion

The following long and short term projects will be implemented so that some of the most obvious problems which have been highlighted in this situation survey can be corrected:

##### Long term projects (over the next five years)

- Promote a system of management for each area with particular emphasis on soils and climate. The objective of this project will be to bring to the growers' attention the practices and procedures that they should adopt to achieve optimum production for their particular areas.
- Encourage more growers to use the courses available from the Experiment Station for the training of labour. Since sugarcane production in this area is largely labour intensive and labour constitutes more than 50% of the cost of sugarcane production, it is essential that the efficiency of labour be increased. This can be achieved through training.
- Encourage growers to reduce gradually their dependence on variety NCo 376 so that no more than 60% of their total area under cane is of this variety. The recent disease surveys carried out by the Local Pest and Disease Committee have shown high levels of smut and mosaic in NCo 376.

##### Short term projects (one year)

- Collect and analyse field data and use it to establish norms of production for each area. These will be distributed to all growers.
- Encourage GII growers to harvest their cane at a younger age.
- Promote the judicious use of rotary hoes for crop eradication in G1 and the use of minimum tillage in G2.
- Rationalize crop nutrition throughout the area by relating fertilizer programmes to soil types and production potential.
- Ask growers to indicate their training requirements for the next season and arrange bookings.
- Maintain frequent contact with the opinion leaders and thus make full use of existing channels of communication.

**Acknowledgements**

Thanks are due to Mr. R. H. Paxton of the SASA Experiment Station for help and encouragement in carrying out this situation survey. The excellent co-operation of those growers who were selected to complete a questionnaire is sincerely appreciated; without their willing co-operation this project would not have been possible.

**APPENDIX I**

**Confidential**

**SITUATION SURVEY QUESTIONNAIRE**

SURVEY CODE NO. IV/8

Status: Owner/Partner/Lessee/Lessor/Manager

Other .....

**1. Farm Detail:**

1.1 Total area of farm ..... ha

1.2

Season	Area under cane	Area harvested	Total tons cane	Total tons sucrose
77/78				
78/79				
79/80				
80/81				
81/82				
82/83				

1.3 With no production restriction and average rainfall, what would be your sustained maximum production?  
..... tons cane/year.

1.4 What was your annual rainfall (recorded/estimated) over the past years?

77: mm, 78: mm, 79: mm,

80: mm, 81: mm,

1.5 Describe the soils you have on your farm giving proportions of each—  
.....  
.....  
.....

1.6 Describe the topography of your farm—  
% flat to undulating can easily be worked by wheel tractor  
% steep can just be worked by sheel tractor  
% very steep cannot use wheel tractor across the slope

**2. Land use planning:**

- 2.1 Do you have a Land Use Plan for your farm? YES/NO
- 2.2 What area (or proportion) of your farm has been laid out according to the plan? ..... ha or ..... %
- 2.3 Do you practice strip cropping? YES/NO
- 2.4 Do you use any other soil conservation practices?  
(specify) .....
- 2.5 How do you drain your wet fields? .....
- 2.6 How often do you maintain (clean) your pipe drains? .....

**3. Crop eradication**

- 3.1 When do you plough out a field of cane?
  - (a) when the tons cane/ha figure is low.
  - (b) when the field is infested with pest/diseases (eldana-RSD-mosaic-smut).
  - (c) when the cane looks bad.
  - (d) when the tons cane/ha/month figures fall below the farm average.
  - (e) when the economic return from the field falls below an acceptable standard.
- 3.2 How do you kill the old cane at ploughout?
  - (1) deep ploughing
  - (2) shallow ploughing
  - (3) ripping
  - (4) rotavating
  - (5) Roundup
  - (6) Hand chipping
- 3.3 When do you normally kill your old cane?
  - Winter ..... Summer .....
  - Spring ..... Autumn .....

**4. Varieties**

- 4.1 What percentage area of each variety is being grown on your farm?  
.....
- 4.2 Are you satisfied with the above situation. If not, how would you like to change it? .....
- 4.3 What are your feelings about the release of new varieties?
  - (a) like to try them all as soon as they are released? YES/NO
  - (b) like to try them, but frequency of release should be spaced? YES/NO
  - (c) like to wait until they have proved themselves? YES/NO

**5. Seedcane**

- 5.1 What seedcane do you use for commercial planting?
  - (a) selected fields not H.W.T. ....
  - (b) ex H.W.T. Nursery. ....
  - (c) ex certified nurseries. ....
  - (d) 1st from certified nursery .....
  - (e) 1st from H.W.T. nursery. ....
- 5.2 Do you have employees who have been trained for nursery inspection?
- 5.3 Is your nursery inspected regularly for
  - (a) rogue stools
  - (b) mixed varieties
  - (c) RSD
  - (d) smut
  - (e) mosaic
  - (f) eldana

**6. Fertilizer**

- 6.1 What is your fertilizer programme?
  - (a) Plant cane .....
  - (b) Ratoon cane .....
- 6.2 Whose advice do you use in working out this programme?
  - (a) A Farmer (name) .....
  - (b) The Miller
  - (c) The Experiment Station F.A.S.
  - (d) Fertilizer Salesman (name) .....
  - (e) Own estimate
  - (f) Your Extension Officer
- 6.3 How do you apply your fertilizer?
  - by hand
  - by wheelbarrow
  - by tractor spreader
- 6.4 Have any of your labourers been trained in fertilizer distribution?

**7. Weed control**

- 7.1 What is your weed control programme?  
.....
- 7.2 How successful were you at keeping on top of weeds last summer?  
Right on top. ....  
Fairly clean .....  
Beaten. ....
- 7.3 How do you apply herbicides/  
Boomsprayer? .....  
Knapsack sprayer? .....  
Aerial? .....
- 7.4 Are your labourers trained in herbicide application? .....

**8. Irrigation**

- 8.1 What area of your farm is under irrigation/  
.....
- 8.2 What form of irrigation control do you use?  
(a) Fixed cycle time (specify) .....  
(b) Water Profit & Loss .....  
(c) Others (specify) .....
- 8.3 Whose advice do you use for irrigation/ .....

**9. Harvesting**

- 9.1 What is your policy regarding trashing and burning?  
(a) trash except at ploughout .....  
(b) trash in summer only .....  
(c) trash except for wet fields .....  
(d) burnt and tops lined. ....  
(e) burnt and tops left scattered .....  
(f) burnt and tops lined and reburnt .....  
(g) trash except ploughout and lodged fields .....
- 9.2 Have your cane cutters been trained? .....
- (1) cut and stack by hand. ....  
(2) cut by hand, stack by grab .....  
(3) cut by hand and load in vehicle by hand .....  
(4) cut by hand—load by grab. ....  
(5) cut and load by machine. ....
- 9.3 Have your cane cutters been trained? .....
- 9.4 What is the average delay between cutting and crushing for your farm? ..... hrs.
- 9.5 Have you tried using ripeners?  
(a) type. ....  
(b) area and timing. ....

**10. Training and education**

- 10.1 How do you feel about the labour training provided by the Experiment Station?  
(a) I like it as it is?  
(b) I would like a permanent local venue?  
(c) I do my own training  
(d) I do not see the need to train labour  
(e) Trained labourers do not stay on the farm

- 10.2 Would you like to update your Agricultural Education? .....
- 10.3 What Experiment Station courses have you attended so far?  
(a) Certificate Course .....  
(b) Agricultural Chemicals Modular Course .....  
(c) Farm Planning Modular Course .....  
(d) Disease and Variety Modular Course .....  
(e) Irrigation and Drainage Modular Course .....

**11. Mechanization**

- 11.1 How many tractors do you operate on your farm? .....
- 11.2 Would you like training for yourself in  
operating .....  
maintenance .....  
repairs .....
- 11.3 Would you like training for your labour in  
operating .....  
maintenance .....  
repairs .....

**12. Farm Management and Administration**

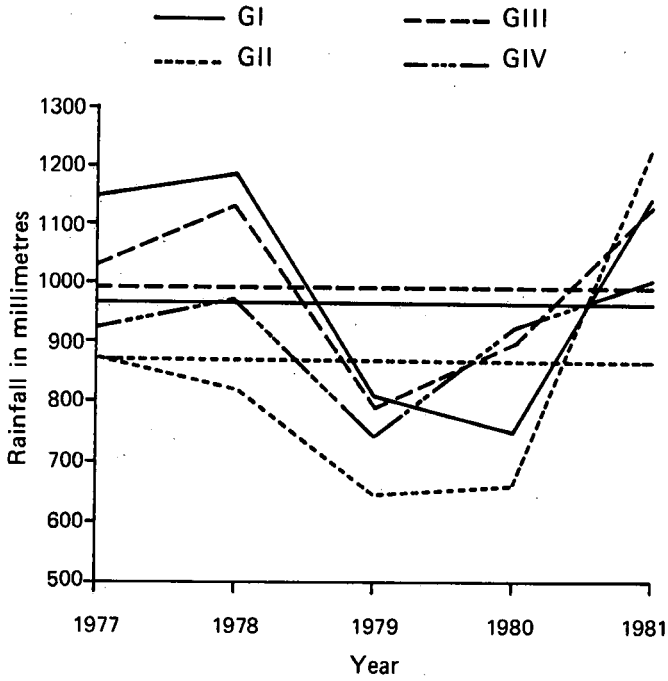
- 12.1 What kind of Field Records do you keep?  
(a) estimate book .....  
(b) field record system. ....  
(c) cash analysis book .....  
(d) labour records .....  
(e) machinery records .....  
(f) material stock book .....
- 12.2 Do you get your field records analysed by the Experiment Station Computer? .....
- 12.3 Do you work out a—  
(1) yearly cutting and ploughout programme .....  
(2) yearly operations programme .....  
(3) yearly budget .....  
(4) none of these .....
- 12.4 Do you have a long term plan for your farm? .....

**14. Extension Service**

- 14.1 Which fellow grower do you usually go to for advice or information?  
(name) .....
- 14.2 Who do you consider the best grower in your community?  
(name) .....
- 14.3 Would you like to make suggestions towards improving our extension service? .....
- 14.4 Would you like to suggest any way in which the Experiment Station can improve the service offered to you?  
.....

APPENDIX II

1. Rainfall (see attached graph).



2. Soil parent materials:

Parent materials	GI	GII	GIII	GIV	LG
Recent Red Sands	30,25%				5%
Recent Grey Sands	19,5%				2%
TMS (ordinary)	10%	3%	83%	18%	36%
TMS (mistbelt)			0,2%	62%	11%
Dwyka	10%	81%		13%	14%
Lower Ecca		5%			11%
Middle Ecca	18,75%	2%			10%
Dolorite	6,5%	6%	16%	6%	8%
Alluvium	5%	3%	0,8%	1%	

3. Topography

Topography	GI	GII	GIII	GIV	LG
Flat to undulating	56%	57%	30%	61%	38%
Steep	38%	44%	40%	24%	47%
Very steep	6%	30%	30%	15%	15%