AN ANALYSIS OF CHANGE IN THE CROPPING PATTERN IN KERALA WITH PARTICULAR REFERENCE TO THE SUBSTITUTION OF COCONUT FOR RICE 1960-61 to 1978-79

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CONTENTS

INTRODUCTION:

There are two kinds of agricultural land in Kerala,
wet-land and garden-land. The land surface is interspersed
with hills and valleys. This undulating terrain causes the
water to drain off the hills and accumulate in the valleys.
Wet-lands are low-lying lands, particularly in the valleys,
where there is an abundance of water in the soil through
out the year. Garden lands are found on the slopes and hill
tops where water is not so abundant, particularly during the
summer months. Rice is the main crop grown on the wet lands,
whereas coconut is the predominant garden land crop. Rice
and coconut are also the most important crops, in terms of
area, grown in the state, as is seen from the table 1. But,
whereas coconut and certain other garden land crops (eg.
arecanut, banana) can be grown on the wet lands, rice is not
normally grown on the garden lands.[1]

Over the past two decades in Kerala, the cropping
pattern has been shifting in favour of garden land crops
vis-a-vis wet land crops, i.e., the proportion of area under
wet land crops, particularly paddy, to gross cropped area has
been gradually falling while that of garden land crops, parti-
cularly coconut, has been rising.[2]

Table 1: <u>Proportion of Area to Total Cropped Area, Rice and
Coconut, 1974-75 (percentages)</u>

Districts	Rice	Coconut
1. Trivandrum	16.19	31.33
2. Quilon	13.69	28.46
3. Alleppey	39.41	32.68
4. Kottayam	13.17	18.82
5. Ernakulam	33.02	24.55
6. Trichur	44.28	23.30
7. Palghat	52.35	8.82
8. Kozhikode	26.42	32.28
9. Canannore	27.63	26.03
10. Kerala	29.11	24.71

Note: Area in Idukki is redistributed between Kottayam
and Ernakulam, that of Malappuram between Palghat
and Kozhikode according to the proportion derived
from a three year average prior to the formation
of the new districts.

Source: Area figures from <u>Statistics for Planning</u>, Bureau
of Economics and Statistics, Government of Kerala,
1977.

A shift in area away from paddy has important impli-
cations with regard to employment and income distribution
in the State.

Kerala has a chronic unemployment problem. The
average number of days not worked for men workers belonging
to rural labour households was the highest in Kerala in
1964-65 and 1974-75, increasing within this period from 138
days to 170 days.[3] Besides, "a good percentage of the labour
force in agriculture is underemployed, as employment is seasonal
and agriculture is dominated by perennial crops".[4] Rice culti-
vation is a major source of employment in the State. The labour
input into paddy is very large and it is cultivated nearly wholly
by hired labour, as we shall see later in our study. On the
other hand, labour requirements of garden land crops, such as
coconut, are minimal (though a fairly large part of these are
also met by hired labour). It is noteworthy in this respect
that not only large land holdings but holdings in the small
size groups also cultivate paddy predominantly with hired labour.
(See Table 2). These holdings, which have bulk of their work
done by wage labour, are more likely to shift away from paddy
cultivation because of the predominant labour costs (as we
shall see later). A decline in the area under paddy cultivation,

Table 2: <u>Proportion of Family Labour Input to Total</u>
<u>Human Labour Input in Paddy Cultivation</u>. (Percentage)

Size Group (Acres)	Alleppey	Quilon	Region
0 - 1.0	29.84	36.36	32.10 (67.90)
1.0 - 2.5	21.57	26.19	24.24 (75.76)
2.5 - 5.0	15.92	15.49	15.68 (84.32)
5.0 -10.0	10.88	16.84	12.69 (87.31)
10.0 -15.0	9.55	9.13	9.46 (90.54)
15.0 -25.0	7.55	9.69	7.68 (92.32)
Above 25.0	3.25	-	3.25 (96.75)
ALL	8.94	15.50	10.35 (89.65)

Note: Figures in parenthesis show proportion of hired
labour to total human labour input.

Source: <u>Studies in the Economics of Farm Management - Kerala,</u>
<u>1964-65</u>, Directorate of Economics and Statistics,
Ministry of Food, Agriculture, Government of India, 1972

in such a situation, will further accentuate the problem of

unemployment and underemployment.

A related issue is that of changes in income distribution

between owner cultivators[5]/and agricultural labourers which may

come about with the shifts in area under cultivation away from

paddy to other crops, say coconut. The share of wages in
gross value of output is much higher in paddy cultivation
than in coconut: it is only 14.00% for coconut cultivation,
while it is 32.12% in the case of paddy.[6/] The share of
output and income going to wage-labour will, therefore,
decline if area shifts aways from paddy and the income dis-
tribution will, consequently, shift in favour of cultivators.

Rice is also the staple food of the people of Kerala.
Kerala has never been self-sufficient in food, but this
decline in wet land cultivation could further deteriorate
the food situation in the state if supplies from elsewhere
are not readily available. This, however, is more a political
question, since in principle it is possible to import rice
from other states.

Thus, the decline in area under rice-cultivation has
important implications with regard to the employment situation,
income-distribution and self-sufficiency of food in the State.
The problem of movement of area away from rice is, therefore,
the focus of our study. Taking rice and coconut as crops
representative of wet-land and garden land crops,[7/] respectively,
an attempt is made here to analyse the reasons for shift in area
from the former to the latter. The employment problem emanating
from such a shift is also briefly discussed.

The general trend in the cropping pattern changes in
Kerala during the last two decades is the starting point of
our analysis. The focus of Chapter I is to establish empiri-
cally the movement of area away from rice and also to provide
some evidence, even though suggestive, of the extent of the
area under paddy being substituted by garden land crops,
particularly coconut.

Having done so, we move on to discuss the reasons for
such a shift. Chapter II provides the rationale for this
in terms of relative profitability of coconut and paddy culti-
vation, where we find that the former is more profitable due
to substantial differences in costs of these two crops. The
comparisons are here made on the basis of data for a single
year.

In Chapter III we analyse the costs of cultivation
and its constituents in order to ascertain the factors that
cause substantial differences in costs and hence profitability
in the growing of these two crops. Labour cost is identified
as the crucial factor causing this difference due to the greater
physical input of labour in rice cultivation.

The profitability of a crop is determined by input costs
and output prices. Ideally one would like to have estimates of

profitability for different points of time, so as to see
if it has been shifting over time for the two crops and
juxtapose it with the observed cropping pattern shift.
Unfortunately, data are available for computing relative
profitability only for one time point (rice 1973.74,
coconut 1974.75). We shall, however, try to fill in this
gap by examining the trends in input and output prices,
in Chapter IV, over the last two decades to determine
whether the higher profitability of coconut cultivation
is a phenomenon specific to the input costs and output
prices in these particular years or the culmination of
long term changes in these components of profitability.

NOTES AND REFERENCES:

1. Single-cropped, "dry-land" paddy is, however, grown
   on the slopes, but it constitutes a very nominal pro-
   portion of the gross cropped area under rice, 5.6 per
   cent in 1975-76. Extent of 'dry-land' paddy is obtained
   from Season and Crop Reports, 1975-76, Bureau of Economics
   and Statistics (BES), Trivandrum, Table XIII, p.12

2. There are certain problems related to the area statistics
   for certain crops and we shall discuss these problems in
   Chapter 1, where we discuss this shift in cropping pattern.

3. Rural Labour Enquiry, 1974-75, Summary Report on Wages
   and Earnings, and Employment and Unemployment of Rural
   Labour Households, Labour Bureau, Ministry of Labour,
   Government of India, Chandigarh.

4. Draft Sixth Five Year Plan 1980-85 and Annual Plan 1980-81,
   Vol.I, State Planning Board, Trivandrum, Government of
   Kerala, 1980 p.1.

5. The proportion of tenant cultivators, if any, would be
   minimal since the incidence of tenancy in the state is
   low.

6. This has been calculated from village level data on the
   costs of cultivation of paddy and coconut collected by
   the Department of Economics, University of Kerala under
   the "Comprehensive Scheme to study the Cost of Cultivation
   of Principal Crops in Kerala" at the instance of the Ministry
   of Agriculture, Government of India. The details regarding
   this data are discussed in Chapter 2.

7. We choose these crops because they are the major crops
   among the wet and garden land crops (in terms of proportion
   of area) and also because detailed data is available only
   for these crops.

CHAPTER I: CHANGES IN CROPPING PATTERN

The cropping pattern of an area is determined by factors such as temperature, moisture availability during the summer months, drainage conditions during the rainy season, and the availability of sunlight.[1/] Altitude, rainfall, soil type and topography individually or combined together determine these factors.

Kerala falls under the heavy rainfall region receiving rain from both the South-West and North East monsoons. The great variety of crops grown in Kerala is due to the topographical features of the region. The land surface is interspersed with hills and valleys. The water runs off the hill tops and slopes and gets accumulated in the valleys. Thus on the hill tops and upper slopes crops that tolerate low moisture conditions, especially in the summer months, can be grown. On the slopes, moisture preferring crops (eg. coconuts, arecanuts) and in the valleys crops that tolerate an abundance of water (eg. paddy) will do better.

"The land mass of Kerala can be distinguished into three broad natural physiographic divisions, namely Highlands, Midland and Lowland, each of them running parallel from South to North".[2/]

Plantation crops such as tea, coffee, cardamom and rubber are grown on the Highlands.[3] The Low lands[4] have near-level topography and sandy to sandy loam soil. Paddy is grown on the low lying lands or fields, and coconut and arecanut are grown on the garden lands. The Midlands[5] have undulating terrain. Rice is grown in the valleys and on the terraced slopes, while moisture preferring crops like coconut and arecanut are grown on the belt of land immediately above the paddy fields and on the slopes.

For our purposes we shall classify the crops into three broad groups wet land crops (mainly rice), garden land crops (mainly, coconut, arecanut, tapioca, pepper, cashewnut and fruits) and plantation crops (tea, coffee, rubber and cardamom). We shall be concerned primarily with the first two groups of crops. Of these rice, constituting 29.1 percent and coconut constituting 24.7 per cent of the total cropped area in 1974-75, are the two dominant crops in the State.[6]

The general pattern of change in the cropping pattern in Kerala over the past two decades is that the proportion of area under wet land crops, particularly of rice, in total cropped area is declining and that of garden land crops is

rising. The main aim of this chapter is to establish the
fall in area under rice and to discuss the possibilities
of substitution of coconut on this land.

This chapter is divided into four sections. A brief
discussion of the broad trend in the cropping pattern in
Kerala between 1960-61 and 1978-79 is given in Section 1.
We discuss changes in rice area in detail in Section 2, and
establish that the actual physical area under rice has fallen
in recent years since this is a necessary condition to argue
that the substitution of coconut for rice is taking place.
Section 3 discusses the changes in area under coconut and
juxtaposes this with the changes in area under rice seen in
the earlier section. Finally, we discuss the possibilities
of substitution of coconut for rice in Section 4. Certain
problems related with the estimates of area of different crops
are discussed in Appendix 1 to supplement the discussion.

Section 1

The broad trend in the cropping pattern in Kerala
between 1960-61 and 1978-79 has been that the area under wet
land crops, particularly paddy, as a proportion of total area
has been falling, whereas that under garden land crops, parti-
cularly coconut, has been increasing. In this section we will

study this broad trend in terms of area under each crop as
a proportion to total gross cropped area.

All-Kerala figures show that the predominant crops
in terms of proportion to total area, besides rice, is
coconut. Whereas rice constituted 33.2 percent of total
area in 1960-61, coconut constituted 21.3 percent. Of the
other crops tapioca constituted 10.3 percent and plantation
crops such as tea, coffee, rubber together constituted 7.5
percent in the same year. Other crops in order of their
proportions to total area in 1960-61 were mangoes and
plantains, pepper, arecanut, cashewnut and cardamom.[7]
(Table 1.1)

By 1974-75[8] the proportion of area under rice had
fallen to 29.1 percent and that under coconut had increased to
24.7 percent. Tapioca remained more or less unaffected at
10.5 percent. Tea, Coffee and Rubber increased to 9.1 percent.
The relative importance of pepper declined. At the All-Kerala
level the other crops that gained relatively are arecanut
cashewnut and cardamom. Mangoes and plantains together lost
relative area.

A similar pattern-of fall in the proportion of area
under rice and a rise in that under coconut and certain

Table 1.1: Proportion to Total Cropped Area (Percentages)

	Trivandrum		Quilon		Alleppey		Kottayam		Ernakulam	
	60-61	74-75	60-61	74-75	60-61	74-75	60-61	74-75	60-61	74-75
Paddy	19.03	16.19	17.95	13.69	35.78	39.41	12.86	13.17	35.06	33.02
Coconut	27.99	31.33	25.17	28.46	34.17	32.68	18.92	18.82	19.88	24.55
Tapioca	28.95	31.88	22.58	26.41	12.71	7.81	14.24	14.76	7.98	6.75
Pepper	4.24	1.64	2.05	4.07	0.79	1.80	4.53	6.83	3.07	6.16
Cardamom							7.83	11.37	0.47	0.46
Arecanut	1.83	1.86	1.49	2.46	1.03	2.09	1.46	1.00	1.83	3.27
*Fruits	4.06	4.55	7.86	4.17	3.67	3.08	3.62	5.98	4.05	3.93
Cashewnut	2.33	1.81	3.47	2.30	1.33	1.48	0.72	0.49	2.93	2.61
Groundnut	0.33	-	-	-	-	-	-	-	-	-
Tea, Coffee, Rubber	2.13	3.58	9.64	9.30	0.88	1.56	23.09	22.16	7.24	9.22

Table 1.1: Proportion to Total Cropped Area (Percentages)

	Trichur 60-61	Trichur 74-75	Palghat 60-61	Palghat 74-75	Kozhikode 60-61	Kozhikode 74-75	Canannore 60-61	Canannore 74-75	Kerala 60-61	Kerala 74-75
Paddy	51.92	44.23	60.33	52.55	30.24	26.42	35.77	27.63	33.16	29.11
Coconut	18.30	23.30	5.80	8.82	27.79	32.28	18.10	26.03	21.32	24.71
Tapioca	3.90	3.50	1.05	6.23	5.31	4.72	2.65	2.33	10.31	10.50
Pepper	0.35	1.76	1.07	0.99	4.49	4.74	16.15	8.72	4.25	3.91
Cardamom	-	-	0.56	0.46	0.30	0.22	3.18	4.48	1.22	1.54
Arecanut	2.10	6.14	1.68	1.80	5.04	4.77	0.14	0.11	2.31	3.07
*Fruits	3.92	4.10	4.11	3.35	4.66	3.25	5.85	3.12	4.43	3.63
Cashewnut	4.51	2.76	1.02	2.50	2.91	3.93	2.46	12.30	2.31	3.46
Groundnut			4.83	4.29					0.68	0.58
Tea Coffee, Rubber	3.40	3.81	2.40	3.82	8.51	17.47	4.93	7.45	7.55	9.13

Note: *Fruits include mangoes, bananas and plantains

Source: Derived from the Area under the various crops and total cropped area given in:

(i) Agricultural Statistics in Kerala, Bureau of Economics and Statistics, Government of Kerala, 1975.

(ii) Statistics for Planning, Bureau of Economics and Statistics, Government of Kerala, 1977.

other garden land crops is seen at a disaggregated level
also, district-wise (Table 1.1), except in Alleppey and
Kottayam where the proportion of area under rice actually
increases during this period.

In the next section we discuss in detail the changes
in area under rice, since it is the predominant wet land crop
and seems to be losing area. We shall then go on to discuss
changes in coconut area, juxtapose the two, and attempt to
see if there is any possible link between the observed trends
in the area of these two crops.

Section 2

Official sources of statistics on the area under rice
give us only the total gross cropped area under rice in each
year, not the net sown area (i.e., the actual physical area
under rice cultivation). One problem arising out of this is
that we are unable to distinguish between the increase in
gross area due to multiple cropping and that due to actual
increase in physical area (i.e. in net area) under rice from
the published figures. This is crucial to our enquiry, as we
are interested in knowing if there has been any substitution
on paddy-lands and whether there has been, therefore, a fall

in net area under rice. Fortunately, we have been able
to obtain some estimates of the net area under rice and
the intensity of cultivation for three time points.

In this section we shall first focus on the changes
in gross cropped area and relative area (i.e., proportion to
total area) of rice. Our aim here is to identify the various
phases of change and the districts in which this change has
been most marked. We shall then present the figures on net
sown area and intensity of cultivation for the three time
points available and, based on this, try to interpret the
changes we observed earlier in the gross cropped area.

In general the gross area under rice has been declining
in both absolute (actual area) and relative (as a proportion
to total area) terms. However, while proportion of area under
rice to total area started to fall in the early 1960's, the
area started to decline in absolute terms only in the mid
1970's.

Looking at the absolute gross area under rice we discern
three broad phases: (1) 1960-61 to 1968-69 when the area under
rice increased sharply, (2) 1969-70 to 1974-75 when the area
under rice tended to stagnate, neither falling nor rising very

Table 1.2: <u>Area under Rice (Hectares) and Proportion to Total Cropped Area (Percentages)</u>

Years	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Canannore	Kerala('000)
1960-61	37417 (19.03)	46143 (17.95)	79389 (35.78)	39965 (12.86)	77894 (35.06)	102197 (51.92)	192108 (60.33)	108115 (30.24)	95698 (35.77)	778.91 (33.16)
1961-62	36411 (18.41)	44989 (17.46)	76125 (34.38)	38706 (12.34)	74150 (34.00)	93435 (49.41)	191204 (60.03)	105250 (29.43)	92434 (34.58)	752.69 (32.15)
1962-63	38531 (19.45)	49691 (18.33)	82302 (37.16)	40775 (12.73)	83584 (38.50)	108218 (53.04)	194439 (59.10)	111242 (30.21)	83895 (27.31)	802.66 (32.82)
1963-64	38789 (19.78)	49605 (17.91)	82320 (37.38)	40691 (12.60)	83560 (35.14)	108493 (53.60)	194862 (60.10)	111042 (30.96)	95738 (30.68)	805.08 (32.71)
1964-65	38602 (19.57)	49469 (17.75)	81911 (37.27)	40775 (12.44)	83040 (35.04)	107586 (53.84)	194666 (58.44)	109844 (29.58)	95228 (30.04)	801.12 (32.18)
1965-66	38734 (18.79)	49637 (17.26)	81603 (36.71)	40530 (12.11)	83460 (33.80)	108807 (52.20)	195121 (57.70)	110193 (28.67)	94244 (29.22)	802.33 (31.44)
1966-67	39036 (18.11)	50057 (16.84)	81087 (35.87)	39732 (11.32)	84172 (32.20)	108844 (50.85)	194826 (56.35)	108806 (27.76)	92878 (29.12)	799.44 (30.52)
1967-68	39583 (16.44)	50378 (15.10)	81708 (35.52)	41008 (11.56)	85987 (31.52)	108967 (49.53)	196968 (54.90)	111294 (26.91)	93651 (28.42)	809.54 (29.36)
1968-69	39962 (16.99)	51785 (14.99)	86713 (36.76)	49886 (13.33)	93994 (34.23)	114371 (49.60)	211352 (55.10)	125155 (29.12)	97653 (28.44)	873.87 (30.63)
1969-70	39489 (16.74)	51884 (14.74)	85240 (36.09)	50081 (13.44)	93691 (33.40)	113311 (47.93)	211326 (54.31)	130384 (29.26)	98653 (26.83)	874.06 (29.97)
1970-71	39496 (16.25)	51884 (15.20)	85162 (36.68)	50033 (13.45)	93691 (33.93)	115267 (46.90)	211419 (54.30)	129186 (27.73)	98692 (26.95)	874.93 (29.84)

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Table 1.2: Area under Rice (Hectares) and Proportion to Total Cropped Area (Percentages)

Years	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Cannanore	Kerala('000)
1971-72	39496 (15.83)	51729 (14.52)	85162 (36.52)	50033 (13.63)	93691 (32.90)	115267 (47.00)	211393 (53.34)	129683 (27.75)	98702 (27.52)	875.16 (29.58)
1972-73	39486 (15.86)	51155 (14.24)	91131 (38.45)	50209 (13.34)	94046 (33.13)	110492 (45.32)	210890 (52.81)	128338 (27.08)	97957 (26.92)	873.70 (29.26)
1973-74	39765 (16.28)	51189 (13.78)	92039 (38.35)	50086 (13.25)	94338 (32.70)	109914 (44.70)	211755 (52.80)	127624 (26.68)	98065 (28.02)	874.68 (29.16)
1974-75	39926 (16.19)	51686 (13.69)	96459 (39.41)	49920 (13.17)	95561 (33.02)	108966 (44.23)	213653 (52.35)	127339 (26.42)	97961 (27.63)	881.46 (29.11)
1975-76	37447 (15.80)	53053 (15.36)	96316 (40.68)	50826 (14.41)	108223 (35.94)	126426 (51.17)	201828 (52.36)	117437 (23.84)	84466 (22.04)	876.02 (29.38)
1976-77	37976 (15.71)	49657 (14.78)	88591 (39.13)	55851 (15.61)	108447 (36.63)	118065 (50.76)	199412 (53.29)	114916 (23.06)	81459 (21.99)	854.37 (29.13)
1977-78	34529 (15.22)	50383 (15.52)	90907 (41.10)	49326 (14.58)	107250 (34.23)	119768 (51.19)	199312 (52.20)	110376 (22.24)	78523 (20.26)	840.37 (28.74)
1978-79	33080 (14.67)	50815 (16.54)	75501 (36.12)	41158 (12.16)	105287 (32.97)	115787 (48.74)	199666 (51.89)	105118 (21.97)	72825 (18.91)	799.24 (27.70)

Note: 1. Area in Idukki redistributed between Kottayam and Ernakulam, that of Malappuram between Palghat and Koshikode according to the proportions derived from a three year average prior to the formation of the new districts.

2. Figures in parenthesis refer to proportion to Total Cropped Area.

Source: (i) Agricultural Statistics in Kerala, Bureau of Economics and Statistics, Government of Kerala, 1975
(ii) Statistics for Planning, Bureau of Economics and Statistics, Government of Kerala, 1977.
(iii) Unpublished data for the latest period obtained from the Bureau of Economics and Statistics, Government of Kerala, Trivandrum.

perceptibly, (3) 1975-76 to 1978-79 when the area under rice fell sharply.

The absolute area under rice showed a 13.0 percent increase between 1960-61 and 1974-75, in the State as a whole, of which 12.2 per cent increase took place between 1960-61 and 1968-69. Between 1974-75 and 1978-79, it dropped by 9.0 per cent. (Table 1.2). District-wise data showed a similar trend.

Table 1.3: <u>Percentage Change in Gross Area under Rice</u>

Districts	1960-61 to 1978-79
1. Trivandrum	(-) 11.59
2. Quilon	(+) 10.13
3. Alleppey	(+) 14.51
4. Kottayam	(+) 23.41*
5. Ernakulam	(+) 35.17
6. Trichur	(+) 13.30
7. Palghat	(+) 3.93
8. Kozhikode	(-) 2.77
9. Canannore	(-) 23.90
10. Kerala	(+) 2.61

*Refer to the period 1960-61 to 1977-78. There is a sudden fall in area in 1978-79 in Kottayam which is uncharacteristic of the rest of the period under study.

Source: Derived from Table 1.2

The districts can, however, be classified into two groups: The first experiencing a significant increase in gross area under rice for the entire period 1960-61 to 1978-79; and the second, where the increase in area was relatively small or negative, (Table 1.3). Ernakulam, Kottayam, Alleppey, Trichur and Quilon fall within the first group; Canannore, Kozhikode, Palghat and Trivandrum within the second.

The second group of districts show a greater tendency to shift away from rice cultivation than the first. Within the second group of districts, the northern most districts of Canannore and the Southern most district of Trivandrum show the sharpest fall in area.

The above discussed changes in absolute area of rice may simply be a reflection of similar changes in total area cultivated in each district. In order to abstract the changes in absolute area of rice from total area changes we shall look at the changing proportions of rice area to total area cultivated in various districts. The idea is to identify clearly the cropping pattern changes away from rice, if there was any such change.

In 1960-61 area under rice occupied 33.2 percent of the total area under cultivation in the whole of Kerala. This

proportion declined through out the period under study till
it reached 27.7 percent in 1978-79, i.e., the proportion of
rice in the total area sown declined by 5.5 per cent. 3.2
percent of this fall occurred between 1960-61 and 1969-70
and 1.4 percent between 1976-77 and 1978-79. Between 1969-70
and 1974-75, the proportion of area under rice stagnated around
29.5 percent (Table 1.2)

Table 1.4: **Changes in Proportion of Rice Area to Total
Cropped Area (Percentage Points)**

Districts	1960-61 to 1968-69 (1)	1960-61 to 1978-79 (2)
1. Trivandrum	(-) 2.04	(-) 4.36
2. Quilon	(-) 2.96	(-) 1.14
3. Alleppey	(+) 0.98	(+) 0.34
4. Kottayam	(+) 0.47	(+) 1.72*
5. Ernakulam	(-) 0.83	(-) 2.09
6. Trichur	(-) 2.32	(-) 3.18
7. Palghat	(-) 5.23	(-) 8.44
8. Kozhikode	(-) 1.12	(-) 8.27
9. Canannore	(-) 7.33	(-) 16.86
10. Kerala	(-) 2.53	(-) 5.46

*Refers to the period 1960-61 to 1977-78

Source: Derived from Table 1.2
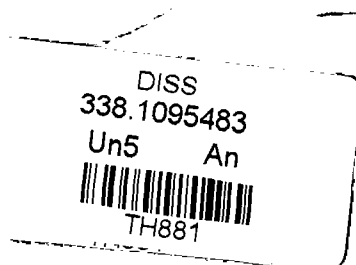
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A similar pattern is observed in the case of most
of the districts (Table 1.2) Of the districts, Canannore,
Kozhikode, Palghat and Trivandrum show a continuous fall
in the proportion of area under rice from 1960-61 to
1978-79 (Table 1.2). They also show the maximum fall in
relative area under rice (Table 1.4 Col. 2). Alleppey
and Kottayam, on the other hand, show an almost continuous
increase in relative area under rice, except for a drop in
the last year (Table 1.2).

Thus the relative area under rice falls during the
entire period (1960-61 to 1978-79) in most of the districts.
But the fall in relative area before 1974-75 and after should
be interpreted differently. Within the period 1960-61 to
1974-75, the maximum fall in relative area in most districts
occurred between 1960-61 and 1968-69 (See Table 1.4., Col. 1),
after which it stagnated. Interestingly this phase also
signified the sharpest absolute gross area increase under
rice in most districts, as was seen earlier, This means
that the absolute area under some other crop/crops was
increasing much more sharply, the total area being the sum
total of all area under various crops. After 1974-75, however,
not only the relative area but the absolute gross are under
rice also declined.

Thus we find that the absolute gross area under rice has been falling, particularly in recent years. It's relative importance has also been declining, more so in some districts than in others.

Of the three time points for which we have data on net area under rice, 1969-70 and 1975-76 encompass, the second phase we distinguished earlier, i.e., the period in which the gross area under rice stagnated. Then in this phase, the net area under rice actually fell, but the intensity of cultivation increased nominally causing little change in the gross area under rice (Table 1.5).

Between 1975-76 and 1976-77, which fall within the third phase, there is a sharp fall in net area. Consequently the gross area also falls (Table 1.5). It is not strictly possible to draw inferences from the data relating to two consecutive years, since what is observed may be a phenomenon peculiar to those particular years. But due to lack of data for any other year we interpret this with caution. The fall in net area occurs mainly from single cropped lands (Table 1.5). This, as we shall see in the next chapter, is probably because rice cultivation is less remunerative when only single cropped.

Table 1.5: <u>Net Sown Area, Gross Cropped Area, and Intensity</u>
<u>of Cultivation Under Rice ('000 hectares)</u>

Type of Land	1969-70[1]		1975-76[2]		1976-77[3]	
	Net Area	Gross Area	Net Area	Gross Area	Net Area	Gross Area
Single Cropped land	181.7	181.7	193.3	193.3	156.6	156.6
Double Cropped Land	336.8	673.6	294.5	589.0	291.4	582.7
Triple Cropped Land	6.3	18.9	31.2	93.6	38.4	115.1
Total	524.8	874.2	519.0	875.9	486.4	854.4
Intensity of Cropping of Rice[4].	166.58%		168.77%		175.69%	

Sources: 1. K.N. Syamasundaran Nair "What Ails Rice Production
in High Rainfall Tropics - Kerala - A Case" Presented
to the symposium on 'Rice Research and Development',
Pattambi, 21-23 Dec. 1977.

2. <u>Season and Crop Reports</u>, 1975-76, Bureau of Economics
and Statistics, Government of Kerala, Trivandrum.

3. <u>Season and Crop Reports</u>, 1976-77, Bureau of Economics
and Statistics, Government of Kerala, Trivandrum.

4. Intensity of Cropping of Rice: $\dfrac{\text{Gross Area under Rice}}{\text{Net Area under Rice}} \times 100$

The observed changes in gross-area can now be interpreted
as follows. Between 1960-61 and 1968-69 there was a large increase
in gross area. This was possibly due to increase in the intensity

of cultivation during this period; the actual increase in net area under rice even during this period could not have been very large except for some amount of reclamation of land from 'kayals'. After 1968-69, the increase in intensity of cultivation tapered off, perhaps because most of the land in which multiple cropping was possible had already been brought under cultivation; since net area also fell between 1968-69 and 1974-75, there was stagnation in the gross area under rice during this period. Between 1975-76 and 1978-79 the gross area under rice itself fell, though less sharply in a few districts than in others. This fall could have been due to two reasons-fall in intensity of cultivation, and/or the fall in actual net sown area. It appears unlikely that lands already multiple cropped would be cropped less intensively, unless some other crop was being grown between two crops of paddy. Actually, the intensity of cropping of rice rose between 1975-76 and 1976-77 (Table 1.5), indicating that the lands in rice-cultivation were now mainly the lands that were being more intensively cultivated. Though we do not have data for the subsequent years it is highly probable that the further decline in the gross area under rice has been mainly on account of fall in actual net area, due to diversion of paddy lands under single cropping.

It would be interesting to examine in which districts
or regions this phenomenon of decline in net area under rice
has been occurring. Unfortunately we have district-wise data
on net area under rice for only two consecutive years, 1975-76
and 1976-77. The information we have for earlier years are
confined to the distribution of gross area under rice as bet-
ween the autumn, winter, and summer crops. On Comparing these
latter estimates with the district-wise net area of rice in
1975-76, we obtain, some interesting results as can be seen
from Table 1.6.

Columns (1), (3), (5) in Table 1.6 give the area under
rice in each district in the season in which this area was
highest in 1960-61, 1965-66 and 1969-70; this indicates the
minimum net area under rice for each district in the respective
years. It will be seen that this estimated minimum net area
under rice in these years is significantly higher than the
actual net area in 1975-76 in Canannore; it is higher also
in Palghat, Malappuram, Kozhikode and (to a much smaller extent)
Trivandrum. In Quilon the estimated minimum net area was higher
than the actual in 1975-76, only in 1969-70.

This implies clearly that the net area under rice in the
Northern districts of Canannore, Kozhikode, Malappuram, Palghat

Table 1.6: Net Area in Major Seasons, Loss in Net Area - Rice (hectares)

Districts	1960-61 Major Season (1)	Minimum Loss 1960-61 to 1975-76 (2)=(1) - (7)	1965-66 Major Season (3)	Minimum Loss 1965-66 to 1975-76 (4)= (3)-(7)	1969-70 Major Season (5)	Minimum Loss 1969-70 to 1975-76 (6) = (5)-(7)	1975-76 Net Area** (7)
Trivandrum	18889 (A)	677	19769 (W)	1557	20201 (W)	1989	18212
Quilon	26049 (W)	-	27479 (W)	-	29340 (W)	932	28408
Alleppey	40098 (S)	-	42075 (S)	-	41704 (S)	-	62911
Kottayam ()* Idukki Ernakulam	52795 (W)	-	55397 (W)	-	67073 (W)	-	103729
Trichur	58481 (W)	-	61076 (W)	-	61499 (W)	-	72637
Palghat ()* Malappuram Koghikode	186859 (A)	8386	181432 (A)	2959	180125 (A)	1652	178473
Canannore	67905 (A)	13522	66421 (A)	12038	65897 (A)	11514	54383
Kerala	396132 (A)	-	398012 (A)	-	393747 (A)	-	519064

Note: (A) - Autumn, (W) - Winter, (S) - Summer.

*These districts are clubbed together to make the season-wise area comparable with net area in Col.(7) since Idukki and Malappuram were created only in 1972-73 and 1970-71 respectively.

**Dry-land paddy given seperately has been incorporated into these figures.

Source: 1. Agricultural Statistics in Kerala, 1975, Bureau of Economics and Statistics, Government of Kerala.

2. Season and Crop Report, 1975-76, Bureau of Economics and Statistics, Government of Kerala.

has fallen between 1960-61 and 1975-76, the major part of this fall being after 1965-66, particularly in Canannore. In the Southern districts of Trivandrum and Quilon, the fall in net area has been marked only since 1969-70. In the Central districts it is not possible to say anything regarding this from the available data, though that does not exclude the possibility of some fall in net area even in these districts.

This lends support to our earlier interpretation of the changes in gross-cropped area, that the increase in gross-cropped area noticed in the first phase (1960-61 to 1968-69) was mainly due to increase in the intensity of cultivation and not due to any increase in actual area, particularly in the Northern districts.

Thus we identify the Northern most districts of Canannore, Kozhikode and Palghat as those showing the strongest tendencies to shift land away from rice-cultivation; Trivandrum and Quilon also moved in the same direction.

A fall in net area under rice could mean the following processes were occuring. Land previously under rice-cultivation might now be left fallow, though one would expect

this to be only a transitory phenomenon before the land is
put to an alternative use.[9/] Alternatively, rice might be
substituted by a more remunerative[10/] garden-land crop, like
coconut. Some of the land could also be converted into house
sites, especially since the price of land for house-sites has
been rising sharply in recent years. We are primarily interested
in the first two processes and shall discuss them in the later
sections.

Section 3

The absolute and relative area figures for coconut before
and after 1975-76 are not strictly comparable in magnitude. This
is so for the reason that there are differences in the sample
size[11/] used for estimating the total number of palms in each
district. But the direction of change of the two are comparable.
Hence we shall use the published figures of area, taking care not
to compare the magnitudes of absolute area before and after 1975-76,
but assuming the direction of change after 1975-76 to be correct
and comparable with the direction of change before 1975-76. The
same will hold for the figures of the proportion of area under
coconut to total area.

Looking at the absolute area under coconut for All-Kerala
we see that there was continuous increase in area from 1960-61

to 1976-77. Though it dropped slightly in the last two years, 1977-78 and 1978-79, it is clear that the area under coconut increased by 50.4 percent over this decade and a half, the greater part of this increase (41.4 percent) took place between 1960-61 and 1969-70. (Table 1.7).

At a more dis-aggregated level, Canannore, and Palghat nearly doubled its area under coconut within the period 1960-61 and 1974-75 [12/](Table 1.8). Kozhikode, Ernakulam, Trichur and Quilon, followed by Trivandrum, also show a phenomenal increase in the area under coconut in the same period. The area under coconut continued to increase in Canannore, Palghat and Ernakulam after 1974-75. In Quilon, Alleppey and Kottayam there was a substantial decline since 1974-75 in the area under coconut, and some (though not very significant) decline in Kozhikode and Trivandrum as well.

It will be observed that the major part of the increase in area took place in most districts between 1960-61 and 1968-69 (Table 1.8). The percentage increase in the absolute area under coconut (37.0 percent) was much larger than the increase in the absolute area under rice (12.2 percent) during this period. This is consistent with and explains our earlier observation that the sharp increase in the absolute area along with the fall

Table 1.7: Area Under Coconut (hectares) and Proportion to Total Cropped Area (Percentages)

Years	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Canannore	Kerala (000)
1960-61	55039 (27.99)	64713 (25.17)	75829 (34.17)	58795 (18.92)	44172 (19.88)	35977 (18.30)	18488 (5.80)	99341 (27.79)	48414 (18.10)	500.76 (21.32)
1961-62	55326 (27.98)	64865 (25.17)	77064 (34.81)	58944 (18.80)	44890 (20.60)	37020 (19.60)	18765 (5.90)	99484 (27.81)	48472 (18.14)	504.82 (21.56)
1962-63	55815 (28.17)	70261 (25.92)	68425 (30.90)	63705 (19.89)	44951 (20.70)	34673 (17.00)	20335 (6.20)	114360 (31.06)	66744 (21.72)	539.26 (22.04)
1963-64	56864 (29.00)	70431 (25.43)	69059 (31.36)	64698 (20.03)	46403 (19.52)	35497 (17.53)	20929 (6.45)	113877 (31.75)	67239 (21.55)	544.99 (22.14)
1964-65	58711 (29.77)	73455 (26.35)	70784 (32.21)	67065 (20.45)	46966 (19.82)	36835 (17.75)	21589 (6.50)	113642 (30.61)	69944 (22.07)	558.99 (22.45)
1965-66	61150 (29.66)	74019 (25.74)	75599 (34.01)	71618 (21.40)	51740 (20.94)	37236 (17.85)	22903 (6.80)	118332 (30.79)	73716 (22.86)	586.31 (22.98)
1966-67	61762 (28.65)	77718 (26.15)	77595 (34.33)	70009 (19.95)	59132 (22.60)	40958 (19.13)	25650 (7.42)	120698 (30.80)	76071 (23.85)	609.58 (23.28)
1967-68	70401 (29.23)	80052 (23.99)	79675 (34.64)	70865 (19.98)	59273 (21.73)	41148 (18.70)	27658 (7.70)	131078 (31.69)	78571 (23.59)	638.72 (23.16)
1968-69	73885 (31.41)	85000 (24.60)	81557 (35.58)	78272 (20.92)	62784 (22.90)	48916 (21.21)	32911 (8.60)	132345 (30.80)	90393 (26.32)	686.06 (24.05)
1969-70	67137 (28.46)	91732 (26.06)	82463 (34.92)	75705 (20.32)	63758 (22.72)	50451 (21.34)	34063 (8.75)	138599 (31.10)	93931 (25.55)	707.84 (24.27)
1970-71	76515 (31.49)	92512 (27.11)	81962 (35.30)	74839 (20.11)	64687 (23.36)	54861 (22.32)	33775 (8.67)	146750 (31.50)	93235 (25.46)	719.14 (24.52)
1971-72	77326 (31.00)	104272 (29.26)	82139 (35.23)	70120 (19.11)	70352 (24.70)	54684 (22.37)	34211 (8.63)	148581 (31.79)	88575 (24.69)	730.26 (24.68)

Table 1.꤇: <u>Area Under Coconut (hectares) and Proportion to Total Cropped Area (Percentages)</u>

Years	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Cananore	Kerala ('000)	Corrected figures (Kerala) ('000
1972-73	76194 (30.60)	106798 (29.73)	79941 (33.73)	74737 (19.86)	70880 (24.97)	56869 (23.33)	34552 (8.65)	154235 (32.54)	91223 (25.07)	745.43 (24.96)	
1973-74	76956 (31.50)	106798 (28.75)	79941 (33.31)	71242 (18.84)	70880 (24.57)	56869 (23.13)	35724 (8.91)	155195 (32.44)	91223 (26.06)	744.83 (24.83)	
1974-75	77270 (31.33)	107409 (28.46)	79963 (32.68)	71317 (18.82)	71059 (24.55)	57328 (23.30)	35979 (8.82)	155571 (32.28)	92277 (26.03)	748.17 (24.71)	
1975-76	74074 (31.25)	98073 (28.40)	72824 (30.76)	60577 (17.18)	59789 (19.85)	50699 (20.52)	28237 (7.33)	156474 (31.77)	92198 (24.06)	692.95 (23.24)	751.19 (25.20)
1976-77	79335 (32.83)	93465 (27.81)	64338 (28.42)	59560 (16.65)	65053 (21.97)	50030 (21.51)	29106 (7.78)	161483 (32.41)	92575 (24.99)	694.99 (23.69)	753.36 (25.68)
1977-78	75806 (33.42)	87563 (26.98)	59354 (26.84)	54294 (16.05)	68567 (21.88)	49641 (21.22)	29436 (7.71)	154562 (31.15)	94256 (24.32)	673.48 (23.03)	729.98 (24.97)
1978-79	72775 (32.27)	81381 (26.49)	61814 (29.57)	57009 (16.84)	72779 (22.79)	50690 (21.34)	29551 (7.68)	149087 (31.16)	85541 (22.21)	660.63 (22.89)	

Note: 1. Area in Idukki redistributed between Kottayam and Ernakulam, that of Malappuram between Palghat and Kozhikode according to the proportions derived from a three year average prior to the formation of the new districts.

2. Figures in parenthesis refer to proportion to Total Cropped Area.

Sources: Same as in Table 1.2

Table 1.8: <u>Percentage Changes in Area Under Coconut</u>

Districts	1960-61 to 1968-69	1960-61 to 1974-75	1975-76 to 1978-79
1. Trivandrum	34.24	40.39	(-) 1.75
2. Quilon	31.35	65.97	(-)17.02
3. Alleppey	7.55	5.45	(-)15.12
4. Kottayam	33.13	21.30	(-) 5.89
5. Ernakulam	42.14	60.87	21.73
6. Trichur	35.96	59.33	0
7. Palghat	78.01	94.16	4.65
8. Kozhikode	33.22	56.22	(-) 1.22*
9. Canannore	86.70	90.59	2.23*
10. Kerala	37.00	49.41	(-) 2.82**

*Refers to the period 1975-76 to 1977-78. These
 districts show a slight drop in area in 1978-79
 which is uncharacteristic of the rest of the period.

**Refer to the corrected figures (See Appendix 1) of
 area for the period 1975-76 to 1977-78.

Source: Derived from Table 1.7.

in the relative area under rice during this period was due to

the still sharper increase in area under some other crop/crops;

the data analysed above show clearly that one of these crops was coconut.

In order to abstract this phenomenal increase in area under coconut from the increase in total area, we look at the relative area under coconut i.e., the proportion to total area. The proportion of coconut area to total area increased steadily from 21.3 percent in 1960-61 to 25.7 percent (corrected figures) in 1976-77, a 4.4 percent increase, dropping only slightly in the last two years (1977-78 and 1978-79) for Kerala as a whole (Table 1.7)

Among the districts, Canannore, shows the maximum increase in the relative area under coconut from 1960-61 to 1974-75, followed by Trichur, Ernakulam, Kozhikode and (to a lesser extent) Trivandrum (Table 1.9). These districts continued their increase in relative area under coconut after 1974-75 (though Kozhikode lost relative area in 1977-78 and 1978-79) (Table 1.7)

Thus the phenomenal increase in area under coconut during the period under study, reflected in its gain in relative area also, was to a large extent in the Northern districts.

Juxtaposing the changes noticed in the area under rice, in the earlier section, with the changes in the area under coconut, we observe that whereas rice was losing area both absolutely (net area) and relatively, coconut was gaining. District-wise,

Table 1.9: <u>Changes in Proportion of Coconut Area to</u>
<u>Total Area (Percentage Points)</u>

Districts	1960-61 to 1974-75	1974-75 to 1978-79
1. Trivandrum	3.29	1.02
2. Quilon	3.24	(-)1.91
3. Alleppey	(-)1.49	(-)1.91
4. Kottayam	(-)0.10	(-)0.34
5. Ernakulam	4.67	2.94
6. Trichur	5.00	0.82
7. Palghat	3.02	0.35
8. Kozhikode	4.49	(-)0.61
9. Canannore	7.93	0.26*
10. Kerala	3.39	(-)0.23*

*Refers to the period 1975-76 to 1977-78

Source: Derived from Table 1.7

the northern most districts of Canannore and Kozhikode followed by Palghat and the Southern most district of Trivandrum showed this tendency to shift out of rice cultivation; these districts showed also the greatest growth in area under coconut.

In the next section we shall consider whether we can conclude from these two facts that coconut was being substituted for rice, particularly in these districts.

Section 4

Common observation as we travel through the State and certain indirect evidence suggest that rice is being substituted by coconut. In this section we analyse the possibility of this process occurring.

Travelling through the State of Kerala we commonly observe two facts. One, the extent of paddy lands being left fallow has increased considerably in recent years. And two, coconut, and sometimes banana, are being cultivated on paddy lands.

Our observation regarding the increase in fallow lands is substantiated by the data on current fallows (Table 1.10). The area under current fallows were falling consistently from 1960-61 to 1974-75 in all districts; then there was a sudden increase in the land left fallow in 1975-76 and this has continued to increase thereafter in all districts upto 1978-79.

Alleppey has shown the maximum increase in current fallows during recent years, increasing more than 600 percent between 1974-75 and 1978-79.[13/] Other districts showing remarkable growth in fallows are Trivandrum, Quilon, Trichur and Palghat. It is significant that Alleppey, Trichur and Palghat are districts which had the longest proportion of their area under rice-cultivation.[14/] Alleppey, though it did not register much of a shift in the cropping pattern, as we saw earlier, outstrips all other districts

Table 1.10: Current Fallow (hectares)

Years	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Canannore	Kerala ('000
1960-61	2713	.3709	5935	7041	6910	4624	9297	15425	11468	67
1961-62	2239	3413	5935	6698	7112	4325	9572	15335	11737	66
1962-63	2238	2218	3439	5986	3214	2455	7857	12733	3741	44
1963-64	1856	1709	1924	4818	2646	1808	8600	10792	3956	38
1964-65	1169	1869	639	3648	2178	1007	9341	8278	6605	35
1965-66	1085	1570	790	2945	1820	1630	8760	8200	6420	33
1966-67	597	1384	600	1815	2255	1860	7798	5044	5093	26
1967-68	466	1384	494	1815	2255	1860	5044	5093	4922	23
1968-69	281	480	344	3159	2883	1847	4197	5492	4471	23
1969-70	253	425	458	3258	3204	1681	4281	5410	4272	23
1970-71	273	398	568	3462	3229	1581	4430	5261	4431	24
1971-72	263	434	528	3381	3189	1765	4564	4905	4350	23
1972-73	239	399	594	4665	4773	1554	4224	4460	4756	26
1973-74	231	488	561	5429	6230	1744	4418	4585	4266	28
1974-75	224	484	530	4410	4794	1546	4327	4186	3888	25
1975-76	1304	1313	1475	2852	5458	3583	8528	3983	7172	37
1976-77	1172	1654	2013	2765	5046	4067	9640	4495	6557	37
1977-78	2411	1834	5435	4576	4527	4501	10264	6564	5999	46
1978-79	1261	1917	3817	4553	4113	4266	10213	6885	5221	42

Note: Area in Idukki redistributed between Kottayam and Ernakulam, that of Malappuram between Palghat and Kozhikode according to the proportions derived from a three year average prior to the formation of the new districts.

Source: Same as in Table 1.2

in its increase in current fallows. A possible reason for this could be that the wet lands cultivated in this region are not convertible into garden lands, being mainly 'kayal' lands and in certain areas below sea level. Hence the only option available to farmers if they do not wish to cultivate rice is to leave it fallow.

As observed in Section 2, land left fallow will not permanently be left as such. Current fallows can only be a transitory phenomenon before the land is put to an alternative use. One such use is to cultivate a more remunerative crop, like coconut, on the land.

There are two commonly observed ways in which paddy lands are converted into coconut gardens. Coconut saplings are planted on the bunds of the paddy fields. This also helps to strengthen the bunds. Gradually these bunds are widened and another row of coconut saplings are planted and this goes on till the whole field is converted into a raised coconut garden. In the second method, the land is raised in mounds within the paddy fields at regular intervals from each other and coconut saplings are planted on them . As these plants reach a certain stage in their growth, more such mounds are raised till the whole plot is converted into a coconut garden.

The advantage of these two methods is that in the period before the coconut palms mature, paddy continues to be planted and harvested between the bunds or mounds so that the gestation period when no income is forthcoming from coconut is shortened. The initial investment involved in this process is also limited.

In the earlier discussion on the topographical features of Kerala and its impact on the cropping pattern (See introduction to the chapter) it was observed that rice was grown under varied topographical conditions - in the flat landscape of the low lands, in the valleys, and in the terraced slopes of the Midlands. Coconut is a crop which prefers moist soil conditions, and can be grown in all these conditions as well. Hence, topographically, it is possible for rice to be substituted by coconut in the low lands and in the valleys and terraced slopes of the Midlands. At the same time coconut can substitute, besides rice, other garden land crop such as arecanut, pepper, cashewnut, tapioca etc. on the slopes of the Midlands.

Besides common observation and the topographical possibilities the data we have analysed so far indicate this trend towatds such substitution on paddy lands. It was seen that the net area under rice has been falling from the early 1960's.

in some districts, but more markedly in recent years. On the other hand, coconut has been gaining rapidly throughout the period. Besides, the districts which showed the greatest tendency to shift away from rice experienced also the greatest increase in coconut area (e.g. the Northern districts).

So far, we have looked at this process from the point of view of rice losing out to coconut. Viewed at from the point of view of coconut, this phenomenal increase in area could be due to three reasons. First, due to increase in total net area, such as by marginal lands being brought under cultivation; since a large proportion of such increase in total area could be garden land, and coconut can be generally cultivated on it, it would gain from such area expansion. This we call the 'net-area expansion effect'. Second, coconut could gain from other garden lands crops, in substitution for other garden land crops; this we shall refer to as the 'garden-land substitution effect'. Thirdly, coconut could gain from rice growing lands,i.e.,in substituting for rice on wet land; this may be called the 'wet-land substitution effect'.

It is not possible to seperate out rigorously these three effects on account of the limitations of the available statistics of area under these crops (See Appendix 1). Though the first two effects are important they are not our primary

concern; it is the third possibility that we are interested in, and this is what we have attempted to establish in this chapter.

There are in fact no data to prove that rice is being substituted by coconut or that coconut is being grown on paddy fields. But, as we have seen, certain common observations and indirect statistical evidence point to this fact. And, as we have indicated in the introduction, such a trend has important implications for the state.

It is therefore to this problem that this study addresses itself and, in our subsequent chapters, we shall analyse the reasons for the substitution and indicate the problems arising out of such a process.

NOTES AND REFERENCES:

1. The following discussion on agro-climatic and topographical
   factors affecting the cropping pattern in Kerala is based
   on the "Report of the Committee on Agro-Climatic Zones and
   Cropping Patterns, April 1974.", Department of Agriculture,
   Government of Kerala, Trivandrum.

2. Ibid, p.17.

3. "Physically it is featured as a land strewn with steep hills
   and narrow valleys. It is ideally suited for plantation
   crops like tea, coffee, cardamom and to a limited extent for
   rubber in the lower elevations" Ibid, p.17.

4. "The lay-out of the land surface is an admixture of low-
   lying lands or fields and garden lands. Vast expanses of
   paddy lands are seen interspersed with garden lands where
   coconut and arecanut are grown. The garden lands are also
   level lands, but they are usually one to two meters above
   the paddy lands in elevation" Ibid, p.54.

5. "The valleys are not extensive .... The soil in the valleys
   is loamy with fairly good water holding capacity. The
   valleys are shaped, levelled and rice is grown .... The
   soil in the belt of land lying immediately above the paddy
   fields upto 3-4 meters is well drained and moist for most
   parts of the year. Crops which have a preference for moist
   soil conditions like .... arecanut and coconut are grown ...
   Above this belt where the slope having mild inclination,
   areas are terraced, levelled up and rain-fed crops like
   upland rice, sweet potato, tapioca etc. are grown. Generally,
   a drought tolerant crop, like cashewnut, is grown on the hill
   tops" Ibid., p.55.

6. The relative share in area of the various crops grown in
   Kerala is discussed in detail in Section 1.

7. The accuracy of these proportions would depend on the
   firmness of the estimates of area under these garden land
   crops. There are certain problems related to these estimates.
   See Appendix 1 for a discussion on this.

8. The trend in relative area between 1960-61 and 1974-75
   has been a continuous fall in the case of rice, and an
   almost continuous increase in the case of coconut, are-
   canut, cashewnut and tea, coffee, rubber taken together.
   But for purposes of discussion we compare the proportion
   of area of all crops for the time points 1960-61 and
   1974-75 (Table 1.1). We choose 1974-75 because it is
   the last year for which we have comparable data on coconut
   area. (This is due to change in sample size for estimation
   of the number of trees in 1975-76, as discussed in Appendix 1).
   Consequently, all other crops are also studied for the period
   1960-61 to 1974-75.

9. "The Kerala Land Utilization Order, 1967 ... prohibits
   leaving paddy lands fallow or even cultivation of any
   other crop on such lands than the particular crop grown
   before". This order is, however, never effectively
   enforced. See P.G.K. Panikar "Recent Trends in the Area
   Under and Production of Rice in Kerala", Centre for
   Development Studies, Trivandrum, Working Paper No.116.

10. See Chapter 2

11. Before 1975-76 estimation of the number of palms in the
    district was done by the Land Utilisation Survey, but in
    1975-76 this was taken on by the 'Coconut Arecanut Survey'.
    This latter used a larger sample size due to which estimates
    before and after 1975-76 are not comparable (See Appendix 1).

12. The period 1960-61 to 1974-75 is chosen because it is the
    last year for which we have comparable data on coconut area
    due to the change in sample size in 1975-76 as discussed in
    Appendix 1.

13. Part of this phenomenal increase may be due to the fact that
    the area under current fallow in the initial year (1974-75)
    was much lower than in most of the other districts, i.e., the
    base from which this increase is calculated is narrow.

14. Published data on current fallows do not give the extent of
    paddy lands left fallow, but we can assume that current
    fallows consist of land under seasonal and annual crops of
    which rice constitutes the major proportion. Also see
    Appendix 1.

CHAPTER II: RELATIVE PROFITABILITY OF PADDY
AND COCONUT CULTIVATION

In this chapter we make an attempt to explain the
substitution of coconut for paddy in terms of the relative
profitability of these two crops. The underlying assumption
of our analysis is that rice, like coconut, is a commercial
crop commercial in the sense of being produced for the market.

The substitution of coconut for paddy can occur in
either of two ways: (a) through the conversion of the entire
paddy field into garden land by raising the level of the paddy
field and then planting coconut saplings on it; or, more
commonly, (b) through a process of strengthening the bunds,
or raising mounds, within the paddy fields on which coconut
saplings are grown (as described in detail in Chapter 1). The
latter is a more gradual process and the initial investment
involved is smaller. Besides, in this case, paddy continues
to be planted in the field until at least some of the coconut
palms begin to yield a return; while, in the former, the
waiting period involved in obtaining returns from the land
is longer.

In either case, the profitability of the two crops can
be compared by taking the net returns over a period of say
40 years (the main bearing life of the coconut palms) for

both paddy and coconut, and comparing the annual rate of
return so calculated[1]. These benefit cost exercises can
not only take into account the waiting period, but also
the fixed costs - primarily the initial investment involved
in the conversion and any fixed assets used in the cultivation
of either of the two crops. Thus the two methods of conversion,
mentioned above, can also be differentiated and the relative
profitability of each can be assessed through these exercises.

In our study, we do not, however, adopt this course as
the detailed information required for such an analysis on the
capital and maintanance costs of growing coconut palms, and
on the yield over the whole life of the palms, is not available.
Data on the fixed costs involved in paddy cultivation are also
not available. We shall consider only measures of returns over
a period of one year, with the available data relating to 1973-74
for paddy holdings and 1974-75 for coconut holdings.[2] The assum-
ption underlying the comparison of returns from paddy and coconut
cultivation during a year is that, the superiority of coconut in
this respect is a necessary (though not sufficient) pre-condition
for the farmer to consider converting paddy lands into coconut
lands.

The chapter is divided into two sections. In the first
section, we discuss briefly the village level data made use of

in this study; the various measures of returns and the

concept of cost adopted are also discussed in this section.

In the second section, we shall present the results obtained

from analysing the data on returns and certain interesting

facts emerging from it. The data relating to costs, however,

are analysed in detail only in the next chapter.

Section 1

The only source of detailed information available on

the costs of cultivation of paddy and coconut in Kerala is

a continuous survey undertaken by the Department of Economics,

University of Kerala, at the instance of the Ministry of

Agriculture, Government of India, under the 'Comprehensive

Scheme to study the cost of cultivation of Principal Crops

in Kerala'. The survey was started in 1970-71 as a continu-

ation of the Farm Management Studies (FMS) conducted earlier

(which were, however, terminated in 1964-65); we shall hereafter

refer to this as the cost of cultivation survey. The results

of the cost of cultivation survey have not been published so

far, but the Ministry of Agriculture gave us special permission

to use the primary schedules, and the Department of Economics,

University of Kerala made them available to us.

The basic information collected by the Cost of
Cultivation survey is of the 'cost-accounting' type
similar to the FMS surveys. The period covered is one
agricultural year. Twenty four schedules are canvassed
among the selected households and daily enumeration is
made of their farming activities by the field staff
stationed in the village. The cost of cultivation survey
is, however, more comprehensive since it covers the entire
State of Kerala, whereas the FMS covered only the districts
of Quilon and Alleppey. The sample aesign chosen by the
cost of cultivation survey is also different from the FMS;
we shall explain this in detail later.

The principal crop covered is paddy, but for two years,
1974-75 and 1975-76, the principal crop surveyed was coconut.
During these two years, only five of the earlier paddy villages
were retained and surveyed.

The State is divided into five zones based on various
characteristics, primarily the topography and agricultural
practices of the region. Within these zones the taluks are
selected according to the probability proportional to the crop
area-paddy area in the case of paddy, and dry land area in the
case of coconut. The sample units are the census villages; from

the taluks a random sample of 20 villages for paddy and
15 for coconut is selected. This method of selection
covers all the districts and all the agroclimatic zones
of the State as can be seen from Tables 2.1, 2.2 below.

For our purposes we have selected 10 of these
villages for paddy and 9 for coconut; they are dispersed
over the State and cover all the agro-climatic zones. Of
the villages so selected, two paddy villages did not have
corresponding coconut villages in the same district$\underline{3}/$ and
one coconut village did not have a corresponding paddy
village$\underline{4}/$. Therefore, of the 19 villages, we were left
with 8 pairs of villages, each pair representing a district,
which could be used for comparing the costs of cultivation
and returns from paddy and coconut. We use only these 8
pairs of villages. It is not possible however to obtain
data for the two crops for the same year, so we have chosen
1973-74 for paddy and 1974-75 for coconut-the only two conse-
cutive years for which data were available.

The ultimate unit of investigation was the operational
holding. All operational holdings of the selected villages
were arranged in ascending order of their magnitude of area
and were grouped in five size strata on the basis of equal
proportionate area cultivated. Two holdings were selected

Table 2.1: <u>Sample Villages and their Agro Climatic Zones</u>

<u>Paddy 1973-74</u>

	District	Taluk	Sample Village	Agro Climatic Zone
1.	Trivandrum	Nedumangad	*Uzhamalackal	Southern Midland
2.	Trivandrum	Trivandrum	*Kadakampally	Red Loam
3.	Quilon	Quilon	*Trikkadavoor	Onnathukara
4.	Alleppey	Mavelikkara	*Pandalam-Thekkekkara	Onnathukara
5.	Alleppey	Shertalai	Panavally	Coastal Sandy
6.	Ernakulam	Kenayannor	Thekkumbhagam	Onnathukara
7.	Ernakulam	Parur	*Parur	Coastal Sandy
8.	Ernakulam	Kunnathunad	Perumbavoor	Central Midlands
9.	Trichur	Trichur	*Cherpu	Central Midland
10.	Trichur	Talappally	Nelluwaye	Central Midland
11.	Palghat	Alathur	Kavassery II	Palghat
12.	Palghat	Chittur	Nallappilly	Chittur Black Soil
13.	Palghat	Palghat	*Elappally	Palghat
14.	Palghat	Ottapalam	Vilayoor	Central Midland
15.	Malappuram	Perinthelmanna	Vellathur	Central Midland
16.	Malappuram	Ernad	*Nilambur	Northern Midland Malappuram type
17.	Kozhikode	S. Wynad	*Noolpuzha	High Ranges
18.	Canannore	Tellicherry	Trippanagathu	Northern Midland
19.	Canannore	Canannore	Muzhappilangad	Northern Midland
20.	Canannore	Thaliparamba	*Chelevi	Northern Midland

*Refers to the villages selected in this study.

Table 2.2: <u>Sample Villages and their Agro-Climatic</u>
<u>Zones Coconut 1974-75</u>

District	Taluk	Sample Villages	Agro Climatic Zones
1. Trivandrum	Trivandrum	*Thiruvallam	Red Loam
2. Trivandrum	Chirayankil	Koduvazhanoor	Onnathukara
3. Trivandrum	Nedumangad	*Nedumangad	Southern Midland
4. Quilon	Kottarakara	Melila	Southern Midland
5. Quilon	Pathanamtitta	Vallicode	High lands
6. Alleppey	Kuttanad	Thakazhy	Kolelands & Kuttanad
7. Alleppey	Thiruvalla	Koipuram	Southern Midland
8. Kottayam	Meenzhil	*Bharanaganam	Highlands
9. Ernakulam	Parur	*Alangad	Coastal Sandy
10. Trichur	Kodungallur	*Edavilangu	Coastal Sandy
11. Palghat	Ottapalam	*Pattithara	Central Midlands
12. Malappuram	Tirur	*Parappanangady	Northern Midland Malappuram Type
13. Kozhikode	Kozhikode	*Beypore	Northern Midland Malappuram Type
14. Kozhikode	Quilandy	Atholi	Northern Midland
15. Canannore	Canannore	*Kannadiparamba	Northern Midland

*Refer to the villages selected in this study

randomly from each size strata. Thus 10 holdings from each village from all size classes were chosen.

The problem with the above mentioned method of sampling is that the villages are neither comparable with each other in terms of size classes nor in terms of proportion of holdings. The holdings within each size-group are only comparable in terms of the proportion of area operated by them (roughly 20%). But whereas in one village, for example, in the first size-group, 40% of the households may hold 20% of the land, in another 30% of the households may hold the same proportion of land. The inequality of distribution of land is much higher in the first case than in the second. Due to this, the averages of profitability, cost etc. computed for these size-groups are not strictly comparable. Hence in our study, where we wish to make such comparisons between villages we have converted the data into decile groups - deciles in terms of proportion of operational holdings.

Before discussing the various measures of returns used in this study we shall first clarify the measure of cost used. We look at the problem of substitution of paddy by coconut from the point of view of a farmer with a given plot of land and other assets and a given supply of family labour. The concern is not whether to cultivate or not to cultivate, but simply what crop to cultivate-paddy or coconut? Consequently, the opportunity

cost of family labour, owned land and other assets in the cultivation of either crop is the same; and hence are left out of account. As mentioned earlier, the fixed costs, in terms of the initial investment required in the conversion of paddy plots to coconut plots and the fixed assets involved in cultivation, have also been left out of account due to lack of appropriate data.

The total cost measure in our study relates to the various operational costs[5] – the outlay in cash and kind actually incurred by the cultivator. (paid-out costs)[6] It includes cash and kind expenses on hired human labour, hired bullock labour, hired machine labour, seed, manure, fertilizers, pesticides and irrigation charges. It does not include the paid-out expenses of land revenue and cess, and interest on crop loans, due to lack of data on them. Our cost measure also does not include imputed values of family labour, own bullock labour, rent on own land and depreciation charges[7] for the reason mentioned earlier.

The most rough and ready measure of returns is the gross output per unit of land. Here, since we are comparing coconut with paddy, we use gross value of output per hectare.

This is not a sufficient measure since the costs of cultivation involved in the two crops are strikingly different. Hence, a better measure is the net revenue per hectare, net revenue being

gross revenue _minus_ total costs.

These two measures capture the returns to one unit of land. But given a certain amount of land the returns the farmer gets over total costs may be a more important consideration for him. Thus a more refined measure of returns would be <u>net revenue per hectare</u> (where net revenue is gross total costs per hectare value of output minus total costs), i.e. net returns per unit cost. This last measure is also a measure of profitability.

Section 2

In this section we analyse the substitution of coconut for paddy in terms of the relative profitability (net revenue per unit cost) of cultivation of the two crops[8]. Secondly, we look at which sections of the paddy cultivators (in terms of size of holdings)and what type of paddy lands (in terms of single and double cropped lands) are likely to substitute coconut for paddy.

Comparing between paddy and coconut[9], net revenue per unit cost is higher for coconut than for paddy cultivation in the selected villages of <u>ALL</u> the districts.[10](See Table 2.3 Cols. 1 & 4). There is wide variation however in the net revenue per unit cost in coconut cultivation, due to variation in the gross value of output per hectare and the total cost per hectare. This is discussed in detail in Section 2 of the next

Table 2.3: Net Revenue per unit cost, Gross value of Output per hectare, Net Revenue per hectare (Rupees)

Districts (Selected Villages)	Paddy (1973-74)			Coconut (1974-75)		
	Net Revenue/hect Total Cost/hect	Gr. V.O.[1]/ hectare	Net Revenue hectare	Net Revenue/hect Total Cost/hect	Gr. V.O. hectare	Net Revenue hectare
	(1)	(2)	(3)	(4)	(5)	(6)
1. Trivandrum (K)	0.90	6777.01	3211.03	4.86 (N)	3033.75 (N)	2515.97 (N)
2. Trivandrum (U)	0.57	4703.15	1699.86	5.97 (T)	10334.75 (T)	8851.75 (T)
3. Ernakulam	0.86	2514.48	1164.96	4.28	4602.44	3730.23
4. Trichur	0.34	5705.42	1452.41	0.74	3641.46	1547.44
5. Palghat	1.18	7062.85	3826.74	2.65	2046.85	1485.87
6. Malappuram	1.09	3817.47	1993.41	10.27	2061.02	1878.13
7. Kozhikode	1.07	2031.40	1050.10	8.75	5995.29	5380.29
8. Canannore	0.88	4210.86	1970.51	2.54	1539.49	1105.09

Notes: 1. Gr. V.O/hectare: gross value of output per hectare

2. Trivandrum (K), (U), (T), (N) refer to the villages Kadakampally, Uzhamalackal, Thiruvallam and Nedumangad respectively.

3. All the data on coconut holdings refer to mixed coconut plots except for the selected village of Malappuram. where they refer to pure coconut plots

Table 2.4: <u>Net Revenue per unit cost - Paddy</u> (Rupees)

Deciles	Trivandrum-Kadakampally Net Revenue/hect Total Cost/hect	Trivandrum-Uzhamalackal Net Revenue/hect Total Cost/hect	Quilon-Trikkadvoor Net Revenue/hect Total Cost/hect	Alleppey-Pandalam Net Revenue/hect Total Cost/hect	Ernakulam-Parur Net Revenue/hect Total Cost/hect
50%	1.44 (7)	0.54 (3)	0.06 (4)	0.92 (7)	1.05 (5)
6	0.58 (3)	0.22 (2)	0.28 (6)	0.45 (2)	0.89 (4)
7	(-)0.19 (1)	0.15 (1)	0.29 (7)	0.45 (2)	0.88 (3)
8	0.17 (2)	0.85 (4)	(-)0.08 (3)	0.51 (4)	1.30 (6)
9	0.80 (4)	0.92 (5)	(-)0.05 (2)	0.55 (5)	1.30 (6)
10	0.83 (5)	1.41 (6)	0.22 (5)	0.62 (6)	0.43 (2)
Top 5%	0.96 (6)	2.85 (7)	(-)0.35 (1)	0.32 (1)	0.19 (1)
	TRICHUR-CHERPU	PALGHAT-ELAPPALLY	MALAPPURAM-NILAMBUR	CANANNORE-CHELERI	KOZHIKODE-NOOLPUZHA
50%	(-)0.42 (1)	1.29 (6)	1.50 (7)	0.73 (1)	2.42 (7)
6	0.63 (5)	1.19 (4)	1.07 (3)	0.86 (3)	1.67 (6)
7	0.74 (7)	1.16 (3)	1.07 (3)	0.89 (4)	1.43 (5)
8	0.14 (3)	1.02 (1)	1.38 (5)	1.13 (7)	0.95 (4)
9	0.44 (4)	1.04 (2)	1.47 (6)	1.09 (6)	0.40 (1)
10	0.69 (6)	1.28 (5)	0.69 (1)	0.89 (4)	0.75 (3)
Top 5%	0.23 (2)	1.32 (7)	0.78 (2)	0.82 (2)	0.41 (2)

Note: Figures in the parenthesis refer to ranks

Table 2.5: Gross Value of Output/hectare - Paddy (Rupees)

Deciles	Trivandrum-Kadakampally Gross value of output/ hectare		Trivandrum-Uzhmalackal Gross value of output/ hectare		Quilon-Trikkadavoor Gross value of output/ hectare		Alleppey-Pandalam Gross value of output/ hectare	
50%	9560.81	(7)	4150.00	(2)	7847.00	(4)	6529.80	(7)
6	6109.45	(5)	4045.17	(1)	9367.82	(6)	5278.87	(3)
7	3100.45	(1)	4299.00	(2)	9611.31	(7)	5278.87	(3)
8	4526.73	(3)	5890.68	(6)	7045.40	(3)	5285.38	(5)
9	6838.29	(6)	5323.97	(5)	6424.27	(2)	5176.54	(2)
10	4570.24	(4)	7662.66	(7)	7915.32	(5)	5583.95	(6)
Top 5%	4335.72	(2)	4918.75	(4)	4369.05	(1)	3024.22	(1)

	ERNAKULAM-PARUR		TRICHUR-CHERPU		rALGHAT-ELAPPALLY		MALAPPURAM-NILAMBUR	
50%	2126.30	(2)	2229.00	(1)	6408.49	(1)	4280.11	(6)
6	2551.41	(4)	10149.90	(6)	7337.31	(4)	3436.53	(1)
7	2636.64	(5)	11679.32	(7)	7601.32	(7)	3619.00	(2)
8	3163.59	(7)	6047.08	(4)	7585.71	(6)	4001.96	(4)
9	3065.92	(6)	6780.98	(5)	7392.95	(5)	4081.89	(5)
10	2227.53	(3)	5504.39	(3)	6922.47	(3)	3641.85	(3)
Top 5%	2029.74	(1)	3078.40	(2)	6722.09	(2)	4569.15	(7)

	CANNANORE-CHELERI		KOZHIKODE-NOOLPUZHA	
50%	4054.59	(3)	2384.75	(6)
6	3806.13	(1)	2159.00	(5)
7	3880.36	(2)	1941.98	(3)
8	5186.28	(7)	1485.18	(1)
9	4456.63	(6)	1512.16	(2)
10	4253.86	(4)	2462.49	(7)
Top 5%	4282.26	(5)	2077.64	(4)

Note: Figures in parenthesis refer to ranks.

Deciles	Trivandrum-Kadakampally Net Revenue hectare		Trivandrum-Uzhamalackal Net Revenue hectare		Quilon-Trikkadavoor Net Revenue hectare		Alleppey-Pandalam Net Revenue hectare	
50%	5637.67	(7)	1452.77	(4)	458.50	(4)	3124.27	(7)
6	2243.38	(5)	723.17	(2)	2041.45	(6)	1649.03	(2)
7	(-)712.74	(1)	559.91	(1)	2140.23	(7)	1649.03	(2)
8	667.67	(2)	2702.82	(6)	(-)629.50	(2)	1781.69	(4)
9	3034.82	(6)	2556.67	(5)	(-)350.13	(3)	1846.91	(5)
10	2079.32	(3)	4481.81	(7)	1451.24	(5)	2141.28	(6)
Top 5%	2117.99	(4)	1278.89	(3)	(-)2394.48	(1)	1173.88	(1)

	ERNAKULAM-PARUR		TRICHUR+CHERPU		PALGHAT-ELAPPALLY		MALAPPURAM-NILAMBUR	
50%	1087.52	(3)	(-)1606.53	(1)	3605.26	(1)	2566.82	(7)
6	1200.38	(4)	3933.15	(6)	3979.96	(6)	1766.60	(2)
7	1237.36	(5)	4964.68	(7)	4091.31	(7)	1872.11	(4)
8	1790.00	(7)	728.33	(3)	3825.09	(3)	2318.63	(5)
9	1730.37	(6)	2057.52	(4)	3759.97	(2)	2430.99	(6)
10	672.87	(2)	2239.79	(5)	3886.49	(5)	1498.49	(1)
Top 5%	320.43	(1)	569.90	(2)	3825.82	(4)	1868.78	(3)

	CANANNORE-CHELERI		KOZHIKODE-NOOLPUZHA	
50%	1714.13	(1)	1686.79	(7)
6	1763.56	(2)	1349.44	(6)
7	1829.00	(3)	1142.96	(5)
8	2753.51	(7)	721.61	(3)
9	2322.33	(6)	432.87	(1)
10	2012.09	(5)	1058.41	(4)
Top 5%	1933.67	(4)	605.27	(2)

Note: Figures in parenthesis refer to ranks

chapter. The higher profitability of coconut cultivation could be a major factor influencing the substitution of coconut for paddy.

In order to see if there is any size-wise pattern in the returns obtained from paddy cultivation, the net revenue per unit cost in each decile, is ranked in ascending order (the lowest being given rank 1). The gross value of output per hectare and the net revenue per hectare are also ranked similarly. No clear decile wise pattern emerged, but the top 5% of holdings show one characteristic. They are seen to obtain either rank 1 or 2 in a number of villages, i.e., the top 5% of holdings obtain the lowest or second lowest returns. This is true for 7 out of 10 selected villages for net revenue per unit cost[11] (Table 2.4); and for 6 and 5 selected villages, respectively, for gross value of output per hectare[12] (Table 2.5) and net revenue per hectare[13] (Table 2.6). Thus paddy cultivation appears to be least profitable in the top 5% of holdings in a large number of villages.[14]

An interesting fact that emerges when gross and net returns per unit of land of paddy and coconut are compared are the differences in returns to single and double cropped paddy lands as compared to coconut.

The gross value of output per hectare of coconut is _greater_ than that of paddy cultivation only in the selected villages of Trivandrum (Thiruvallam), Ernakulam and Kozhikode[15]/(Table 2.3 Col.2&5). On the other hand, the gross value of output per hectare of paddy is _greater_ than that of coconut in the selected villages of Trichur, Palghat, Malappuram and Canannore. (Table 2.3 Col.2&5). This is also true of both the paddy villages of Trivandrum over the coconut village of Nedumangad (Trivandrum).[16]/ Interestingly, of the eight comparable villages in paddy cultivation, only the villages of Ernakulam and Kozhikode have single cropped lands. All the other villages have double and sometimes even triple cropped lands. Thus the gross returns per unit of double cropped lands are higher than the returns per unit of coconut land.

Besides, the net revenue per hectare of coconut holdings is _higher_ than that of paddy only in Trivandrum (T) Ernakulam and Kozhikode[17]/ and marginally in Trichur[18]/(Table 2.3 Col. 3 & 6) whereas net revenue per hectare of paddy is _greater_ than that of coconut in the selected villages of Palghat, Malappuram, Canannore and Trivandrum (K)[19]/(Table 2.3) Again here it is the single cropped paddy villages of Ernakulam and Kozhikode which have lower net revenue per unit of land in paddy than in coconut cultivation.

An important finding emerging from this is that paddy
lands when double cropped yield higher net returns than coconut
lands, but not when single cropped. Unfortunately, we do not
have similar data on single and double cropped lands in each
village in order to show this more clearly. But the above
finding suggests that, within each district in which shift
from paddy to coconut is occurring, it is probably the single
cropped lands that are being either left fallow or converted
to garden lands.

Another fact that we observed earlier is that paddy
cultivation is least profitable in the top 5% of holdings; hence
the shift to garden land cultivation could be more extensive
from this group. Besides, it is probably this top size-group
which is financially best equipped to shift, either by converting
paddy lands to garden lands or by leaving them fallow for a while.

Thus we find that the profitability of coconut cultivation,
in terms of net returns over costs (our first measure), is higher
than that of paddy cultivation and could be the major factor
influencing substitution of coconut for paddy. This is irres-
pective of whether the lands are double or single cropped. On the
other hand, gross and net returns per unit of land on double
cropped paddy lands are higher than that from coconut cultivation.
This indicates that current costs, and perhaps particular components
of this cost, play a crucial role in the phenomenon of substitution.
Hence in the next chapter we will study the costs involved in the
two crops in detail.

Table 2.7: Net Revenue/Total Cost - Paddy and Coconut (by decile groups) (Rupees)

Deciles	PADDY Trivandrum-Kadakampally	COCONUT Trivandrum-Nedumangad	PADDY Palghat-Elapally	COCONUT Palghat-Pattithara
50%	1.44	6.66	1.29	4.94
6	0.58	5.32	1.19	10.78
7	(-)0.99	4.92	1.16	11.10
8	0.17	5.11	1.02	2.10
9	0.80	5.35	1.04	1.31
10	0.83	3.92	1.28	1.57
Top 5%	0.96	3.45	1.32	1.46
	TRIVANDRUM-UZHAMALAKAL	TRIVANDRUM-THIRUVALLAM	MALAPPURAM-NILAMBUR	MALAPPURAM-PARAPANNAGADI
50%	0.54	7.96	1.50	4.20
6	0.22	7.96	1.07	12.10
7	0.15	5.01	1.07	15.11
8	0.85	4.29	1.38	14.02
9	0.92	5.37	1.47	13.31
10	1.41	5.82	0.69	8.46
Top 5%	2.85	6.09	0.78	6.24
	ERNAKULAM-PARUR	ERNAKULAM-ALANGAD	CANANNORE-CHELERI	CANANNORE-KANNADIPARAMBI
50%	1.05	4.57	0.73	1.04
6	0.89	4.57	0.86	4.84
7	0.88	4.57	0.89	5.02
8	1.30	3.02	1.13	2.97
9	1.30	3.89	1.09	2.51
10	0.43	4.68	0.89	1.82
Top %	0.19	4.44	0.82	1.54
	TRICHUR-CHERPU	TRICHUR-EDAVAVILANGU	KOZHIKODE-NOOLPUZHA	KOZHIKODE-BEYPORE
50%	(-)0.42	0.51	2.42	8.98
6	0.63	0.85	1.67	9.95
7	0.74	0.22	1.43	6.12
8	0.14	0.23	0.95	5.24
9	0.44	0.79	0.40	5.91
10	0.69	1.20	0.75	10.96
Top 5%	0.23	1.77	0.41	12.14

Table 2.8: <u>Gross value of Output/hectare - Paddy and Coconut (by decile groups)</u>   (Rupees)

Deciles	PADDY Trivandrum-Kadakkampally	COCONUT Trivandrum-Nedumangad	PADDY Palghat-Elapally	COCONUT Palghat-Pattithara
50%	9560.81	3661.25	6408.49	3251.14
6	6109.45	2391.09	7337.31	1566.26
7	3100.45	2108.39	7601.32	1561.44
8	4526.73	2792.11	7585.71	1394.96
9	6838.29	4157.29	7392.95	1780.19
10	4570.24	2987.38	6922.47	3168.79
Top 5%	4335.72	2873.37	6722.09	3102.41
	TRIVANDRUM-UZHAMALAKAL	TRIVANDRUM-THIRUVALLAM	MALAPPURAM-NILAMBUR	MALAPPURAM-PARAPANNAGADI
50%	4150.00	11619.65	4280.11	903.55
6	4045.17	11653.61	3436.53	1294.68
7	4299.00	8836.55	3619.00	1369.08
8	5890.68	8062.92	4001.96	1845.07
9	5323.97	8403.10	4081.89	2868.57
10	7662.66	11111.37	3641.85	2383.14
Top 5%	4918.75	10920.43	4569.15	1846.72
	ERNAKULAM-PARUR	ERNAKULAM-ALNGAD	CANANNORE-CHELERI	CANANNORE-KANNADIPARANDI
50%	2126.30	5104.33	4054.59	828.46
6	2551.41	5107.84	3806.13	2603.00
7	2636.64	5107.84	3880.36	2734.58
8	3163.59	3931.00	5186.28	1529.97
9	3065.92	4890.65	4456.63	1370.76
10	2227.53	4492.79	4253.86	1454.56
Top 5%	2029.74	3605.45	4282.26	1457.78
	TRICHUR-CHERPU	TRICHUR-EDAVAVILANGU	KOZHIKODE-NOOLPUZHA	KOZHIKODE-BEYPORE
50%	2229.00	3403.27	2384.75	11260.15
6	10149.90	4178.59	2159.00	11345.45
7	11679.32	3205.35	1941.98	5997.20
8	6047.08	3404.51	1485.18	4947.15
9	6780.98	4087.30	1512.16	5449.49
10	5504.39	3669.15	2462.49	4806.44
Top 5%	3078.40	3909.34	2077.64	5378.86

Table 2.9: Net Revenue per hectare - Paddy and Coconut (by decile groups)   (Rupees)

Deciles	PADDY Trivandrum-Kadakampally	COCONUT Trivandrum-Nedumangad	PADDY Palghat-Elapally	COCONUT Palghat -Pattithara
50%	5637.67	3183.50	3605.26	2704.00
6	2243.38	2013.00	3979.96	1433.29
7	(-) 712.74	1752.44	4091.31	1432.37
8	667.67	2335.47	3825.09	944.42
9	3034.82	3502.08	3759.97	1008.28
10	2079.32	2379.88	3886.49	1937.37
Top 5%	2117.99	2227.88	3825.82	1841.51
	TRIVANDRUM-UZHAMALAKAL	TRIVANDRUM-THIRUVALLAM	MALAPPURAM-NILAMBUR	MALAPPURAM-PARAPANAGADI
50%	1452.77	10322.37	2566.82	729.78
6	723.17	10353.80	1786.60	1195.88
7	559.91	7367.77	1872.11	1284.07
8	2702.82	6539.54	2318.63	1722.18
9	2556.67	7082.96	2430.99	2668.18
10	4481.81	9481.40	1498.49	2131.24
Top 5%	1278.89	9379.79	1868.78	1591.51
	ERNAKULAM-PARUR	ERNAKULAM-ALANGAD	CANANNORE-CHELERI	CANANNORE-KANNADIPARAMBI
50%	1087.52	4187.42	1714.13	422.31
6	1200.38	4190.93	1763.56	2157.00
7	1237.36	4190.93	1829.00	2280.54
8	1790.00	2952.88	2753.51	1144.11
9	1730.37	3889.81	2322.33	980.37
10	672.87	3701.37	2012.09	937.94
Top 5%	320.43	2943.26	1933.67	884.23
	TRICHUR-CHERPU	TRICHUR-EDAVAVILANGU	KOZHIKODE-NOOLPUZHA	KOZHIKODE-BEYPORE
50%	(-)1606.53	1149.62	1686.79	10131.58
6	3933.15	1924.94	1349.44	10205.30
7	4964.68	456.62	1142.96	5154.66
8	728.33	628.88	721.61	4154.77
9	2057.52	1796.80	432.87	4661.40
10	2239.79	2000.24	1058.41	4404.45
Top 5%	569.90	2499.75	605.27	4969.37

NOTES AND REFERENCES

1. One such exercise has been undertaken for coconut, rubber and oil palms by M.V. George and P.T. Joseph, in their paper "Cost-Benefit Analysis of Investment in Tree Crops", Indian Journal of Agricultural Economics, Vol:XXVIII No.4, October-December 1973.

2. The date used in this study and the choice of years are discussed in Section 1 of this chapter.

3. These are the selected villages of Quilon and Alleppey.

4. This is the selected village of Kottayam

5. The Farm Management Studies ase the following four concepts:

   "Cost A_1: Cash and kind expenses (or paid out costs) actually incurred by the cultivator. These include cash and kind expenditure on items like hired human labour, owned or hired bullock labour, seed, manure fertilizers, pesticides, etc., land revenue and cess, irrigation charges, depreciation charges of implements, machinery and buildings, and interest on crop loans.

   Cost A_2: Cost A_1 + rent paid for leased in land.

   Cost B: Cost A_2 + rental value of owned land and interest on owned fixed capital.

   Cost C: Cost B + imputed value of family labour"

   These concepts of costs used by the FMS Surveys areq quoted from "Cost of Cultivation of Paddy - An Analytical Tool for Evaluation", Evaluation Division, State Planning Board, Kerala, April 1971.

6. This measure of cost is a variation on Cost A_1 of the FMS studies described in end-note 5.

7. These imputed costs are included in the concept of costs used in the FMS studies, end-note 5. Rent paid for leased-in land, included in Cost A_2 of the FMS, cannot be a major item of expenditure because the incidence of tenancy in the State is low, and is also left out of account.

8. Since we are interested in substitution of coconut on paddy lands, ideally, we would like to have data on profitability of coconut cultivation on such lands. But such information is not available, and our data on coconut cultivation refer to all coconut gardens. This is a limitation of our study and should be borne in mind while discussing the relative profitability of the two crops.

9. The various measures of returns, cost, labour input, etc. have been computed seperately for mixed coconut plots and pure coconut plots, the former being coconut gardens inter cropped with other garden land crops. The proportion of pure coconut plots are very small in each village, hence comparisons with paddy is always made with mixed plots, except in the case of Malappuram where the coconut village had predominantly pure coconut plots.

10 . This is also true when the villages are compared decile-wise, except for the 7th decile of the villages of Trichur. See Table 2.7.

11. They are the selected villages of Quilon, Alleppey, Ernakulam, Trichur, Malappuram, Canannore and Kozhikode (Table 2.4)

12. They are the selected villages of Quilon, Alleppey, Ernakulam, Trichur, Palghat and Trivandrum (Kadakampally). (Table 2.5)

13. They are the selected villages of Quilon, Alleppey, Ernakulam, Trichur and Kozhikode. (Table 2.6)

14. Decile-groups in this study refer to deciles in terms of operational holdings in the villages as mentioned earlier. The sample-size (10 holdings in each village) is not really large enough to sustain reliable decile wise comparisons, but we note this since it is true for a number of villages for all the three measures of returns used.

15. This is true when these 3 pairs of villages are compared decile-wise also. (Table 2.8).

16. This is also true when the villages are compared decile-wise, except for the top and bottom deciles of the selected villages of Trichur (Table 2.8).

17. This is true when the three pairs of villages are compared decile-wise also. (Table 2.9).

18. This is due to the fact that the bottom 50% of paddy holdings in Cherpu (Trichur) show a large loss, there pulling down the net revenue/hectare for the village as a whole. (Table 2.9)

19. Only over the coconut village of Nedumangad, and not over Thiruvallam, as seen earlier. Net revenue per hectare is greater in paddy than in coconut cultivation decile-wise also in Palghat, Malappuram (Except 9th and 10th deciles) and Canannore (except 6th and 7th deciles). (Table 2.9).

CHAPTER III: ANALYSIS OF COSTS OF CULTIVATION

One of the main reasons for the large difference in profitability is the difference in costs of cultivation of the two crops, paddy and coconut. In the first section of this chapter, we compare the total cost of cultivation of the two crops. Labour cost is identified as the most important component of total cost, followed by fertilizer costs, for both the crops. If wage-rates are high but the hired labour input in a crop is minimal it would not affect the profitability of the crop much. Hence we examine, in the same section, the physical input of labour in the two crops.

As observed in the last chapter, net revenue per unit cost in coconut cultivation varies widely among the selected villages. Costs of cultivation of coconut also vary widely. In section 2, we shall make an attempt to explain these variations to the extent possible from our data.

The quantum of physical input of labour into the two crops differs substantially. The substitution of coconut for paddy has therefore important implications for employment in agriculture. We briefly focus on this problem in Appendix 2.

Section 1

The cost of cultivation per hectare of paddy is very much **higher** than that of coconut cultivation, district-wise, in all the selected villages[1]. (Table 3.1., Col.1 & 5).

The cost of paddy cultivation per hectare is lowest in the selected villages of Kozhikode and Ernakulam (Table 3.1., Col.1), where paddy is single-cropped. It is highest in Trichur where the land is double and sometimes even triple cropped. The cost of cultivation of coconut varies widely among the selected villages (as mentioned earlier), the reasons for which we shall discuss in section 2.

Looked at in terms of total cost per rupee of product, i.e. total cost/gross value of output, the cost of cultivation is again much higher in paddy, district-wise, in all the selected villages[2]. (Table 3.1., Cols 2 & 6).

Thus the cost of cultivation per hectare and per unit value of output are both substantially higher in paddy cultivation than in coconut. This affects the differences in profitability of the two crops.

The major component of total cost is labour cost[3]. It ranges from 45 to 75 per cent in paddy cultivation and from

Table 3.1: <u>Costs of Cultivation per hectare and per unit value of output - Paddy and Coconut</u>

(Rupees)

Districts (Selected Villages)	PADDY (1973-74)				COCONUT[1] (1974-75)			
	Total Cost / hectare	Total Cost[2] / GVO	Labour Cost / Total Cost	Labour Cost / hectare	Total Cost / hectare	Total Cost / GVO	Labour Cost / Total Cost	Labour Cost / hectare
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Trivandrum (K)	3565.98	0.53	0.63	2235.78	517.79(N)	0.17	0.57	293.65
2. Trivandrum (U)	3003.30	0.64	0.53	1576.03	1483.00(T)	0.14	0.50	734.15
3. Ernakulam	1349.51	0.54	0.75	1016.63	872.21	0.19	0.58	507.82
4. Trichur	4253.01	0.75	0.45	1904.56	2094.02	0.58	0.66	1384.57
5. Palghat	3236.11	0.46	0.56	1819.50	560.98	0.27	0.41	231.07
6. Malappuram	1824.05	0.48	0.59	1074.39	182.89	0.09	0.65	119.44
7. Kozhikode	981.30	0.48	0.55	538.23	615.01	0.10	0.70	432.63
8. Canannore	2240.36	0.53	0.67	1506.52	434.40	0.28	0.77	335.46

Notes: 1. All data on Coconut holdings in the table are for mixed coconut plots, except for Malappuram where data are for pure coconut plots

2. Total Cost/GVO - total cost per gross value of output = Total cost per rupee of product

3. Total Cost and labour cost refer to one full agricultural year for both crops

4. Trivandrum (K), (U), (N), (T) are the villages Kadakampally, Uzhamalackal, Nedumangad and Thiruvallam respectively.

41 to 77 percent in coconut (Table 2.3 Cols. 3&7). Thus the proportion of labour cost in total cost is not necessarily higher in paddy cultivation than in coconut. In fact in the Northern districts of Malappuram, Kozhikode and Canannore, the share of labour cost in total cost is higher in coconut cultivation. This means that labour cost is relatively at least as important as component in coconut cultivation as in paddy cultivation, though the total cost involved is much smaller in the former than in the latter.

Since the cost of cultivation of paddy is much higher than coconut cultivation, and the proportion of labour costs is almost the same it follows that the absolute magnitude of labour cost in paddy is much higher than in coconut. As observed in the Table above, labour cost per hectare is much higher in paddy than in coconut cultivation, district-wise, in all the selected pairs of villages.[4] (Table 3.1 Cols 4&8).

It is necessary to find out also what is the major component constituting non-labour costs. Fertilizers costs are found to be the second largest component of operational costs. It constitutes between 25 and 45 per cent of total costs in paddy cultivation and between 22 and 52 per cent in coconut cultivation (Table 3.2   ). Fertilizer cost per hectare is also considerably higher in paddy cultivation

than in coconut, except in the selected villages of Ernakulam,
where the fertilizer input in paddy is exceptionally low.[5]/

Table 3.2: Proportion of Fertilizer Costs in Total Costs,
Fertilizer costs per hectare - Paddy and Coconut

Districts (Selected Villages)	Paddy (1973-74)		Coconut (1974-75)	
	Fertilizer Costs / Total Cost	Fertilizer Costs / hectare	Fertilizer Costs / Total Cost	Fertilizer Costs / hectare
		(Rs.)		(Rs.)
1. Trivandrum (K)	0.27	952.72	0.43 (N)	224.14
2. Trivandrum (U)	0.40	1210.25	0.49 (T)	731.49
3. Ernakulam	0.25	332.88	0.41	357.93
4. Trichur	0.45	1922.14	0.27	559.52
5. Palghat	0.38	1240.76	0.52	293.87
6. Malappuram	0.38	691.36	0.28	52.13
7. Kozhikode	0.44	433.23	0.29	180.69
8. Canannore	0.27	607.01	0.22	93.93

Notes: 1. Trivandrum (K), (U), (N), (T) refer to the selected
villages of Kadakampally, Uzhamalackal, Nedumangad
and Thiruvallam respectively.

2. The date on coconut holdings refer to mixed-coconut
plots, except for the village of Malappuram where it
is for pure coconut plots.

Then the substantial difference in the absolute labour
costs and in the fertilizer costs per hectare could together
be a reason for the large difference in the costs of cultivation,

and hence in the profitability of the two crops.

Labour cost is determined by the prevailing wage
rate and the quantum of labour input. The wage rates
of agricultural labour, as we shall see in the next
chapter, are very high in Kerala, and have been rising
continuously. If the wage rate is high but the hired
labour input in a crop is minimal, labour cost would
not be very high and it would not affect profitability
much. We need therefore to examine whether there is any
difference in the hired labour component of the total
labour input, and the quantum of hired and total labour
input in the two crops and how far this could explain the
difference in labour costs.

The total labour input per hectare in paddy culti-
vation is found to be substantially higher than in coconut
cultivation (Table 3.3 Col.3&6). Moreover, paddy is culti-
vated almost wholly by hired labour. The component of hired
labour in total labour input is approximately 90 per cent in
paddy cultivation, except in the village selected in Kozhikode
where it is 61 per cent (Table 3.3 Col.1 & 4). The hired
labour component in total labour is much lower in coconut
cultivation, except in the selected villages of Malappuram
and Canannore. Though the proportion of hired labour in

Table 3.3: <u>Proportion of Hired Labour, Hired Labour and Total Labour per hectare</u>
<u>(hours/hectare) - Paddy and Coconut</u>

Districts (Selected Villages)	PADDY (1973-74)			COCONUT[1] (1974-75)		
	Hired Labour[2]/ Total Labour	Hired Labour[2]/ hectare	Total Labour hectare	Hired Labour Total Labour	Hired Labour hectare	Total Labour hectare
	(1)	(2)	(3)	(4)	(5)	(6)
1. Trivandrum (K)	0.95	2742.68	2876.64	0.62 (N)	227.79	369.70
2. Trivandrum (U)	0.92	2727.12	2970.72	0.59 (T)	554.64	946.89
3. Ernakulam	0.93	750.20	806.77	0.58	318.20	549.28
4. Trichur	0.90	1899.36	2119.27	0.76	1229.43	1608.74
5. Palghat	0.95	2148.30	2262.90	0.36	289.62	806.70
6. Malappuram	0.90	2076.17	2300.66	0.99	80.14	80.45
7. Kozhikode	0.61	890.27	1469.32	0.66	342.22	514.68
8. Canannore	0.88	2637.63	2982.65	0.95	276.57	290.84

Note: 1. All data on Coconut holdings are for mixed coconut plots, except Malappuram where data are for pure coconut plots.

2. Labour Input is measured in labour hours during one agricultural year.

3. Trivandrum (K), (U), (N), (T) are the villages Kadakampally, Uzhamalackal, Nedumangad, and Thiruvallam respectively.

coconut cultivation in these two villages is high, the absolute quantum of such labour input is small and so is therefore the total labour cost per hectare in coconut cultivation (Table 3.3 Col.5).

The hired labour used per hectare in paddy cultivation is substantially higher than that in coconut in all the selected villages, district-wise[6]. (Table 3.3 Cols. 2 & 5).

Thus the magnitude of use of hired labour input per hectare is substantially higher in paddy cultivation. This explains the difference in the labour costs of the two crops. The striking difference in labour input into coconut and paddy, together with the differences in fertilizer costs, plays a crucial role in determining profitability and hence in the substitution of coconut for paddy.

Section 2

As observed in the last chapter, there is a wide variation in the net revenue per unit cost in coconut cultivation in the selected villages. This measure being a composite of the gross value of output per hectare and the total cost per hectare, its variations should be traceable to the variations in these components.

The selected villages in the Trichur and Malappuram districts are the two extremes so far as net revenue/total cost is concerned, it being exceptionally low in the former and exceptionally high in the latter. The explanation lies mainly in the large variations in the total cost/hectare; it is the lowest for the village in Malappuram and highest for the village in Trichur (Table 3.4).

Table 3.4: Net Revenue/Total Cost, Gross Value of Output/ hectare and Total Cost/hectare in Coconut Cultivation 1974-75
(Rupees)

Districts (Selected Villages)	Net Revenue Total Cost		Gross value of output hectare		Total Cost hectare	
1. Trivandrum (N)	4.86	(5)	3033.75	(4)	517.79	(3)
2. Trivandrum (T)	5.97	(6)	10334.75	(8)	1483.00	(7)
3. Ernakulam	4.28	(4)	4602.44	(6)	872.21	(6)
4. Trichur	0.74	(1)	3641.46	(5)	2094.02	(8)
5. Palghat	2.65	(3)	2046.85	(2)	560.98	(4)
6. Malappuram	10.27	(8)	2061.02	(3)	182.89	(1)
7. Kozhikode	8.75	(7)	5995.29	(7)	615.01	(5)
8. Canannore	2.54	(2)	1539.49	(1)	434.40	(2)

Note: 1. All data refer to mixed coconut plots except in the village of Malappuram, where it refers to pure coconut plots.

2. Trivandrum (N), (T) refer to the selected villages of Nedumangad and Thiruvallam.

3. Figures in parenthesis refer to ranks, the villages being ranked in ascending order.

For the villages of Kozhikode and Trivandrum (T) the relative disadvantage in terms of total costs per hectare has been more than compensated by the high gross value of output/hectare (Table 3.4). We, therefore, find that net revenue/total cost is very high in these villages, it being higher only in the village of Malappuram.

In the selected village of Ernakulam, both gross value of output/hectare and total cost/hectare are rather high; and in Nedumangad (Trivandrum) both are rather low (they obtain similar rank in both the cases). The combination of these returns and costs, therefore, puts them in the middle range as far as net revenue/total cost is concerned.

In the village of Palghat gross value of output and total cost per hectare work in the same direction to reduce net revenue/total cost, and make it one of the lowest. That is, gross value of output/hectare is low and total cost/hectare belongs to the middle range, the two together reducing net revenue per unit cost.

In the village of Canannore, however, both gross value of output and total cost/hectare are low; but while the former is the lowest, the latter is significantly higher than the lowest total cost/hectare of the village of Nalappuram.

This results in a low net revenue per unit cost.

The explanation of variation in net revenue per unit cost in terms of variation in its components, gross value of output/hectare and total cost/hectare, is still incomplete unless we explain the variations in the components themselves. It needs to be noted here that, since gross value of output/hectare refers to output from both coconut and the inter-crops

Table 3.5: <u>Price of Coconut (Rs./100 nuts) (1974-75) Proportions of Gross Value of Output from Inter-Crops</u>

Districts	Prices	Proportion of Gross Value of output from Inter-Crops
Trivandrum	78.79	0.17(N) 0.08(T)
Ernakulam	94.35	0.11
Trichur	88.77	0.03
Palghat	87.99	0.50
Malappuram	75.09	-
Kozhikode	78.97	0.02
Canannore	87.39	0.32
Kerala	85.13	-

Notes: Trivandrum (N), (T) - the villages of Nedumangad and Thiruvallam.

Sources: 1. <u>Season and Crop Report</u>, 1974-75 Bureau of Economics and Statistics, Government of Kerala.

2. Village level data from Cost of Cultivation Survey.

grown on the mixed plots, it will depend on the price of coconut, the output/hectare of coconut, and the proportion of total output from the inter-crops.

In the two villages where the proportion of value of output from the inter-crops is high, i.e. in Palghat and Canannore, the gross value of output/hectare is the lowest, inspite of the price of coconut in these districts being somewhat above the average. $\underline{\frac{1}{}}$ In these villages the coconut plots are perhaps freshly planted with coconut saplings (seen from the high proportion of non-bearing trees, Table 3.6); this would not only make gross value of output/hectare low; but also raise the share of inter-crops in the value of output.

The only village in which price of coconut seems to play a significant role is in Malappuram. In this village only pure coconut plots are considered and the low gross value of output per hectare is explained by the exceptionally low price of coconut. Interestingly, in Ernakulam where the price of coconut is the highest, gross value of output/hectare is not the highest; while in two districts where the price of coconuts is low (Trivandrum and Kozhikode) the gross value of output/hectare is the highest. In one of the Trivandrum villages (Nedumangad), the gross value of output/hectare is itself not very high.

Table 3.6: Costs per hectare (Rupees), Labour Input per Hectare (hours), Proportion of Non-Bearing Palms, and Plams per hectare in Coconut Cultivation

Districts (Selected Villages)	Total Cost hectare	Labour Cost hectare	Fertilizer Cost hectare	Hired Labour hectare	Total Labour hectare	Hired Labour Total Labour	Non-Bearing Palms Total Palms	Non-Bearing Palms hectare	Total Palms hectare
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Trivandrum (N)	517.79(3)	293.65(3)	224.14(4)	227.79(2)	369.70(3)	0.62(4)	0.23(2)	28.92(2)	125.75(3)
2. Trivandrum (T)	1483.00(7)	734.15(7)	731.49(8)	554.64(7)	946.89(7)	0.59(3)	0.44(8)	119.39(8)	271.34(7)
3. Ernakulam	872.21(6)	507.82(6)	357.93(6)	318.20(5)	549.28(5)	0.58(2)	0.23(2)	38.63(4)	167.96(5)
4. Trichur	2094.02(8)	1384.57(8)	559.62(7)	1229.43(8)	1608.74(8)	0.76(6)	0.30(4)	78.08(6)	258.71(6)
5. Palghat	560.98(4)	231.07(2)	293.87(5)	289.62(4)	806.70(6)	0.36(1)	0.39(7)	31.18(3)	79.96(1)
6. Malappuram	182.89(1)	119.44(1)	52.13(1)	80.14(1)	80.45(1)	0.99(8)	0.17(1)	20.74(1)	112.02(2)
7. Kozhikode	615.01(5)	432.63(5)	180.69(3)	342.22(6)	514.68(4)	0.66(5)	0.30(4)	99.15(7)	330.52(8)
8. Canannore	434.40(2)	335.46(4)	93.93(2)	276.57(3)	290.84(2)	0.95(7)	0.38(6)	57.26(5)	150.71(4)

Notes: 1. All the data in Columns 1-6 are for mixed coconut plots, except for the selected village of Malappuram which are for pure coconut plots.

2. Columns 7, 8, 9 refer to mixed and pure coconut plots taken together

3. Trivandrum (N) & (T) refer to the selected villages of Nedumangad and Thiruvallam respectively.

4. Figures in parenthesis refer to ranks, the villages being ranked in ascending order.

Thus the burden of explaining the variations in the gross value of output/hectare seems to fall more on variations in productivity, and less on price differential and the proportion of output from intercrops. The productivity, however, depends partly on the number of palms per hectare (i.e., intensity of cultivation) and partly on the soil and other agro-climatic conditions. The effect of these variables cannot however be specifically determined from our data pertaining to the various villages.

The variations in total cost/hectare, on the other hand, depend on the variations in its main components, labour costs and fertilizer costs per hectare. Our data provides some clues regarding variations in these components which we shall discuss now.

The labour cost per hectare and the fertilizer cost per hectare vary widely corresponding to, and thereby accounting for, the variation in the total cost per hectare. For example, the selected villages of Trichur and Trivandrum (Thiruvallam), followed by Ernakulam, have the highest total cost/hectare and also the highest labour cost and fertilizer cost/hectare. (Table 3.6 Cols 1,2,3). The selected village of Malappuram, on the other hand, has the lowest total cost/hectare and also the lowest labour cost and fertilizer costs per hectare. Thus,

total cost variations correspond to the variations in these two input costs, and there seems to be also a correlation between the use of the two inputs, labour and fertilizers.

The variation in the labour cost per hectare can be explained directly by the hired labour per hectare employed in the villages. Again the selected villages of Trichur, Trivandrum (T) and Ernakulam[8]/have the highest and Malappuram the lowest, hired labour per hectare (Table 3.6 Col.4). The main thing to be explained, therefore, are the per hectare variations in labour and fertilizer use.

The labour input and fertilizer input in coconut cultivation vary with the age of the palms, being greater in the initial stage, mainly before the palms have begun to bear fruit. Thus the variation observed in the use of total and hired labour and fertilizer per hectare can be explained partly in terms of the proportion of non-bearing trees to total trees. The impact of this will, however, depend on the intensity of cultivation (palms/hectare). Since we have considered only mixed coconut plots, except in the village of Malappuram, and since the labour input and fertilizer input in this study refers to the plot as a whole, the use of inputs would also depend on the type of crop that is inter-cropped with coconut.

Table 3.7 shows the various crops that are inter
cropped with coconut in the selected villages.[2/] Of these

Table 3.7: <u>Crops inter-cropped with Coconut</u>

Districts (Selected Villages)	Inter-Crops
1. Trivandrum (Nedumangad)	Jackfruit, Mango, Tapioca
2. Trivandrum (Thiruvallam)	Jackfruit, Mango, Tamarind, Arecanut
3. Ernakulam	Tapioca, Arecanut
4. Trichur	Arecanut, Mango, Jackfruit, Plantain, Papaya, Pepper, Cashew, <u>Tapioca</u>
5. Palghat	<u>Banana/Plantain</u>, Arecanut, Mango Jackfruit, <u>Sweet Potato</u>
6. Kozhikode	<u>Arecanut, Jackfruit</u>, Mango, Tamarind
7. Malappuram	
8. Canannore	Cashew, Jackfruit, Papaya, Mango

Note: Predominant inter-crops are emphasised

inter-crops, arecanut, jack fruit, mango, cashewnut and tamarind
are perennial crops and the labour input into them is minimal
used mainly for harvesting. Banana, Plantains, Tapioca and
Sweet Potato are seasonal crops and the labour input into them
is substantially greater.

We will now attempt to explain the observed variations in hired and total labour through these factors taken together, i.e., the proportion of non-bearing trees, the intensity of cultivation (palms/hectare) and the crops that are inter cropped with paddy in the villages.[10]

Thiruvallam in Trivandrum has an exceptionally high proportion of non-bearing trees to total trees and also the largest number of non-bearing trees per hectare. The inter-crops grown in this village are mainly perennial crops and do not require much labour input. Thus, in this village the first two factors alone account for the high labour input (hired and total) (Table 3.6 and 3.7).

The selected village of Trichur has the highest hired and total labour input per hectare, This village has a high proportion of non-bearing palms and a high intensity of palms per hectare. It also has a large number of inter-crops grown in each plot, the predominant one being the labour-intensive tapioca. These facts together would explain the exceptionally high labour input in the coconut plots in the village (Table 3.6., 3.7).

The village of Kozhikode has the greatest intensity of palms per hectare and a high proportion of non-bearing trees. But unlike the village of Trichur, it is not so intensely inter

cropped, the predominant inter-crops being arecanut and jackfruit, both perennial crops. Thus in spite of its high density of coconut palms, the labour input (hired and total) is lower than that in the village of Trichur (Table 3.6, 3.7).

In spite of a lower proportion of non bearing trees and lower intensity of palms/hectare, the selected village from Ernakulam has a slightly higher total labour/hectare than the village from Kozhikode. This anomaly can only be explained by the fact that the inter-crop grown in the former is more labour intensive (tapioca) than those grown in the latter. The hired labour per hectare, however, is lower due to the higher family labour use in the village.

Similarly, in the selected village of Palghat, the extremely high total labour/hectare in spite of low intensity of palms per hectare, can only be explained by the extensive use of labour in the inter-crops, particularly banana.[11]/ (a labour intensive crop). The proportion of family labour use in this village is very high explaining the low hired labour/hectare.

The village in Canannore and Nedumangad in Trivandrum have a low hired and total labour input. Both these villages have low intensity of palms/hectare; consequently, though the

Canannore village has a high proportion of non-bearing trees, the actual non-bearing trees/hectare is low. The inter-crops grown in these villages are also not very labour intensive, though tapioca is grown in a few plots in Nedumangad.

Finally, in Malappuram we consider only pure coconut plots, as mentioned earlier. The intensity of palms/hectare is exceptionally low with a very low proportion of non-bearing palms. Hence this village has an exceptionally low labour input per hectare.

Paddy has always been a more labour intensive crop than coconut, primarily due to the nature of the crops themselves. One may ask therefore, why did the substitution of coconut for paddy not occur earlier? What changes in recent years necessitated such a shift? It is important to note that, in recent years, a sharp increase in wage rates and in fertilizer prices have been experienced, and that paddy, being a crop in which labour and fertilizers are used more intensively, is affected more adversely than coconut. Also paddy prices have been stagnating, while coconut has gained from substantial price increases. These trends in input and output prices are discussed in detail in the next chapter. An attempt is also made to relate these price changes to area changes discussed in the first chapter.

Table 3.8: <u>Total Cost per Hectare - Paddy and Coconut</u> (Rupees)

Deciles	PADDY Trivandrum-Kadakampally	COCONUT Trivandrum-Nedumangad	PADDY Palghat-Elapally	COCONUT Palghat-Pattithara
50%	3923.15	477.75	2803.23	547.14
6	3866.07	378.09	3357.35	132.97
7	3813.19	355.94	3519.01	129.08
8	3859.06	456.64	3760.62	450.54
9	3803.47	655.21	3632.99	771.91
10	2490.92	607.51	3035.98	1231.42
Top 5%	2217.73	645.49	2896.27	1260.90
	TRIVANDRUM-UZHAMALAKAL	TRIVANDRUM-THIRUVALLAM	MALAPPURAM-NILAMBUR	MALAPPURAM-PARAPANGADI
50%	2697.23	1297.28	1713.29	173.76
6	3332.00	1299.81	1659.93	98.80
7	3739.09	1471.93	1746.89	85.00
8	3187.86	1523.38	1683.33	122.88
9	2767.31	1320.14	1650.90	200.39
10	3180.85	1629.97	2143.36	251.90
Top 5%	3639.86	1540.64	2400.38	255.21
	ERNAKULAM-PARUR	ERNAKULAM-ALNGAD	CANANNORE-CHELLERI	CANANNORE-KANNADIPARAMBI
50%	1038.79	916.91	2340.47	406.15
6	1351.03	916.91	2042.58	446.00
7	1399.29	916.91	2051.36	454.04
8	1373.94	978.12	2432.77	385.86
9	1335.55	1000.83	2124.30	390.39
10	1554.67	791.42	2241.77	516.61
Top 5%	1709.32	662.19	2348.59	573.55
	TRICHUR-CHERPU	TRICHUR-EDAVAVILANGU	KOZHIKODE-NOOLPUZHA	KOZHIKODE-BEYPORE
50%	3835.53	2253.65	697.96	1128.57
6	6216.75	2253.65	809.56	1140.15
7	6714.63	2104.11	799.02	842.54
8	5318.75	2775.63	763.56	792.38
9	4723.47	2286.68	1079.28	788.08
10	3264.60	1668.90	1404.08	401.99
Top 5%	2508.50	1409.59	1472.36	409.49

Table 3.9: <u>Total Cost/Gross Value of Output - Paddy and Coconut</u> (Rupees)

Deciles	PADDY Trivandrum-Kadakampally	COCONUT Trivandrum-Nedumangad	PADDY Palghat-Elapally	COCONUT Palghat - Pattithara
50%	0.41	0.13	0.44	0.17
6	0.63	0.16	0.46	0.08
7	1.23	0.17	0.46	0.08
8	0.85	0.16	0.50	0.32
9	0.56	0.16	0.49	0.43
10	0.55	0.20	0.44	0.39
Top 5%	0.51	0.22	0.43	0.41
	TRIVANDRUM-UZHAMALAKAL	TRIVANDRUM-THIRUVALLAM	MALAPPURAM-NILAMBUR	MALAPPURAM-PARAPANNAGADI
50%	0.65	0.11	0.40	0.19
6	0.82	0.11	0.48	0.08
7	0.87	0.17	0.48	0.06
8	0.54	0.19	0.42	0.07
9	0.52	0.16	0.40	0.07
10	0.42	0.15	0.59	0.11
Top 5%	0.74	0.14	0.53	0.14
	ERNAKULAM-PARUR	ERNAKULAM-ALANGAD	CANANNORE-CHELERI	CANANNORE-KANNADIPARAMBI
50%	0.49	0.18	0.58	0.49
6	0.52	0.18	0.54	0.17
7	0.53	0.18	0.53	0.17
8	0.43	0.25	0.47	0.25
9	0.44	0.20	0.48	0.29
10	0.70	0.17	0.53	0.36
Top 5%	0.84	0.18	0.55	0.39
	TRICHUR-CHERPU	TRICHUR-EDAVAVILANGU	KOZHIKODE-NOOLPUZHA	KOZHIKODE-BEYPORE
50%	1.72	0.66	0.29	0.10
6	0.61	0.54	0.38	0.10
7	0.57	0.65	0.41	0.14
8	0.88	0.82	0.51	0.16
9	0.70	0.56	0.71	0.14
10	0.59	0.45	0.57	0.08
Top 5%	0.81	0.36	0.71	0.08

Table 3.10: Labour Cost per Hectare - Paddy and Coconut (Rupees)

Deciles	PADDY Trivandrum-Kadakampally	COCONUT Trivandrum-Nedumangad	PADDY Palghat-Elapally	COCONUT Palghat-Pattithara
50%	2500.48	169.38	1640.00	107.71
6	2205.24	220.23	1974.04	15.79
7	1947.13	231.31	2072.68	14.79
8	2190.30	279.11	1955.86	232.10
9	2527.45	369.47	1847.80	396.40
10	1784.85	367.54	1770.60	512.16
Top 5%	1690.58	366.07	1729.60	511.13
	TRIVANDRUM-UZHAHALAKAL	TRIVANDRUM-THIRUVALLAM	MALAPPURAM-NILAMBUR	MALAPPURAM-PARAPANGADI
50%	1385.85	609.73	930.18	140.30
6	1886.08	609.36	1021.20	88.49
7	2165.73	675.99	1076.12	78.65
8	1594.18	695.08	1043.13	89.86
9	1390.31	741.54	1003.99	117.25
10	1707.84	807.88	1223.40	148.69
Top 5%	1947.70	795.25	1400.78	150.57
	ERNAKULAM-PARUR	ERNAKULAM-ALANGAD	CANANNORE-CHELLERI	CANANNORE-KANNADIPARAMBI
50%	788.21	477.53	1478.81	279.77
6	953.45	476.29	1435.49	326.80
7	987.50	478.14	1432.53	333.38
8	993.20	443.84	1617.18	321.26
9	971.97	536.37	1535.80	333.89
10	1216.66	523.56	1554.37	418.28
Top 5%	1365.74	451.19	1576.74	453.32
	TRICHUR-CHERPU	TRICHUR-EDAVAVILANGU	KOZHIKODE-NOOLPUZHA	KOZHIKODE-BEYPORE
50%	1320.27	964.23	356.33	737.59
6	2919.98	964.23	371.15	740.15
7	3238.90	2103.11	417.77	597.57
8	2325.23	2164.25	504.46	572.34
9	2161.05	1563.41	629.25	546.76
10	1636.83	1114.43	740.24	285.68
Top 5%	1244.43	923.42	761.19	320.89

NOTES AND REFERENCES

1. This is true when compared decile-wise also for all pairs
   of villages, except for the bottom 50%, 6, 7 and 8th
   deciles of the selected villages of Kozhikode (Table 3.8).

2. This is true when the villages are compared decile-wise
   also, except for the 7th decile in the villages of Trichur
   (Table 3.9). Total Cost/Gross Value of Output (T.C/GVO)
   is the obverse of the measure of profitability, net revenue
   per unit cost, (NR/TC), used in Chapter 2.

$$\text{i.e. } \frac{NR}{TC} = \frac{GVO - TC}{TC} = \frac{GVO}{TC} = 1$$

   Since the net revenue per unit cost is higher in coconut
   cultivation, it follows that total cost per gross value of
   output (TC/GVO) will be higher in paddy cultivation.

3. Labour cost here includes only wages paid to hired labour.
   Imputed family labour costs are not included, as explained
   in Chapter II.

4. This is true also when compared decile-wise in all the
   selected villages, except for the bottom 50%, 6th, 7th and
   8th deciles of the selected villages in Kozhikode (Table 3.10).

5. The fertilizer cost per hectare are exceptionally low in the
   selected villages of Ernakulam and Kozhikode since the lands
   here are single cropped.

6. The labour input per hectare (both hired and total) is the
   lowest in the selected villages of Ernakulam and Kozhikode
   in paddy cultivation. This is due to the fact that these
   two villages have only single cropped lands. The labour
   input/hectare (hired and total) in coconut cultivation
   varies widely among the selected villages. An attempt to
   explain these variations is made in Section 2.

7. We are assuming here that the prices which prevailed in the
   selected villages were the same as in the districts. This
   assumption is made due to lack of village-wise data on prices.

8. The hired labour per hectare in the village of Kozhikode,
   however, is higher than that in the village of Ernakulam
   due to the much greater intensity of palms/hectare as we
   shall see later (Table 3.6 Col.4).

9. It is not possible to accurately seperate out the labour input into coconut and that into the inter crops since many of the operations are common for the plot as a whole.

10. Since we do not have any information regarding the intensity of fertilizer use in various crops that are inter-cropped with coconut, in the following discussion only variations in labour use are attempted to be explained in terms of the above mentioned variables. As mentioned, however, labour and fertilizer use are highly correlated and, therefore, the explanation of variations in labour use shall also, to a considerable extent, explain the variation in fertilizer use.

11. The labour input (mainly family labour) in banana cultivation in this village is given seperately.

CHAPTER IV: TRENDS IN INPUT AND OUTPUT PRICES

In the earlier chapter we looked at the relative profit-
ability of the two crops, rice and coconut at one time point
and came to the conclusion that coconut is a more profitable
crop. What we observed for the years 1973-74 and 1974-75 is
perhaps a culmination of what has been occurring over a period
of time. Ideally we would like to have profitability figures
for a period of time or at least for 2 or 3 time points, so as
to compare the shifts in profitability that may have occurred
since the early 1960's. Unfortunately we do not have such data
for any other year.

The profitability of a crop is determined among other
things, by input and output prices. In this chapter we shall
try to fill in the gap, of lack of figures on profitability, by
examining the trends in the input and output prices during the
last two decades. From this we shall try to draw some conclu-
sions regarding the changes in profitability of cultivation of
the two crops.

This chapter is divided into two sections. In the first
section we look at the movements in the absolute and relative
prices of rice and coconut, and compare them with the area

movements we studied earlier. Since this study is primarily

devoted to the shift of cultivation away from rice and to

coconut, in the second section we shall examine trends in the

input prices in rice cultivation, i.e., in wage rates and

fertilizer prices, to see what could be the cause of the

diminishing profitability of rice cultivation and whether

this is only a recent phenomenon or the culmination of a trend.

Section 1

In Chapter 1 we focused on the actual movements of area

under specific crops in an endeavour to uncover certain area

shifts between them. The broad movement we noticed is a shift

of area away from rice and in favour of coconut[1]. In this

section we shall examine how far these are the reflections of

appropriate price changes.

Price is an important factor affecting the allocation

of area under crops. The three situations, as envisaged by

Dharm Narain, when price may not play this role are (a) "in

a mono-culture economy, where the entire area sown belongs

to only one crop"; (b) "when several crops are sown along side

one another, provided area sown to each crop are so specific

that they cannot be transferred to alternative uses"[2] and (c)

when two crops are close substitutes of one another at the level

of consumption, because in such a case the "prices (of

these crops) will tend to move in step; and the less,

therefore, will be the provocation from price to a shift

of area between them"$\underline{3}/$

Kerala is not a mono-culture economy, hence the

first possibility is not relevant to this study. Regarding

the second, we have seen in Chapter 1, while discussing the

topographical features of the State, that rice and coconut

can be grown under similar agro climatic conditions, and

that rice area can be converted to coconut gardens.$\underline{4}/$ As

for the third possibility, rice and coconut are substitutable

only to a very limited extent at the level of consumption,

rice being a foodgrain crop and coconut being only in part a

food crop. Again according to Dharm Narain "the play of price

on foodgrain areas is likely to be more significant when food-

grains compete with other crops, rather than with rival food-

grains, for area".$\underline{5}/$

Once it is agreed that there is likely to be a correlation

between price and area movements of the crops, the question that

arises is what prices to use, and what is the expected lag between

the change in prices and the change in area?

In this study we use prices obtaining at the time of harvest

(farm harvest prices) as the relevant price to which farmers respond

As regards the time lag between price change and area change, in

the case of rice we lag prices by one year. But in the case of

coconut a one year or two year lag is meaningless, because land once converted to coconut cultivation cannot easily be shifted back to any other crop. Therefore, the farmer would look for a long term trend in coconut prices before taking such a decision, rather than the coconut price in any one or two previous years.

In this section we shall first examine the movement of prices of rice and coconut and relate it to the movement in area under these crops. We then examine the movement of relative prices of rice to coconut and of coconut to rice to see if there is any correlation between them and the changes in area observed earlier.

In the whole of Kerala the price of paddy shows a rising trend from 1960-61 to 1974-75 rising from 0.41p.per kg to Rs.2.46 per kg, except for a slight dip between 1967-68 and 1970-71. This general trend is seen at the district level also for all districts. After 1974-75 the price of paddy falls sharply in all districts (Table 4.1, 4.2).

The major part of the increase in the price of paddy between 1960-61 and 1974-75 took place between 1960-61 and 1967-68, as can be seen from Table 4.2

Table 4.1: Farm Harvest Prices - Paddy Rs./kg

Year	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Canannore	Kerala
1960-61	0.47	0.41	0.41	0.41	0.42	0.39	0.39	0.43	0.44	0.41
1961-62	0.51	0.46	0.45	0.42	0.44	0.41	0.42	0.41	0.46	0.44
1962-63	0.50	0.46	0.43	0.41	0.41	0.38	0.38	0.41	0.44	0.41
1963-64	0.51	0.49	0.44	0.41	0.44	0.41	0.45	0.42	0.46	0.44
1964-65	0.88	0.83	0.78	0.70	0.73	0.69	0.49	0.72	0.64	0.68
1965-66	0.97	0.87	0.94	0.86	0.90	0.89	0.83	0.90	0.75	0.87
1966-67	1.21	1.14	1.20	1.16	1.15	1.01	0.87	0.88	0.98	1.02
1967-68	1.61	1.56	1.55	1.39	1.53	1.33	1.20	1.18	1.29	1.37
1968-69	1.19	1.35	1.14	1.11	1.14	1.04	0.93	1.04	1.13	1.09
1969-70	1.19	1.28	1.08	1.03	1.11	0.97	0.90	0.94	0.98	1.02
1970-71	1.10	1.11	0.96	0.93	0.98	0.88	0.80	0.85	0.89	0.94
1971-72	1.20	1.17	1.04	1.07	1.07	0.99	0.91	0.93	0.91	1.00
1972-73	1.40	1.32	1.24	1.27	1.30	1.20	1.13	1.21	1.11	1.19
1973-74	2.28	1.98	1.85	1.87	2.08	1.90	1.80	1.90	1.61	1.87
1974-75	3.19	2.68	2.40	2.58	2.79	2.51	2.26	2.52	2.14	2.46
1975-76	2.25	2.05	1.84	1.89	1.96	1.82	1.65	1.87	1.68	1.89
1976-77	1.68	1.56	1.42	1.38	1.57	1.41	1.35	1.59	1.33	1.48
1977-78	1.50	1.39	1.25	1.22	1.37	1.25	1.26	1.36	1.21	1.33
1978-79	1.51	1.38	1.22	1.19	1.32	1.23	1.21	1.29	1.14	1.28
1979-80	1.68	1.43	1.29	1.26	1.41	1.28	1.29	1.39	1.27	1.37

Source: 1. Season and Crop Reports for Kerala State, Various Years, Bureau of Economics and Statistics, Government of Kerala.

2. Unpublished data for the latest period obtained from the Bureau of Economics and Statistics, Government of Kerala, Trivandrum.

Table 4.2: <u>Percentage Changes and Absolute Prices</u> (Rs./kg)
<u>of Paddy - Farm Harvest Prices</u>

Districts	Percentage Changes in Prices				Absolute Peak Prices	
	1960-61 to 1967-68	1967-68 to 1970-71	1960-61 to 1974-75	1974-75 to 1978-79	1967-68	1974-75
1. Trivandrum	<u>242.55</u>	(-)31.68	<u>578.72</u>	(-)52.66	<u>1.61</u>	<u>3.19</u>
2. Quilon	<u>280.49</u>	(-)28.85	<u>553.66</u>	(-)48.51	<u>1.56</u>	<u>2.68</u>
3. Alleppey	<u>278.05</u>	(-)38.06	485.37	(-)49.17	<u>1.55</u>	2.40
4. Kottayam	239.02	(-)33.09	<u>529.27</u>	(-)53.88	<u>1.39</u>	<u>2.58</u>
5. Ernakulam	<u>264.29</u>	(-)35.95	<u>564.29</u>	(-)52.69	<u>1.53</u>	<u>2.79</u>
6. Trichur	241.03	(-)33.83	<u>543.59</u>	(-)51.00	1.33	2.51
7. Palghat	207.69	(-)33.33	479.49	(-)46.46	1.20	2.26
8. Kozhikode	174.42	(-)27.97	486.05	(-)48.81	1.18	2.52
9. Canannore	193.18	(-)31.01	386.36	(-)46.78	1.29	2.14
10. Kerala	234.15	(-)31.39	500.00	(-)47.97	1.37	2.46

Note: Maximum percentage changes and greater absolute prices have been emphasised.

Source: Percentage changes in prices have been calculated from the absolute prices of paddy given in Table 4.1

Among the districts the <u>Northern</u> districts of Canannore,

Kozhikode and Palghat showed minimal percentage increase in

price of paddy for the whole period 1960-61 to 1974-75. On the other hand, the peak prices of paddy in 1967-68 and 1974-75 are high in the Southern districts of Trivandrum, Quilon, Ernakulam, Kottayam and Alleppey (1967-68 only). Canannore showed the least percentage increase in price of paddy and also the lowest absolute price of paddy in the peak year 1974-75 (Table 4.2)

Thus the Northern districts have a greater incentive to go out of rice-cultivation since their price advantage in rice is the least. This supports our earlier hypothesis that it is perhaps mainly from these districts that the conversion of lands to coconut cultivation has been occurring.

The general trend in coconut prices is a continuous rise from 1960-61 to 1979-80, both at the All-Kerala and at the district levels. It dips, slightly in 1968-69, 1971-72 and 1975-76, but then continues to rise from the year after (Table 4.3).

The major part of this increase in prices occurred between 1960-61 and 1974-75, as is seen in Table 4.4. Within this period the increase in prices was concentrated between 1960-61 - 1967-68 between 1971-72 - 1974-75.

Table 4.3: <u>Price of Coconut</u> Rs./100 nuts

Years	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Canannore	Kerala
1960-61	21.45	22.06	22.83	24.12	22.58	23.41	21.16	18.23	19.52	21.47
1961-62	21.01	20.34	23.22	23.67	23.54	21.56	-	19.70	18.86	21.36
1962-63	24.40	24.33	26.35	25.61	26.97	25.07	-	23.28	24.00	24.78
1963-64	23.83	23.71	25.28	26.29	25.69	25.56	-	21.66	22.63	24.02
1964-65	26.21	26.92	28.06	28.25	29.52	29.00	-	24.64	24.19	26.77
1965-66	39.13	39.50	39.10	40.33	43.04	42.79	-	37.52	34.67	39.16
1966-67	35.62	35.78	38.31	39.58	40.50	39.61	34.21	34.36	34.91	36.82
1967-68	40.12	45.08	46.17	47.36	49.34	48.43	45.11	45.57	42.12	45.37
1968-69	35.63	41.63	39.37	41.06	43.72	41.27	35.79	37.52	37.44	39.27
1969-70	44.45	47.30	49.96	52.78	56.06	52.19	51.60	49.37	48.38	49.84
1970-71	49.67	55.55	58.78	61.16	66.27	58.66	58.59	54.11	57.26	57.13
1971-72	38.21	42.36	44.55	45.30	48.11	40.94	40.17	38.53	42.06	42.07
1972-73	48.09	55.22	55.44	57.45	55.14	53.85	49.92	49.53	51.11	52.79
1973-74	83.24	87.58	90.83	94.82	99.49	91.78	87.33	86.18	90.56	89.01
1974-75	78.79	85.69	87.55	89.66	94.35	88.77	87.99	78.97	87.39	85.13
1975-76	61.75	66.55	66.70	68.17	75.44	70.08	71.83	63.90	61.98	67.38
1976-77	83.11	89.79	95.88	98.23	104.86	94.18	80.88	85.45	89.46	91.32
1977-78	90.66	96.32	99.04	103.66	111.62	107.28	99.64	91.73	95.64	101.37
1978-79	92.88	101.33	103.57	104.60	117.67	108.97	102.95	92.64	103.56	103.13
1979-80	104.07	121.36	119.27	117.10	129.16	122.18	110.43	104.67	112.28	115.60

Source: Same as in Table 4.1

Table 4.4: Percentage changes in Farm Harvest Prices
of Coconut

Districts	1960-61 to 1967-68	1971-72 to 1974-75	1960-61 to 1974-75	1960-61 to 1979-80
1. Trivandrum	87.04	106.20	267.32	385.17
2. Quilon	104.35	102.29	288.44	450.14
3. Alleppey	102.23	96.52	283.49	422.43
4. Kottayam	96.35	97.92	271.72	385.49
5. Ernakulam	118.51	96.11	317.85	472.01
6. Trichur	106.88	116.83	279.20	421.98
7. Palghat	113.19	119.04	315.83	421.88
8. Kozhikode	149.97	104.96	333.19	474.16
9. Canannore	115.78	107.77	347.69	475.20
10. Kerala	111.32	102.35	296.51	438.45

Note: Maximum percentage increases within each period
have been emphasised.

Source: Percentage increases in prices have been calculated
from the absolute prices of coconut given in Table 4.3.

Among the various districts the Northern districts of
Canannore, Kozhikode and Palghat showed the maximum increase
in coconut prices followed by Ernakulam and Trichur in the

various periods (Table 4.4).

In the Northern districts, this greater increase in coconut prices together with the lower percentage increases and absolute prices of rice (seen earlier) would create an incentive to increase area under coconut cultivation even at the expense of rice cultivation. This again corresponds with our earlier observation that these districts showed movement of area away from rice.[6/]

As pointed out by Dharm Narain, "attempts to examine the effect of price on acreage changes under a particular crop with reference to the price of only that crop are inadequate. The significance of a price change when other prices remain constant is different from what it would be when other prices also change. Hence the need for correction: to convert crude prices into more meaningful ones".[7/] Various 'correction factors' have been used, for example the index of prices of goods and services used by the farmer, a general index of wholesale prices, an index of agricultural prices and prices of competing crops.

Thus besides absolute price movements we also look at the relative price movement of rice and coconut. It is seen that for All-Kerala the relative price, price of rice/price of coconut, moves in favour of rice till 1967-68. Between

1967-68 and 1974-75 it fluctuates, but with a declining trend. After 1974-75 the relative price of rice to coconut falls sharply upto 1979-80. (Table 4.5) Thus the relative price moves in favour of coconut after 1967-68.

A similar trend is seen in all the districts. In Kozhikode and Trichur though, the rise in relative-prices in favour of rice in 1974-75 shoots above the peak in 1967-68, but tapers off immediately after (Table 4.5).

This again corresponds to our earlier observation an area movements. Rice area increases until 1967-68 as the relative price moves in favour of it, but then begins to stagnate and starts falling after 1974-75 as the relative price begins to move in favour of coconut after 1967-68.

In order to visually compare the movement in prices and relative prices with area under rice and coconut we plot graphs seperately for each of these two crops for the State as a whole (Figures 1 & 2).

It is seen that the price of rice and area of rice move almost in unison[8/]. Relative price of rice to coconut rises in the first phase till 1967-68 along with the area under rice. In the second phase between 1968-69 and 1974-75 the area under rice remains more or less constant, whereas relative prices tend

Table 4.5: <u>Relative Price of Paddy to Coconut</u>, $\frac{P_R}{P_C}$ x 100

| Years	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Canannore	Kerala
1960-61	2.19	1.86	1.80	1.70	1.86	1.67	1.84	2.36	2.25	1.91
1961-62	2.43	2.26	1.94	1.77	1.87	1.90	-	2.08	2.44	2.06
1962-63	2.05	1.89	1.63	1.60	1.52	1.52	-	1.76	1.83	1.65
1963-64	2.14	2.07	1.74	1.56	1.71	1.60	-	1.94	2.03	1.83
1964-65	3.36	3.08	2.78	2.48	2.47	2.38	-	2.92	2.65	2.54
1965-66	2.48	2.20	2.40	2.13	2.09	2.08	-	2.40	2.16	2.22
1966-67	3.40	3.19	3.13	2.93	2.84	2.55	2.54	2.56	2.81	2.77
1967-68	4.01	3.46	3.36	2.93	3.10	2.75	2.66	2.59	3.06	3.02
1968-69	3.34	3.24	2.90	2.70	2.61	2.52	2.60	2.77	3.02	2.78
1969-70	2.68	2.68	2.16	1.95	1.98	1.86	1.74	1.90	2.37	2.05
1970-71	2.21	2.00	1.63	1.52	1.48	1.50	1.37	1.57	1.55	1.65
1971-72	3.14	2.76	2.23	2.41	2.22	2.42	2.27	2.41	2.16	2.38
1972-73	2.91	2.39	2.24	2.21	2.36	2.23	2.26	2.44	2.17	2.25
1973-74	2.74	2.26	2.04	1.97	2.09	2.07	2.06	2.20	1.78	2.10
1974-75	4.05	3.13	2.74	2.88	2.96	2.83	2.57	3.19	2.45	2.89
1975-76	3.64	3.08	2.76	2.77	2.60	2.60	2.30	2.93	2.71	2.80
1976-77	2.02	1.74	1.48	1.40	1.50	1.50	1.67	1.86	1.49	1.62
1977-78	1.65	1.44	1.26	1.18	1.23	1.17	1.26	1.48	1.27	1.31
1978-79	1.63	1.36	1.18	1.14	1.12	1.13	1.18	1.39	1.10	1.24
1979-80	1.61	1.18	1.08	1.08	1.09	1.05	1.17	1.33	1.13	1.19

Note: P_R - Price of Rice P_C - Price of Coconut

Source: Computed from Tables 4.1 and 4.3

Fig. 1. AREA UNDER RICE, PRICE OF RICE, RELATIVE PRICE OF RICE TO COCONUT.
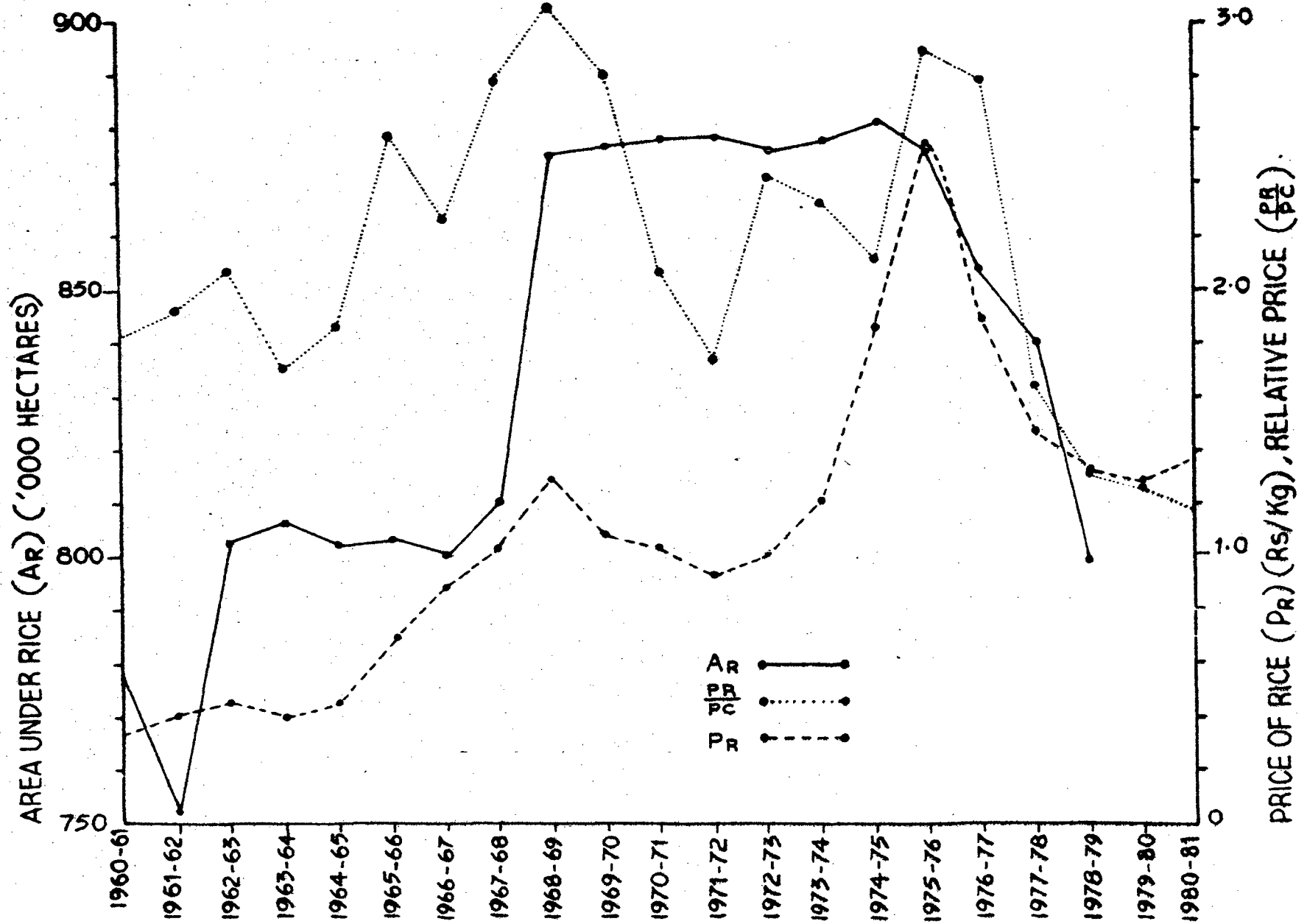
Note: PRICE AND RELATIVE PRICE HAVE BEEN LAGGED BY ONE-YEAR.
YEARS ON THE HORIZANTAL AXIS REFER TO THE AREA FIGURES.

Fig.2. AREA UNDER COCONUT, PRICE OF COCONUT, RELATIVE PRICE OF COCONUT TO RICE.
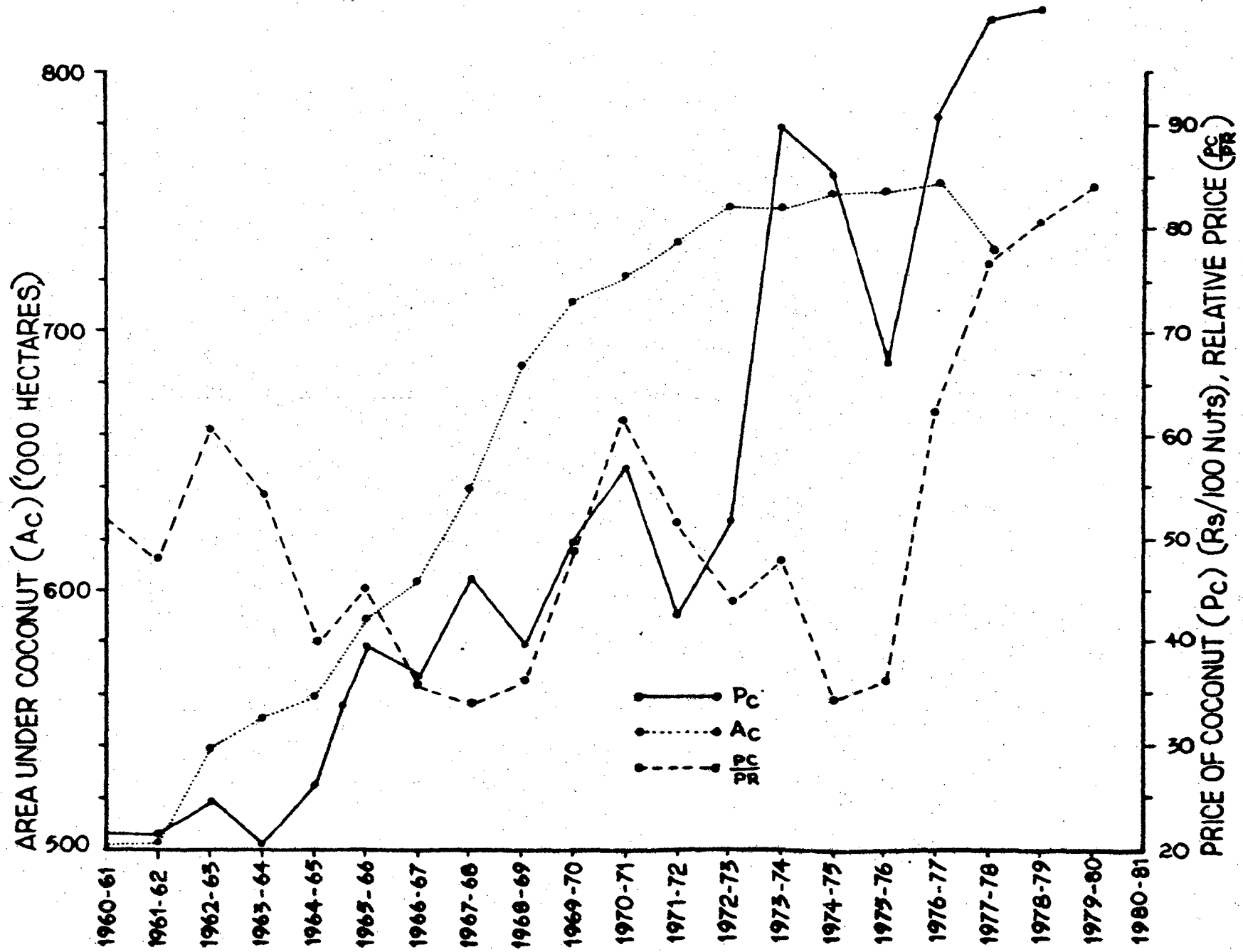
to fluctuate. And finally after 1974-75, both relative prices and area under rice fall sharply. This fairly close movement of area under rice and relative price of rice to coconut is perhaps due to the fact that,to the producer, coconut is a fairly close substitute for rice.$\underline{2}/$

In the case of coconut, the price of coconut and area under coconut increases steadily almost throughout the period 1960-61 to 1978-79. But the relative price of coconut to rice does not necessarily move with the area under coconut, the former fluctuating rather erratically. One reason for this discrepancy in the movement of area under coconut and relative price of coconut is perhaps that rice is not the only substitute for coconut. Coconut can substitute other garden land crops also.

There the movement in area under rice and coconut are seen to be the reflections of changes in prices of these crops. The relative stagnation and fall in area under rice in the latter phases coincide with the movement of relative price of rice to coconut, against rice and in favour of coconut.

These absolute and relative price movements over the last two decades would have an impact on the profitability of cultivation of these two crops. On the one hand, fluctuating prices and relative prices of rice and their plunge in the later years (together with rising input prices we shall see later) added to the insecurity of rice-cultivation and to the consequent fall in area under rice. On the other hand, the

consistent rise in coconut prices led to the bouyancy of
coconut cultivation and the continuous increase in coconut
area.

Thus, the profitability of rice-cultivation being
lower than that of coconut cultivation for the years
1973-74, 1974-75, observed in Chapter 2, is perhaps the
culmination of a trend in the movement of the absolute and
relative prices of the two crops and not an isolated pheno-
menon.

Section 2

In this section we look at the trend in the major
input prices, wage rates and fertilizer prices, involved
in the cultivation of rice to see how it could have influenced
the cost of cultivation and hence the profitability of rice
cultivation.

There has been a phenomenal increase in the money
wage rates of paddy field labour (male), 385.9 percent
between 1960-61 and 1978-79 All-Kerala. The money wage rates
rose consistently from 1960-61 to 1978-79 in all the districts,
Table 4.6. The only district which showed any decline in
wage-rates is Palghat, after 1974-75.

Table 4.6:   Agricultural Wages - Paddy Field Labourers (Men) (Rupees)

Years	Trivandrum	Quilon	Alleppey	Kottayam	Ernakulam	Trichur	Palghat	Kozhikode	Canannore	Kerala
1960-61	1.59	1.80	1.78	1.71	-	1.97	1.45	2.05	2.48	1.85
1961-62	2.20	1.77	1.99	1.87	2.62	2.41	1.85	2.46	2.84	2.22
1962-63	2.41	2.02	2.28	1.78	2.89	2.71	2.28	2.36	2.92	2.42
1963-64	2.44	2.07	2.27	2.03	3.32	2.87	2.13	2.42	3.02	2.51
1964-65	2.69	2.55	2.79	2.37	3.69	2.98	2.52	2.85	3.21	2.84
1965-66	2.96	2.92	3.14	2.93	4.01	3.21	2.71	3.18	3.72	3.20
1966-67	3.68	3.25	3.90	3.27	4.29	3.85	3.36	3.53	4.30	3.71
1967-68	-	-	-	-	-	-	-	-	-	4.46
1968-69	4.71	4.35	4.72	4.32	5.00	5.35	4.26	4.33	5.51	4.73
1969-70	4.83	4.47	5.37	4.96	5.00	5.45	4.29	4.33	5.44	4.90
1970-71	4.75	4.47	5.43	5.04	5.83	5.62	4.05	4.39	6.23	5.09
1971-72	4.75	4.47	5.47	6.38	5.94	5.95	4.58	4.60	6.78	5.43
1972-73	5.10	4.72	5.97	6.75	6.92	5.98	5.05	4.86	6.93	5.78
1973-74	5.88	6.00	6.57	5.73	6.88	7.26	7.37	6.19	9.04	6.67
1974-75	6.96	7.25	7.70	7.54	8.71	8.08	8.39	7.81	11.10	8.05
1975-76	7.58	7.50	8.29	8.40	9.63	8.50	6.94	9.15	11.44	8.57
1976-77	7.96	7.73	7.90	7.38	9.69	8.50	6.18	9.06	11.38	8.44
1977-78	8.00	8.00	8.00	7.25	9.75	8.50	6.35	9.00	12.13	8.67
1978-79	8.00	8.46	8.05	7.25	9.79	8.88	6.75	9.71	12.96	8.99

Note: We were unable to obtain district-wise wage rates for 1967-68

Source: 1. Season and Crop Reports for Kerala State. Various years, Bureau of Economics and Statistics, Government of Kerala.

2. Statistics for Planning. 1980., Bureau of Economics and Statistics, Government of Kerala.

Table 4.7: **Percentage Changes in Wage Rates of Paddy**
Field Labour (Male)

Districts	1960-61 to 1968-69	1968-69 to 1974-75	1960-61 to 1974-75	1960-61 to 1978-79
1. Trivandrum	196.23	47.77	337.74	403.14
2. Quilon	141.67	66.67	302.78	370.00
3. Alleppey	165.17	63.14	332.58	352.25
4. Kottayam	152.63	74.54	340.94	323.98
5. Ernakulam	90.84[1/]	74.20	232.44[1/]	273.66[1/]
6. Trichur	171.57	51.03	310.15	350.76
7. Palghat	193.79	96.95	478.62	365.52
8. Kozhikode	111.22	80.35	346.34[2/]	373.66
9. Canannore	122.18	101.45	347.58	422.58
10. Kerala	155.68	70.19	335.14	385.95

Note: 1. Initial year refers to 1961-62 since date for 1960-61 was not available.

2. This refers to the period 1960-61-1975-76. In Kozhikode there is a sharp increase in wage rate between 1974-75 and 1975-76 which continues unabated thereafter.

Source: Percentage changes in wage rates have been calculated from the Absolute Wage Rates given in Table 4.6.

The maximum increase in wage-rates occurred in the Northern most districts of Canannore and Kozhikode and the Southern most

district of Trivandrum in the whole period 1960-61 to
1978-79 (Table 4.7). For all the districts the bulk of
the change in wages came about in the first phase, 1960-61
to 1967-68 except for the Northern most districts of Kozhikode
and Canannore where it was concentrated in the later phases,
after 1968-69. This is perhaps due to to fact that these
Northern districts had higher wage rates in the initial period
1960-61 itself (Table 4.8).

Table 4.8: <u>Wage Rates of Paddy Field Labour (Male)</u> (Rupees)

Districts	1960-61	1968-69	1974-75	1978-79
1. Trivandrum	1.59	4.71	6.96	8.00
2. Quilon	1.80	4.35	7.25	8.46
3. Alleppey	1.78	4.72	7.70	8.05
4. Kottayam	1.71	4.32	7.54	7.25
5. Ernakulam	2.62*	5.00	8.71	9.79
6. Trichur	1.97	5.35	8.08	8.88
7. Palghat	1.45	4.26	8.39	6.75
8. Kozhikode	2.05	4.33	7.81	9.71
9. Canannore	2.48	5.51	11.10	12.96
10. Kerala	1.85	4.73	8.05	8.99

Note: The time series of wage rates from 1960-61-1978-79
is given in Table 4.6
*This refers to 1961-62

Source: <u>Season and Crop Reports</u>, various year, Bureau of
Economics and Statistics, Government of Kerala.

Looking at the money wage rates it has been consistently the highest in Canannore. Besides Kozhikode, Ernakulam and Trichur also have very high wage rates compared to the rest of the State (Table 4.8).

The exceptionally high wage rates even in the initial period, and the phenomenal increase in wage-rates particularly in the latter phases in Canannore, would make rice-cultivation in this district less attractive than in other districts. Besides Kozhikode, Ernakulam and perhaps Trichur also have had high wage rates and greater in increase in wage-rates than other district. Since wage-cost constitutes around 45 to 75 per cent of total cost, and paddy is cultivated almost wholly by hired labour, (See Chapter 3) this would work to act as an increasing squeeze on profitability over time.

Comparing the increase in wage-rates with the increase in price of paddy in the period 1960-61 to 1974-75, it is seen that the wage rates increased more sharply in the Northern districts whereas paddy prices increased more sharply in the Southern districts. With the sharper increase in wages and the slower increase in prices, the decline in profitability of rice cultivation would have been much greater in the Northern districts.

Fertilizer costs is, after labour cost, the second largest constituent of total-cost in paddy cultivation. Whereas labour cost constitutes between 45 to 75 percent of total costs, fertilizer costs constitutes between 25 to 45 percent of total costs, (Table 4.9). Hence the trend in fertilizer prices would have a significant influence on the costs of cultivation of paddy.

Table 4.9: Proportion of Labour Cost and Fertilizer Cost of Total Cost in Paddy Cultivation (1973-74)

Districts (Selected Villages)	Labour Cost / Total Cost	Fertilizer Cost / Total Cost
1. Trivandrum (K)	0.63	0.27
2. Trivandrum (U)	0.53	0.40
3. Quilon	0.62	0.37
4. Alleppey	0.60	0.33
5. Ernakulam	0.75	0.25
6. Trichur	0.45	0.45
7. Palghat	0.56	0.38
8. Malappuram	0.59	0.38
9. Kozhikode	0.55	0.44
10. Canannore	0.67	0.27

Note: Proportions of labour cost and fertilizer costs are calculated for selected villages from the primary schedules of the "Comprehensive Scheme to study the Cost of Cultivation of Principal Crops in Kerala", Ministry of Agriculture, Government of India.

Table 4.10: <u>Fertilizer Prices - All India and Kerala</u> (Rs./Metric tonne)

Years	All India[1]			Kerala[2]		
	Urea (46% N)	Super Phosphate (16% P_2O_5)	MOP* (60% K_2O)	Urea (46% N)	Super Phosphate (16% P_2O_5)	MOP (60% K_2O)
1972	959.00	301.85	543.00	-	425.00	553.00
1973	1050.00	353.00	670.00	1050.00	492.00	683.00
1974	2000.00	759.00	1230.00	-	762.00	1244.00
1975	1850.00	695.00	1180.00	1850.00	950.00	1192.00
1976	1750.00	344.00	910.00	1750.00	539.00	916.00
1977	1550.00	361.00	805.00	1550.00	576.00	809.00
1978	-	-	-	-	500.00	-
1979	-	-	-	1450.00	566.00	-
1980	-	-	-	2000.00	754.00	1123.00

Note: *MOP - Muriate of Potash

Source: 1. <u>Fertilizer Statistics</u>, Fertilizer Association of India

2. Fertilizer Prices for Kerala were obtained from the Fertilizers and Chemicals Travancore Ltd., Marketing Division, Trivandrum. They are the prices at which fertilizers are distributed all over Kerala.

Fertilizer prices are almost uniform throughout the country except for minor regional differences, as can be seen from table 4.10. Hence we shall use the All India Fertilizer prices to look

at the trend in fertilizer price.

The index numbers of fertilizer prices, constructed from the All India prices of fertilizers, show a slight fall in the initial period from 1960 to 1965. It then begins to rise upto 1974, rising sharply between 1973 and 1974. There is a fall in prices after 1974, except for a sharp increase again in 1980 as seen above for Kerala (Table 4.11).

Table 4.11: Fertilizer Price Index: Base : 1961=100

Year	Index
1961	100.00
1962	101.05
1963	98.55
1964	93.84
1965	88.26
1966	89.88
1967	98.55
1968	111.11
1969	110.70
1970	151.86
1971	149.57
1972	150.50
1973	173.80
1974	328.50
1975	308.30
1976	259.60
1977	231.45

Note: This index of fertilizer prices has been calculated by weighting the prices of individual fertilizers (Urea, Superphosphate and MOP) by the proportion of nutrients N, P, K contained in them.

Source: Fertilizer Statistics, Fertilizer Association of India, New Delhi.

Thus apart from the sharp increase in price of rice in the first phase, the fall in fertilizer prices also may have contributed to making rice cultivation a profitable venture during this period (1960-61-1967-68), and the area under rice rose. But after 1966 the price of fertilizers began its sharp rise adding to the already difficult situation created by the sharp increase in wage rates and fluctuating paddy prices.

Thus the relative non-profitability of rice cultivation, observed earlier, is not peculiar to a particular year. There has been a continuous trend towards this seen in the rising input prices, of agricultural labour and fertilizers, and fluctuating paddy prices. It is likely that the profitability of paddy deteriorated further after 1974-75 because, though the rise in fertilizer prices tapers off, the wage rates of agricultural labour continue to increase sharply and paddy prices begin a downward plunge.

NOTES AND REFERENCES

1. This is also, according to Dharm Narain, a way of determining which are the competing crops in the region. "Starting from known facts we must then pass from crops which are likely to, to crops which in fact do, compete". To the extent that we have been able to show that coconut is substituting rice, we can consider them competing crops.
Dharm Narain , Impact of Price Movements on Areas Under Selected Crops in India 1900-1939, 1965 Cambridge University Press p.17.

2. Ibid, p.7

3. Ibid p.7

4. Even according to Dharm Narain, such specificity is seldom absolute. "More often than not it is only a matter of degree; areas are only more (or less) suited to one use relatively to another. And then again, it is a function of time ..... In the generality of cases, then specificity may affect the extent of area shifts between crops, or the promptness with which they occur, rather than preclude their occurrence altogether"
Ibid p.7

5. Ibid p.8

6. See Chapter 1

7. Dharm Narain, op.cit., p.11

8. The price of rice and relative price of rice to coconut is lagged by one year as mentioned earlier.

9. This pattern is true for nearly all the districts.

SUMMARY AND CONCLUSIONS

The dissertation makes an attempt to analyse the reasons for the shift in cropping pattern away from rice and in favour of coconut.

Actual (net) area under rice has fallen, particularly in recent years, whereas area under coconut has increased phenomenally. There is suggestive evidence to show that coconut has been substituting rice on wet-lands.

The rationale for this shift is found in the fact that the relative profitability of coconut cultivation is much higher than that of rice cultivation. It is also seen that single cropped paddy lands are more likely to be converted to coconut gardens than double cropped lands.

The reason for the marked difference in profitability of the two crops is located in the greater labour and fertilizer costs involved in rice cultivation. The profitability and costs of cultivation have been studied with reference to a particular year.

Profitability of a crop is determined by input costs and output prices. Over the past two decades, whereas the price of rice has been fluctuating, falling sharply in recent years, the price of coconut increased consistently. Wage-rates

of agricultural labourers and fertilize prices have also
been rising over this period. Since labour costs and
fertilizer costs are much higher in rice cultivation,
the rising prices of these inputs would affect rice culti-
vation more adversely than coconut cultivation. The fluctu-
ating paddy prices and rising input-costs worked together to
make rice cultivation a less profitable venture. On the
other hand, the consistent rise in coconut prices and smaller
quantum of labour and fertilizer use in coconut cultivation
increased the profitability of the latter.

Thus the substitution of coconut for rice can be
attributed to the diminishing profitability of rice-cultivation.
The latter being due to the large amount of labour and fertilizer
use in rice-cultivation, and the long-term unfavourable movement
of input and output prices over the past two decades.

APPENDIX   I

The figures on absolute area under rice, coconut and
other crops are obtained from the published sources of the
Bureau of Economics and Statistics, Trivandrum. There are
certain problems related to these estimates of area under
different crops. In this note we shall elucidate some of
these problems which arise mainly out of the process of
estimation of these figures. We shall discuss first the
area under coconut, and second the area under other garden
land crops — the process of estimation and the problems
related to it. Finally, we shall point out certain problems
of using the published estimates of area under rice and those
using out of non-publication of certain useful information.

The method of estimation of area under coconut is as
follows. An estimate is made of the total number of palms
in the district/state.through a sample survey. A norm of
approximately 230 palms/hectare$^{1/}$is then used to estimate
the total area under coconut. This norm has been estimated
from a sample of pure coconut plots in each district, and
has remained unchanged through out the period of study.

A problem arising out of this method of *estimation*
is that, if the actual intensity of cultivation of coconut
(i.e. palms/hectare) is considerably higher than this norm,
or if the intensity of cultivation has been increasing over

time, the estimated area would be an over-estimate. In the latter case, the increase in area observed in the published figures could be taken as a reflection of the increase in gross cropped area (due to increase in intensity of cropping), but need not imply either that marginal lands were being brought under cultivation or that wetlands were being converted into garden lands. It would simply be a reflection of the increasing intensity of cultivation of coconut gardens.

On the other hand, if the intensity of cultivation is lower than the norm, or decreasing over time, the estimated area would be an under-estimate.

In the 9 villages for which we have data it is seen that there is fairly wide variation in the intensity of cultivation for predominantly inter-cropped coconut plots. The intensity is generally higher in the lowlands and low in the higher lands. For the state as a whole, the intensity averages out at 230 palms/hectare.

Even if we accept the figures for the area under coconut as fairly reliable, there remains the problem of comparability over the entire period from 1960-61 to 1978-79. This problem arises not from the method of estimation as described above, but from the fact that the sample size

from which the estimate of the number of palms in the
districts was made was enlarged in 1975-76.$\frac{2}{}$ This makes
the absolute area figures for coconut before 1975-76 and
after not comparable. The Bureau of Economics and Stati-
stics, Trivandrum, however made available to us the
corrected and comparable index number of area under coconut
in Kerala State from 1960-61 to 1977-78. This enabled us
to construct comparable estimates of coconut area for Kerala.
Comparing these corrected figures with the original published
figures (Table1.7Column 11), we found that both sets of date
after 1975-76 move together i.e. move in the same direction.
That is, the area figures between 1975-76 and 1978-79 are
comparable among themselves in direction and magnitude, but
comparable with figures prior to 1975-76 only in direction.
On the basis of this, we make the assumption for our forth-
coming analysis that the direction of change before and after
1975-76 are comparable, although the magnitudes are not. This
will be true both for the absolute area under coconut and the
proportion of coconut area to total area.

The method of estimation of area under other garden
landcrops involves the following. First, the estimates of
area under most of the garden land crops$\frac{3}{}$are based on norms
of the number of trees to an hectare, as in the case of the
coconut area estimates. Second, most garden land is mixed-

cropped, i.e. more than one crop is grown on it at the same time. In order to get over this problem the concept of gross-area is made use of to arrive at the total area under these crops.

The Instructions for Field Staff[4]/ make this clear: "It may be noted that the gross area concept will be followed with regard to the recording of area under crops. According to this concept, the area under various crops in one acre of land can be more than one acre according to the intensity of crops. The following example will make this clear.

" Let the crops grown in a particular survey number having net area of 50 cents be as follows:

1. Banana - 400 (No.)   2. Pineapple - 1000 (No.)
3. Tubers - 10 cents   4. Tapioca - 5 cents

"Converting the crops given in number into area adopting the standards per acre, the area under banana will be 50 cents (800 per acre) and pineapple - 20 cents (5000 per acre). So the gross cropped area will be 50+20+10+5 = 85 cents".

The main problem arising out of this process of estimation is that we do not have any estimate of the actual net area under each of these crops. Besides even the gross area obtained by this process are only rough estimates.

The published sources of area under rice give only gross area under rice. This becomes a problem since we are interested

in knowing whether the actual area (net) under rice has been falling over the last two decades. (This problem is discussed in detail in the text of Chapter 1 itself).

Finally, certain information collected during the Land Utilisation Survey, which would be useful to this study, are not published.

First, though the data on area under current fallows specifically on wet land are collected seperately,[5] the published sources give only current fallows in general without specifying the type of land. This information, regarding area under wet lands left fallow, would be useful since any significant increase in this could signify the amount of land on its way out of rice cultivation as discussed in Chapter 1.

Secondly, the survey enumerates perennial and annual crops grown on wet land and dry land seperately,[6] but published sources club these together. Estimates of perennial crops grown on wet lands would suggest to us the possible growth (or decline) of these crops on wet lands which is the primary concern of this study.

NOTES AND REFERENCES

1. This information was given to us by the Bureau of
   Economics and Statistics, Trivandrum. The norm in
   all districts is approximately 230 palms/hectare,
   except for Idukki where it is 175 palms/hectare.

2. Before 1975-76, the estimation of the total number
   of palms in the district was done by the land
   Utilisation Survey, but in 1975-76 this was taken
   on by the 'Coconut-Arecanut Survey'. This latter
   used a larger sample size, which is why the estimates
   after 1975-76 are not comparable with those before
   1975-76.

3. For example, arecanut, cashew, pepper, banana, pineapple.

4. Instruction for Field Staff on Area and Yield Estimation
   Surveys - 1980-81, Agricultural Division, Bureau of
   Economics and Statistics, Government of Kerala, p.4.

5. Ibid p.17.

6. Ibid p.17.

APPENDIX II

Paddy is a labour intensive crop whereas the use of
labour in coconut cultivation is limited. The phenomenon
of the substitution of coconut for paddy, which we have been
studying, therefore has a det#rimental effect on the employ-
ment situation in the State.

Unemployment and underemployment has always been a
major problem in Kerala. According to the latest plan
document, 11.5 lakh persons are totally unemployed in the
State.$\frac{1}{}$ A shift in the cropping pattern from paddy to
coconut will intensify this problem.

In this note we will attempt an approximate estimate of
the unemployment that would be created by the substitution of
coconut for paddy.

The total physical input of labour in paddy cultivation
is approximately 2086 hours per hectare in the selected villages.$\frac{2}{}$
In terms of standard 8 hour labour days, ohe hectare of paddy
land provides approximately 260 labour days of employment in
one particular agricultural year.

The total physical input of labour in coconut cultivation
is approximately 654 hours per hectare in the selected villages.$\frac{3}{}$
Again in terms of standard 8 hour days, one hectare of mixed
cropped coconut garden provides approximately 82 labour days of

employment in a particular year.

Thus if <u>one hectare</u> of land is shifted from paddy cultivation to coconut, approximately 178 (260-82) days of employment in one agricultural year are lost.

On the other hand, if <u>one hectare</u> of paddy land is left fallow for a year, 260 days (approximately) of employment are lost.

Both these phenomenon have been occurring fairly extensively in most of the districts, as seen earlier. The unemployment thus created would be fairly substantial, as can be seen from the above estimates for one hectare of land.

NOTES AND REFERENCES

1. <u>Draft Sixth Five Year Plan</u> 1980-85 and <u>Annual Plan</u>
    1981-82 Vol.1. State Planning Board, Trivandrum,
    Government of Kerala.

2. This has been calculated from the paddy holdings of
    all the 10 villages selected for the study. It is
    only an approximate estimate for the State as a whole.
    The estimate includes labour input in the villages of
    Kozhikode and Ernakulam where the lands are single
    cropped. If these villages are removed the figure
    for total labour input per hectare would be much higher.

3. This has been calculated from the coconut holdings of
    the 8 selected villages. Kottayam is not included
    since in this village coconut is inter-cropped with
    rubber and the labour input is primarily for rubber
    cultivation.