Demand for Farm Managers in the Coconut Estate Sector

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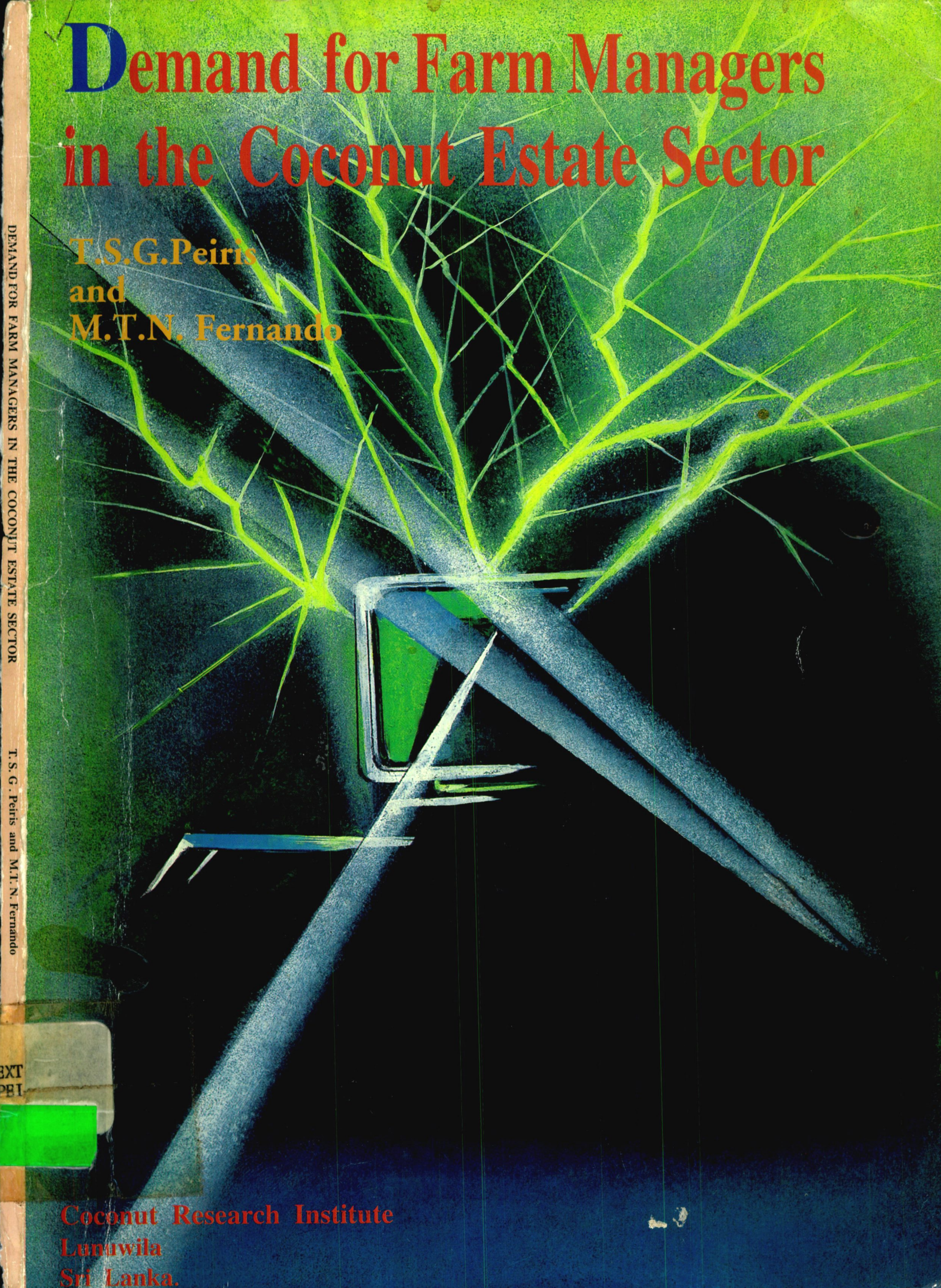

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EXECUTIVE SUMMARY

The yield gap of coconuts between the potential and actual productivity of the estates (> 20 acres) has been widening over the years. Among many reasons, the general lack of competent persons to manage the estates, and consequent non adoption or incorrect adoption of recommended cultural practices on coconut cultivation have largely contributed to this yield gap.

A survey was conducted to assess the demand for the Farm Managers and their desirable qualities as expected by the proprietors of the coconut estates. Considering financial and time constraint, 100 coconut estates (> 20 acres) in the districts of Kurunegala, Gampaha and Puttalam were selected. The overall response rate for the survey was 95%.

More than 80% of the coconut were with absentee landlords. Large-scale businessmen and other various professionals own about 60% of estates. Irrespective of the status of the proprietors, the productivity of almost all the coconut estates were below the potential yields.

About 25% of estates are looked after by watchmen while rest of the estates by supervisors. About 95% of the watchmen and 65% of the supervisors had not participated in any training program on coconut cultivation conducted by the Coconut Research Institute (CRI) or Coconut Cultivation Board (CCB) and 66% of caretakers (supervisors/watchmen) do not interact with Coconut Development Officers on a regular basis. Most of the caretakers were unaware of correct implementation of the cultural and agronomic practices such as application of fertilizer (amount and method), maintenance of mulch and cover crops, use of huskpits and use of contour drains recommended by the CRI.

About 89% of the estates in the sample was classified as 'poor' by the survey team. Above all, almost all the proprietors have realised that in addition to uncontrollable factors such as thieving, the lack of competent caretakers is a major

factor for poor standard of estates and consequently they were not able to reap optimal economic benefits of the coconut cultivation. The level of performance of the estate is significantly associated with status of the cultural and agronomic practices and land suitability classes for coconut.

There is a demand for Farm Managers trained by the CRI. About 25% of the proprietors of over 50 ac estates and 35% of the proprietors of 20-50 ac estates need such persons urgently. The percentage of proprietors who expressed that they need such persons, once a vacancy arises, was 71% and 48% from over 50 ac and 20-50 ac estates respectively.

It is therefore necessary to start a training program for farm managers as soon as possible because there is dearth of trained managers. It is recommended to start the first batch of 25 males between 25-30 years of age, having three passes in G.C.E. (A.L) bioscience or Diploma in Agriculture for three months intensive training. The course should cover all aspects of coconut cultivation, intercropping, animal husbandry, labour management, accounting procedures in estates, and the use of machinery etc.

1. INTRODUCTION

The potential productivity of a coconut estate is decided based on its land suitability for coconut, when other biotic factors are non-limiting. The land suitability classification of coconut is based on such parameters as moisture availability, rooting depth of the soil, aeration and drainage status of the soil, fertility status of the soil, and climatic conditions (Somasiri, *et. al*, 1994). The yield gap of coconuts between the potential and actual productivity of estates (> 20 acres) has been widening over the years. Among many reasons, the general lack of competent persons to manage the estates, and consequent non adoption or incorrect adoption of the recommended cultural practices of the Coconut Research Institute (CRI) on coconut cultivation have largely contributed to this yield gap. In view of this, the CRI is planning to launch a program to train Farm Managers to be eventually recruited to the estates. Therefore, a survey was carried out to assess the demand for Farm Managers and to elicit the level of skills and desirable qualities expected of them by the proprietors of the coconut estates.

2. METHODOLOGY

A field survey was conducted in the districts of Kurunegala, Gampaha and Puttalam to obtain data. The sampling design adopted was stratified two stage random sampling. The extent of the estates (land size) within district was the first stage stratification and estates within land size in the selected districts was randomly selected in the second stage. Considering financial and time constraint, a sample size of 100 was decided on the basis of ratio of the precision and standard deviation. The sample size between three selected districts and two land size classes (20-50 ac & > 50 ac) was determined by probability proportion to the number of estate of the respective groups (Table 1). The addresses of the estates were obtained randomly with replacement from the database available in the Department of Census and Statistics, Colombo.

Table 1. Distribution of the sample size

District	Extent of the estate (ac)		Total
	20-50	≥50	
Kurunegala	21	41	62
Puttalam	10	16	26
Gampaha	5	7	12
Total	36	64	100

The survey was conducted in two stages. Initially, the person who looks after the estate 'caretaker' (supervisor or watchman) was interviewed in the estate with an appointment and the status of the estate was assessed by the survey team. At the second stage, the owner of the estate was interviewed at his/her residence (or working place) on an appointment.

The survey was carried out during September, October, and November in 1998. The overall response rate for the survey was 95%. The data were acquired to a structured questionnaire and were analysed using Statistical Analysis System (SAS 6.0, 1996).

3. BACKGROUND OF THE ESTATES AND PROPRIETORS

3.1. Topography of the lands

The type of the lands inspected were grouped into three categories: (a) mature plantation without under-plantation (MP), (b) mature plantation with under- plantation (MPUP), and others). Irrespective of estate size, 51% of estates were MP, 30% were MPUP and the balance 19% was a mixed/senile plantation. The distribution of lands in the sample between land suitability classes for coconut (Somasiri, *et al,* 1994) is shown in Table 2.

Table 2. Distribution of sample between lands in land suitability classes for coconut

Extent of the estate (ac)	Land suitability class for coconut				Total
	Class 1 (S1)	Class 2 (S2)	Class 3 (S3)	Class 4 (S4)	
20 -50	3 (8)	9 (25)	22 (61)	2 (6)	36
≥ 50	6 (10)	15 (25)	31 (53)	7 (12)	59
Total	9 (15)	24 (25)	53 (56)	9 (5)	95

(Values in parenthesis are row percentages)

The majority of soil type of many estates was found to be sandy loamy and clay loamy. About 75% estates (irrespective of size) had regular planting system, but the recommended density was found in only about 55% of lands. About 30% of the estates had a lower and others had a higher density than recommended.

Type of ownership (sole vs. combined) of lands was significantly

associated ($p<0.001$) with estate size (Table 3). More percentage of estates below 50 acres (80%) had sole ownership, and the majority of over 50 acres (68%) estates had combined ownership. About 65% of the estates in the sample were inherited properties, while 35% estates were purchased properties (Table 3).

Table 3. Percentages of estates between type and form of ownership

Extent of the estate (ac)	Type of ownership		Form of ownership	
	Sole	Combined	Inherited	Purchased
25 - 50	80%	20%	54%	46%
≥ 50	32%	68%	67%	33%
Total	50%	50%	62%	38%

3.2 Status of the proprietors

About 50% of estate owners was over 50 years of age, 35% was in between 50-40 years of age, while others were below 40 years. The majority of the owners (55%) had received up to General Certificate of Education Ordinary Level. About 40% of the owners had a minimum of university degree in various fields. Both age and educational level were not significantly associated with the extent of the estates. The main occupation of the proprietors varied from planters to highly qualified professionals as depicted in Figure 1.

Figure 1. Distribution of the main occupation of the proprietors

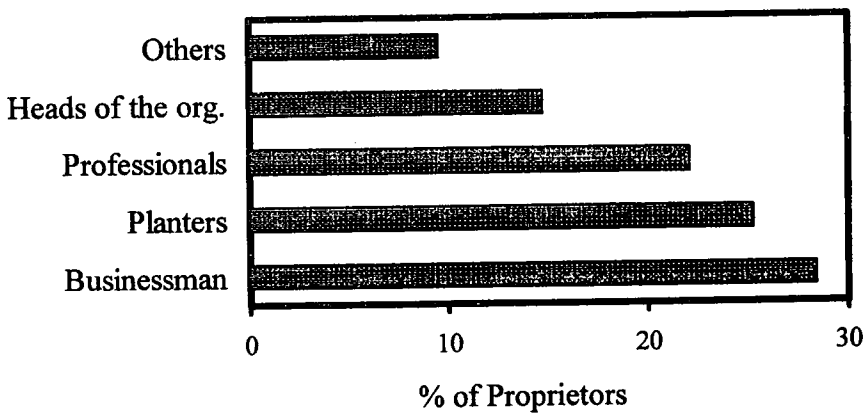
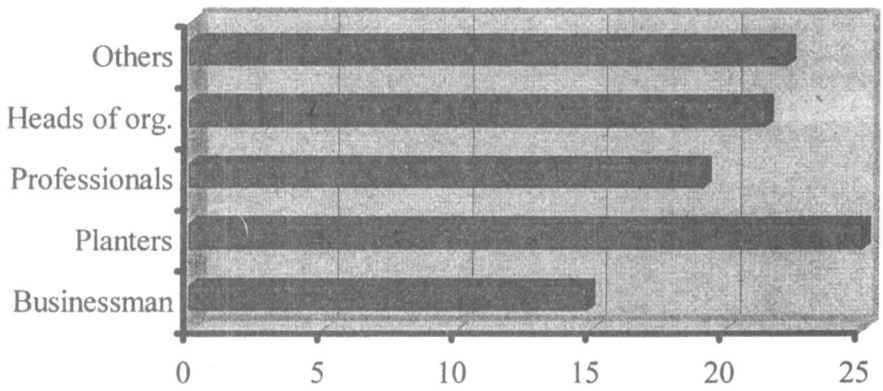


Figure 1 indicates that the majority of the coconut estates are owned by businessmen followed by professionals such as doctors, accountants, lawyers, engineers etc. The heads of organizations category consists of Chairmen, Directors, Secretaries of a Ministry etc. Figure 1 also indicates that about 65% of the coconut estates are owned by large-scale businessmen, professionals and heads of organizations. All of these proprietors have their own commitments in their main occupation and consequently their time involvement to coconut estates is restricted.

Figure 2 indicates that extremely low percentage of proprietors had participated in a training program on coconut cultivation conducted by the Coconut Research Institute (CRI). The percentage of planters who obtained any training on coconut cultivation was 25%.

Figure 2. Percentage of proprietors who participated in any training program on coconut cultivation conducted by the CRI



In addition to the income from main occupation of the proprietors, about 70% of them had other sources of income. Other source of income of the majority of the owners was business.

About 65% claimed that their main source of income is derived from the main occupation, irrespective of the extent of the estates. Only 15% claimed

that their main source of income was from the coconut estate. Of those who obtained the main income from the coconut estate, 65% were from over 50 acres and 35% were from 20-50 acres.

3.3 Status of residence on the estate

It was found that about 80% of the owners (>50 ac) and about 90% of the owners (20-50 ac) are absentee landowners. The status of the residence on the estate is not significantly associated with the main source of income or the extent of the estate. Table 4 indicates that 70% of owners whose main source of income was coconut property and 85% of the owners whose main source of income was other than coconut property do not reside on the estate. Most of the proprietors prefer to stay close to the cities because of their other commitments such as close to working place, children's education etc.

Table 4. Relationship between main source of income and status of residence

Main source of income	Status of the residence in the estate		Total
	Resident	Non resident	
Coconut estate	4 (29)	10 (71)	14
Other sources	12 (15)	69 (85)	81
Total	16 (17)	79 (83)	95

(Values in parenthesis are row percentages).

The distance from the residence to the estate varied from 10 km to 140 km with a median of 75 km. The frequency of visit was significantly correlated ($p<0.05$) with the distance from the residence to the estate. Irrespective of land size, about 35% of the owners used to visit their coconut estates irregularly. The percentages of owners who visit their lands at weekly and monthly intervals were 35% and 30% respectively (Table 5).

The majority (80%) of the proprietors visits their estates in their own diesel vehicle. Patrol vehicles are used by 12%. The rest 8% uses public transport.

Table 5. Frequency (%) of visits of owners to their lands

Extent of the estate (ac)	Frequency of visit		
	Weekly	Monthly	Irregular intervals
20 – 50	37%	34%	29%
≥ 50	36%	28%	36%
Total	36%	31%	33%

Irrespective of estate size, about 85% of the proprietors had no idea about the cost of production per 1000 nuts because it had not been calculated, in spite of their claim that nut price is not sufficient to meet the expenses.

4. BACKGROUND OF THE PERSONS WHO LOOK AFTER ESTATES ('CARETAKERS')

All the estates are looked after either by a supervisor or a watchman, but some estates had both supervisors and watchmen. For the purpose of this survey, the estates were grouped into two, namely: (a) the estates having a supervisor (or both supervisor and watchman), and (b) the estates having a watchman alone.

4.1 Status of the caretakers

The distribution of the status of the person who looks after the estates (caretaker) is shown in Table 6.

Table 6. Status of the person who looks after the estate

Extent of the estate (ac)	Position of the caretaker			Total
	Supervisor	Watchman	Others (owner/managing company)	
20 – 50	14 (40)	16 (46)	5 (14)	35
≥50	43 (72)	12 (20)	5 (8)	60
Total	57 (60)	28 (30)	10 (10)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(2)} = 9.4, P = 0.009$$

The position of the person is significantly associated with the extent of the estate. The percentage of supervisors are much higher in larger estates (>50 ac) than medium size estates (20-50 ac). Nearly 20% of the estates over 50 ac and 45% estates between 20-50 ac are looked after by a watchman. No woman caretakers were found in the estates in this sample.

4.2 Qualities of the caretakers

In this section, the relationships between the position of the caretaker and other factors were studied. Ten estates managed by the owners or managing companies were pooled with the category of supervisors. The position of the caretaker was not significantly associated with the educational qualification (Table 7).

Table 7. Educational level of the caretakers

Position of the Caretaker	Educational level			Total
	Primary	Secondary	Diploma	
Supervisor	35 (52)	29 (42)	4 (6)	67
Watchman	18 (64)	10 (36)	0 (0)	28
Total	53 (56)	38 (40)	4 (4)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(2)} = 2.37, P = 0.306$$

The majority of the caretakers had only a primary education (that is up to General Certificate of Education Ordinary Level - GCE (OL) or below). The difference between the percentages of supervisors and watchmen having secondary education (that is above GCE (OL)) was small.

An extremely low percentage (5%) of young people (< 30 yr.) was engaged as caretakers in the estates (Table 8). Further, about one fifth of the caretakers were between 30 - 40 years of old. The majority of watchmen was over 40 years old and the majority of supervisors was over 50 years old. The results suggest that the estates suffer from a general lack of young managerial staff and hence it is necessary to develop a mechanism to absorb such staff to look after coconut estates.

Table 8. Age of the caretakers

Position of the caretaker	Age group				Total
	< 30	30 - 40	40 - 50	≥ 50	
Supervisor	4 (6)	12 (18)	17 (25)	34 (51)	67
Watchman	1 (3)	8 (28)	12 (42)	7 (25)	28
Total	5 (5)	20 (21)	29 (31)	41 (43)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(3)} = 6.30, P = 0.098$$

The analysis found that almost all the caretakers (irrespective of the position) reside in the estates. The main source of income of about 90% of the caretakers is salary drawn from the estates and other perks given by the proprietors (Table 9).

Table 9. Main source of income of the caretakers

Position of the caretaker	Main source of income		Total
	From the estate	Other sources	
Supervisor	58 (87)	9 (13)	67
Watchman	25 (89)	3 (11)	28
Total	83 (87)	12 (13)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 1.10, P = 0.484$$

About 25% of the supervisors visit other coconut estates belong to the owner or other coconut estates close to their estates, in order to obtain an additional income (Table 10). Most of other supervisors (who do not visit other coconut lands) claimed that their employer would not allow visiting other coconut estates. It implies that there is also a 'indirect' demand for the Farm Managers on a part time basis.

Table 10. Visiting of other coconut estates by the caretakers

Position of the caretaker	Status of visit		Total
	Yes	No	
Supervisor	18 (26)	49 (73)	67
Watchman	0 (0)	28 (100)	28
Total	18 (19)	77 (81)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 9.28, P = 0.002$$

The participation of training in coconut cultivation is significantly associated with the position of the caretaker (Table 11).

Table 11. Participation of caretakers on training in coconut cultivation

Position of the caretaker	Participation of training in coconut		Total
	Yes	No	
Supervisor	23 (34)	44 (66)	67
Watchman	1 (4)	27 (96)	28
Total	24 (25)	71 (75)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 9.28, P = 0.002$$

Sixty six percent of the supervisors and 96% of the watchmen had not followed any training conducted by the CRI or Coconut Cultivation Board (CCB).

It was also found that nearly 70% of the caretakers, irrespective of the position has not read advisory circulars or publications on coconuts.

The relationship between caretakers and Coconut Development Officers (CDOO) is shown in Table 12.

Table 12. Interaction between Coconut Development Officers (CDOO) and the caretakers

Position of the caretaker	Regular	Not regular	Total
Supervisor	24 (36)	43 (64)	67
Watchman	8 (29)	20 (71)	28
Total	32 (34)	63 (66)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.47, P = 0.492$$

The interaction between CDOO and the caretakers was not significantly associated with the position of the caretaker. The results indicate that irrespective of the position of the caretakers, they do not meet CDOO regularly. Further, both caretakers and proprietors claimed that they couldn't obtain technical assistance for the estates whenever they required. It implies that there should be an efficient system to visit estates on regular basis and to give technical advice either by CDOO or CRI officers.

5. PERFORMANCE OF THE ESTATE ACTIVITIES

It was observed that the coconut palms were not numbered in about 70% of estates. Further, 80% of the estates below 50 ac and 50% of the estates over 50 ac were not blocked under any criteria. The estates, of which blocks were maintained, blocking was not done either on age of plantation or soil type. Rainfall records were not kept by 97% of estates between 20-50 ac. The corresponding proportion for estates over 50 ac was 65%. This implies that it is necessary to improve the estates in respect of the above activities.

5.1 Availability of labour

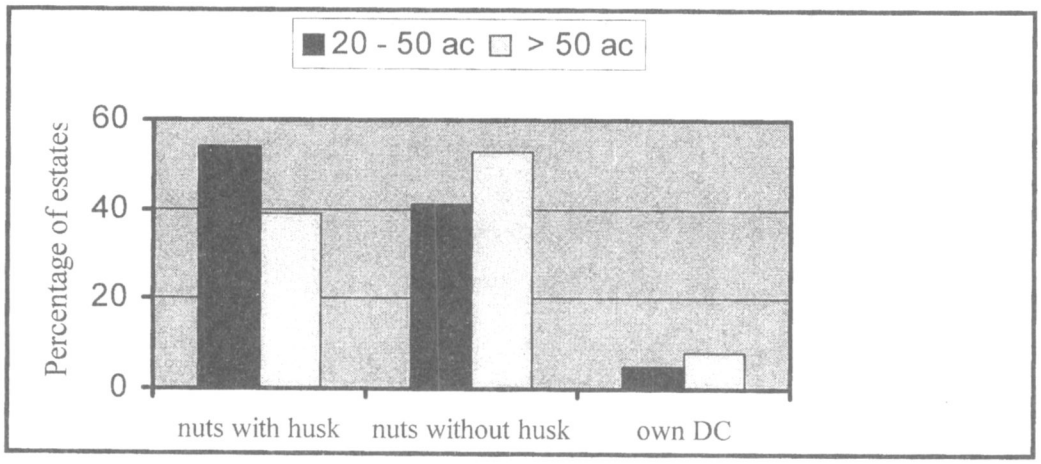
The mean number of families live in the estates over 50 ac was two. The corresponding figure for estates between 20-50 ac was one. However, the mean number of persons of these families who engage in the activities on coconut cultivation is one in both groups of estates. This implies that the internal labour force is grossly inadequate for routine work in the estate. Irrespective of estate size, about 50% of the owners claimed that finding labourers is difficult and therefore they can not plan estate activities. The common reason for the lack of labourers is that the both men and women can easily find work around the estate at higher wages than those paid by the estates. The owners also complained that they could not get full service of the labourers because of their indulgence in illicit alcohol.

About 50% of the estate owners over 50 ac claimed that it is difficult to find coconut pickers as against 30% in the other group. Most owners complained that even though the pickers promised to come they do not generally turn up on that day and give various excuses. It discourages the owners to visit the estate for the picking.

5.2 Disposal of nuts

The distribution of disposal of nuts is shown in Figure 3.

Figure 3. Disposal of nuts by the estates

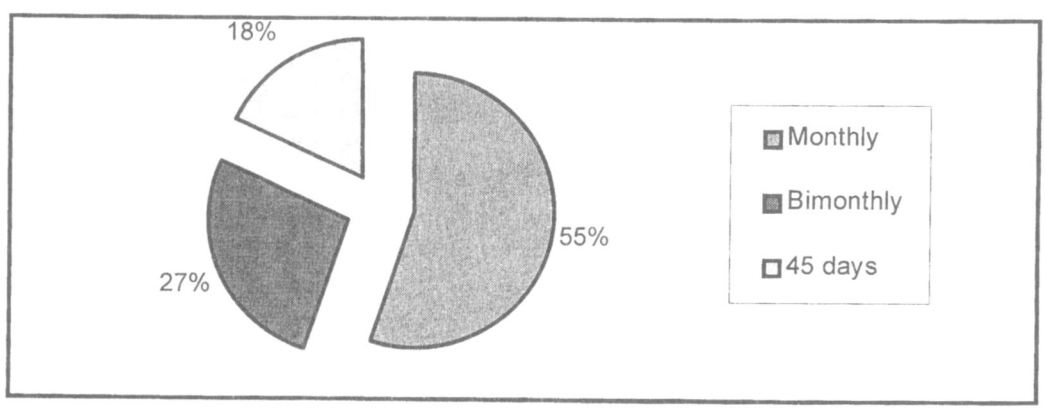


It was found that except a very few percentage of proprietors, who own DC mills, others used to sell nuts with or without husk. The majority of owners of over 50 acres (55%) sell nuts without husk (Fig. 3). About 55% of the owners of below 50 acres sell nuts with husk. Only about 10% of the proprietors have given authority to their caretaker to sell nuts.

5.3 Harvesting interval

Estate owners do not practice a common harvesting interval. The distribution of harvesting pattern of the estates in the sample is shown in Figure 4.

Figure 4. Distribution of harvesting intervals



Monthly picking is practised by the majority (55%) of the estates as against the bi-monthly picking by 27%. It should be noted that 17% of the estates is still implementing 45 days interval picking. The picking interval was not significantly associated with the availability of pickers.

The cost for picking, using a bamboo pole, varied from Rs. 25 per acre to Rs. 120 per acre with a mean of Rs. 55 and mode of Rs. 40. This implies that the majority of the proprietors pay low rates for pickers. It leads the pickers to search alternative jobs for more attractive and steady income.

5.4. Assessment of cultural practices on coconut

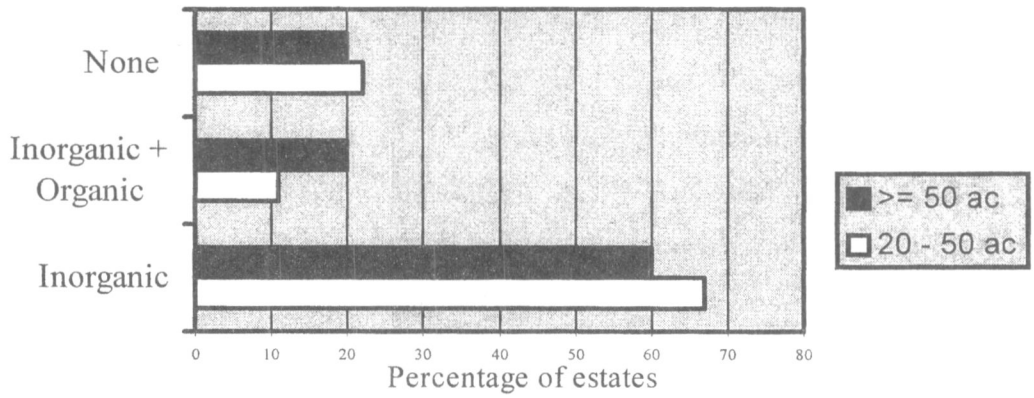
Some of important cultural practices on coconut cultivation recommended by the CRI include application of fertilizer, method of fertilizer application, use of dolomite, establishment of husk pits, mulch, cover crops and contour drains. The status of each practice was assessed by the survey team.

5.4.1 Use of fertilizer

Figure 5 indicated that, irrespective of frequency and method of application, 62% in the sample has used inorganic fertilizer only, 17% in the sample has used inorganic fertilizer with organic supplement while 21% claimed that they could not fertilise for a long period.

The popular brand of fertilizer among the large estate owners was CTC followed by Baurs. The majority of medium estate owners (20-50 ac) use Baurs followed by CTC fertilizer.

Figure 5. Application of fertilizer by types



'Regular application of fertilizer' was defined as applying fertilizer annually or once in two years irrespective of the amount, type and brand of fertilizer. Table 13 indicates that the regular application of fertilizer was not associated with the extent of the estate and in general the percentage of regular fertilizer application is higher in large estates (>50 ac) than in medium size (20-50 ac) estates.

Table 13. Regular application of fertilizer

Extent of estate(ac)	Regular	Irregular or not apply	Total
20 - 25	18 (50)	18 (50)	36
≥ 50	36 (61)	23 (39)	59
Total	54 (57)	41 (43)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 1.41, P = 0.293$$

The recommended fertilizer amount per palm per year is 2.0 kg, 2.5 kg and 3.0 kg depending on soil type. Thus, in this analysis the amount applied was considered as the 'correct dosage' if it was 2.0-3.0 kg. If the amount was more than 3.0 kg, it was considered as `overdose'. Table 14 indicates that nearly 50% of the owners (irrespective of extent of the estate) applied more than the recommended dosage. Irrespective of the frequency and method of application, about 30% were aware the correct dose.

Table 14. Amount of fertilizer (per palm per year)

Extent of estate (ac)	Correct amount (2.0-3.0) kg	Overdose (> 3 kg)	Less or none (< 2kg)	Total
20 - 25	10 (28)	16 (44)	10 (28)	36
≥ 50	22 (37)	27 (46)	10 (17)	59
Total	32 (34)	43 (45)	20 (21)	95

(Values in parenthesis are row percentages)

$\chi^2_{(2)} = 1.41$, P = 0.396

The amount of fertilizer and the frequency of application was significantly associated (Table 15).

Table 15. Association between frequency and amount of fertilizer application

Frequency of application	Correct amount	Overdose	Less or none	Total
Regular	20 (37)	30 (55)	4 (8)	54
Irregular or not apply	12 (29)	13 (32)	16 (39)	41
Total	32 (34)	43 (45)	20 (21)	95

(Values in parenthesis are row percentages)

$\chi^2_{(2)} = 14.41$, P = 0.001

It indicates that among the regular fertilizer users in the sample, 55% had applied higher dosage than the recommended quantity. Of the regular fetilizer users, only 37% had applied the correct amount. Among the irregular fertilizer users, 32% had used an overdose. It can be hypothesised that higher dosage of fertilizer had been applied mainly due to the lack of knowledge. This suggests a deficiency in technology transfer and possibly the need of knowledgeable managers to look after the coconut estates.

Having identified the correct amount of fertilizer, the correct method of fertilizer application is also required for efficient use of fertilizer. The recommended correct method of application of fertilizer by the CRI is broadcasting, incorporation, and mulching or trenching and mulching depending on the slope of the land. Table 16.1 indicates that irrespective of the size of estate, the correct method of fertilizer application has not been adopted by about 35% of estates.

Table 16.1 Method of application vs. extent of the estate

Extent of estate (ac)	Correct method	Incorrect method	Total
20 - 50	22 (61)	14 (39)	36
≥ 50	41 (69)	18 (31)	59
Total	63 (66)	32 (34)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.75, P=0.402$$

The method of fertilizer application was nearly significantly associated with type of the caretaker (Table 16.2). This indicates that of the estates, which are looked after by a watchman alone, nearly 50% were not aware the correct application method of fertilizer. The corresponding percentage for the estates, which are looked after by a supervisor (or both supervisor and watchman) was 30%.

Table 16.2 Method of application vs. type of the caretaker

Type of the caretaker	Correct method	Incorrect method	Total
Supervisor	48 (72)	19 (28)	67
Watchman	16 (54)	13 (46)	28
Total	63 (66)	32 (34)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 2.889, P=0.079$$

The optimum benefit of fertilizer can be achieved when the amount, method and time of application are all correct. But in this survey, data on time of fertilizer application was not collected, and thus it was assumed that all the proprietors had applied fertilizer at the correct time. The analysis indicated that both the amount of fertilizer and the method of application of fertilizer were correctly practised by about 25% estates irrespective of the extent of the estate (Table 17). This has to be considered as a lower rate. This figure was computed irrespective of the frequency of application. Regular application, correct method and correct amount were practised only 17% in the sample.

Table 17. Status of fertilizer application

Extent of estate (ac)	Both method and amount		Total
	correct	incorrect	
20 –50	8 (22)	28 (78)	36
≥ 50	17 (29)	42 (71)	59
Total	25 (26)	70 (74)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.05, P=0.479$$

Table 18 indicates that the number of times leaf samples were analyzed for the differential fertilizer recommendation (DFR) was significantly associated with the extent of the land.

Table 18. Number of times leaf samples got analysed DFR during the last five years

Extent of estate (ac)	Once or twice	None	Total
20 - 50	6 (14)	31 (86)	36
≥ 50	22 (37)	37 (63)	59
Total	27 (28)	68 (72)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 6.102, P=0.014$$

About 37% of the large estates (≥ 50 ac) got their leaf samples analyzed for DFR once or twice during the last five years, as against 14% among the medium size estates (20-50 ac). However, the fertilizer recommended by the DFR analysis was practised, at least once, by 72% (16 out of 22) of the large estates and by 33% (2 out of 6) of medium size estates. It implies that DFR service is not practised by the medium size estates at the same rate as larger estates perhaps because former are less aware or less affordability of the DFR technology.

5.4.2 Recommended cultural practices

The use of husk pits, mulch, cover crops and contour drains was assessed as 'satisfactory' and 'not satisfactory' by the survey team and the results are shown in Tables 19 - 22 respectively.

Table 19. Status of husk pits

Extent of estate (ac)	Level of performance		Total
	Satisfactory	Not satisfactory	
20 - 50	9 (25)	27 (75)	36
≥50	18 (30)	41 (70)	59
Total	27 (28)	68 (72)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.35, P=0.564$$

Table 20. Status of mulch

Extent of estate (ac)	Level of performance		Total
	Satisfactory	Not satisfactory	
20 - 50	12 (33)	24 (67)	36
≥ 50	13 (22)	46 (78)	59
Total	25 (26)	70 (74)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 1.47, P=0.225$$

Table 21. Status of cover crops

Extent of estate (ac)	Level of performance		Total
	Satisfactory	Not satisfactory	
20 - 50	10 (28)	26 (72)	36
≥ 50	11 (19)	48 (81)	59
Total	21 (22)	74 (78)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 1.08, P=0.298$$

Table 22. Status of contour drains

Extent of states (ac)	Level of performance		Total
	Satisfactory	Not satisfactory	
20 - 50	11 (31)	25 (69)	36
≥ 50	18 (30)	41 (70)	59
Total	29 (31)	66 (69)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.01, P=0.978$$

The status of any of the four cultural practices was not significantly associated with the extent of the estate. Analyses also found that the status of these cultural practices were not significantly associated with the type of the caretaker. This indicates that irrespective of the land size and type of the caretaker the standard of the cultural practices (husk pits, mulch, cover crops, and contour drains) was not satisfactory in about 75% of the estates due to lack of knowledge by the caretakers or the landowners. This situation directly affects the level of production of the estate.

5.4.3 Optimisation of land use

The analysis found that about 60% of the estates has grown annuals, semi-perennials, perennials, or two or more types as intercrops under coconut,

irrespective of the extent of area of intercrops. Others had not practised any type of intercrops because their proprietors are not interested due to uncertainty of weather and price risk. Among the estates that practised intercrops, only 25% were in satisfactory level (Table 23).

Table 23. Status of intercrops

Extent of the estate (ac)	Satisfactory	Not satisfactory	Total
20 - 50	5 (20)	20 (80)	25
≥ 50	10 (28)	25 (72)	35
Total	15 (25)	45 (75)	60

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.01, P=0.978$$

About 75% of the estates had practised animal husbandry. The type of animals varied, but cattle were the most popular in coconut estates. The common methods of raising cattle were free grazing and tethering system. According to the assessment of the survey team, 18% of the animal production systems practised was satisfactory (Table 24).

Table 24. Status of animal husbandry

Extent of estate (ac)	Satisfactory	Not satisfactory	Total
20-50	5 (16)	25 (84)	30
≥ 50	9 (19)	37 (81)	46
Total	14 (18)	62 (82)	76

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.01, P=0.978$$

5.5 Assessment of cultural practices in land suitability classes for coconut

In this Section the status of the cultural practices discussed above is presented in relation to the land suitability classes for coconut. For the purpose of

comparison, data were analyzed by pooling S_1 and S_2, and S_3 and S_4 separately. The results are shown in Table 25.

Table 25. The percentage of estates practicing different cultural practices

Type of cultural practice	Land suitability classes for coconut			
	S_1 and S_2		S_3 and S_4	
	Correct	Incorrect	Correct	Incorrect
• Fertillizer application (both amount and method of application)	55%	45%	37%	63%
• Mulching	30%	70%	24%	76%
• Establishing husk pits	36%	64%	24%	76%
• Establishing cover crops	27%	73%	19%	81%
• Contour drains	48%	52%	21%	79%
• Intercropping	26%	74%	24%	76%
• Animal husbandry	25%	75%	14%	86%

The percentage of estates of which cultural practices were correctly adopted in S_3 & S_4 was lower than that in S_1 & S_2. The high percentage of estates with incorrectly adopted cultural practices would result in under achievement of the potential yield of those estates. Except for fertilizer application and establishment of counter drains in the estates in S_1 & S_2 all the other cultural practices were incorrectly practised in the majority of the estates.

5.6 Assessment of knowledge on coconut cultivation

The awareness of various aspects on coconut cultivation was assessed by asking some questions related to the coconut cultivation from the owner and the caretaker separately. The results are summarised in Table 26.

Table 26. Percentage of awareness on correct technologies of coconut production by proprietors and caretakers

Technologies related to coconut production	% of awareness on correct technology	
	Proprietors	Caretakers
▪ Method of seed nut selection	27%	34%
▪ Identification of good seedling	35%	52%
▪ Application of YPM at the time of transplanting	25%	34%
▪ Recommended fertilizer (amount/frequency) for seedlings	35%	46%
▪ Identification of deficiency symptoms of K	22%	32%
▪ Diagnosis of dolomite deficiency	28%	45%
▪ Beneficial effects of NFT trees	38%	56%
• Identification of disease palms such as LSD or PMD	22%	41%

(YPM = recommended fertilizer for seedlings; NFT = Nitrogen fixing trees; LSD = leaf scorch decline; PMD = pre- mature decline)

Results clearly indicate that in general the knowledge on the aspects relevant to coconut production technology tested in the survey was better among the caretakers than among the proprietors. However, the level of knowledge in both groups was not satisfactory except the caretaker's knowledge on identification of correct seedling and the beneficial effects of NFT trees. It is obvious that the knowledge of both caretakers' and the proprietors' should influence the performance of the estate.

Thus it indicates the necessity of having more frequent programs to educate both caretakers and proprietors of the coconut estates, particularly the caretakers on all aspects of coconut cultivation.

5.7 Use of machinaries

Table 27. Use of machines for various activities on coconut cultivation by the estates (%)

Activity	Extent of the estate (ac)			
	20 - 50		≥ 50	
	Yes	No	Yes	No
❖ Opening of seedling holes	11%	89%	20%	80%
❖ Establishment of husk pits	8%	92%	15%	85%
❖ Establishment of contour drainage	5%	95%	11%	89%
❖ Application of fertilizer	8%	92%	7%	93%
❖ Control of weeds	19%	81%	27%	73%

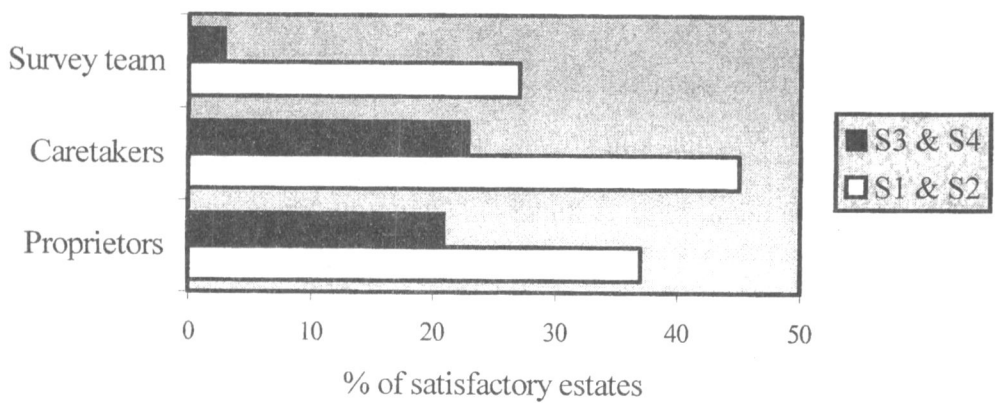
The use of machinery for various activities of coconut cultivation is not yet popular in spite of the shortage of labour and profitability over manual use. Many proprietors expressed that they were not aware of the places to hire machines, and even if they knew, it is not easy to obtain the service whenever required.

6. FACTORS INFLUENCING THE PERFOMANCE OF ESTATES

6.1 Classification of estates

The survey team inspected the coconut estates and classified the performance of the estate into 'good' and 'poor' categories based on visual observation of the palms. Only 11% (11 out of 95 estates), were identified as good estates by the survey team. The percentages of good estates between S_1 and S_2 and S_3 and S_4 are shown in Figure 6 (data were pooled for S_1 and S_2 and S_3 and S_4). In addition to the judgement of the survey team, both the owners and the caretakers were asked separately whether they were satisfied about the performance of the estate. Their responses are also shown in Figure 6.

Figure 6. Percentage of 'satisfactory' estates according to the views of different groups



The results indicate that majority of the proprietors and the caretakers were not satisfied with the performance of their estates. This implies that both of them have realised that they have not achieved the potential output from their lands. The proportion of satisfactory lands according to the caretaker was higher

than that of according to the owners. Analysis revealed found that the judgement of owner and the judgement of the caretaker were independent.

The percentage of satisfactory estates in S_1 and S_2 was higher than that in S_3 and S_4 based on the classification of all three groups. The percentage of satisfactory estates according to both caretaker and the proprietor was 6%. This value is close to the corresponding value identified by the survey team. The percentage of not satisfactory lands by both owners and caretakers was 50%. The reasons for having large proportion of unsatisfactory estates are discussed below.

6.2 Performance of lands and its associations with various factors

In order to identify the associations of the performance of estates identified by the survey team with various 'factors' (land suitability classes for coconut, participation of training programs by both the owner and the caretaker, various cultural practices recommended by the Coconut Research Institute), the relationship between each factor with performance of estate was tested using 2-way contingency tables.

6.2.1 Land suitability class for coconut (LANDSC)

Table 28. Association between the land suitability classes for coconut and performance of estates

Land suitability class for coconut	Level of performance of the estate according to the survey team		Total
	Good	Poor	
S_1 and S_2	9 (27)	24 (73)	33
S_3 and S_4	2 (3)	60 (97)	62
Total	11	84	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 12.16, P=0.001$$

The results indicate that the level of performance of estates according to the survey team was significantly associated with the land suitability classes for coconut. The proportion of good level of performance estates in S_1 and S_2 (27%) was much higher than that in S_3 and S_4 (3%). The proportion of poorly performed estates in S_3 and S_4 was 97% as against the corresponding proportion of 73% in S_1 and S_2. It indicates that almost all lands in S_3 and S_4 were below the satisfactory level. The analysis also found that the level of performance was not significantly associated with the extent of the estate.

Table 29. Association between the participation in training programs in coconut cultivation by the proprietors and performance of the estate

Participation in training program by the proprietors	Level of performance of the estate according to the survey team		Total
	Good	Poor	
Yes	3 (16)	16 (84)	19
No	8 (11)	68 (89)	74
Total	11	84	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.41, P=0.521$$

Table 30. Association between the participation in training programs in coconut cultivation by the caretakers and performance of the estate.

Participation in training program by the caretakers	Level of performance of the estate according to the survey team		Total
	Good	Poor	
Yes	2 (8)	22 (92)	24
No	9 (13)	62 (87)	71
Total	11	84	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.330, P=0.565$$

Level of performance of the estate was not significantly associated with participation in training programs on coconut cultivation either by the proprietors (Table 29) or with that by the caretakers (Table 30). It indicates that irrespective of the participation in training programs on coconut by the caretaker or the proprietor, majority of the estates was classified as poor. Also, only two estates were found where both proprietor and the caretaker had gone through a training program on coconut cultivation and those two estates were classified as good.

6.2.2 Use of fertilizer (CORFER)

The use of correct amount and method of fertilizer was significantly associated with the level of performance of lands (Table 31).

Table 31. Association between correct application of fertilizer (amount & method) and performance of the estate

Method and amount of fertilizer	Level of performance of the estate according to survey team		Total
	Good	Poor	
Correct	8 (19)	33 (81)	41
Not correct	3 (5)	51 (95)	54
Total	11	84	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 4.434, P=0.035$$

The percentage of good estates was 19% among the estates adopted both amount and method of fertilizer correctly. Among the estates both amount and method were not correctly adopted, the percentage of good estates was 5%.

The highest percentage of good estates were observed among the estates applied fertilizer regularly (Table 32). Irregular application of fertilizer caused the higher percentage of poor estates.

Table 32. Association between frequency of fertilizer application and performance of the estate

Frequency of fertilizer application	Level of performance of the estate according to survey team		Total
	Good	Poor	
Regular	8 (15)	46 (85)	54
Irregular	3 (7)	38 (93)	41
Total	11	84	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 1.28, P=0.258$$

6.2.4 Status of mulch (MULCH)

Results indicate that the status of mulch in the lands was significantly associated with level of performance of the lands (Table 33).

Table 33. Association between status of mulch and performance of the estate

Status of mulch	Level of performance of the estate according to the survey team		Total
	Good	Poor	
Satisfactory	7 (28)	18 (72)	25
Not satisfactory	4 (6)	66 (94)	70
Total	11	84	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 8.936, P=0.003$$

Percentage of good lands was higher when mulch was established satisfactorily than that when mulch was not established satisfactorily. Nearly 95% estates were classified as poor among the estates established mulch unsatisfactorily.

6.2.5 Status of huskpits (HUSKPT)

Table 34. Association between status of husk pits and performance of the estate

Status of husk pits	Level of performance of the estate according to the survey team		Total
	Good	Poor	
Satisfactory	7 (26)	20 (74)	27
Not satisfactory	4 (6)	64 (94)	68
Total	11	84	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 7.584, P=0.006$$

The status of husk pits in the estates was significantly associated with level of performance of the estates. Of the estates having husk pits in satisfactory level, 26% was classified as good estates. The percentage of good estates of which husk pits were not in satisfactory level was 6%.

6.2.6 Status of contour drains (CONTDR)

Table 35. Association between status of contour drains and performance of the estate

States of contour drains	Level of performance of the estate according to survey team		Total
	Good	Poor	
Satisfactory	8 (28)	21 (72)	29
Not satisfactory	3 (4)	63 (96)	66
Total	11	84	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 10.447, P=0.001$$

Estates that adopted contour drains satisfactorily had the highest percentage of good estates (28%) as against the estates that adopted contour drains unsatisfactorily (4%). The status of the contour drains was significantly associated with the level of performance of the estates classified by the survey team.

6.2.7 Status of cover crop (COVERC)

The Chi-square value in Table 36 indicates that there was no significant association between status of cover crops and the performance of estates classified by the survey team. Of the estates of which cover crops had established satisfactorily, the percentage of good estates was 19. The corresponding percentage for the estates of which cover crops had not established satisfactorily was 9.

Table 36. Association between status of cover crop and performance of the estate

Status of cover crop	Level of performance of the estate according to survey team		Total
	Good	Poor	
Satisfactory	4 (19)	17 (81)	21
Not Satisfactory	7 (9)	67 (91)	74
Total	11	84	95

(Values in parenthesis are row percentages)

$\chi^2_{(1)} = 1.469$, P=0.226

6.3 Interaction between factors on the performance of estate

In the previous Section, using pairwise association it was identified that the factors such as land suitability class for coconut (LANSCC), correct use of

fertlizer (CORFER), status of mulch (MULCH), status of huskpits (HUSKPT), status of contour drains (CONTDR) were significantly associated separately with the level of performance of the estates. The status of covercrop (COVERC) was not significantly associated with the level of performance of the estates. The limitation with the 2-way separate analysis is that the effect of each factor is not adjusted for the effect of other factors. In order to study each of the independent effects, all the factors should be studied simultaneously. Thus linear logistic model was fitted using PROC CATMOD procedure in SAS, as all the factors are binary variables.

Modelling was started with a saturated one containing all the main effects and 2-way interactions. All the interactions were non-significant. Therefore a main effect model was fitted. The analysis of variance table is shown in Table 37.

Table 37. Results of maximum-likelihood analysis of variance

Source	DF	Chi Square	Prob
Intercept	1	8.68	0.0032
LANDSSC	1	8.06	0.0045
CORFER	1	4.29	0.0383
MULCH	1	2.28	0.1314
HUSKPT	1	0.74	0.3908
CONTDR	1	0.07	0.7897
COVERC	1	1.05	0.3056
Likelihood ratio (LR)	31	35.97	0.2471

Since the probability associated with likelihood ratio (LR) statistic is high and non-significant it confirmed that the additive model is adequate. Results indicate that the land suitability class for coconut (LANDSSC) along with the correct amount and method of fertilizer application (CORFER) are significant factors to keep estates in a good condition (that is, to have good palms).

Results also showed that coefficients for all the factors are positive, indicating that first level (satisfactory) of each cultural practice has higher

probability for good performance of estates than the second level (not satisfactory) of cultural practices. In other words, the estates of which the above cultural practices are correctly practised are more likely to performance in good condition than the estates of which cultural practices are incorrectly practised.

6.4 Analysis of yield gap

The potential yields per palm per year (yield/p/y) in the four main land suitability classes for coconut: S_1, S_2, S_3, and S_4 are 93, 78, 68 and 47 respectively. The potential yield and observed yield in relation to land suitability classes are shown in Figure 7. The observed yield was computed from the survey data (yield data was not available in all the estates) by taking the average yield during 1996 and 1997 based on the availability.

Figure 7. Gap between potential yield and observed yield

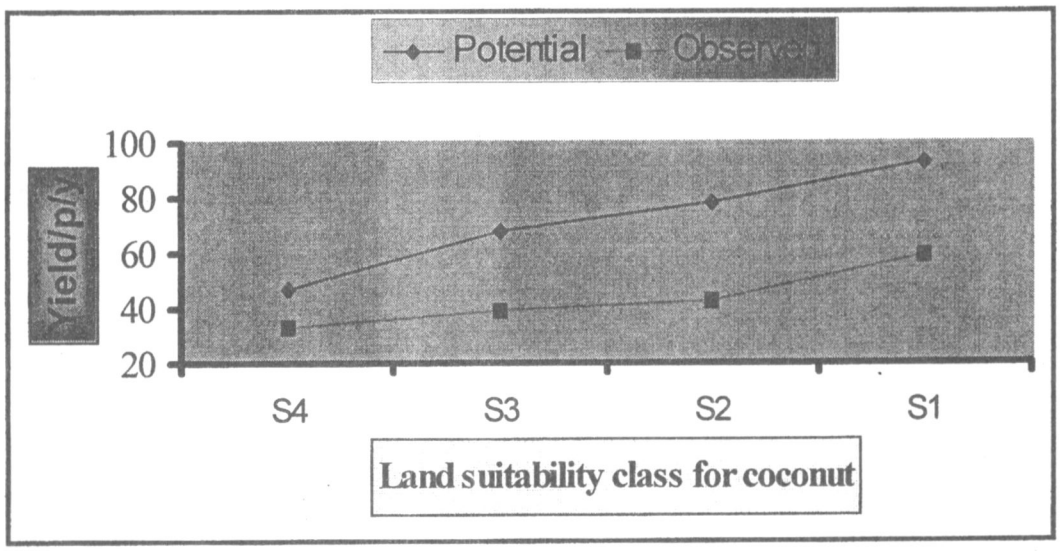


Figure 7 shows that the `yield gap' (that is the difference between potential and observed yields) has increased when it moved from S_4 to S_1, when the yield figures were pooled irrespective of the level of cultural practices. In order to find the factors influencing on yield gap general linear model was fitted. The results are shown in Table 38.

Table 38. Results of the Anova for the Dependant variable 'yield gap'

Factor	Degree of freedom	Sum of squares	Prob > F
LANDSSC	3	4410	0.0001
CORFER	1	950	0.0100
MULCH	1	363	0.1037
HUSKPT	1	61	0.5004
CONDR	1	658	0.0303
COVERC	1	36	0.6000
Error	47	6192	

(Model R - square = 0.54; p = 0.0001; CV=34%)

Results indicate that yield gap is significantly different between land suitability classes for coconut. The yield gap is also significantly different between the status of application of fertilizer (correct amount and method) and status of contour drains. Two-factor and higher order interactions were not significant. Comparison between levels of each factor was not done as the sample size was small and the yield was obtained for one or two years. The results suggest that the land suitability class for coconut, the correct amount and method of fertilizer application and status of contour drains significantly influence on the yield gap.

7. OWNERS VIEW ON FARM MANAGERS

7.1. Stability of the caretakers

In order to find out the stability of the caretakers in an estate, the proprietors were requested to indicate the number of caretakers recruited during the last ten-year period. The cumulative distribution of the number of recruiters is shown in Figure 8.

Figure 8. Cumulative distribution of the number of caretakers who were in the estates

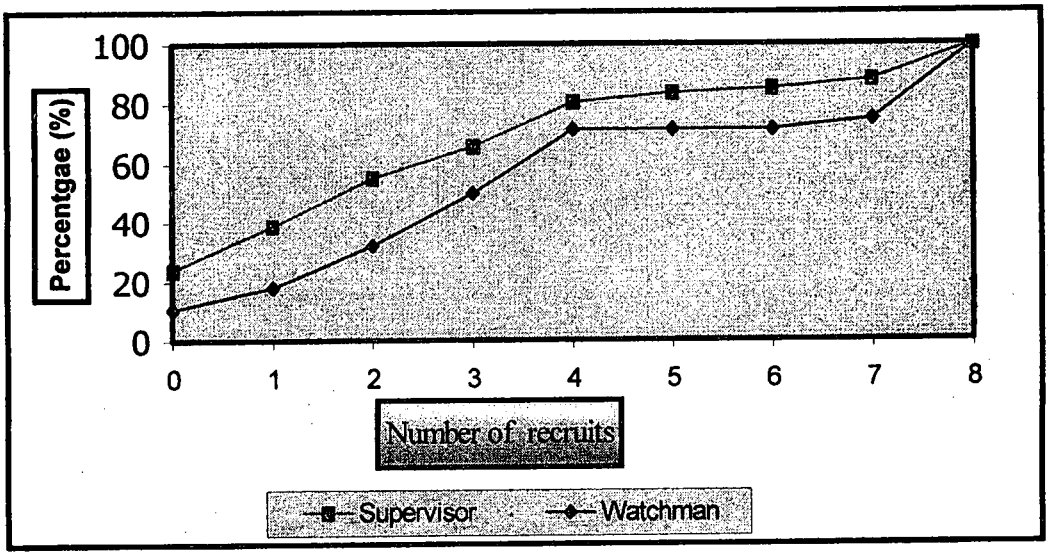


Figure 8 indicates that the proportion of proprietors who had changed five or more supervisors during the last ten years was 20%. The corresponding proportion for watchman was 29%. The percentages that the same caretaker has been in the estate for last ten years were 24% and 11% for supervisor and watchman respectively.

In general, the rate of stability in a one place is higher among

supervisors than watchman. The rate of stability was not associated with the extent of the estate. Further, majority of the proprietors expressed that they are not satisfied with their caretakers mainly due to the lack of trustworthiness, lack of interest to develop the estate and insufficient knowledge on coconut cultivation. This implies that the proprietors look forward to obtain the service of stable, honest and energetic persons.

7.2. Actual demand for Farm Managers

The demand for Farm Managers was significantly associated with the extent of estate (Table 39). The percentage of proprietors who directly mentioned that they need a person trained by the Coconut Research Institute (CRI) urgently was 22% and 33% from over 50 ac and 20-50 ac estates respectively. This implies that immediate demand for recruitment was higher in medium size estates than in large estates. The percentage of proprietors who expressed that they would consider to take such a farm manager, once a vacancy arises, was 71% and 48% from over 50 ac and 20-50 ac estates respectively. Further 19% proprietors of over 50 ac and 7% proprietors of 20-50 ac have expressed that they would not need such farm managers.

Table 39. Percentage demand for Farm Managers

Extent on the estate (ac)	Choice of the proprietors			Total
	Yes	Will consider	No	
20-50	12 (33)	17 (48)	7 (19)	36
≥ 50	13 (22)	42 (71)	4 (7)	59
Total	25 (26)	59 (62)	11 (12)	95

(Values in parenthesis are row percentages)

$$\chi^2_2 = 6.249, P = 0.044$$

7.3 Qualities of Farm Managers to be trained

The qualities of persons to be selected for the training as Farm Managers were obtained from all the proprietors irrespective of whether or not they needed farm managers trained by the CRI.

7.3.1. Experience of the persons

Table 40. Type of experience of the persons to be trained

Extent on the estate (ac)	Choice of proprietors		Total
	Fresh person	Experienced person	
20-50	19 (53)	17 (47)	36
≥ 50	29 (49)	30 (51)	59
Total	48 (50)	47 (50)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.118, P = 0.732$$

About 50% of the owners expressed that the training should be given to the fresh persons while other 50% liked if the persons having some experience in coconut cultivation are trained. Table 40 indicates that the choice between fresh and experienced persons was not significantly associated with the size of the estate.

7.3.2 Age of the persons to be trained

Table 41. Age of the persons to be trained

Extent on the estate (ac)	Choice of proprietors			Total
	20-25 yr.	25-30 yr.	30-35 yr.	
20-50	4 (11)	18 (46)	14 (43)	36
≥ 50	5 (8)	30 (51)	24 (41)	59
Total	9 (8)	48 (53)	38 (39)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(2)} = 0.529, P = 0.807$$

The choice of age group was not associated with extent of the estates. Results indicate that the highest percentage of proprietors in both categories of estates preferred 25-30 years old youths to be trained.

7.3.3 Gender of the persons to be trained

Table 42. Gender of the persons to be trained

Extent on the estate (ac)	Gender		Total
	Male	Female	
20-50	32 (89)	4 (11)	36
≥ 50	54 (92)	5 (8)	59
Total	86 (91)	9 (9)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 0.181, P = 0.670$$

As shown in Table 42, nearly 90% of the proprietors (irrespective of the extent of the estate) preferred males to be trained. The main reasons why proprietors do not prefer females to be recruited as Farm Managers are because of the security reasons, and difficulties in providing accommodation in spite of their perception that the females are more trustworthy and keen for work than males.

7.3.4. Marital status of the persons to be trained

The highest percentage of proprietors (irrespective of estate size) preferred to recruit married persons to unmarried persons because latter tend to visit their homes very often. About 30% of proprietors expressed that marital status is immaterial for them.

7.3.5 Educational background of the trainees

Table 43. Educational qualifications of the persons to be trained

Extent on the estate (ac)	Level of education			Total
	Primary	G.C.E.(0L/AL)	Diploma (Agric)	
20-50	5 (14)	26 (72)	5 (14)	36
≥ 50	3 (5)	41 (70)	15 (25)	59
Total	8 (8)	67 (71)	20 (21)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(2)} = 3.495, P = 0.174$$

Irrespective of the extent of the estate, the highest percentage of proprietors (70%) expressed that the youths should have at least General Certificate of Education (Ordinary Level or Advanced Level). However, they do not want to recruit youth having good grading for G.C.E. (AL) as they may not remain in the estate sector jobs. About 25% of the proprietors of over 50 ac estates and about 15% of proprietors of 20-50 ac estates prefer to recruit diploma holders in Agriculture..

Further, most of owners felt that the knowledge in biology, enthusiasm for agriculture, good family background, ability to speak in English, and personality are additional factors to be considered in selecting Farm Managers. Thus it suggests that the ideal educational qualification of the persons to be selected for the training would be three passes in G.C.E (AL) bioscience or Diploma in Agriculture.

7.3.6. Other qualities of the persons to be trained

The majority of the proprietors (>80%) preferred to take a Farm

Manager outside the areas of their estates while others mentioned that they do not mind persons from an area close to their estates. The advantage of having a person from outside the area of the estate is that his involvement with the villagers is less and he would be able to get work done from the labourers more efficiently. This implies it is necessary to select the youths for the training from different areas. The highest percentage (92%) of the owners of large estates wanted the Farm Manager to live on the estate (Table 44). The percentage of proprietors of the medium size estates that wanted that the Farm Managers to live on the estate was 67%.

Table 44. Preference of the proprietors about residence of Farm Managers

Extent on the estate (ac)	Choice of the proprietors		Total
	Live on property	Live outside	
20-50	24 (67)	12 (33)	36
≥ 50	54 (92)	5 (8)	59
Total	78 (82)	17 (18)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 9.404, P = 0.002$$

Proprietors were also requested to indicate whether they need Farm Managers on full time or part time basis. The results indicate that the requested type of service was significantly associated with the extent of estate (Table 45).

Table 45. Type of the service of the Farm Managers

Extent of the estate (ac)	Choice of the proprietors		Total
	Full time basis	Part time basis	
20-50	22 (61)	14 (39)	36
≥ 50	52 (88)	7 (12)	59
Total	74 (78)	21 (22)	95

(Values in parenthesis are row percentages)

$$\chi^2_{(1)} = 9.483, P = 0.002$$

About 90% of the proprietors of over 50 ac estates indicated that they require Farm Managers on full time basis. The percentage of owners of 20-50 ac estates who indicated that they require full time basis was about 60%.

7.4. Areas to be included in the training course

All the owners expressed that the training should cover all the aspects of coconut cultivation such as selection of seed nuts, raising coconut nursery, application of fertilizer, and other cultural practices etc. Apart from good biological knowledge of cultural practices, the Farm Managers should also be able to demonstrate to workers the cultural practices in the field. Therefore, more emphasis should be given to offer the trainees a rigorous practical training on all aspects of coconut cultivation.

In addition to the above, the proprietors were asked whether certain modules to be included in the course content. Their responses are shown in Table 46.

Table 46. Percentage of proprietors who mentioned that the following modules to be included in the course content

Type of the module	Response of the proprietors having estates of	
	20 - 50 ac	≥ 50 ac
❑ Intercropping	90%	90%
❑ Animal husbandry	68%	60%
❑ Maintenance of accounts and ledgers	40%	55%
❑ Labour management	20%	45%
❑ Coconut processing	22%	37%
❑ Selling of nuts	11%	20%
❑ Ornamental fish	6%	2%

Results suggest that in addition to training on coconut cultivation most proprietors expect good knowledge of intercropping and animal husbandry from the Farm Managers, and it is necessary to include those areas in the course content. Further maintenance of accounts on estate activities, maintenance of check role and labour handling are also necessary to be included in the course.

8. CONCLUSIONS

More than 80% of the coconut estates (> 20 ac) is with absentee landlords and about 60% is owned by large-scale businessmen and professionals in various disciplines. The time available for those proprietors to their coconut estates is restricted by their main occupation. Irrespective of the status of the proprietors, the productivity of almost all the coconut estates was below the potential. About 25% of estates are looked after by watchmen while rest of the estates are looked after by supervisors. About 95% of the watchmen and 65% of the supervisors had never participated in a training program on coconut cultivation conducted by the Coconut Research Institute (CRI) or Coconut Cultivation Board (CCB). Almost all the proprietors have realised that in addition to uncontrollable factors such as thieving, the lack of competent caretakers is a major factor for poor standard of estates. Consequently, they were not able to achieve the potential yield from the coconut palms.

Most of the caretakers were not competent to correctly implement the recommendations of the CRI. The percentage of estates, which maintained at least one of the cultural practices such as amount and method of fertilizer application, maintenance of mulch, huskpits, cover crops and contour drains satisfactorily was very low (25%). The combined effect of the correct amount and application of fertilizer, maintenance of cover crops, husk pits and contour drains significantly influenced keeping the estates in satisfactory level. Incorrect use of these methods significantly influence to reduce the yields and so increase the gap between actual and potentials.

There is an actual demand for Farm Managers trained by the CRI. The demand for Farm Managers was significantly associated with the extent of estate. About 25% of proprietors from over 50 ac and 33% from 20-50 ac estates

urgently need to take a trained person as a caretaker. The majority of both groups of estates expressed that they would consider taking such a Farm Manager, once a vacancy arises.

Males between 25-30 years of age having at most three passes of GCE (AL) with bioscience and with or without experience in coconut cultivation is the best group to be selected for the training, according to the preference of the proprietors. Further, most of the proprietors felt that the enthusiasm for agriculture, good family background, and personality are additional factors to be considered in selecting Farm Managers. In addition to training on all the aspects of coconut cultivation, intercropping and animal production, the course should also aim to give good training on other estate activities such as maintenance of accounts, check role, labour management and the use of machinery for various operations on coconut estates.

It is therefore recommended to train a batch of 25 youth for a period of three months on full time basis as soon as possible. The practical training should be arranged both at CRI and the private estates.

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