COST OF CULTIVATION AND MARKETING OF PEPPER IN IDUKKI DISTRICT

By
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THESIS
submitted in partial fulfilment of the requirement
for the degree
MASTER OF SCIENCE IN AGRICULTURE
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1984

DECLARATION

I hereby declare that this thesis entitled "Cost of cultivation and marketing of pepper in Idukki district" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other University or Society.
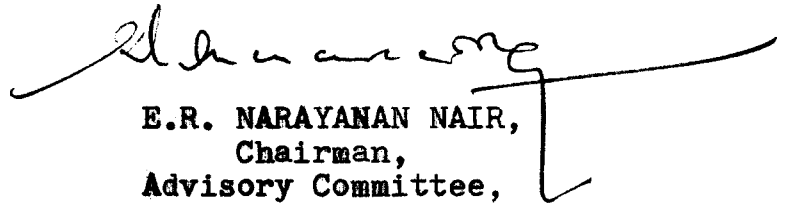
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CERTIFICATE

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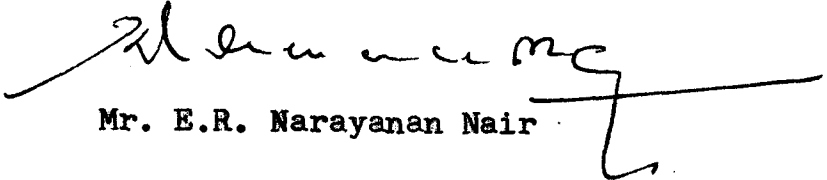
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INTRODUCTION

CHAPTER I

INTRODUCTION

Black pepper refers to the wrinkle-dried whole berries
of the pepper vine _Piper nigrum_ L. The pepper vine is a
perennial woody climber which prefers a tropical humid
habitat. It grows best in well-drained humus-rich soils,
optimally with a pH of 5.5. Clay-loam soils are ideal and
the virgin red laterites in the Western Ghats are equally
good. It responds best to a warm moist climate. It grows
well upto an altitude of 1200 metres,.tolerates a tempera-
ture range of $50^{\circ}F$ to $104^{\circ}F$ and an annual precipitation of
2500 mm would be just fine.

The crop is generally propagated vegetatively from vine
cuttings. Ideally, cuttings from the runner shoots which
originate from the base of the vines are used. Cuttings from
the lateral fruiting branches can also be used. The runner
shoots can be kept coiled on sticks pegged on the ground so
that they do not hit the soil and strike roots. Two to
three noded cuttings planted with one node sunk in the soil
in partially shaded nurseries in February-March will be
ready for planting with the onset of the south-west monsoon.

The pepper vine requires a proper support, with a
grippable surface for its special roots, to help itself up.
Live standards are commonly used. In Kerala the vines are

grown up on an assortment of trees like mango trees, jack trees, coconut palms and arecanut palms, and even in coffee gardens where the shade trees serve as standards. However it is mostly raised on special shade trees in monoculture. The most popular shade tree is perhaps the common Erythrina tree (Erythrina indica), while the Dadap tree (E. lithosperma) is also used. The thorny surface of these standards provide a good grip for the climbing roots, and they themselves are fast-rooting, rapid growing trees. The standard cuttings are usually planted in April-May with the pre-monsoon showers, ideally in 50-75 cm^3 pits spaced 3-4 m either way. The rooted pepper cuttings are normally planted in June-July with the soil-cooling monsoon rains, at the rate of two to three to a standard, about 30 cm away from its base. They are commonly tied on to the standards using strips of plantain sheath or thin coir loosely and the base is mulched with dry leaves or such material to resist splashing by the rain. Planting on the southern side of the standard is avoided, for fear of scorching by the southerly sun. For the same reason farmers also avoid slopes facing south. Tying the vines is repeated as and when required. The vines may be earthed up before the repeating monsoon. Often weeding, mulching and shading is done later in the year to deal with the ensuing summer. The standards may be pruned in March-April and the flushes that emerge may be cut off later with

the exception of one or two growths. The vines begin to yield by the third year. The yield stabilizes by the seventh year. A relatively stable yield plateau follows for the next ten to fifteen years after which it slowly tapers off to uneconomic levels.

For people who like their food good and hot, pepper offers multifarious uses. As a condiment it has ever so many culinary applications where it often provides the Midas touch that turns ordinary dishes to savoury delights. It is used to season and flavour common dietary items from meat, fish, eggs and vegetables to soups, salads, sauces, gravies, pickles and ketchups. Pepper has several medicinal uses as well because of its carminative stimulant, diuretic and stomachic properties and it is even used as a cure-all remedy in folk medicine.

The production and marketing of black pepper is a business, centuries old. Even in the days before Christ, Arabian spice merchants are known to have frequented the Malabar Coast with special interest to take back a cargo of black pepper, popularly regarded as the black gold. From the Arabs, who in those days kept the world's only source of black pepper a guarded trade secret, the king of spices used to move on surface to cater to the almost unsatiable demand raised by the markets of the West in the olden days. There are evidences to indicate the existence of black pepper

trade in the ancient markets of Alexandria, Babylon, Baghdad, Constantinople, Hangchow, Hormuz and Venice. As early as in the first century A.D., Gaiius Plinus Secundus remarked that "it is quite surprising that the use of pepper has come so much into fashion, seeing that in other substances (spices) which we use it is sometimes their sweetness and sometimes their appearance that has attracted our notice, where as pepper has nothing in it that can plead as recommen- dation to either fruit or berry; its only desirable quality being a certain pungency and yet it is for this that we (in Rome) import it all the way from India" (Parry, 1969). The consumption of this spice became so much featurised in the Roman way of life that when Alaric the Goth beseiged Rome in the fifth century A.D. part of the ransom he demanded from the city was three thousand pounds of black pepper.

The lure of the spice trade has had an influence on the movement of history. Hot on the enigmatic spice trail many geographical discoveries were made. The discovery of a sea route to the East was a priority issue in medieval Europe. Once the sea route was charted out Arab, Portugese, Dutch, English and French traders vied with each other to establish trade dominion. Colonial interests followed commercial ones. In India this led to the establishment of the English East India Company, the harbinger of British colonization. For about two centuries Britain bled India with exploitive and restrictive trade practices.

When the British left India for good in 1947, they kept behind among a horde of economic problems, an adverse foreign trade position. Even today India continues to be labelled a developing country. Any developing country had better escalate its productive capacity rapidly. This would ask for large imports of manufactured and capital goods. Thus it would not be very surprising for a developing country to confront a hostile balance of trade situation. An emphasis on export promotion is justified not only to meet the growing foreign debts, but also to bear the cost of development itself. Exports should in other words finance imports.

Export can be regarded as the lead factor in the growth of developing economies. This is perhaps the only way to cross the foreign exchange hurdle. Many economists have argued in favour of export-led growth. The recent 'Tandon Panel' on Export Promotion has suggested an overall export target of Rs.18,000 crores in 1990-91, against the estimated level of Rs.7,000 in 1980-81 implying a growth rate of 10 per cent per year. The panel has also recommended greater involvement of the states in the production plans of export based agricultural commodities. It has stressed on stirring up the production of crops like pepper which earn precious foreign exchange.

As in the case of most of the developing nations, the

share of agricultural products in India's foreign trade is considerable. About one-third of India's exports originate from agriculture. Black pepper exports contribute significantly to this. A table showing the export of black pepper from India during the period 1970-71 to 1981-82 is provided in Table 1. Spurring up the production of export-oriented crops like pepper is indeed a feasible course of action.

However the productivity of black pepper in India gives a sad picture of stagnation. The productivity in fact fell from 266 kg per hectare in 1949-50 to 243 kg per ha in 1980-81 (Official Estimates by the Directorate of Economics and Statistics, Govt. of India) which is nothing short of dismal. The stagnant productivity and the low temporal expansion of area under pepper has been a drag on the national pepper production. The country's pepper production which stood at 21 thousand tonnes in 1949-50, crawled up to 27 thousand tonnes in 1980-81 (Official Estimates by the Directorate of Economics and Statistics, Govt. of India). Time series data pertaining to the area, production and productivity of black pepper in India from 1949-'50 to 1980-'81 is provided in Table 2.

Brazil, Indonesia, Malaysia and India are the world's major producers of black pepper today, with smaller quantities coming in from Madagascar, Sri Lanka, Kampuchea and

Table 1. Export of pepper from India during the years
1970-71 to 1981-82

Years	Quantity (tonnes)	Value ('000 Rs.)	f.o.b. price in Rs per kg(Weighted average prices)
1970-71	17,969.70	1,52,484.70	8.49
1971-72	19,247.50	1,48,249.80	7.70
1972-73	19,958.00	1,43,099.00	7.17
1973-74	31,648.12	2,95,308.43	9.33
1974-75	26,341.40	3,44,761.74	13.09
1975-76	24,226.00	3,38,836.63	13.99
1976-77	20,526.97	3,82,353.76	18.63
1977-78	24,677.50	4,95,080.00	20.06
1978-79	15,263.33	2,80,717.36	18.39
1979-80	20,898.45	3,35,224.80	16.04
1980-81	25,336.80	3,68,438.10	14.54
1981-82	21,379.55	2,86,890.82	13.42

Source: Upto 1979-80 - DGCIS, Calcutta
1980-81 to 1981-82 - Provisional estimates by the SEPC, Cochin

Table 2. **Area, production and productivity of black pepper**
in India from 1949-50 to 1980-81

Year	Production ('000 t)	Area ('000 ha)	Productivity (kg/ha)
1949-50	21	79	266
1959-51	21	86	263
1951-52	23	82	280
1952-53	23	82	280
1953-54	24	84	286
1954-55	27	86	302
1955-56	28	89	315
1956-57	28	89	303
1957-58	27	93	290
1958-59	26	93	280
1959-60	26	94	277
1960-61	28	103	272
1961-62	28	103	272
1962-63	26	102	256
1963-64	25	102	235
1964-65	24	103	236
1965-66	23	102	226
1966-67	23	121	224
1967-68	26	122	215
1968-69	26	121	212
1969-70	25	120	212
1970-71	26	119	221
1971-72	26	120	219
1972-73	26	120	219
1973-74	29	122	236
1974-75	28	122	231
1975-76	26	112	229
1976-77	32	114	277
1977-78	32	114	279
1978-79	22	84	262
1979-80	28	111	252
1980-81	27	111	243

Source: Directorate of Economics and Statistics,
Government of India

Thailand. In 1955, India produced 40 per cent of the world's pepper output, while Indonesia put in 25 per cent, Malaysia 24 per cent and Brazil 1 per cent. The corresponding figures for 1981 were 20 per cent, 22 per cent, 20 per cent and 32 per cent respectively. India is clearly losing the race. It is bad enough that a country which was the world's only producer of black pepper for centuries together has now been relegated to the stature of just another producer. Meanwhile a country like Brazil which had barely started production in the 1950s has remarkably expanded its output to the extent that it today leads the list in both production as well as export. Some recent statistics relating to the production and export of black pepper by the different producing nations for the period 1976-1981 is provided in Table 3.

The U.S.A., the U.S.S.R., West Germany, France, Saudi Arabia, Morocco, Japan, Italy, the U.K., Canada, Egypt, Belgium, Denmark, Holland, Spain, Yugoslavia, Australia, Czechoslovakia and Iran are the important pepper importing countries of the world. The U.S.A. is the largest importer, followed by the U.S.S.R. and West Germany. Singapore also figures as an important pepper importer but most of it's import is meant for re-export. During the 1950s and the early 1960s the U.S.A. and some West European nations were the main buyers of Indian pepper. A notable change has occurred in this pattern over

Table 3. Production and export of black pepper by different producing nations (in Metric Tonnes)

	1976	1977	1978	1979	1980	1981
I. Brazil						
Production	28,000**	28,400	27,937	30,062	40,628	46,137
Export	20,240	17,710	29,958	25,185	31,966	41,909
II. Indonesia						
Production	27,400	30,700	36,600	25,600	31,500	32,000
Export	28,845	30,854	37,038	24,955	29,680	33,995
III. Malaysia						
Production	37,100	28,893	36,618	37,430	31,460	28,591
Export	35,410	28,893	36,618	37,430	31,460	28,591
IV. India						
Production	28,500	34,010	21,500	27,700	29,490	29,490
Export	17,939	24,677	15,719	20,898	25,337	20,607
V. Others*						
Production	6,000**	7,000**	7,000**	8,000**	8,000**	9,000**
Export	4,228	4,649	3,443	3,590	3,663	NA

Legend

NA - Not Available

 * - Includes Madagascar, Sri Lanka, Kampuchea and Thailand

** - Estimated by the method of least squares

Source: 1. Pepper Community, Indonesia
2. F.A.O., Rome
3. Directorate of Economics and Statistics, Government of India
4. SEPC, Cochin
5. Fruit & Tropical Products, December 1981 issue

the last decade with the U.S.S.R. and some East European
nations emerging as the chief buyers, of Indian pepper.
The import of Indian pepper by the U.S.A. and Western Europe
is fizzling out because our prices are not at competitive
levels. The trade with Eastern Europe pulls on partly
because of bilateral trade agreements. During 1980-81 the
East European countries comprising of the U.S.S.R.,
Czechoslovakia, Yugoslavia, Poland, East Germany, Rumania,
Bulgaria and Hungary, together bought about 73 per cent of
the total volume of India's pepper exports. About 61 per cent
of this was imported by the U.S.S.R. alone (The Spices Export
Promotion Council).

The pepper trade involves inelasticity of supply parti-
cularly in the short run as well as downward price inelasti-
city of demand. This leads to wobbling prices, which in turn
results in income instability for the primary producers.
Price fluctuation is quite flagrant in this agribusiness.
The time-series data of free-on-board prices for the twelve
years tabulated in Table 1 on statistical treatment shows
that the arithmetic mean of the prices is Rs.13.40 per kg
with a standard deviation of Rs.4.26 per kg giving a coeffi-
cient of variation of 31.79 per cent. The range of the price
figures during the period is as high as Rs.13.44 per kg
between Rs.7.17 per kg in 1972-73 and Rs.20.67 per kg in
1977-78. The coefficient of variation for this period is

however much lower than the 72.04 per cent estimated by the
F.A.O. for Malabar black pepper for the period 1950-1960,
perhaps indicating that things are improving. Year to year
price fluctuations are in fact encountered in the case of
most spices. The coefficients of variation of export prices
in the cases of cardamom, turmeric, ginger and chillies for
the period 1970-71 to 1980-81 works out to 49.91 per cent,
46.61 per cent, 42.23 per cent and 23.71 percent respectively
(Directorate of Cocoa, Arecanut and Spices Development).
Table 1 also shows that the fluctuation in the earnings from
pepper is not as much due to the changes in the volume of
export as due to the straggling prices. India's pepper trade
involves "greater earning instability than unit value or volume
instability" (Kumar and Subbarao, 1968).

Besides black pepper India also exports white pepper.
Nowadays various processed forms of pepper are also exported.
These include pepper oleoresin, pepper oil, pepper powder,
dehydrated green pepper, freeze-dried pepper, green pepper
in brine, decorticated white pepper etc. Another recent
development is the export of whole and ground pepper in con-
sumer retail packets.

A study conducted by the International Trade Centre,
Geneva, showed that the demand for pepper in many importing
countries such as the U.S.A., the U.K., Canada and in some

Western European countries grows at an annual rate of 1 to
3 per cent. An annual increase in demand of about 5 per cent
is forecasted for the FRG and France. A rise in demand for
pepper to the tune of 5 to 10 per cent a year is regarded as
realistic for some of the East European and Middle East
nations as well as for Egypt, Japan, Argentina, etc. The
future of pepper trade is clearly going to be a tale of
opportunities for the producing nations. Already India faces
stiff competition in the world market and the way things are
going, it will not be very surprising, if India gets totally
out-smarted soon. It is against this backdrop that this study
has been done.

The recommended objectives of this study as originally
conceived are as follows:

1. To estimate the cost of cultivation of pepper and
   to study the economics of pepper production.

2. To examine the prevailing market structure for pepper.

3. To study the marketing practices followed.

4. To identify the various marketing channels for pepper.

5. To work out the price spread in pepper marketing.

The data required for the study have been generated from
primary sources. The information pertaining to marketing has
also been gathered largely through personal interviews with

several functionaries. A sample survey was conducted with these objectives during the period March to May 1983, in the district of Idukki, and in the spice market at Jew Town in Cochin. It is sincerely hoped that this effort might be useful to the people involved in planning and policy making on this important cash-crop.

The text is divided into eight chapters including the present introductory chapter. Chapter two is concerned with an outline of the agricultural economy of Idukki district. A review of literature related to the study constitutes chapter three. Chapter four describes the methodology adopted in the generation and analysis of data. Chapter five discusses the economics of production as obtained through the study, while chapter six presents the economics of marketing. The results obtained are summarised in chapter seven. A portrayal of the production and marketing problems encountered and a few suggestions are included in the concluding chapter.

A BRIEF ACCOUNT OF THE AGRICULTURAL ECONOMY OF IDUKKI DISTRICT

CHAPTER II

A BRIEF ACCOUNT OF THE AGRICULTURAL ECONOMY
OF IDUKKI DISTRICT

The entire data for estimating the cost of cultivation
of pepper, as well as the data pertaining to the marketing
of pepper upto the level of the primary wholesalers were
generated from the district of Idukki in central Kerala.
Idukki district sprawls over an area of 5150 sq. km. A good
part of the area still revels in the sylvan splendour of
thick rainfed forests, where the pepper vine itself is
thought to have emerged from. A picturesque district, it
nestles in a green corrugated landscape of hills and valleys
sewn together by rivers, rivulets and streams.

On the Periyar river, as it squirms through a gorge
(Malayalam: Idukku) between two granite hills, is built the
Idukki Arch Dam to which the district owes its name. Idukki
is hemmed in by the districts of Trichur and Coimbatore on
the north, Madurai, Ramnad and Tirunelveli on the east, Quilon
on the south and Kottayam and Ernakulam on the west. For
developmental purposes the district is divided into eight
Blocks. These are Devikulam, Adimali, Nedumkandam, Arudae,
Kattappana, Idukki, Elamdesam and Thodupuzha. The investiga-
tion on the cost of cultivation of pepper was done in the two
blocks of Kattappana and Nedumkandam. The Kattappana block
has an area of 373.10 sq. km. and a population of 1,39,706 in

26582 households. It includes the seven panchayats of Kattappana, Erattayar, Ayyappancoil, Vandanmettu, Chakuvallam, Upputhara and Kanchiyar. The Nedumkandam block has an area of 341.89 sq. km. with a population of 1,21,859 in 24463 households. It consists of the seven panchayats of Senapathi, Rajakumari, Rajakad, Udumbanchola, Nedumkandam, Pampadumpara and Karunapuram. The panchayats of Kattappana, Kanchiyar, Nedumkandam and Karunapuram were the specific areas selected for the study.

Idukki is a highland district barring a bit of midland region on the west flanks of Thodupuzha Taluk. The high ranges vary in altitude from 750 metres at Kulamavu to over 1500 metres at Munnar. This wide range of elevation permits considerable diversity in vegetation. The average yearly rainfall in the district falls within a range of 2500 mm and 4250 mm but it is also on record that this has gone upto 7000 mm in certain years. The eastern and north eastern parts, contrastingly get much lesser rain the annual average dropping down to 1500 mm in the rain-shadow areas of Marayur and Kanthalloor. The monthly normal rainfall pattern for the district is given in Table 4.

Periyar, Thodupuzhayar and Thalayar are the important river systems of the district each with several feeders. The Pamba river originates and runs awhile through it. Devicolam,

Table 4. Normal monthly rainfall in Idukki district

Sl. No.	Month	Rainfall (mm)
1	January	31.1
2	February	24.1
3	March	44.6
4	April	111.7
5	May	200.9
6	June	556.7
7	July	655.1
8	August	432.9
9	September	262.7
10	October	304.4
11	November	195.8
12	December	68.8
Total		2898.9

Source: Directorate of Economics and Statistics, Trivandrum

Eravikulam and Elaveezhapoonchira are the three fresh water lakes in the district.

The total population of the district as per the 1981 census is 9,81,636. The sex ratio is 963 females per 1000 males. There are 1,86,675 households altogether. The rural population of 9,27,007 is spread over 42 villages. The density of population in the district is 192 people per sq. km.

The main income of the district is from agriculture. The total area and the pattern of land utilization in the district is given in Table 5. The district has a total cropped area of 1,70,706 ha of which 12,264 ha are under pepper. Cardamom, tea, tapioca, rice, rubber, coconut, sugarcane, coffee, arecanut, ginger, lemon grass and vegetables are the other main crops grown in the district. A list of all the crops grown in the district along with their acreage production and productivity during the year 1981-82 is included in Table 6. Time-series data on the area, production and productivity of pepper for the period 1974-75 to 1981-82 in Idukki district are furnished in Table 7. The economy of the district is purely dependent on agriculture. Crop husbandry and animal husbandry are the main occupations of the people. Agriculturists and agricultural labourers form the bulk of the population. About 10 per cent of the total population are estate labourers. The total cultivated area in the district is 1,45,620 hectares.

Table 5. Pattern of land utilization in Idukki district
(1981-82)

Sl. No.	Description	Area (ha)
1	Total geographical area	5,15,048
2	Land under forest	2,60,993
3	Land put to non-agricultural uses	15,324
4	Barren and uncultivable wastes	17,336
5	Permanent pastures and grazing land	2,215
6	Land under miscellaneous tree crops	15,450
7	Cultivable waste	39,971
8	Fallow other than current fallow	1,310
9	Current fallow	1,725
10	Net area sown	1,60,724
11	Area sown more than once	8,565
12	Total cropped area	1,69,289

Source: Directorate of Economics and Statistics,
Trivandrum

Table 6. Area, production and productivity of the important
crops in Idukki district (1981-82)

Sl. No.	Crop	Area (ha)	Production	Productivity
1	Rice	8,957	16,108 T	1,798 kg/ha
2	Sugarcane	2,124	13,020 T (gur)	6.13 T/ha (gur)
3	Pepper	12,182	2,010 T (black)	165 kg/ha (black)
4	Ginger	1,144	2,733 T (dry)	2,389 kg/ha (dry)
5	Turmeric	180	319 T (cured)	1,772 kg/ha (cured)
6	Cardamom	45,172	2,300 T (processed)	51 kg/ha (processed)
7	Arecanut	2,389	412 M (nuts)	1.72 lakhs/ha (nuts)
8	Banana	3,185	18,036 T	5,633 kg/ha
9	Cashew	1,243	1,444 T (raw nuts)	1,162 kg/ha (raw nuts)
10	Tapioca	9,635	2,03,588 T	21.13 T/ha
11	Coconut	17,371	44 M (nuts)	2,532/ha (nuts)
12	Lemon grass	1,363	94 T (oil)	68.97 kg/ha (oil)
13	Tea	23,967	34,871 T	1.45 T/ha
14	Coffee	4,827	4,537 T	940 kg/ha
15	Rubber	17,499	11,487 T	656 kg/ha

Legend: T = Metric tonnes
M = Million

Source: Directorate of Economics and Statistics, Trivandrum

Table 7. Time series data on the area, production and productivity of pepper in Idukki district (1974-75 to 1981-82)

Sl. No.	Year	Area (ha)	Production of black pepper (tonnes)	Productivity of black pepper (kg/ha)
1	1974-'75	5,959	1,365	229
2	1975-'76	10,186	2,220	217
3	1976-'77	8,229	732	89
4	1977-'78	10,350	1,232	119
5	1978-'79	12,026	1,660	138
6	1979-'80	10,341	2,224	205
7	1980-'81	12,264	1,852	151
8	1981-'82	12,182	2,010	165

Source: Bureau of Economics and Statistics, Trivandrum

The total number of landholdings is 1,35,550. The size of an average holding comes to 1.07 hectares. Small and medium farmers predominate in the district. They possess 37.55 and 16.11 per cent of the total number of landholdings respectively.

There are no major irrigation projects in the district. The ground water resources are estimated to be poor. About three-fourths of Kerala's electric power is generated from Idukki district. No place in the district figures in the Indian Railway map. The National Highway system too leaves Idukki untouched. The existing major roads are the Cochin-Munnar Road and the Kottayam-Kumili Road. A map of the district is furnished next page for reference.

COIMBATORE

TRICHUR

MADURAI

N

ERNAKULAM

NEDUMKANDAM

KOTTAYAM

KATTAPPANA

RAMNAD

QUILON

TIRUNELVELI

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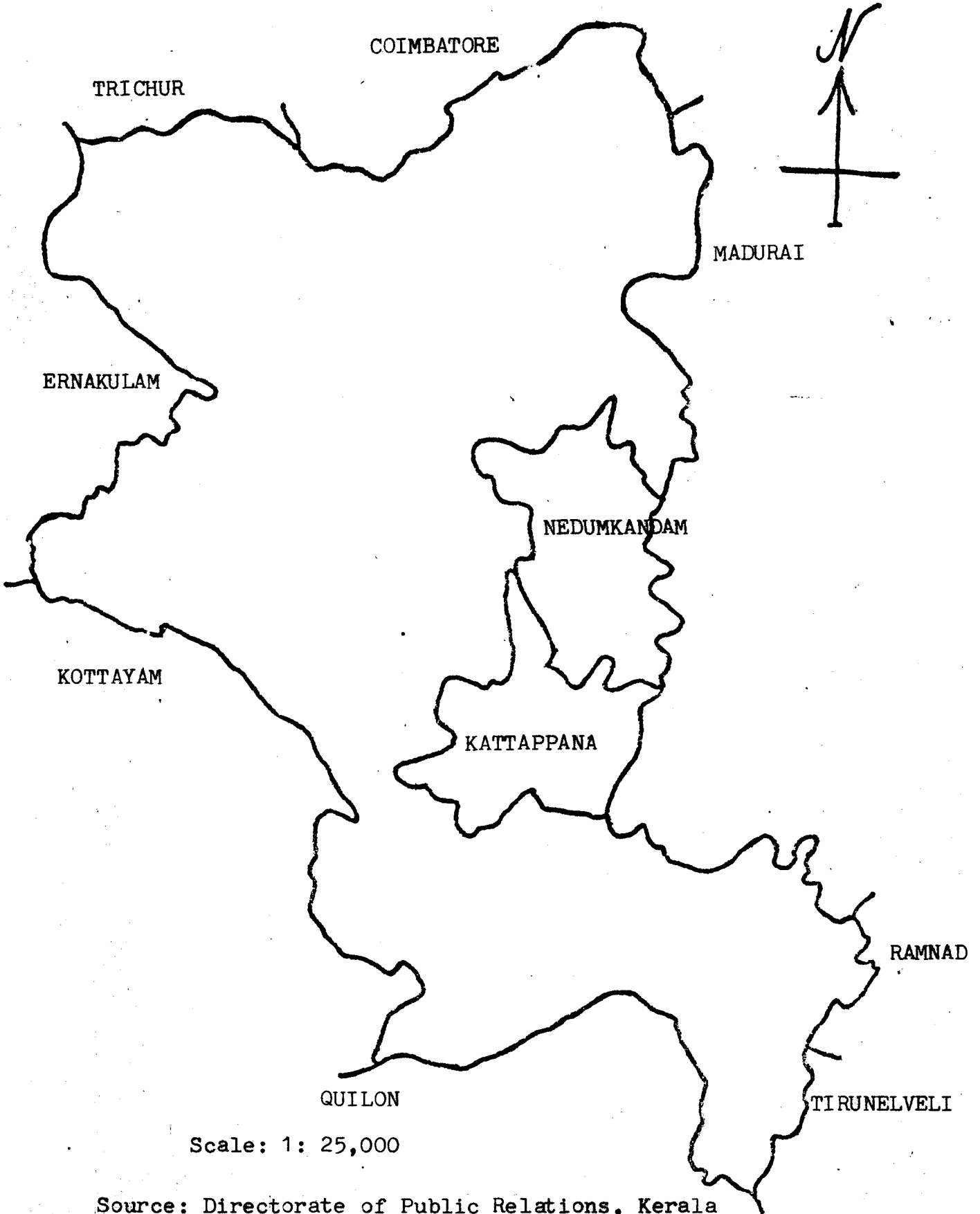
Source: Directorate of Public Relations, Kerala

REVIEW OF LITERATURE

CHAPTER III

REVIEW OF LITERATURE

This chapter briefly reviews some of the previous studies that have relevance in the context of this study. The literature is reviewed under the following heads:

1. <u>Production</u>:

   i) Production of perennials

  ii) Studies on pepper production

2. <u>Marketing</u>:

   i) Marketing in general

  ii) Studies on pepper marketing

1. <u>Production</u>

i) <u>Production of perennials</u>

Staton and Dominick (1964) in an analysis of cost records of 49 apple growers in New York showed that the nature of producers decision paid big dividends in the production and marketing of apples, and observed that there was wide variation from farm to farm in costs associated with growing and harvesting of apples.

Roach (1964) found that the main problem for apple growers in England was to get a remunerative price consistent with production and marketing costs. The cost of production continued to increase while marketing returns did not show

the same proportional increase. He suggested that modern technology, consisting of new root stocks, modern method of orchard management, use of bulk handling and mechanisation in the packhouse would help the grower to grow a better crop.

Stankovie (1967) worked on methods of deciding the time of replanting various perennial crops. Plantations should be re-cultivated when the returns from their permanent crops were less than that could be obtained, at the same cost, by using land for an alternative purpose.

Gupta and George (1967) have worked out the profitability of orange cultivation in Nagpur. The study found that invest-ment in orange cultivation had an average pay back period of 7 years with a net present value of Rs.6,438.00 per acre at a discount rate of 12 per cent and an internal rate of return of 39 per cent and a benefit cost ratio of 2.50. The optimum grove size was observed to be between one and two acres.

Halayya (1969) studied about the performance and problems associated with small production units in the tea industry. He identified that the use of substandard genetic stock and the neglect of cultural practices tended to keep the yields in small units very low compared to that in plantations. He also observed that resource availability was meagre in such cases.

Madappa (1970) studied the cost of production of coffee in India. He identified certain difficulties to be encountered

in the cost studies of crops like coffee. These included cost apportioning problems due to intercropping, mixing up of several varieties of the crop, lack of proper records, etc.

Mehta and Singh (1970) found that the average cost of establishing one hectare of apple orchard upto bearing period in Kulu and Parabati valleys worked out to be Rs.13,495.45 and Rs.10,714.18 respectively. No rent for the use of land was charged as the farms were all owner operated.

ii) Studies on pepper production

Blocklock (1954) observed that in Sarawak the first harvest of pepper was done only after 2½ to 3 years after planting. He gave the relationship between the age of plants and the yield as follows:

Age (in years)	Yield (in lbs/vine)
1 and 2	Nil
3	2½ to 4
4 to 7	8 to 20 (increasing with age)
8 to 15	about 4-5 (decreasing with age)
20 to 30	Nil

He also observed that it took 5-6 months from spike emergence and 4 months from flowering to the actual ripening of berries.

Thomas (1957) suggested three ways to improve pepper production in Kerala State. These were intensive cultivation of existing gardens, replacement of old and uneconomic vines in existing plantations with selected superior vines and extending cultivation to newer areas with potential.

Abraham (1958) stated that small holdings should take a major role in the production of important spices like pepper. He indicated that pepper could be grown as a subsidiary crop in tea and coffee plantations using the shade trees as supports. He opined that the cost of production in such cases would be lower than in pure culture.

Kurup (1960) observed that for raising pepper plantations, planting material was collected from the base of old vines. Vines that resulted from such planting material developed fruiting branches only from a height of about 3 feet from the ground level. Consequently though a vine may have grown to a height of about 18 feet, the effective cropping portion of vine was only 15 feet. If cuttings with fruiting lateral shoots were planted, the vines produced crop right from ground and hence the yield of vines was more. He pointed out to support his finding that in South East Asian countries, cuttings with fruiting lateral branches were only planted, and thus the yield in these countries were much higher than in India.

Venugopalan (1961) estimated that the cost of cultivation of pepper for the first six years was Rs.244.50 per acre. The cost of cultivation during the tenth year when the yield was expected to stabilize was Rs.491.00. The net income per acre by the first ten years of pepper cultivation was estimated to be Rs.2969.00.

Nambiar (1967) pointed out that pepper yields can be raised four fold by cultivating with the variety Panniyur-1.

Tambad and Rao (1968) stated that within a period of 27 years from 1937 to 1962, India's pepper production had doubled. They pointed out that the increase in area has been more than proportionate to the increase in production during the period 1949-'50 to 1966-'67.

Waard (1969) studied about the yield stability of pepper in Sarawak. He attributed the higher yields of pepper in other countries to the favourable agroclimatic conditions, namely uniform rainfall distribution, improved agro-techniques, varieties with high yield potential, use of non-living standards and close spacing.

Kay (1970) discussed the aspects of altitude, soil and climate, varieties used, propagation practices, pests and diseases, harvesting, yields, preparation of black and white peppers, yield and price relationship, packing and storage, grades, variety and quality, chemical composition, utilization

of production, consumption and trade practices of black
pepper.

Pillai and Garg (1970) conducted a sample survey on
pepper in Kerala and identified the potential pepper pro-
ducing areas and the factors affecting it's production in
Kerala.

Mohan (1973) observed that the average cost of establish-
ment of a pepper garden till the bearing stage was Rs.1325
per acre.

Iyer (1977) discussed the important problems in connec-
tion with the cultivation of pepper. The limited land avai-
lability for pepper cultivation, the low rate of productivity
due to genetic factors, traditional methods of cultivation,
pests and diseases were stated as the main problems causing
low pepper productivity in Kerala. A phased programme of
replanting old and uneconomic pepper vines, adoption of
manuring and plant protection operations and the provision of
credit facilities for the purchase of inputs were stated as
necessities to improve the production of pepper.

Wahid and Chaniago (1977) studied the problems of pepper
cultivation in West Kalimantan, a traditional pepper growing
province in Indonesia. They identified the main reasons for
the decline in pepper production. They opined that the future
prospects for increasing production were promising, provided
the necessary man-power was maintained, prices were guaranteed,

infrastructural facilities were improved and extension ser-
vices toned up.

George and Lakshmanachar (1978) estimated the cost of
cultivation of pepper based on a sample of 52 holdings in
the districts of Calicut and Cannanore in Kerala. The costs
upto the full bearing stage which was taken as six years were
worked out, assuming a field population of 1100 vines per
hectare. The results obtained were as follows.

Item	Cost in rupees (per ha)					
	Years					
	1	2	3	4	5	6
1. Clearing and land preparation	584					
2. Cost of standards, digging pits and planting	743					
3. Cost of cuttings and planting	237	45				
4. Cultural practices	719	750	760	800	807	810
5. Manures and manuring	811	933	1167	1433	1578	1623
6. Plant protection	50	78	189	383	445	467
7. Harvesting and drying				356	777	952
Total	3144	1806	2116	2972	3607	3852

The total cultivation expenses for six years based on
the above table was Rs.17,497. The annual expenses from the

sixth year onwards was Rs.3852. The total expenses per hectare from the sixth year onwards inclusive of costs like land cess was stated as Rs.5528. The yield of pepper from a hectare each year from the third year to the sixth year were located as 40 kg, 160 kg, 420 kg and 540 kg. The marketing costs for the same period were Rs.22, Rs.88, Rs.231 and Rs.297 respectively. The value product less marketing charges at a price of Rs.1600 per quintal of pepper for the same period were Rs.618, Rs.2472, Rs.6489 and Rs.8343 in that order. The net income per hectare from the sixth year onwards was stated as Rs.3112.

Pillay et al. (1978) pointed out that the cost of harvesting pepper did not vary whether it was done at half maturity (for pickling, dehydration etc.) or at full maturity (for black pepper). The black pepper equivalents of 100 g of green pepper from the varieties Cheriyakaniakadan, Karimunda and Panniyur-1 was given as 48-60 g, 50-64 g and 56-73 g respectively.

Hasibuan (1978) gave the prospects of pepper production in South Sumatra province. A shortage of capital and high production costs were stated as prevalent in the area.

Brandao et al. (1978) studied the economic viability of black pepper production in the Bahia cocoa region in Brazil. They estimated the capital expenditure required for one

hectare of black pepper in the region. The production costs, inputs, labour requirements and returns per hectare to the producers were analysed. The fixed, variable and average costs of production and the cost per kilogramme of dried pepper were also studied.

Cassiano et al. (1979) worked out the cross elasticity of the supply of black pepper in Para State in Brazil, with respect to the prices of fertilizers as 0.14. They stated that rainfall was an important factor affecting the yield of pepper.

Patel (1979) studied the prospects and problems in pepper production. It was stated that 50 per cent of the vines in Kerala were senile. The average yield he pointed out was the lowest in the very birth-place of pepper.

Tejero et al. (1981) studied the production of black pepper in Batangas in the Philippines. The problems cited by pepper growers included pestilence, irrigation, labour cost, price instability, and low prices offered by buyers.

Menon et al. (1982) pointed out that at the present recommended field population of 1100 pepper vines per hectare the average yield per vine worked out to only 200 g.

They also compared the use of living and non-living standards in pepper cultivation. Erythrina indica was stated as the most common live standard in Kerala. It had a disadvantage

that it shedded leaves in summer when the vines actually
needed shade. Live standards also competed with pepper for
nutrients and moisture. They stated that the cost of an
Erythrina standard was Rs.2. Non-living standards like
reinforced cement concrete/granite/teak posts cost Rs.30
to Rs.50 per standard indicating higher establishment costs.
They stated that the economics of pepper growing on non-
living standards were yet to be worked out.

2. Marketing

i) Marketing in general

Rangachari (1957) emphasised on the aim of orderly
marketing ie., to ensure that producer gets a reasonable
price for his produce by eliminating waste and reducing the
cost of distribution.

Clodius and Willard (1961) prescribed the nature and
analytical frame work of market structure analysis. The
frame work consisted of three elements namely, structure,
conduct and performance.

Weber (1966) studied the market structure, price forma-
tion and trade margins for potatoes in the Federal Republic
of Germany.

Lavania et al. (1966) highlighted the existence of high
price spread due to multiplicity of charges and market fun-
ctions, distress sale of agricultural produce and the market
malpractices. He also showed that some of the developments

beneficial to producers such as confirmation of ownership of
tenants, provision of cheaper institutional finance and
storage facilities to the cultivators, adversely affected
the flow of marketable surplus.

Mamoria and Joshi (1979) mentioned that the grape
growers sold the standing crop to contractors long before it
was ready for harvesting. Some growers harvested their own
produce and sold in the local or distant markets directly
or through agents. Direct sales by growers brought in about
87 paise per mound more when compared with sales through
commission agents.

Gupta and Ram (1979) studied the behaviour of marketing
margins and costs of vegetables. The analysis revealed that
the producer received a very low share (38 per cent) of the
consumer's price whereas the retailer's margin and the mar-
keting cost were quite substantial each appropriating about
one-fourth of the consumer's rupee. Location played an
important role in influencing the retailer's margin. Trans-
port, packing and labour expenses were the major components
of the marketing cost. Co-operative endeavour at the levels
of producers and consumers, and facilities for cold storage
and processing would probably help in improving the marketing
performance.

Ramaswamy (1981) conducted a study on the problems in
the production and marketing of major vegetables in Coimbatore

district. The study revealed that the percentage share of the producer in the consumer's rupee varied from 36.81 to 57.40. The farmers received about 38 per cent of consumer's rupee as their share. The respective shares of wholesalers and retailers were 25 per cent and 13 per cent for Bhindi.

Prasad (1982) wrote a paper on price spread for paddy and wheat in Allahabad district. Identifying the marketing agencies and channels involved in the marketing of these two commodities and estimating the price spread were the main objectives of study. It revealed that the producers share in the consumer's rupee was very low due to the presence of a large number of middlemen between the producer and the ultimate consumer.

ii) Studies on pepper marketing

Mariwala(1957) on a study of market conditions observed that high freightage for export of pepper to the U.S.A. and other countries made the price of Indian pepper higher than that of the competing countries in the world market. He quoted that the freightage was around Rs.26.00 per cwt. to the U.S.A. This was almost 30 per cent of the price of the commodity. In comparison the freight charge of Singapore pepper to the U.S.A. was only Rs.22.00 per cwt. He pointed out further that the problems in black pepper export were lack of export promotion and difficulties regarding detentions by

the food and drug administration. He also observed that the fall in export was a result of cheaper prices asked by Sarawak and Indonesia. A long term solution to this problem was to increase production and to seek more exportable surplus.

Venugopalan (1961) studied the marketing of pepper in Nedumangad taluk in Trivandrum district. He discussed the market practices, functions and charges involved. He also discussed the production, assembling, transport, handling, storage and wholesale distribution of the pepper produced there. He also described the prevailing system of market finance and the market intelligence activities.

Simon (1964) conducted a regression analysis of pepper prices and exports. The price elasticity of exports was worked out as -0.1034. The correlation coefficient was -0.4683. He pointed out that since pepper is on the non-essential list of consumers abroad, price variation will have significant effect on purchases.

Gandhi (1967) observed that the system of marketing in Kerala was old, unsystematic and not in the interest of the growers. He suggested the formation of big planters' co-operatives for pepper marketing.

Kumar and Subbarao (1968) studied the instabilities relating to the earnings, volume and unit value of black pepper exports from India during the period 1957 to 1965-66.

They worked out instability indices relating to the same. They pointed out that pepper recorded the highest unit value instability compared to tea, coffee, groundnut, tobacco, cashew kernels, oilseeds and castor oil.

Arnould (1970) in his note on the world market for pepper, gave a brief account of the pepper exporting countries of the world and the factors contributing to the exports of pepper from these countries.

Jain (1970) reported that in more recent years India's pepper exports had to confront stiff opposition from many countries and the most important among them was Indonesia.

Mohan (1973) observed that 65 per cent of farmers sold pepper to the local merchants. The producer's share in the consumer's rupee was noted as 66.30 per cent.

Venkatachalam and Gray (1974) gave a brief resume of the problems faced by exporters of spices and made suggestions for evolving an export strategy to increase spice exports to different countries.

Gandhi (1974) reported that demand for pepper is increasing at a faster pace than anticipated in various European countries. In West Germany the per capita consumption of pepper had risen to 140 g compared to only 110 g in U.S.A.

Varkey (1976) was of the view that the lack of improved agricultural practices and know-how and inadequate financing

and marketing facilities were the major problems faced by the small scale producers of pepper and pepper products.

Mathur and Singh (1976) reviewed the export of Indian black pepper for the past two decades. They discussed the production and the trends in area and production. They also discussed the prospects for improving the exports of pepper and It's by-products.

Sikka (1976) studied the price spread of black pepper in Kerala. His study revealed two channels of pepper marketing, namely, (1) producer-village merchant-commission agent-exporter-consumer and (2) producer-village merchant-commission agent-wholesaler-wholesaler at consuming centre-retailer-consumer. The producer's share in the consumer's rupee was 66.92 per cent in channel 1 and 64.78 per cent in channel 2. The combined margins of the intermediaries worked out to 6.89 per cent of the consumer's rupee in channel 1 while it was 20.06 per cent in channel 2. In channel 1 the maximum margin went to the exporter who took 5.14 per cent of the consumer's rupee followed by the village merchant with 0.50 per cent, while the top spot in channel 2 went to the retailer with 7.56 per cent followed by the wholesaler at the consuming centre with 5.12 per cent, the wholesaler with 4.37 per cent and the village merchant with 0.93 per cent. The share of the commission agent in the consumer's rupee was 1.25 per cent in channel 1 and 2.08 per cent in channel 2. He pointed out

that the farmers got low shares because they sold their produce in ungraded forms.

Shet (1976) discussed the problems of harvesting and marketing of pepper in Kerala. He also discussed the need for ensuring quality specifications.

The F.A.O. (1976) reported on the world pepper trade and outlook. The aspects covered included the present state of the world economy, the medium term prospects for import demand and the recent policy developments affecting the world pepper economy.

Gandhi (1976) discussed the history of pepper trade from 1974-75 and the developments in the fields of production, direction of trade, consumption and future requirements. He also discussed the potential of pepper production and export.

Sundharam (1977) discussed the advantages of grading and quality control measures for fetching higher prices for Indian pepper.

Menon (1977) devised a new strategy for sales promotion of pepper in foreign markets. The numerous government levies and procedures involved made export of pepper a tiresome procedure, and if effective methods to reduce this could be found, export would become a more attractive proposition.

George (1977) stated that the development of new pepper products such as dehydrated green pepper and buff coloured

pepper will help to improve the market position of Indian pepper in the world.

Shet (1978) gave a vivid account of pepper marketing in Kerala. He stressed on the need for product diversification to enhance the pepper exports from India. Currently India was not producing and exporting white pepper on a commercial basis. There was a preference for white pepper in Western Europe. Hence it was felt that there was an urgent need for a further study regarding the production and export of white pepper.

Cassiano et al. (1979) studied about the supply of perennial crops using the case of black pepper in Para state in Brazil. They worked out the short run and long run supply elasticities of pepper for the state. The price elasticity of supply in the short run was estimated as 0.71, while it was found to be 4.20 in the long run.

Tejero et al. (1981) studied the marketing of black pepper in Batangas in the Philippines. The study identified the channels of distribution, the marketing functions at the farmer's level and the market structure characterizing the industry. The marketing costs were also estimated. The different types of buyers were also identified. They pointed out that because of the attitude of buyers towards the marketing of black pepper, the market leaned towards oligopolistic forms.

METHODOLOGY

CHAPTER IV

METHODOLOGY

The first part of this study is concerned with the estimation of the cost of cultivation of pepper and with the economics of pepper production. The study has been made on the basis of the costs and returns as experienced by pepper growers operating at three scales of production in Idukki district. The three scale of operation-based strata of pepper growers selected for the study were:

Stratum A - Farmers growing pepper in an area of less than one acre (0.4 hectare)

Stratum B - Farmers growing pepper in an area exceeding one acre and within 5 acres (2 hectares)

Stratum C - Farmers growing pepper in an area of over 5 acres.

The economics of pepper production has been worked out by employing a capital productivity analysis. The concepts used in this analysis are discussed separately towards the end of this chapter.

The second part of the study deals with the economics of marketing of pepper produced in Idukki district. It is concerned with studying the marketing channels, the market structure, the market practices, the marketing costs, the

profit margins and the price spread involved in pepper marketing. All kinds of functionaries associated with the marketing of pepper upto and at the terminal market at Cochin were contacted, and all the services involved were studied to get a clear picture.

The procedures, techniques and concepts employed in sample selection, data generation and data analysis are explained below.

Sampling procedure

a) Cost of cultivation

The sample was selected by a multi-stage stratified random sampling technique.

The district of Idukki was purposively selected for the study since it was a recognized and established pepper growing tract. Idukki figures among the leading districts of Kerala considering the area and production of pepper. Within the district the two development blocks of Nedumkandam and Kattappana were selected for the study since they possess the maximum area under pepper in the district. From each of the two blocks, two panchayats were selected further by simple random sampling. These were the panchayats of Nedumkandam and Karunapuram in Nedumkandam block and Kattappana and Kanchiyar in Kattappana block. From each panchayat two wards were selected at random. These were the wards of

3 and 5 in Karunapuram panchayat, 4 and 8 in Nedumkandam panchayat, 1 and 7 in Kattappana panchayat and 2 and 6 in Kanchiyar panchayat.

A sampling frame was constituted for each of the selected wards by listing all the pepper growers in it. The farmers were listed according to the three size classes mentioned earlier. A sample of nine farmers were then randomly selected from each selected ward. This was done in such a way that out of the nine from each ward, three each fell in each of the three size classes. Thus on pooling, a total of 72 farmers were obtained as the total sample size with 24 farmers in each of the three size classes.

b) Marketing

All the farmers interviewed in connection with the earlier part of the study were also studied from the point of view of their marketing practices and the prices received by them on certain specific dates. There was provision built into the schedule used with the farmers for this. The buyers of pepper at the farmers level were thus identified. The subsequent buyers were also located by an identical process.

The marketing functionaries contacted included 20 village merchants and 30 upcountry wholesalers in the development

blocks of Nedumkandam and Kattappana. The respondents at
Cochin included 10 commission agents, 10 exporters and 5
internal wholesalers. The other respondents included brokers,
salesmen, inland transporters, clearing agents, and market
labourers. Besides this, the Marketfed, the Spices Export
Promotion Council, the Directorate of Marketing and Inspec-
tion, the Indian Pepper and Spice Trade Association and the
Hill Produce Merchants Association were also contacted to
gather information.

Collection and processing of data

a) Cost of cultivation

The survey work was conducted using a well-structured
and pre-tested questionnaire. A specimen of the schedule is
given in Appendix I. The data were generated through per-
sonal interviews. The survey work was done during March-
April, 1983. The data thus collected were processed, tabu-
lated and analysed.

b) Marketing

The data required for the study of marketing were also
generated by interviewing the different market functionaries
using another well-structured pre-tested schedule. A copy
of the schedule is included in Appendix II. Information on
the marketing practices, marketing functions, marketing costs,
prices paid and prices received were collected. Transactions

relating to roughly the same period of time were studied, in view of the price fluctuations in the trade. The price spread was worked out relating to a period of fairly stable prices. The information was gathered during April-May, 1983.

The tabular method was the main analytical tool used for data interpretation. Cost items like rent on operating space were determined in all cases irrespective of actual payment at prevailing market rates. Depreciation on furniture, machinery, etc. was computed by the linear method. Incidental costs were cumulated for the concerned category of bearers and divided equally. In the case of traders who did business other than pepper marketing on the same overhead costs, these costs were appropriately allocated.

Concepts used in the estimation of the cost of cultivation

The cost of cultivation refers to the total expenses of pepper growers, experienced in cultivating pepper, expressed on a per hectare basis.

In this study the cost of cultivation of pepper was worked out from the first year to the seventh year when the yield was expected to stabilize. The cost of cultivation was estimated using three approaches, namely the operationwise approach, the inputwise approach and an itemwise approach using the cost concepts cost A, cost B and cost C employed in farm management studies.

a) The operationwise approach

Here the costs faced by farmers were grouped into ten categories.

1. Costs for clearing and land preparation

This included the total cost of labour irrespective of whether it was hired labour or family labour involved in clearing up the land, drawing pits and for soil conservation work. The cost of hired labour was computed on the basis of the wages actually paid. The wage levels prevailing in the area were used as proxy to evaluate the cost of family labour.

2. Costs for establishing standards

This refers to the total labour costs and the cost of materials in the purchase, transport and planting of standards.

3. Costs for establishing vines

This included the total labour cost and the material cost involved in the purchase, transport and planting of pepper vines.

4. Costs for manures and manuring

This refers to the cost of manures, fertilizers and soil amending and ameliorating materials along with the costs of their transport and application. Home-produced manures were valued at the existing market rates.

5. Costs for plant protection

This refers to the cost of plant protection chemicals and the costs of their transport and application.

6. Costs for cultural operations

This included the total labour and material costs involved in lopping standards, tying vines, shading, weeding and mulching.

7. Depreciation

This was worked out to meet the wear and tear of the temporary dead stock, implements and machinery used in pepper cultivation. The annual rate of depreciation was worked out on each item using the straight-line method and then cumulated to get the total annual depreciation allowance.

8. Interest on fixed capital

This was worked out at the rate of 10.25 per cent on the book value of temporary deadstock, implements and machinery used in pepper cultivation with proper apportioning wherever necessary. This rate has been used since it appears to be a realistic measure of the opportunity cost of capital on short-term investment.

10. Rental value of land

Hiring and leasing in of land was not practised among the sample farmers. Hence a rental value of owned land as

one-fifth of the total value of gross produce was considered.

11. <u>Land revenue</u>

The tax on land under pepper cultivation is included here.

12. <u>Costs of harvesting and processing</u>

This involves the total labour costs involved in picking the berries and preparing them for the market.

b) <u>The inputwise approach</u>

Here the total costs were classed under two major heads namely total operating cost and total fixed cost.

The total operating cost included

1. Cost of hired human labour

2. Imputed value of family labour

3. Cost of tying material

4. Cost of plant protection chemicals

5. Cost of manures, fertilizers and soil amendments and ameliorants, and

6. Interest on working capital.

The total fixed cost included

1. Cost of vines and standards

2. Rental value of owned land

3. Depreciation

4. Interest on fixed capital, and

5. Land revenue

The interest on working capital, rental value of owned land, depreciation, interest on fixed capital and taxes were obtained as in the previous approach.

c) Approach using cost concepts employed in Farm Management

Here the analysis was undertaken making use of the three cost concepts, of, cost A, cost B and cost C.

1. Cost A

This included the items under the following heads:

a) Cost of hired human labour

b) Cost of vines and standards

c) Cost of tying material

d) Cost of plant protection chemicals

e) Cost of manures, fertilizers and, soil amendments and ameliorants

f) Interest on working capital

g) Depreciation, and

h) Land revenue

The cost of hired human labour refers to the total paid out wage labour cost.

2. Cost B

This included the items under cost A, the rental value of owned land and the interest on fixed capital.

3. Cost C

This comprises of the cost B and the imputed value of family labour.

The interest on working capital, depreciation, taxes, rental value of owned land and interest on fixed capital were obtained as in the earlier approaches.

Concepts used in the study of marketing

1. Agricultural marketing

"It is a series of functions involved in the transfer of agricultural commodities from the point of production to the point of consumption, resulting in the addition of form, time, space and possession utilities. It includes the exchange function of ownership transfer, the physical functions of cleaning, packing, transport, storage and processing and the facilitating functions of grading, standardization, market financing, risk bearing and market information" (Kohls, 1967).

2. Marketing channel

"It is a path traced in the direct or indirect transfer of title to a product as it moves from the producer to the ultimate consumer or industrial user" (Rao, 1973).

In this study the marketing channel will refer to the link-up of the functionaries involved in leading the farmers' pepper to the exporters/internal wholesalers.

3. Market structure

It refers to "the number of buyers and sellers for a commodity in a market area, their size in relation to each other, the extent of product differentiation, the case of entry of new firms, the ability of firms to exercise some degree of market control, the nature of price differentiation and the nature and type of competition in existence" (Garion, 1961). It indicates "the various market channels, intermediaries and trades involved in moving the produce from the producer to the consumer" (Bhide et al., 1981). "It refers to those characteristics of organization of the market influencing the nature of competition and pricing within it (Lele, 1973).

4. Marketing cost

It refers to the actual expenses involved in bringing the farmer's produce to the exporter/internal wholesaler. The difference between the price received by the farmers and the price paid by the exporters/internal wholesalers is taken to represent the marketing costs and profits involved in the marketing of pepper. The marketing costs would include overhead costs like rent and depreciation and variable costs like transport costs and handling costs.

5. Marketing margin

The marketing margin refers to "the difference between

the price paid and received by a specific marketing agency such as a single retailer or by any types of marketing agency such as retailers or assemblers or by any combination of marketing agencies such as the marketing system as a whole" (Jain, 1971). The width of the margin "may be measured either in percentage form or in absolute amounts" (Shepherd et al., 1976).

6. Profit margin

The profit margin at each stage of marketing is obtained by computing the marketing margin at that stage and deducting the costs of inputs and the processing costs from the value of output. It is not different from the value added at each stage.

7. Price spread

The farm-retail price spread is obtained by "subtracting the net farm value from the retail price" (Purcell, 1979). The net farm value refers to the payment made to farmers on an equivalent quantity of the farm product" (Pederson and Kiley, 1967). "The spread includes the costs incurred and the profits enjoyed by all agencies involved in the transfer of products from farmers to consumers" (George and King, 1971).

The price spread in this study refers to the difference between the price paid by the exporters/internal wholesalers and the price received by the farmers for a unit quantity of

pepper. This difference would indicate the total marketing costs and the total value added.

Analysis of capital productivity

An analysis of the capital productivity involved in an investment project in pepper cultivation with reference to the three strata of the producers as well as the aggregate sample, has also been undertaken in this study.

The pepper vine commences bearing in the third year (Bansil, 1971). The yield stabilizes by the seventh year, and the stability is expected to continue on a plateau till the twentieth year (Iyer, 1961).

The concepts used in the analysis of capital productivity here are as follows:

a) Project duration

The project is considered as terminated when the period of stable yield is over.

b) The pay-back period

This is a measure of the length of time from the beginning of a project by when the net benefits offset the cost of the capital investment, allowing the operator to break even.

c) The benefit-cost ratio

This is a discounted measure of capital productivity.

It is the ratio of the present worth of gross benefits to the present worth of gross costs. The present worth is found out by discounting the returns stream and the cost stream using a 10 per cent discount factor. This rate is based on the market rate of interest on long-term loans which appears to be a realistic estimate of the opportunity cost of capital. Ideally the ratio should exceed one.

$$\text{Benefit-cost ratio} = \frac{\text{Present worth of gross benefits}}{\text{Present worth of gross costs}}$$

Symbolically

$$\text{Benefit-cost ratio} = \frac{\sum_{t=1}^{n} Bt/(1+i)^t}{\sum_{t=1}^{n} Ct/(1+i)^t}$$

where n = the life-span of the project

Bt = gross benefits in the year 't'

Ct = gross costs in the year 't'

i = the discount rate ie., 10 per cent

c) <u>The net present worth</u>

This is the present worth of the net cash flow stream obtained by applying a discount rate of 10 per cent to the net cash flow stream. This rate has been decided on the basis of the same reason as before. Alternately the net present worth can be expressed as the difference between the discounted stream of gross benefits cumulated and that of gross costs cumulated. Ideally this should be positive.

Net present worth = Present worth of gross benefits
 - present worth of gross costs

Symbolically

Net present worth = $\sum_{t=1}^{n} Bt/(1+i)^t - \sum_{t=1}^{n} Ct/(1+i)^t$

where, the symbols used are the same as in the case

of the benefit-cost ratio.

d) <u>The internal rate of return</u>

This is found out by locating by a trial and error

method that discount rate which just makes the net present

worth of the cash flow equal to zero. This unique discount

rate is called the internal rate of return. Symbolically the

internal rate of return is that discount rate 'i' such that

$\sum_{t=1}^{n} Bt-Ct/(1+i)^t = 0$. The symbols used are the same as before.

To interpolate the value of the internal rate of return

lying intermediate to two integer discount rates too high on

one side and too low on the other, the following formula is

adopted (Gittinger, 1976).

i = r + (r'-r) (Pr/Pr Pr')

where i = the interpolated internal rate of return

r = the lower discount rate

r'= the higher discount rate

Pr = the present worth of cash flow at the lower
discount rate

Pr'= the present worth of cash flow at the higher
discount rate.

ECONOMICS OF PRODUCTION

CHAPTER V

ECONOMICS OF PRODUCTION

This chapter consists of two parts. The first part
is concerned with the presentation and discussion of the
cost of cultivation of pepper. The other part deals with
an analysis of the capital productivity of a pepper culti-
vation project.

A. Cost of cultivation of pepper

The cost of cultivation has been estimated using three
approaches, namely, the operationwise approach, the inputwise
approach and an approach using the cost concepts used in
farm management studies which have been explained earlier.
Each approach was used for each of the three strata as well
as for the aggregate sample. The cost of cultivation was
worked out till the seventh year, since the returns were
found to stabilize during that year. The results obtained
are presented below.

I. Operationwise analysis

The cost for cultivating one hectare of pepper as derived
for the aggregate sample is presented operationwise in
Table 8. The total cost of cultivation for each year for the
first seven years were found to be Rs.5952.54, Rs.3958.64,
Rs.4150.55, Rs.4583.87, Rs.4901.45, Rs.5412.39 and Rs.5506.03
respectively. The septenary cumulative total cost of

Table 8. Cost of cultivation of pepper, operationwise analysis (aggregate level) 1983
(Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Clearing and preparing land	918.77 (15.43)	-	-	-	-	-	-
2. Standards and planting	539.50 (9.06)	-	-	-	-	-	-
3. Vines and planting	836.43 (14.05)	80.57 (2.04)	-	-	-	-	-
4. Manures and manuring	617.82 (10.38)	491.70 (12.42)	858.31 (20.68)	924.88 (20.18)	1039.86 (21.22)	1069.62 (19.77)	1123.87 (20.41)
5. Plant protection	1.41 (0.02)	6.97 (0.18)	69.41 (1.67)	123.60 (2.70)	128.68 (2.63)	141.19 (2.61)	142.15 (2.58)
6. Cultural operations	1681.70 (28.26)	2102.92 (53.12)	1758.95 (42.38)	1775.68 (38.74)	1785.70 (36.42)	1813.51 (33.51)	1847.17 (33.55)
7. Harvesting and processing	-	-	128.19 (3.09)	375.78 (8.20)	542.46 (11.07)	972.23 (17.96)	982.04 (17.84)
8. Interest on working capital	257.37 (4.32)	161.78 (4.09)	184.25 (4.44)	228.50 (4.98)	248.62 (5.07)	299.67 (5.54)	304.57 (5.53)
9. Depreciation	76.12 (1.28)	86.39 (2.18)	113.20 (2.73)	116.06 (2.53)	116.66 (2.38)	122.90 (2.27)	122.89 (2.23)
10. Land revenue	4.94 (0.08)	4.94 (0.12)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
11. Interest on fixed capital	30.48 (0.52)	35.37 (0.88)	45.30 (1.09)	46.43 (1.01)	46.49 (0.95)	50.30 (0.93)	50.24 (0.91)
12. Rental value of land	988.00 (16.60)	988.00 (24.96)	988.00 (23.80)	988.00 (21.55)	988.00 (20.16)	988.00 (18.25)	988.00 (17.94)
Total	5952.54 (100)	3958.64 (100)	4150.55 (100)	4583.87 (100)	4901.45 (100)	5412.39 (100)	5506.03 (100)
Grand total						34465.47	

Figures in parentheses indicate percentages of the yearly total

cultivation was found to be Rs.34465.47 at the aggregate level. The year which contributed the largest share of this was the first year with 17.27 per cent, followed by the seventh year with 15.98 per cent. The smallest share came in from the second year with 11.49 per cent of the septenary total.

The total cost of cultivation was the highest during the first year. It was the lowest during the second year after which an upward trend was observed till the seventh year, from where it was found to be stabilized.

The high cost of cultivation during the first year was mainly due to the large costs incurred in fresh planting. The operations of clearing and preparing the land, establishing standards and planting vines together contributed 38.54 per cent of the total cost of cultivation during the first year. The next conspicuous cost contribution was from the cultural operations done during this year.

The total cost of cultivation was the lowest among all years during the second year since new planting costs were low and since there were no costs related to harvesting. The prominent component of cost during this year was the cost of cultural operations. It occupied 53.12 per cent of the total cost. The share of the cost of cultural operations in the total cost was the highest during this year. This was

because the vines were young and actively growing during this year necessitating frequent training and tying, followed by proper shading and mulching.

The cost of cultivation rose by 3.54 per cent over the second year during the third year. This slight rise came about mainly through the emergence of the cost of harvesting and processing and a relative rise in cost of soil conditioning.

The cost of cultivation rose by 10.44 per cent over the third year during the fourth year. This occurred primarily due to an increase in the cost of harvesting and processing.

The cost of cultivation maintained a yearly rise through the fifth, sixth and seventh years too. By the seventh year the total cost of cultivation was 20.12 per cent higher over the fourth year. The most significant reason for this cost escalation was the rising costs for harvesting and processing. Between the fourth and the seventh years the share of this operation in the total cost rose from 8.20 per cent to 17.84 per cent. The cost of harvesting and processing during the seventh year was 161.33 per cent of that during the fourth year.

The magnitude of cost of cultivation during the seventh year was second only to the first year. Cultural operations accounted for 33.55 per cent of the total cost during this

year. The other conspicuous costs were that for soil conditioning and that for harvesting and processing.

The cost of cultivation in each year for the first seven years in pepper cultivation pertaining to stratum A, stratum B and stratum C are tabulated operationwise in Table 9, Table 10 and Table 11 respectively. The total costs relating to stratum A were found to be Rs.7233.45, Rs.4730.83, Rs.4846.99, Rs.5239.11, Rs.5598.53, Rs.6477.34 and Rs.6566.27 for the seven years in that order while the costs relating to stratum B were Rs.6107.05, Rs.4113.04, Rs.4235.58, Rs.4555.03, Rs.4931.86, Rs.5515.76 and Rs.5684.82. The corresponding costs with stratum C were Rs.5574.97, Rs.3798.58, Rs.4015.85, Rs.4553.03, Rs.4859.26, Rs.5327.57 and Rs.5330.72. The septenary total cost of cultivation was the largest with stratum A at Rs.40656.52 followed by stratum B with Rs.35143.16 and stratum C with Rs.33459.98.

Thus the cost of cultivation was the highest in stratum A and the lowest in stratum C. One of the reasons for this was the decreasing plant density from stratum A to stratum C, corresponding to an increase in the size of holding in the same direction. Lower costs were associated with larger areas perhaps due to the economics of scale also.

The cost of cultivation was found to be the highest during the first year, when most of the new planting expenditure was incurred, in all strata. The absolute cost of

Table 9. Cost of cultivation of pepper, operationwise analysis (stratum A) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Clearing and pre-paring land	908.47 (12.56)	-	-	-	-	-	-
2. Standards and planting	682.46 (9.43)	-	-	-	-	-	-
3. Vines and planting	993.16 (13.73)	150.57 (3.18)	-	-	-	-	-
4. Manures and manuring	768.35 (10.62)	569.64 (12.04)	1057.34 (21.81)	1119.67 (21.37)	1119.67 (20.00)	1245.57 (19.32)	1268.36 (19.33)
5. Plant protection	8.40 (0.12)	25.89 (0.55)	27.45 (0.57)	66.16 (1.26)	72.26 (1.29)	109.62 (1.70)	121.30 (1.85)
6. Cultural operations	2481.25 (34.30)	2610.27 (55.18)	2039.30 (42.07)	2139.46 (40.84)	2139.46 (38.21)	2295.02 (35.60)	2351.28 (35.84)
7. Harvesting and processing	-	-	231.43 (4.77)	382.03 (7.29)	723.49 (12.92)	1145.38 (17.77)	1175.22 (17.91)
8. Interest on working capital	147.81 (2.04)	124.03 (2.62)	145.10 (2.99)	181.15 (3.46)	193.01 (3.45)	264.30 (4.10)	270.45 (4.12)
9. Depreciation	178.98 (2.47)	181.75 (3.84)	252.46 (5.21)	256.22 (4.89)	256.22 (4.58)	274.22 (4.25)	273.55 (4.17)
10. Land revenue	4.94 (0.07)	4.94 (0.10)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)	4.94 (0.08)	4.94 (0.08)
11. Interest on fixed capital	71.63 (0.99)	75.74 (1.60)	100.97 (2.08)	101.48 (1.93)	101.48 (1.81)	109.69 (1.70)	109.17 (1.66)
12. Rental value of land	988.00 (13.66)	988.00 (20.88)	988.00 (20.38)	988.00 (18.86)	988.00 (17.65)	988.00 (15.32)	988.00 (15.06)
Total	7233.45 (100)	4730.83 (100)	4846.99 (100)	5239.11 (100)	5598.53 (100)	6447.34 (100)	6560.27 (100)
Grand total							40656.52

Figures in parentheses indicate percentages of the yearly total

Table 10. Cost of cultivation of pepper, operationwise analysis (stratum B) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Clearing and preparing land	942.13 (15.43)	-	-	-	-	-	-
2. Standards and planting	535.32 (8.77)	-	-	-	-	-	-
3. Vines and planting	857.61 (14.04)	101.96 (2.48)	-	-	-	-	-
4. Manures and manuring	603.37 (9.88)	529.11 (12.86)	1005.67 (23.74)	1038.25 (22.79)	1039.75 (21.08)	1182.15 (21.43)	1232.15 (21.67)
5. Plant protection	-	16.72 (0.41)	65.38 (1.54)	69.23 (1.52)	69.23 (1.40)	78.27 (1.42)	78.27 (1.38)
6. Cultural operations	1806.52 (29.59)	2162.84 (55.58)	1722.38 (40.66)	1729.44 (37.97)	1730.29 (35.08)	1792.37 (32.50)	1871.94 (32.93)
7. Harvesting and processing	-	-	76.27 (1.80)	330.83 (7.26)	679.29 (13.77)	999.71 (18.12)	1006.66 (17.71)
8. Interest on working capital	263.74 (4.32)	172.83 (4.20)	206.32 (4.87)	219.19 (4.81)	244.44 (4.96)	293.09 (5.31)	305.64 (5.38)
9. Depreciation	75.29 (1.23)	97.61 (2.37)	119.00 (2.81)	125.13 (2.75)	125.78 (2.55)	126.59 (2.30)	126.58 (2.23)
10. Land revenue	4.94 (0.08)	4.94 (0.12)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
11. Interest on fixed capital	30.13 (0.49)	39.03 (0.95)	47.62 (1.12)	50.04 (1.10)	50.04 (1.01)	50.64 (0.92)	50.64 (0.89)
12. Rental value of land	988.00 (16.18)	988.00 (24.02)	988.00 (23.33)	988.00 (21.69)	988.00 (20.03)	988.00 (17.91)	988.00 (17.38)
Total	6107.05 (100)	4113.04 (100)	4235.58 (100)	4555.05 (100)	4931.86 (100)	5515.76 (100)	5684.82 (100)
Grand total						35143.16	

Figures in parentheses indicate percentages of the yearly total

Table 11. Cost of cultivation of pepper, operationwise analysis (stratum C) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Clearing and preparing land	910.47 (16.33)	-	-	-	-	-	-
2. Standards and planting	525.22 (9.42)	-	-	-	-	-	-
3. Vines and planting	810.43 (14.54)	64.15 (1.69)	-	-	-	-	-
4. Manures and manuring	504.20 (9.04)	478.53 (12.60)	828.53 (20.63)	935.39 (20.54)	963.61 (19.83)	1023.06 (19.20)	1023.06 (19.19)
5. Plant protection	1.21 (0.02)	0.91 (0.02)	64.32 (1.60)	158.77 (3.49)	158.77 (3.27)	186.03 (3.49)	186.03 (3.48)
6. Cultural operations	1493.89 (26.80)	2014.04 (53.02)	1685.91 (41.98)	1700.61 (37.35)	1725.39 (35.51)	1747.51 (32.80)	1750.70 (32.84)
7. Harvesting and processing	-	-	148.79 (3.71)	407.43 (8.99)	636.30 (13.09)	940.84 (17.66)	940.84 (17.65)
8. Interest on working capital	266.96 (4.79)	170.67 (4.49)	187.94 (4.68)	245.06 (5.38)	266.82 (5.49)	313.50 (5.88)	313.50 (5.88)
9. Depreciation	49.87 (0.89)	54.56 (1.44)	81.56 (2.03)	82.03 (1.80)	82.83 (1.70)	87.78 (1.65)	87.78 (1.65)
10. Land revenue	4.94 (0.09)	4.94 (0.13)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
11. Interest on fixed capital	19.86 (0.36)	22.78 (0.60)	30.80 (0.77)	30.80 (0.68)	32.60 (0.67)	35.91 (0.67)	35.91 (0.67)
12. Rental value of land	988.00 (17.72)	988.00 (26.01)	988.00 (24.60)	988.00 (21.70)	988.00 (20.33)	988.00 (18.54)	988.00 (18.53)
Total	5574.97 (100)	3798.58 (100)	4015.85 (100)	4553.03 (100)	4859.26 (100)	5327.57 (100)	5330.72 (100)
Grand total						33459.98	

Figures in parentheses indicate percentages of the yearly total

clearing and preparation of land was more or less the same
in all strata. The cost of establishing standards and vines
were absolutely speaking the highest with stratum A and the
lowest with stratum C. This is indicative of the greater
planting density of 1129 standards per hectare in stratum A
and the lower planting densities of 1071 standards per hec-
tare in stratum B and 1060 standards per hectare in stratum C.
Together, the costs of clearing and preparing land, establi-
shing standards and establishing vines occupied 35.72 per cent
(Rs.2584.09), 38.24 per cent (Rs.2335.06) and 40.29 per cent
(Rs.2246.12) of the total cost in stratum A, stratum B and
stratum C respectively. The highest combined absolute cost
for these operations occurred in stratum A while the lowest
occurred in stratum C. The cost of cultural operations con-
tributed 34.30 per cent (Rs.2481.25), 29.59 per cent
(Rs.1806.52) and 26.80 per cent (Rs.1493.89) of the total
cost in stratum A, stratum B and stratum C respectively.
The cost in this direction was the highest in stratum A and
the lowest in stratum C. This was in fact the case not only
during the first year but during all the other years also.
The costs of soil conditioning and plant protection opera-
tions combined were also the highest in stratum A and the
lowest in stratum C during the first year. This was the case
during all the other years too. Thus on the whole the culti-
vation of pepper relatively speaking, tended to be the most

intensive in stratum A and the most relaxed in stratum C.

During the second year the cost of cultivation was the lowest among all years, in all the three strata. Among the strata it was the highest in stratum A and the lowest in stratum C. The single most significant item of cost during this year, with all strata, was the cost for the cultural operations undertaken. It occupied 55.18 per cent (Rs.2610.27) of the total cost in stratum A, while the corresponding figures in stratum B and stratum C were 55.58 per cent (Rs.2162.84) and 53.02 per cent (Rs.2014.04) respectively. It was the highest in stratum A because the holding size in this stratum being the least, the farmers in this stratum were found to have the least number of vines to manage and hence were found to do the cultural operations more intensively. The cost of cultural operations was also directly related to the plant density, which was the greatest in stratum A.

The cost of cultivation rose steadily, in all strata, during the subsequent years. Between the second and the seventh years this rise was by 38.67 per cent in stratum A, 38.21 per cent in stratum B and 40.33 per cent in stratum C. This was mainly due to the rise in the cost of harvesting and processing. The cost of cultural operations was the highest among all years, in all strata during the second

year. It slightly fell during the third year, after which
it rose slowly till the seventh year. The costs of soil
conditioning and plant protection operations also rose till
the seventh year, albeit gradually. During the seventh year
the cost of cultivation was the highest in stratum A and the
lowest in stratum C. In all the three strata the cost of cul-
tural operations occupied the largest share of the total cost.
It was the highest ie. 35.84 per cent in stratum A, followed
by 32.93 per cent in stratum B and the lowest 32.84 per cent
in stratum C. The costs of soil conditioning, plant protec-
tion operations and, harvesting and processing also displayed
an identical stratumwise trend.

II. Inputwise analysis

The cost of cultivation of pepper, as tabulated input-
wise for the first seven years of pepper cultivation, relating
to the aggregate sample is provided in Table 12. It may be
noted the yearly total cost of cultivation arrived here is
exactly the same as the corresponding figures arrived in
the earlier analysis. As such the discussion made with refe-
rence to the yearly total cost of cultivation in the earlier
analysis is applicable here also.

As already noted the cost of cultivation was the highest
during the first year. The labour input contributed
55.29 per cent of the total cost out of which 27.77 per cent

Table 12. Cost of cultivation of pepper, inputwise analysis (aggregate level) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Hired labour	1637.99 (27.52)	951.42 (24.03)	721.34 (17.38)	945.55 (20.63)	1130.54 (23.07)	1392.79 (25.73)	1422.55 (25.84)
2. Family labour	1652.83 (27.77)	1276.98 (32.26)	1252.43 (30.18)	1284.09 (28.01)	1384.25 (28.24)	1500.28 (27.72)	1548.90 (28.13)
3. Vines and standards	898.08 (15.09)	53.98 (1.36)	-	-	-	-	-
4. Tying material	-	66.32 (1.68)	81.17 (1.96)	67.37 (1.47)	68.88 (1.41)	71.61 (1.32)	71.56 (1.30)
5. Plant protection material	0.67 (0.01)	6.73 (0.17)	42.19 (1.02)	53.35 (1.16)	55.85 (1.14)	57.35 (1.06)	58.72 (1.07)
6. Soil additives	406.05 (6.82)	326.73 (8.25)	717.73 (17.29)	849.58 (18.53)	857.22 (17.49)	924.52 (17.08)	933.46 (16.95)
7. Interest on working capital	257.37 (4.32)	161.78 (4.09)	184.25 (4.44)	228.50 (4.98)	248.62 (5.07)	299.67 (5.53)	304.77 (5.54)
Total operating cost	4853.00 (81.53)	2843.94 (71.84)	2999.11 (72.26)	3428.44 (74.79)	3745.36 (76.41)	4246.22 (78.46)	4339.76 (78.81)
8. Depreciation	76.12 (1.28)	86.39 (2.18)	113.20 (2.73)	116.06 (2.53)	116.66 (2.38)	122.90 (2.27)	122.89 (2.23)
9. Land revenue	4.94 (0.08)	4.94 (0.12)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
10. Rental value of land	988.00 (16.60)	988.00 (24.96)	988.00 (23.80)	988.00 (21.55)	988.00 (20.16)	988.00 (18.25)	988.00 (17.94)
11. Interest on fixed capital	30.48 (0.51)	35.37 (0.89)	45.30 (1.09)	46.43 (1.01)	46.49 (0.95)	50.30 (0.93)	50.24 (0.91)
Total fixed cost	1099.54 (18.47)	1114.70 (28.16)	1151.44 (27.74)	1155.43 (25.21)	1156.09 (23.59)	1166.17 (21.54)	1166.27 (21.19)
Total cost	5952.54 (100)	3958.64 (100)	4150.55 (100)	4583.87 (100)	4901.45 (100)	5412.39 (100)	5506.03 (100)
Grand total						34465.47	

Figures in parentheses indicate percentages of the yearly total cost

was showed by family labour and 27.32 per cent by hired
labour. The cost of planting material contributed
15.09 per cent of the total cost, while soil additives
occupied 6.82 per cent of the total cost. The total varia-
ble cost occupied 81.53 per cent of the total cost, while
the remaining 18.47 per cent comprised of fixed costs. The
most prominent fixed cost item during the first year as well
as during the subsequent years was the rental value of land.
It occupied 16.60 per cent of the total cost during the
first year.

The cost of cultivation was the lowest during the second
year. Much of this reduction came by way of the lesser cost
of planting material during this year, which occupied only
1.36 per cent of the total cost. The share of the imputed
family labour cost rose to 32.26 per cent of the total cost
while the share of the cost of hired labour dropped to
24.03 per cent of the total cost. The reduction in the use
of hired labour was associated with the reduction in new
planting expenditure. The imputed cost of family labour fell
in absolute terms due to the same reason. The share of the
cost of soil additives rose to 8.25 per cent of the total
cost, but it fell in absolute terms, during the second year.
This was due to a tendency observed with most farmers to
manure the standards more during the first year compared to
the second year.

The cost of cultivation rose slightly during the third year. The share of the imputed family labour cost, as well as the share of the cost of hired labour in the total cost, fell during this year. The lowered cost of labour was associated with the spreading up of the various operations over time. A spurt in the use of soil additives was observed during this year. This was probably related to the fact that most vines started to yield during this year. There was a slight rise in the use of plant protection materials also.

The cost of cultivation rose further during the fourth year. This rise was mostly due to an increased use of hired labour, which was associated with the increased cost of harvesting during this year. Family labour continued to be the largest single cost creating input.

The gradual rise in the cost of cultivation from the third year to the seventh year was mostly due to the steady rise in labour employment. The cost of cultivation rose by 39.08 per cent during this period. The imputed cost of family labour rose by 21.29 per cent while the cost of hired labour rose by 49.52 per cent during this period. The larger rise in the hired labour input was associated with the rising cost of harvesting during this period. The cost of soil additives rose by 185.70 per cent during this period, while the cost of plant protection chemicals rose by 872.51 per cent. During the seventh year the share of the cost of soil

additives and plant protection materials in the total cost were 16.95 per cent and 1.07 per cent respectively. As the yield of the vines increased the producers were found to increase the addition of soil conditioning and plant protection inputs. During the seventh year the largest single cost creating input was family labour which occupied 28.13 per cent of the total cost. This was followed by hired labour which created 25.84 per cent of the total cost.

Human labour was found to be the largest cost creating input in the cultivation of pepper during all the years. A total of 1247 person-days were found to be used in pepper cultivation during the seven years. The yearwise break-up of this figure from the first to the seventh year was found to be 205, 145, 128, 155, 176, 212 and 226 person-days in that order. The existing wage rate for male labour was Rs.15 per day while that for female labour was Rs.12. However for operations like lopping the prickly standards and for harvesting, labour was paid at Rs.18 per day. The total cost of labour for the seven years worked out to Rs.18101.42. The share of the cost of labour in the total cost during the seven years were 35.28 per cent (Rs.3290.82), 56.29 per cent (Rs.2228.40), 47.55 per cent (Rs.1973.77), 46.84 per cent (Rs.2229.64), 51.31 per cent (Rs.2514.27), 53.45 per cent (Rs.2893.07) and 53.97 per cent (Rs.2971.45) respectively.

The share of the cost of labour in the total cost was the
highest during the second year because cultural operations
were the most significant part of pepper cultivation during
this year. The relative prominence of the labour cost was
the next highest during the first year when the crop was
planted afresh, followed by that during the seventh year
when the yield of pepper climaxed. The absolute cost of
labour was the highest during the first year mainly because
of new planting. It was higher during the second year com-
pared to the third year primarily because the cultural re-
quirements of the crop were greater during the second year.
The cost of labour increased from the third year to the
seventh year mainly due to the rising cost of harvesting and
processing.

The share of the imputed cost of family labour in the
total cost during all the years, was higher than that of the
cost of hired labour.

The total variable cost occupied 81.53 per cent,
71.84 per cent, 72.26 per cent, 74.79 per cent, 76.41 per cent,
78.46 per cent and 78.81 per cent of the total cost in that
order for the seven years. Labour was the most important
variable input followed in that order by soil additives,
tying materials and plant protection materials. The septenary
total variable cost worked out to Rs.26455.83.

The total fixed cost occupied 18.47 per cent, 28.16 per cent, 27.74 per cent, 25.21 per cent, 23.59 per cent, 21.54 per cent and 21.19 per cent of the total cost in that order for the seven years. The most prominent fixed cost was the rental value of land. It was followed in that order by the interest on working capital, the depreciation on implements and machinery, the interest on fixed capital and the land revenue. The septenary total fixed cost was found to be Rs.8009.64.

The inputwise tabulation of the yearly cost of cultivation of pepper, pertaining to the three strata, stratum A, stratum B and stratum C are provided in Table 13, Table 14 and Table 15 respectively. The septenary total variable cost among the strata was the highest in stratum A at Rs.31362.38 followed by stratum B with Rs.27077.95 and stratum C with Rs.25774.83. The septenary fixed cost totals showed as identical trend, and the corresponding figures were Rs.9294.14, Rs.8065.11 and Rs.7685.65.

As stated earlier the total cost of cultivation was the highest during the first year in all strata. In stratum A, nearly half (48.54 per cent) of the total cost during the first year was the imputed cost of family labour. The corresponding figures relating to stratum B and stratum C were 26.90 per cent and 19.86 per cent respectively. It was

Table 13. Cost of cultivation of pepper, inputwise analysis (stratum A) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Hired labour	678.57 (9.38)	619.60 (13.10)	209.16 (4.32)	464.24 (8.86)	563.04 (10.06)	969.06 (15.03)	1003.28 (15.29)
2. Family labour	3511.15 (48.54)	2237.08 (47.29)	2196.36 (45.31)	2197.70 (41.95)	2440.46 (43.59)	2603.73 (40.39)	2660.43 (40.55)
3. Vines and standards	1099.15 (15.20)	85.68 (1.81)	-	-	-	-	-
4. Tying material	-	70.62 (1.49)	81.73 (1.69)	75.68 (1.44)	75.68 (1.35)	93.29 (1.45)	92.70 (1.41)
5. Plant protection material	2.64 (0.04)	13.34 (0.28)	27.11 (0.56)	40.90 (0.78)	46.90 (0.84)	69.43 (1.08)	76.84 (1.17)
6. Soil additives	550.58 (7.61)	330.05 (6.98)	841.16 (17.35)	928.80 (17.73)	928.80 (16.59)	1070.68 (16.61)	1080.91 (16.48)
7. Interest on working capital	147.81 (2.04)	124.03 (2.62)	145.10 (2.99)	181.15 (3.46)	193.01 (3.45)	264.30 (4.10)	270.45 (4.12)
Total operating cost	5989.90 (82.81)	3480.40 (73.57)	3500.62 (72.22)	3888.47 (74.22)	4247.89 (75.88)	5070.49 (78.64)	5184.61 (79.03)
8. Depreciation	178.98 (2.46)	181.75 (3.84)	252.46 (5.21)	256.22 (4.89)	256.22 (4.58)	274.22 (4.25)	273.55 (4.17)
9. Land revenue	4.94 (0.07)	4.94 (0.10)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)	4.94 (0.08)	4.94 (0.08)
10. Rental value of land	988.00 (13.66)	988.00 (20.88)	988.00 (20.88)	988.00 (18.86)	988.00 (17.65)	988.00 (15.32)	988.00 (15.06)
11. Interest on fixed capital	71.63 (0.99)	75.74 (1.60)	100.97 (2.08)	101.48 (1.93)	109.69 (1.81)	109.69 (1.70)	109.17 (1.66)
Total fixed cost	1243.55 (17.19)	1250.43 (26.43)	1346.37 (27.78)	1350.64 (25.78)	1350.64 (24.12)	1376.85 (21.36)	1375.66 (20.97)
Total cost	7233.45 (100)	4730.83 (100)	4846.99 (100)	5239.11 (100)	5598.53 (100)	6447.34 (100)	6560.27 (100)
Grand total							40656.52

Figures in parentheses indicate percentages of the yearly total cost

Table 14. Cost of cultivation of pepper, inputwise analysis (stratum B) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Hired labour	1708.14 (27.97)	1018.42 (24.76)	798.40 (18.84)	937.43 (19.48)	1078.96 (21.88)	1324.49 (24.01)	1381.27 (24.30)
2. Family labour	1642.75 (26.90)	1297.84 (31.55)	1150.40 (27.16)	1287.79 (29.37)	1474.68 (29.91)	1610.06 (19.19)	1662.01 (29.24)
3. Vines and standards	904.34 (14.81)	72.55 (1.76)	–	–	–	–	–
4. Tying material	–	61.13 (1.49)	63.45 (1.50)	61.43 (1.35)	61.83 (1.25)	62.38 (1.13)	62.38 (1.10)
5. Plant protection material	–	9.24 (0.22)	40.61 (0.96)	47.84 (1.05)	49.84 (1.01)	56.72 (1.03)	56.72 (1.00)
6. Soil additives	489.72 (8.02)	351.46 (8.55)	816.84 (19.29)	833.18 (18.29)	853.35 (17.30)	998.93 (18.11)	1046.63 (18.41)
7. Interest on working capital	263.74 (4.32)	172.83 (4.20)	206.32 (4.87)	219.19 (4.81)	244.44 (4.96)	293.09 (5.31)	305.64 (5.38)
Total operating cost	5008.69 (82.01)	2983.46 (72.54)	3076.02 (72.62)	3436.94 (74.36)	3763.10 (76.30)	4345.59 (78.78)	4514.65 (79.42)
8. Depreciation	75.29 (1.23)	97.61 (2.37)	119.00 (2.81)	125.23 (2.75)	125.78 (2.55)	126.59 (2.30)	126.59 (2.23)
9. Land revenue	4.94 (0.08)	4.94 (0.12)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
10. Rental value of land	988.00 (16.18)	988.00 (24.02)	988.00 (23.33)	988.00 (21.69)	988.00 (20.03)	988.00 (17.91)	988.00 (17.38)
11. Interest on fixed capital	30.13 (0.49)	39.03 (0.95)	47.62 (1.12)	50.04 (1.10)	50.04 (1.01)	50.64 (0.92)	50.64 (0.89)
Total fixed cost	1098.36 (17.99)	1129.58 (27.46)	1159.56 (27.38)	1168.11 (25.64)	1168.76 (23.70)	1170.17 (21.23)	1170.67 (20.58)
Total cost	6107.05 (100)	4113.04 (100)	4235.58 (100)	4551.05 (100)	4931.86 (100)	5515.76 (100)	5684.82 (100)
Grand total						35143.16	

Figures in parentheses indicate percentages of the yearly total cost

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Table 15. Cost of cultivation of pepper, inputwise analysis (stratum C) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Hired labour	1919.29 (34.43)	1020.89 (28.88)	793.13 (19.75)	1134.64 (24.92)	1312.27 (27.01)	1649.28 (30.96)	1651.28 (30.98)
2. Family labour	1107.44 (19.86)	1093.32 (28.78)	1150.43 (28.80)	1158.07 (25.44)	1259.51 (25.92)	1284.91 (24.12)	1285.82 (24.12)
3. Vines and standards	873.22 (15.66)	42.04 (1.11)	-	-	-	-	-
4. Tying material	-	67.53 (1.78)	103.44 (2.58)	70.62 (1.55)	73.42 (1.51)	73.91 (1.39)	73.91 (1.39)
5. Plant protection material	0.74 (0.01)	0.84 (0.02)	38.78 (0.97)	61.68 (1.35)	61.68 (1.27)	59.87 (1.12)	59.87 (1.12)
6. Soil additives	304.65 (6.18)	333.01 (8.77)	630.83 (15.71)	777.19 (17.07)	779.19 (16.04)	829.47 (15.57)	829.47 (15.56)
7. Interest on working capital	266.96 (4.79)	170.61 (4.49)	187.94 (4.68)	245.06 (5.38)	266.82 (5.49)	313.50 (5.88)	313.50 (5.88)
Total operating cost	4552.30 (81.66)	2728.30 (71.82)	2910.55 (72.48)	3447.26 (75.71)	3750.89 (77.19)	4210.94 (79.04)	4214.09 (79.05)
8. Depreciation	49.87 (0.89)	54.66 (1.44)	81.56 (2.03)	82.03 (1.80)	82.83 (1.70)	87.78 (1.65)	87.78 (1.65)
9. Land revenue	4.94 (0.09)	4.94 (0.13)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
10. Rental value of land	988.00 (17.72)	988.00 (26.01)	988.00 (24.60)	988.00 (21.70)	988.00 (20.33)	988.00 (18.54)	988.00 (18.54)
11. Interest on fixed capital	19.86 (0.36)	22.78 (0.60)	30.80 (0.77)	30.80 (0.68)	32.60 (0.67)	35.91 (0.67)	35.91 (0.67)
Total fixed cost	1062.67 (18.44)	1070.28 (28.18)	1105.30 (27.52)	1105.77 (24.29)	1108.37 (22.81)	1116.63 (20.96)	1116.63 (20.95)
Total cost	5574.97 (100)	3798.58 (100)	4015.85 (100)	4553.03 (100)	4859.26 (100)	5327.57 (100)	5330.72 (100)
Grand total						33459.98	

Figures in parentheses indicate percentages of the yearly total cost

observed that the use of family labour exceeded the use of hired labour not only during the first year but also during the subsequent years in stratum A. Hired labour cost constituted 9.38 per cent of the total cost during the first year in stratum A. During this year hired labour was the largest cost contributing input both in stratum B and in stratum C. In stratum B, the share of the cost of hired labour in the total cost was 27.97 per cent which was nearly equal to that of the imputed cost of family labour. The use of hired labour was found to be most weighty in stratum C where it occupied 34.43 per cent of the total cost during the first year. The greatest level of use of hired labour among all the strata was encountered in stratum C while the least level of use was noticed in stratum A during all the seven years. This happened because the number of operators per unit area was the lowest in stratum C and the highest in stratum A. During the first year the cost of planting materials was the largest in stratum A and the lowest in stratum C, in absolute terms. This was indicative of the highest plant density under the conditions in stratum A and the lowest plant density in stratum C. Apparently as the area at the disposal of operators decreased there was a tendency to accommodate more vines per unit area. The cost of planting materials worked out to 15.20 per cent (Rs.1099.15), 14.81 per cent (Rs.904.34) and 15.66 per cent (Rs.873.22)

respectively in stratum A, stratum B and stratum C. The total variable cost during the first year was found to be occupying 82.81 per cent (Rs.5989.90) of the total cost in stratum A. The corresponding figures in stratum B and stratum C were 82.01 per cent (Rs.5008.69) and 81.66 per cent (Rs.4552.30) respectively. The total variable cost was generally the highest in stratum A and the lowest in stratum C during the seven years. During the first year the total fixed cost occupied 18.19 per cent (Rs.1243.55), 17.99 per cent (Rs.1098.36) and 18.44 per cent (Rs.1062.67) of the total cost in stratum A, stratum B and stratum C respectively. The total fixed cost during any year was found to be the highest in stratum A and the lowest in stratum C.

The cost of cultivation fell markedly during the second year in all strata. This happened mainly due to a fall in the cost of fresh planting. The engagement of hired labour fell with all strata. This fall was the most in stratum C and the least in stratum A. In fact in stratum A, the fall in the use of family labour was greater than the fall in the use of hired labour. This was because the use of hired labour was already low during the first year in stratum A. During the second year, family labour contributed the highest share of the total cost in stratum A and stratum B, while that by the hired labour input was slightly higher in stratum C.

During this year a fall in the total variable cost was observed in all strata, due to the fall in the level of labour used.

The cost of cultivation rose slightly in all strata during the third year. A further fall in the use of hired labour and a further rise in the use of family labour was observed in all strata. Family labour constituted the largest single share of the total cost during this year, in all strata. The level of use of hired labour was the lowest during this year, among all the years.

The cost of cultivation rose further during the fourth year in all strata. This rise came about mostly by way of a greater level of hired labour use associated with the cost of harvesting. Family labour continued to be the largest single cost creating input during this year in all strata.

The steady increase in the cost of cultivation in all strata beyond the second year till the seventh year was mainly due to an increase in the level of labour used. The use of labour increased during this period by 28.25 per cent in stratum A. The corresponding figures in stratum B and stratum C were 31.39 per cent and 38.92 per cent respectively. The level of family labour use alone increased by 18.92 per cent in stratum A during this time period. The corresponding figures in stratum B and stratum C were 28.06 per cent and

17.61 per cent respectively. The use of hired labour rose by 61.92 per cent in **stratum A**, 35.63 per cent in stratum B and 61.75 per cent in stratum C during this period. The cost of soil additives and plant protection materials also increased during this period in all strata.

During the seventh year the largest cost contributing input in stratum A and stratum B was family labour while in stratum C it was hired labour. Family labour occupied 40.55 per cent, 29.24 per cent and 24.12 per cent of the total cost during the seventh year with stratum A, stratum B and stratum C respectively. The corresponding figures pertaining to hired labour were 15.29 per cent, 24.30 per cent and 30.97 per cent respectively. The extent of use of soil additives and plant protection materials was the highest with stratum A and the lowest with stratum B.

It was observed that in general the share of hired labour in the total labour used was the greatest in stratum C and the lowest in stratum A. This was related to the holding size, which was the biggest in stratum C and the smallest in stratum A. An intermediate level was maintained in stratum B.

III. <u>Analysis based on cost concepts employed in farm management studies</u>

The cost of cultivation of pepper is tabulated itemwise for the first seven years in pepper cultivation pertaining

to the aggregate level in Table 16. The cost C is exactly identical to the total cost arrived at in the earlier analyses. Insofar as this is the case the discussion pertaining to the total cost in the earlier analyses is applicable here too. Cost B differed from cost A is that, the former included in addition to the items in the latter, mainly the constant opportunity cost of the rental value of land. To this extent, the temporal change in cost A was felt nearly to the same degree in cost B. Hired labour was the most significant cost creating input in cost A as well as in cost B. As such the variation in the level of hired labour use through the different years markedly affected these two costs.

Cost A, cost B and cost C were the highest during the first year. The main cost contributing items in cost A were hired labour, planting material and soil additives. Cost A was found to be 55.12 per cent of cost C during the first year, while cost B occupied 72.23 per cent of cost C. These shares were the highest among all years during the first year. Hired labour cost constituted 49.92 per cent of cost A, 38.10 per cent of cost B and 27.52 per cent of cost C during this year. Planting material cost occupied 27.37 per cent of cost A, 20.89 per cent of cost B and 15.09 per cent of cost C during this year.

Cost A, Cost B and cost C fell significantly during the second year primarily due to the lowered cost of planting

Table 16. Cost of cultivation of pepper, itemwise analysis (aggregate level) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Hired labour	1637.99 (27.52)	951.42 (24.03)	721.34 (17.38)	945.55 (20.63)	1130.54 (23.07)	1392.79 (25.73)	1422.55 (25.84)
2. Vines and standards	898.08 (15.09)	53.98 (1.36)	-	-	-	-	-
3. Tying material	-	66.32 (1.68)	81.17 (1.96)	67.37 (1.47)	68.88 (1.41)	71.61 (1.32)	71.56 (1.30)
4. Plant protection material	0.67 (0.01)	6.73 (0.17)	42.19 (1.02)	53.35 (1.16)	55.85 (1.14)	57.35 (1.06)	58.72 (1.07)
5. Soil additives	406.05 (6.82)	326.73 (8.25)	717.73 (17.29)	849.58 (18.53)	857.22 (17.49)	924.52 (17.08)	933.46 (16.95)
6. Interest on working capital	257.37 (4.32)	161.78 (4.09)	184.25 (4.44)	228.50 (4.98)	248.62 (5.07)	299.67 (5.53)	304.77 (5.54)
7. Depreciation	76.12 (1.28)	86.39 (2.18)	113.20 (2.73)	116.06 (2.53)	116.66 (2.38)	122.90 (2.27)	122.89 (2.23)
8. Land revenue	4.94 (0.08)	4.94 (0.12)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
Cost A	3281.23 (55.12)	1658.29 (41.89)	1864.82 (44.93)	2365.35 (51.60)	2482.71 (50.65)	2873.81 (53.10)	2918.69 (53.01)
9. Rental value of land	988.00 (16.60)	988.00 (24.96)	988.00 (23.80)	988.00 (21.55)	988.00 (20.16)	988.00 (18.25)	988.00 (17.94)
10. Interest on fixed capital	30.48 (0.51)	35.37 (0.89)	45.30 (1.09)	46.43 (1.01)	46.49 (0.95)	50.30 (0.93)	50.24 (0.91)
Cost B	4299.71 (72.23)	2681.66 (67.74)	2898.12 (69.82)	3399.78 (74.17)	3517.20 (71.76)	3912.11 (72.28)	3956.93 (71.87)
11. Family labour	1652.83 (27.77)	1276.98 (32.26)	1252.43 (30.18)	1284.09 (28.01)	1384.25 (28.24)	1500.28 (27.72)	1548.90 (28.13)
Cost C	5952.54 (100)	3958.64 (100)	4150.55 (100)	4583.87 (100)	4901.45 (100)	5412.39 (100)	5506.03 (100)
Grand total						34465.47	

Figures in parentheses indicate percentages of the yearly cost C

material and the lowered cost of hired labour. The fall
was accentuated in cost C since the imputed cost of family
labour also fell during this year. Cost A, cost B and
cost C were the lowest among all years during the second
year.

Cost A, cost B and cost C rose steadily between the
second and the seventh years. Cost A rose by 76.61 per cent
during this period while cost B rose by 47.93 per cent and
cost C rose by 39.09 per cent. This rise occurred mainly
by way of increasing labour use associated with the harvest-
ing and processing of pepper. During the seventh year the
costs A, B and C were second in magnitude to the first year.
Cost A occupied 53.01 per cent of the cost C during this year
while the cost B occupied 71.87 per cent. Hired labour was
the primary cost creating input during this year, in the
costs A and B. It occupied 48.73 per cent of cost A and
35.95 per cent of cost B. Family labour which created
28.13 per cent of cost C was the largest single cost creat-
ing input in and it was followed by the hired labour which
occupied 25.84 per cent of cost C. The septenary cumulative
cost A was found to be Rs.17444.90 at the aggregate level.
The corresponding cost B and cost C figures were Rs.24665.51
and Rs.34465.47 respectively.

The ratio of family labour to hired labour was the
highest during the third year at 1.74. It fell continuously

thereafter to 1.07 during the seventh year, indicating a relatively greater reliance on hired labour, associated with the increasing cost of harvesting and processing.

The cost of cultivation of pepper for the seven years pertaining to stratum A, stratum B and stratum C are tabulated itemwise in Table 17, Table 18 and Table 19 respectively. The septenary cost A was the highest among the three strata in stratum A at Rs.15225.45 followed by stratum B and stratum C with Rs.17783.49 and Rs.17979.92 respectively. Cost B and cost C showed similar trends. Cost B pertaining to stratum A, stratum B and stratum C were Rs.22809.61, Rs.25016.99 and Rs.26114.58 respectively, while the corresponding cost C figures were Rs.40656.52, Rs.35143.16 and Rs.33459.98 respectively.

Cost A was the highest among all years during the first year in stratum B and stratum C. In stratum A, cost A during this year was the third highest after that in the seventh and the sixth years in that order. The cost of hired labour in stratum A also displayed an identical trend. Cost B behaved similarly with cost A in the three strata.

Hired labour was the largest cost creating item during all the years in all the strata in the costs A and B. The cost of hired labour was in general the least in stratum A and the most in stratum C. Cost A and cost B were also

Table 17. Cost of cultivation of pepper, itemwise analysis (stratum A) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Hired labour	678.57 (9.38)	619.60 (13.10)	209.16 (4.32)	464.24 (8.86)	563.04 (10.06)	969.06 (15.03)	1003.28 (15.29)
2. Vines and standards	1099.15 (15.20)	85.68 (1.81)	-	-	-	-	-
3. Tying material	-	70.62 (1.49)	81.73 (1.69)	75.68 (1.44)	75.68 (1.35)	93.29 (1.45)	92.70 (1.41)
4. Plant protection material	2.64 (0.04)	13.34 (0.28)	27.11 (0.56)	40.90 (0.78)	46.90 (0.84)	69.43 (1.08)	76.84 (1.17)
5. Soil additives	550.58 (7.61)	330.05 (6.98)	841.16 (17.35)	928.80 (17.73)	928.80 (16.59)	1070.68 (16.61)	1080.91 (16.48)
6. Interest on working capital	147.81 (2.04)	124.03 (2.62)	145.10 (2.99)	181.15 (3.46)	193.01 (3.45)	264.30 (4.10)	270.45 (4.12)
7. Depreciation	178.98 (2.46)	181.75 (3.84)	252.46 (5.21)	256.22 (4.89)	256.22 (4.58)	274.22 (4.25)	273.55 (4.17)
8. Land revenue	4.94 (0.07)	4.94 (0.10)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)	4.94 (0.08)	4.94 (0.08)
Cost A	2662.67 (36.81)	1430.01 (30.23)	1561.66 (32.23)	1951.93 (37.26)	2068.59 (36.95)	2745.92 (42.59)	2804.67 (42.75)
9. Rental value of of land	988.00 (13.66)	988.00 (20.88)	988.00 (20.38)	988.00 (18.86)	988.00 (17.65)	988.00 (15.32)	988.00 (15.06)
10. Interest on fixed capital	71.63 (0.99)	75.74 (1.60)	100.97 (2.08)	101.48 (1.93)	109.69 (1.81)	109.69 (1.70)	109.17 (1.66)
Cost B	3722.30 (51.46)	2493.75 (54.46)	2650.63 (54.69)	3041.41 (58.05)	3158.07 (56.41)	3843.61 (59.61)	3899.84 (59.45)
11. Family labour	3511.15 (48.54)	2237.08 (47.29)	2196.36 (45.31)	2197.70 (41.95)	2440.46 (43.59)	2603.73 (40.39)	2660.43 (40.55)
Cost C	7233.45 (100)	4730.83 (100)	4846.99 (100)	5239.11 (100)	5598.53 (100)	6447.34 (100)	6560.27 (100)
Grand total						40656.52	

Figures in parentheses indicate percentages of the yearly cost C

Table 18. Cost of cultivation of pepper, itemwise analysis (stratum B) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Hired labour	1708.14 (27.97)	1018.42 (24.76)	798.40 (18.84)	937.43 (19.48)	1078.96 (21.88)	1324.49 (24.01)	1381.27 (24.30)
2. Vines and standards	904.34 (14.81)	72.55 (1.76)	-	-	-	-	-
3. Tying material	-	61.13 (1.49)	63.45 (1.50)	61.43 (1.35)	61.83 (1.25)	62.38 (1.13)	62.38 (1.10)
4. Plant protection material	-	9.24 (0.22)	40.61 (0.96)	47.84 (1.05)	49.84 (1.01)	56.72 (1.03)	56.72 (1.00)
5. Soil additives	489.72 (8.02)	351.46 (8.55)	816.84 (19.29)	833.18 (18.29)	853.35 (17.30)	998.93 (18.11)	1046.63 (18.41)
6. Interest on working capital	263.74 (4.32)	172.83 (4.20)	206.32 (4.87)	219.19 (4.81)	244.44 (4.96)	293.09 (5.31)	305.64 (5.38)
7. Depreciation	75.29 (1.23)	97.61 (2.37)	119.00 (2.81)	125.23 (2.75)	125.78 (2.55)	126.59 (2.30)	126.59 (2.23)
8. Land revenue	4.94 (0.08)	4.94 (0.12)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
Cost A	3446.17 (56.43)	1788.17 (43.48)	2049.56 (48.39)	2229.22 (47.84)	2419.14 (49.05)	2867.06 (51.98)	2984.17 (52.49)
9. Rental value of land	988.00 (16.18)	988.00 (24.02)	988.00 (23.33)	988.00 (21.69)	988.00 (20.03)	988.00 (17.91)	988.00 (17.38)
10 Interest on fixed capital	30.13 (0.49)	39.03 (0.95)	47.62 (1.12)	50.04 (1.10)	50.04 (1.01)	50.64 (0.92)	50.64 (0.89)
Cost B	4464.30 (73.10)	2815.20 (68.45)	3085.18 (72.84)	3267.26 (70.65)	3457.18 (70.09)	3905.70 (70.81)	4022.87 (70.76)
11. Family labour	1642.75 (26.90)	1297.84 (31.55)	1150.40 (27.16)	1287.79 (29.37)	1474.68 (29.91)	1610.06 (29.19)	1662.01 (29.24)
Cost C	6107.05 (100)	4113.04 (100)	4235.58 (100)	4551.05 (100)	4931.86 (100)	5515.76 (100)	5684.82 (100)
Grand total						35143.16	

Figures in parentheses indicate percentages of the yearly cost C

Table 19. Cost of cultivation of pepper, itemwise analysis (stratum C) 1983 (Rupees/hectare)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1. Hired labour	1919.29 (34.43)	1020.89 (28.88)	793.13 (19.75)	1134.64 (24.92)	1312.27 (27.01)	1649.28 (30.96)	1651.28 (30.98)
2. Vines and standards	873.22 (15.66)	42.04 (1.11)	-	-	-	-	-
3. Tying material	-	67.53 (1.78)	103.44 (2.58)	70.62 (1.55)	73.42 (1.51)	73.91 (1.39)	73.91 (1.39)
4. Plant protection material	0.74 (0.01)	0.84 (0.02)	38.78 (0.97)	61.68 (1.35)	61.68 (1.27)	59.87 (1.12)	59.87 (1.12)
5. Soil additives	304.65 (6.18)	333.01 (8.77)	630.83 (15.71)	777.19 (17.07)	779.19 (16.04)	829.47 (15.57)	829.47 (15.56)
6. Interest on working capital	266.96 (4.79)	170.61 (4.49)	187.94 (4.68)	245.06 (5.38)	266.82 (5.49)	313.50 (5.88)	313.50 (5.88)
7. Depreciation	49.87 (0.89)	54.66 (1.44)	81.56 (2.03)	82.03 (1.80)	82.83 (1.70)	87.78 (1.65)	87.78 (1.65)
8. Land revenue	4.94 (0.09)	4.94 (0.13)	4.94 (0.12)	4.94 (0.11)	4.94 (0.10)	4.94 (0.09)	4.94 (0.09)
Cost A	3449.67 (61.88)	1694.58 (44.61)	1840.62 (45.83)	2376.16 (52.18)	2579.15 (53.08)	3018.75 (56.67)	3020.99 (56.67)
9. Rental value of land	988.00 (17.72)	988.00 (26.01)	988.00 (24.60)	988.00 (21.70)	988.00 (20.33)	988.00 (18.54)	988.00 (18.54)
10. Interest on fixed capital	19.86 (0.36)	22.78 (0.60)	30.80 (0.77)	30.80 (0.68)	32.60 (0.67)	35.91 (0.67)	35.91 (0.67)
Cost B	4467.53 (80.14)	2705.36 (71.22)	2859.42 (71.20)	3394.96 (74.56)	3599.75 (74.08)	4042.66 (75.88)	4044.90 (75.88)
11. Family labour	1107.44 (19.86)	1093.32 (28.78)	1150.43 (28.80)	1158.07 (25.44)	1259.51 (25.92)	1284.91 (24.12)	1285.82 (24.12)
Cost C	5574.97 (100)	3798.58 (100)	4015.85 (100)	4553.03 (100)	4859.26 (100)	5327.57 (100)	5330.72 (100)
Grand total							33459.98

Figures in parentheses indicate percentages of the yearly cost C

generally the lowest in stratum A and the highest in stratum C. Cost C also behaved likewise.

The ratio of family labour to hired labour was the highest during the third year with all strata. This ratio was generally the highest in stratum A and the lowest in stratum C. The ratio also continued to be greater than one between the second and the seventh years in stratum A and stratum B, while it was mostly below one in stratum C. The ratio kept falling between the third and the seventh years in all the strata.

During the seventh year hired labour which contributed 15.29 per cent, 24.30 per cent and 30.98 per cent of cost C, respectively in stratum A, stratum B and stratum C was the single largest cost creating item in the costs A and B. The other notable contribution to the cost A in all the strata came by way of soil additives. Cost B included these main costs besides a marked cost towards the rental value of land. Cost A and cost B were the highest during this year in stratum A. This happened mainly because the use of hired labour maximised during this year in stratum A. Hired labour occupied 35.77 per cent of cost A and 25.73 per cent of cost B, in stratum A during this year. Since the level of family labour employment was in general the greatest in stratum A, the absolute differences between cost C and the costs A and B

were the most pronounced in this stratum. These differences were generally the least in stratum C, while stratum B maintained an intermediate level.

B. **Analysis of capital productivity**

The financial worth of investment on pepper cultivation as brought out by the various measures of capital productivity described earlier is presented below.

The analysis was done considering a pepper cultivation project of twenty years duration as decided earlier. The cost stream was created on the basis of the cost of cultivation already estimated. On the benefit side, the physical quantities of black pepper were valued at Rs.11 per kg based on the model price received by the farmers during the period of data generation. When a pepper cultivation monoculture project is terminated the farmer can expect to receive a return through the sale of wood from the standards. It was assumed that the vines were raised on Erythrina standards. A hectare of such a plantation would yield about 300 cubic metres of soft wood. The wood was valued at Rs.50 per cubic metre, to obtain a gross return of Rs.15,000 per hectare. After deducting Rs.3000 towards salvaging expenses, it was thus found that a net return of Rs.12,000 resulted on this account. This amount too was integrated into the benefit stream. The results of the analysis are presented below.

a) The payback period

The pay-back period was worked out on the basis of the undiscounted cumulative costs and returns, is tabulated in Appendix III. The cumulative cost stream was found to break even with the cumulative returns stream, during the tenth year at the aggregate level. This was the case in each strata separately too.

The pay-back period was thus ten years at the aggregate level and at the three strata levels. In otherwords the capital investment costs were returned in ten years. Therefore investment in pepper cultivation compared favourably with alternatives having pay-back periods greater than ten years. It was observed that this measure failed to bring out the difference in the investment worth between the three strata. However this was found to become apparent when the earnings after the pay-back period and the timing of proceeds were also reckoned, as in the following measures.

b) The benefit-cost ratio

The computation of the benefit-cost ratio is presented in Appendix IV. At the discount rate employed viz., 10 per cent, the ratio of the present worth of the cost stream to the present worth of the benefit stream was found to be 1.09 at the aggregate level. The benefit-cost ratios relating to stratum A, stratum B and stratum C were located at 1.08, 1.09 and 1.10 respectively.

Thus the benefit-cost ratio exceeded unity in all the cases. In otherwords at an opportunity cost óf capital of 10 per cent, investment in pepper cultivation was found to be recovered. The margin of recovery was the largest in stratum C and the smallest in stratum A. This is however not indicative of the comparative wealth generating capacity which will be brought out by the next measure.

c) The net present worth

The computation of the net present worth is also shown in Appendix IV. At the aggregate level the net present value of the benefit stream exceeded the net present value of the cost stream by Rs.4180.76, at a discount rate of 10 per cent. The corresponding figures relating to stratum A, stratum B and stratum C were found to be Rs.4031.23, Rs.3911.13 and Rs.4433.01 respectively.

Thus at all levels the net present worth was found to be positive. Among the strata the capacity to generate wealth was the highest in stratum C and the lowest in stratum B.

d) The internal rate of return

The computation of the internal rate of return is presented in Appendix V. At the aggregate level the internal rate of return was located at 13.48 per cent. The corresponding rates concerning stratum A, stratum B and stratum C

were 13.31 per cent, 13.03 per cent and 13.87 per cent res-
pectively.

At the aggregate level investment in pepper cultivation
was thus found to be preferable to alternatives that yielded
less than 13.48 per cent interest. Among the strata the
average earning power of money invested was the greatest in
stratum C and the lowest in stratum B.

ECONOMICS OF MARKETING

CHAPTER VI

ECONOMICS OF MARKETING

The harvesting of pepper usually commenced by December-January in the hills. The spikes were plucked when one or two berries turned orange-red. They were then spread on mats and the berries were detached by methods like trampling. The berries were then dried in the sun for at least three bright days, so that the outer skin shrank blackened and crinkled, to produce the black pepper of commerce.

The farmers processed the harvested produce at home. The dried berries were winnowed to get rid of undesirable ingredients before they were sold. The buyers of black pepper at the farmers' level were the village merchants and the upcountry wholesalers. A description of these and the other main functionaries involved in the marketing of pepper is given below.

a) Market functionaries

Village merchant: The village merchant bought the farmers' produce in the hinterland and sold it to the upcountry wholesaler.

Upcountry wholesaler: The upcountry wholesaler bought pepper both from farmers and village merchants, and operated at the assembling centres.

Commission agent: The commission agent acted according to the instructions of the upcountry wholesaler whom he represented and negotiated the sale of the produce he was entrusted with. He arranged delivery and sometimes extended credit facilities. He deducted his charges and remitted the balance to the upcountry wholesaler.

Broker: The broker acted on behalf of the exporter/ internal wholesaler he represented in negotiating purchases, without any physical control of the pepper he dealt with.

Exporter/Internal wholesaler: The exporter/internal wholesaler bought pepper at the terminal wholesale market to sell it in another wholesale market, foreign/domestic.

b) Marketing system, market structure and market practices

Out of the 72 farmers interviewed 36 farmers (50 per cent) sold their pepper directly to the upcountry wholesalers while 32 farmers (44.44 per cent) sold to the village merchants. The remaining 4 farmers (5.56 per cent) had vines that were in the gestation period.

Out of the 24 farmers in stratum A (with area under pepper less than 0.4 hectare), 17 farmers (70.83 per cent) sold their produce to the village merchants, while 6 farmers (25 per cent) sold to the upcountry wholesalers and 1 farmer (4.17 per cent) had vines in the gestation period. The average productivity in this stratum was 885.85 kg of black

pepper per hectare during the peak-yield period. This meant that, operating with a maximum area of 0.4 hectare they would, on an average, have a marketable surplus of 354.34 kg of black pepper at best. It was observed that this category of farmers preferred to sell to the village merchants, in spite of the fact that on any given day the upcountry wholesalers offered higher prices.

The village merchants typically operated in the interior areas while the upcountry wholesalers were located at the assembling centres which were farther from most of the production points. Thus the sale of the produce to the upcountry wholesalers involved a larger transport cost. Jeeps were found to be the most common mode of transport in the villages for both the people and their produce. The transport cost generally did not fall in proportion to the quantity transported. In other words the transport cost to the upcountry dealers did not vary much relating to whether the farmer transported ten kg or fifty kg of pepper. The farmers in stratum A generally sold in small lots. The per unit transport cost tended to be higher with smaller lots. Thus often the price difference on any day between the price offered by the upcountry wholesalers and the village merchants was not found to offset the higher per unit transport cost faced by the farmers in stratum A.

The preference to the village merchants was also found to be made on the grounds of the acquaintance and personal contact they had with the farmers, besides their proximity to the production points. The producers in stratum A were also often found to have sale commitments to the village merchants. This was due to the nature of the business that some of the village merchants did in the villages. These village merchants maintained provision stores in the villages round the year and often allowed the producers to run up a credit with their business. This was done on condition that such producers sold their pepper to them later. Commitments like this appeared wholly by word of mouth, and not documented. All the committed farmers encountered in the study were keen not to default on the repayment of such debts to continue the relationship in future. These farmers also admitted the fact that they were paid lesser per unit prices on any day compared to the prices paid to uncommitted farmers. They were however found to be willing to accept the arrangement as long as other alternatives were absent. However, they indicated that every year they tried to minimize such commitments to take advantage of the open market prices of pepper. Prices were arrived at by individual negotiation in any case. The holding capacity of farmers in this category appeared to be low.

Among the 24 farmers in stratum B (with area under pepper between 0.4 and 2 hectares), 12 farmers (50 per cent)

sold pepper to the village merchants, while 11 farmers (45.83 per cent) sold to the upcountry wholesalers and 1 farmer (4.17 per cent) did not have any bearing vines.

The farmers in this category chose upcountry wholesalers nearly as frequently as village merchants to dispose their produce. With an average productivity of 782.83 kg of black pepper per hectare at the peak, this category of farmers marketed a volume of output ranging between 313.53 and 1567.66 kg of black pepper at best. Those with larger outputs were better equipped to exploit the economies of scale in transporting the produce to the upcountry wholesalers to take advantage of any price differences that existed.

Nineteen farmers (79.17 per cent) out of a total of 24 contacted in stratum C (with an area under pepper exceeding 2 hectares) sold pepper to the upcountry wholesalers directly. Three farmers (12.5 per cent) sold pepper to the village merchants and 2 farmers (8.33 per cent) had vines in the gestation period. At the peak, this category of farmers had an average productivity of 735.68 kg of black pepper per hectare. This meant that their range of marketable surplus during the peak years would be greater than 1471.36 kg of black pepper. These farmers were thus found to be in a better position to take advantage of the upcountry wholesalers' better price offers. Committed sales to the village

merchants were strikingly low among these farmers, pointing out to a good holding capacity.

All the 20 village merchants contacted during the study stated that they sold their pepper to the upcountry wholesalers. Nine of them (45 per cent) admitted that though they were independent traders, they cultivated to a certain extent, an agency relationship with a particular upcountry wholesaler. Eight village merchants (40 per cent) agreed that they operated as the clientele of three or four upcountry wholesalers, while 3 (15 per cent) claimed that they did business free of any such agreements.

Out of the 20 village merchants, 14 merchants (70 per cent) pointed out that being among the clientele of one or more upcountry wholesalers afforded them an extent of insulation from the uncertainty and variability associated with day to day pepper prices. They stated that such business relationships also provided them with assurance and ease in sale. They also indicated that on any given day the upcountry wholesalers offered them a premium price compared to what was offered to the producers. Two village merchants (10 per cent) stated that they operated on capital borrowed from the upcountry wholesalers and were thus committed to sell to them.

All the village merchants said that they fixed their daily price offers on the basis of the prices they antici-pated at the wholesalers'. Those village merchants who also ran provision stores agreed that they took in pepper from the farmers also by a method not different from barter exchange.

All the village merchants indicated that they undertook sampling of the lot brought for sale by the farmers before offering a price. A hand drawn sample of the lot was drawn and checked for the dryness, light berry content, pinhead content and extraneous matter content. They stated that they preferred only well-dried black pepper. They agreed that they made deductions in the price offered if the produce was found to be inadequately dried. The price offered was also lowered as the light-berry, pinhead and extraneous matter content of the lot increased. The price was finally arrived at by bargaining.

Fifteen (75 per cent) of the 20 village merchants ope-rated only during the marketing season of pepper. A village merchant transacted, on an average, 13.07 tonnes of black pepper a year.

The 30 upcountry wholesalers interviewed, bought, on an average 63.42 per cent of the volume of pepper they transacted, from the farmers directly. The rest was purchased from the

village merchants. All the 30 upcountry wholesalers agreed
that they entertained a clientele of village merchants. Seven
(23.33 per cent) of them maintained their own purchase shops
in the interior areas too, where they competed with the
village merchants.

All of them indicated that before entering purchasing a
lot they checked the quality of the produce offered for sale.
The price was typically lowered in line with the inadequacy
of dryness of the lot, the content of light berries and pin-
heads, and the content of chaff, stones or other extraneous
matter, in the lot. They were also prepared to offer better
prices for lots with a large content of bold berries. They
admitted that they offered a premium of 5 to 10 paise per kg
over the price paid to farmers, to those village merchants
who regularly sold to them, depending on the market, the
individual, and the existing business relationship. The prices
were arrived at by individual negotiation in any case. An
upcountry wholesaler was found to transact on an average
267.5 tonnes of black pepper during a year.

The sale of black pepper from the upcountry wholesalers
in Idukki district was typically found to be orchestrated by
the commission agents at Cochin. The commission agents
employed representatives at the assembling markets to rope
in deals from the upcountry wholesalers. But a certain degree

of fixity was observed in the preference of one or a few
commission agents by a particular upcountry wholesaler.
Twentysix (86.67 per cent) upcountry wholesalers admitted
this fact. All the upcountry wholesalers stated that they
brought their produce to Cochin by road on trucks. The lots
were stocked with the commission agents for which the latter
had godowns. The commission agents sometimes undertook to
test-sample the offered lot for corroborating it's claimed
quality. This was commonly done on the basis of experience
by visual observation.

After taking in a lot, it was upto the commission agents
to try and locate suitable buyers, with price offers that are
acceptable to their clients. The buyers were either exporters
or internal wholesalers. The upcountry wholesalers after
bringing in their lots directed the commission agents to sell
off or stock the lots depending on the bearish or bullish
tendency of the market. This also depended on the liquidity
preference of the sellers and their inclination to speculate.
In any case even before a sale was actually negotiated, the
commission agents typically advanced 70-90 per cent of the
estimated value of the lot to the upcountry wholesalers.
The amount advanced also depended on the business relations
that existed between them. The commission agents generally
did not charge interest on the amount advanced even if the
lot remained unsold for 3 to 7 days. Beyond the specified

interest-free time limit the commission agents charged interest on the advanced amount the rate of which varied from 5 to 25 per cent in the cases encountered. The duration of the interest-free stocking period and the rate of interest charged were found to depend on the business relations that existed between the two functionaries.

Acting on behalf of their clients, the upcountry merchants, the commission agents sometimes employed salesmen to locate and negotiate sales. The function of the salesmen accorded them a semblance to sellers' brokers. However, they will be referred to as salesmen based on the parlance in actual practice. The salesmen contacted the buyers' brokers with sale offers. For bringing in a buyer the salesmen were paid fees by the commission agents, which commonly ranged from 0.015 per cent to 0.02 per cent of the value of the sales proceeds. The commission agents also located and negotiated sales personally.

From among the various costs faced by the commission agents some were deducted from the upcountry wholesalers. These included (a) landing, (b) weighment of the lot, (c) stacking the lot, (d) salesmen's fee, if any, (e) local delivery to the buyer's godown and (f) stacking the lot in the buyer's godown.
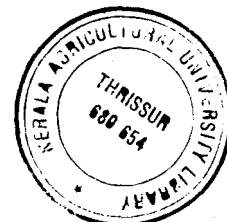
The commission agents on an average marshalled the transaction of 845 tonnes of black pepper a year. They were paid commission at the rate of 1 per cent ad valorem. While transacting the lot the commission agents also collected 1 per cent of the value of the sale as a trade discount. This discount was as a practice offered to the buyers.

Representing the exporters/internal wholesalers it was often the brokers who negotiated with the commission agents. The exporters/internal wholesalers generally placed a purchase order with the brokers for a certain quantity of black pepper of a specified quality. The brokers then located commission agents with compatible offers. For the service rendered the brokers contacted in this study received brokerage to the order of about 25 rupees per tonne transacted. The brokers, on an average, effected the transaction of about 1170 tonnes of black pepper a year.

Once the exporters/internal wholesalers settled on a buy, they bulked the lot at the commission agents' godown, refilled it in their own sacks and stitched them. It was then the obligation of the commission agents to undertake local delivery of the lot and to stack it at the godowns of the exporters/internal wholesalers.

At the exporters' premises, the lot was once again bulked. It was then winnowed, sizered and garbled. Garbling was done

either manually or using a garbling machine. The lot was then wetted, washed and dried. If necessary, oiling and polishing followed this.

For a consignment to be exported, a certificate of grading issued by the Agmark authorities was imperative. The exporters were also to possess a certificate of authorization issued by the Agmark authorities. Before exporting a lot the exporters gave in a request to the Agmark authorities to inspect and grade it. The Agmark inspectors then took test sample of the lot meant for export. A sub-sample of 2 kg from a 5 per cent sample of the lot was used for the purpose. The sample was analysed to estimate the percentage content of light berries, pinheads, extraneous matter and moisture in it. The quality of the lot was ascertained on the basis of this and a corresponding grade was designated. The various Agmark grade designations and their criteria are presented in Table 20.

After the test sampling was done, Agmark labels were issued, if the quality of the lot was in conformity with the specifications of the importers. The lot thus cleared was then packed in gunny bags and stitched. New double gunny bags with a net capacity of 70 kg were found to be the standard packing material for export purposes. The gunny bags were typically double-stitched after filling and weighing. The bags were then sealed with lead seals bearing the Agmark

Table 20. Grade designations of black pepper

A. Garbled grades

Sl. No.	Designation	Upper limit for content of			Size of retaining sieve (mm)
		Extraneous matter (%)	Light berries (%)	Moisture (%)	
1	Malabar garbled Grade 1 (MG1)	0.5	2.0	11.5	-
2	Malabar garbled Grade 2 (MG2)	0.5	5.0	11.5	-
3	Tellichery garbled special extra bold (TGSEB)	0.5	3.0	11.5	4.75
4	Tellichery garbled extra bold (TGEB)	0.5	3.0	11.5	4.25
5	Tellichery garbled (TG)	0.5	3.0	11.5	4.25 (50% min) 4.00 (50% max)

B. Garbled light grades

Sl. No.	Designation	Upper limit for content of		Lower limit for light berry content (%)
		Extraneous matter (%)	Pinheads (%)	
1	Garbled light grade special	2	0	50
2	Garbled light grade 1 (GL1)	2	5	50
3	Garbled light grade 2 (GL2)	5	10	50
4	Garbled light grade 3 (GL3)	6	15	50

(contd.)

C. Ungarbled grades

Sl. No.	Designation	Upper limit for content of		Moisture (%)
		Extraneous matter (%)	Light berries (%)	
1	Malabar ungarbled Grade 1 (MUG1)	2	7	12
2	Malabar ungarbled Grade 2 (MUG2)	2	10	12
3	Malabar ungarbled Grade 3 (MUG3)	3	15	12
4	Malabar ungarbled Grade 4 (MUG4)	4	20	12

D. Ungarbled light grades

Sl. No.	Designation	Upper limit for content of	
		Extraneous matter (%)	Pinheads (%)
1	Ungarbled light grade special	3	0
2	Ungarbled light Grade 1 (ULG1)	4	5
3	Ungarbled light Grade 2 (ULG2)	7	10

Source: Directorate of Marketing and Inspection, Nagpur

stamp, and the **Agmark labels** were stitched on the bags. Before the lot was officially cleared for export it was subjected to a check sampling to ensure that the lot packed was the same as that graded. All the tests done for grading were repeated on the check sample.

The consignment thus cleared for export was typically handed over, on paper, to a clearing and forwarding agency. Such an agency was paid to undertake the following operations. These included inland transport to the wharf, warehousing, fumigation, preparation of export documents, effecting insurance, facilitation of customs inspection, banking, payment of cooper charge, payment of port-weighment charge, payment of examination-coolie charge, clearance of cargo, payment of tally clerk charge, payment of octroi duty and payment of customs cess.

At the importers' premises also the lot was bulked and winnowed. The lot was then sizered, since most of the internal demands were placed in terms of size grades. It was then washed, dried and packed in polythene bags inside single gunny bags which were then double stitched. The lot was then transported, to order, by road freight to the wholesalers located mostly at places like Delhi, Bombay, Calcutta, Kanpur, Indore, Amritsar, Nagpur, Hyderabad, etc.

c) Marketing costs

1. Marketing cost at the producers' level

The marketing costs borne by the farmers for packing the produce worked out to Rs.0.15 per tonne. The cost of transporting pepper to the village merchants and the up-country wholesalers, was, on an average, found to be Rs.9.70 and Rs.39.49 per tonne respectively.

2. Village merchants

The average costs borne by the village merchants worked out as listed below. The costs are expressed in rupees per tonne of pepper.

1.	Rent on operating space	=	15.49
2.	Depreciation on furniture and machinery	=	0.28
3.	Staffing	=	0.78
4.	Stationery, licence, etc.	=	0.06
5.	Packing	=	0.07
6.	Loading, transporting and delivery	=	32.06
	Total cost	=	48.74

2. Upcountry wholesalers

The upcountry wholesalers faced on an average the following costs in handling a tonne of black pepper. The costs are expressed in rupees.

1. Rent on operating space = 11.48

2. Depreciation on furniture and machinery = 0.26

3. Staffing = 9.45

4. Licence, registration, auditing, accounting, stationery, electricity, taxes, etc. = 6.93

5. Travel and communication = 11.89

6. Packing, loading and transporting = 154.72

7. Landing at the commission agents = 4.75

8. Stacking at the commission agents' = 1.43

9. Weighment of the lot = 2.99

10. Local delivery to buyers' godown = 14.89

11. Stacking at buyers' godown = 1.43

12. Salesmen's charges (incidental; paid only in 35 per cent of the cases) = 7.00

13. Commission paid = 120.00

14. Trade discount = 120.00

Total cost = 467.22

3. Commission agents

The average costs met by the commission agents were as follows. The costs are expressed in rupees per tonne.

1. Rent on operating space = 9.28

2. Depreciation on furniture and machinery = 0.23

3. Staffing = 18.48

4. Licence, registration, auditing, accounting, stationery, electricity, taxes, brokerage, etc. = 37.14

5. Travel, communication and business entertainment = 8.67

Total cost = 73.80

4. Exporters

The exporters faced the following costs on an average. The figures represent the costs in rupees per tonne of pepper.

1. Rent on operating space = 9.37

2. Depreciation on furniture and machinery = 1.16

3. Staffing = 23.21

4. Licence, registration, auditing, accounting, stationery, electricity, taxes, etc. = 39.38

5. Brokerage = 25.00

6. Travel, communication and expenses connected with market intelligence and business entertainment = 21.17

7. Bulking, refilling and stitching at the commission agents' premises = 7.48

8. Bulking at own godown = 2.99

9. Winnowing = 26.04

10. Garbling:

    a) Manual garbling = 38.68, or

    b) Machine garbling (considered here) = 4.82

11. Wetting, washing and drying = 14.45

12. Oiling and polishing (faced only for about 20 per cent of the volume of pepper) = 0.07

13. Agmarking = 35.00

14. Packing (includes cost of double gunny bags, weighing and filling) = 152.42

15. Stitching and marking (includes double stitching of gunny bags, Agmark label stitching and marking) = 6.37

16. Restacking = 2.04

17. Loading and inland transport = 18.72

18. Payment made to clearing and forwarding agents, and charges towards export duty, customs cess, octroi, charities and deductions = 97.18

                Total cost = 488.86

5. Internal wholesalers

The internal wholesalers had to bear the following costs per tonne of pepper. The costs are expressed in rupees.

1. Rent on operating space = 11.45

2. Depreciation on furniture and machinery = 0.92

3. Staffing = 12.48

4. Licence, registration, auditing, accounting, stationery, electricity, taxes, etc. = 32.50

5. Brokerage = 25.00

6. Travel, communication and expenses connected with market intelligence and business entertainments = 13.07

7. Bulking, refilling and stitching at the commission agents' premises = 7.48

8. Bulking at own godowns = 2.99

9. Winnowing = 26.04

10. Sizering = 18.01

11. Wetting, washing and drying = 14.45

12. Packing (includes cost of single gunny bags, polythene bags, inserting, filling and weighing) = 96.71

13. Stiching and marking = 3.82

14. Restacking = 2.04

15. Loading = 3.82

16. Road freight costs to:

    a) Calcutta = 550.00

    b) Bombay = 450.00

    c) Delhi = 600.00

    d) Kanpur = 600.00

    e) Indore = 480.00

    f) Nagpur = 900.00

    g) Hyderabad = 350.00

    Total cost (excluding road freight charge) = 270.78

d) <u>Marketing channels</u>

It was revealed by this study that the black pepper produced in Idukki district moved most frequently along the following marketing channels.

Channel I   - Producer-Village Merchant-Upcountry Wholesaler-(Commission Agent)-Exporter

Channel II   - Producer-Upcountry Wholesaler-(Commission Agent)-Exporter

Channel III - Producer-Village Merchant-Upcountry Wholesaler-(Commission Agent)-Internal Wholesaler

Channel IV   - Producer-Upcountry Wholesaler-(Commission Agent)-Internal Wholesaler

To the extent that most of the pepper produced in Idukki district went for export purposes, the traffic along Channel I and Channel II was greater. It was also observed that among these two channels, Channel II was involved in moving a larger volume of black pepper. The pepper produced in Idukki moved for consumption within the country along Channel III and Channel IV. Channel IV transducted a larger volume of pepper, among these two channels.

e) <u>Price spread of pepper</u>

The study of the price spread of pepper was carried out only upto the terminal market at Cochin. This forms the main limitation of this study. Black pepper was transported from Cochin to various distant markets both domestic and foreign.

The net share of the producer in a rupee of the free-on-board/free-on-lorry price of black pepper at Cochin has been worked out for each of the four marketing channels, along with the costs and profit margins of the intermediaries involved in each. The price spread was studied by the method of concurrent margin, during a period of relative price stability in April 1983.

It may be noted that in the analysis the cost items like commission and brokerage have been built into the payer's cost.

1. Price spread in Channel I

   Channel I - Producer-Village Merchant-Upcountry Wholesaler-(Commission Agent)-Exporter

Item	Rs/Qtl	Per cent share
1. Net share of the producer	1118.88	86.06
2. Marketing expenses incurred by the producer	1.12	0.09
3. Selling price of the producer/buying price of the village merchant	1120.00	86.15
4. Village merchant's total cost	4.88	0.38
5. Village merchant's profit margin	10.12	0.78
6. Selling price of the village merchant/buying price of the upcountry wholesaler	1135.00	87.31
7. Upcountry wholesaler's total cost	46.52	3.58

Item	Rs/Qtl	Per cent share
8. Upcountry wholesaler's profit margin	8.48	0.65
9. Selling price of the upcountry wholesaler/buying price of the exporter	1190.00	91.54
10. Exporter's total cost	48.89	3.76
11. Exporter's profit margin	61.11	4.70
12. Free-on-board price	1300.00	100.00

This channel was found to be one of the two busiest channels in the marketing of pepper based on the fact that more pepper was exported than internally consumed. The main functionaries involved in this channel were village merchants, upcountry wholesalers, commission agents, brokers and exporters.

The net share of the producer in the f.o.b. price was found to be 86.06 per cent. The net share of the producer was found to be the lowest among all the four channels in Channel I. The producers incurred marketing expenses to the order of 0.09 per cent of the f.o.b. price. At the village merchant's level the total marketing cost worked out to 0.38 per cent of the f.o.b. price, while the village merchant's margin worked out to 0.78 per cent of the f.o.b. price. The marketing margin worked out to 1.16 per cent of the f.o.b.

price at this stage. The marketing cost and the profit margin at the upcountry wholesalers level worked out to 3.58 per cent and 0.65 per cent of the f.o.b. price respectively. The marketing margin at this stage was 4.23 per cent of the f.o.b. price. The marketing cost at the exporter's level which came to 3.76 per cent of the f.o.b. price and the exporter's margin which came to 4.70 per cent of the f.o.b. price were found to be the largest among that of all the functionaries in this channel. The marketing margin at this stage worked out to 8.46 per cent of the f.o.b. price.

The combined marketing cost in Channel I came to 7.81 per cent of the f.o.b. price, while the combined profit margin was located at 6.13 per cent of the f.o.b. price. Both these figures were found to be the highest among the four channels studied, in Channel I. Thus the largest price spread viz., 13.94 per cent of the final price emerged in Channel I.

2. Price spread in Channel II

Channel II - Producer-Upcountry Wholesaler-(Commission Agent)-Exporter

Item	Rs/Qtl	Per cent share
1. Net share of the producer	1126.04	86.62
2. Marketing expenses incurred by the producer	3.96	0.30

Item	Rs/Qtl	Per cent share
3. Selling price of the producer/ buying price of the upcountry wholesaler	1130.00	86.92
4. Upcountry wholesaler's total cost	46.52	3.58
5. Upcountry wholesaler's profit margin	13.48	1.04
6. Selling price of the upcountry wholesaler/buying price of the exporter	1190.00	91.54
7. Exporter's total cost	48.89	3,76
8. Exporter's profit margin	61.11	4.70
9. Free-on-board price	1300.00	100.00

Like Channel I, Channel II also figured in transducting a large volume of pepper since it leads to the export market. The functionaries in this channel included upcountry wholesalers, commission agents, brokers and exporters.

The net share of the producer in the f.o.b. price was found to be 86.62 per cent which was higher than that in Channel I. The net share of the producer in the final price was the third largest in this channel. The marketing cost at the upcountry wholesaler's level was 3.58 per cent while that at the exporter's level was 3.76 per cent of the f.o.b. price. The upcountry wholesaler's margin was 1.04 per cent of the f.o.b. price which was higher than in the previous channel.

The exporter's margin was larger at 4.70 per cent of the f.o.b. price. The marketing margin at the upcountry wholesalers level was 4.62 per cent of the f.o.b. price while that at the exporter's level was 8.46 per cent.

The combined marketing cost worked out to 7.64 per cent of the f.o.b. price. The combined profit margin came to 5.74 per cent of the f.o.b. price. The price spread worked out to 13.38 per cent of the f.o.b. price. The price spread was lower than in the previous channel on account of the fewer number of intermediaries.

3. Price spread in Channel III

Channel III - Producer-Village Merchant-Upcountry Wholesaler-(Commission Agent)-Internal Wholesaler

Item	Rs/Qtl	Per cent share
1. Net share of the producer	1118.88	88.80
2. Marketing expenses incurred by the producer	1.12	0.09
3. Selling price of the producer/buying price of the village merchant	1120.00	88.89
4. Village merchant's marketing cost	4.88	0.39
5. Village merchant's profit margin	10.12	0.80
6. Selling price of the village merchant/buying price of the upcountry wholesaler	1135.00	90.08
7. Upcountry wholesaler's marketing cost	46.52	3.69

Item	Rs/Qtl	Per cent share
8. Upcountry wholesaler's profit margin	8.48	0.67
9. Selling price of the upcountry whole- saler/buying price of the internal wholesaler	1190.00	94.44
10. Internal wholesaler's marketing cost	27.08	2.15
11. Internal wholesaler's profit margin	42.92	3.41
12. Free-on-lorry price	1260.00	100.00

While Channel I and Channel II guided pepper to the export business, Channel III, like Channel IV, led pepper to the internal business. The functionaries in Channel III included village merchants, upcountry wholesalers, commission agents, brokers and internal wholesalers.

The net share of the producer in the f.o.l. price in Channel III worked out to 88.80 per cent. The producer's marketing expenses came to 0.09 per cent of the f.o.l. price. The marketing cost at the levels of the village merchant, the upcountry wholesaler and the internal wholesaler worked out to 0.39 per cent, 3.69 per cent and 2.15 per cent of the f.o.l. price respectively. The corresponding profit margins were found to be 0.80 per cent, 0.67 per cent and 3.41 per cent of the f.o.l. price. The village merchants extracted their largest profit margin in Channel III. The corresponding

marketing margins were found to be 1.19 per cent, 4.34 per cent and 5.56 per cent of the f.o.l. price.

The combined marketing cost and the combined profit margin in this channel worked out to 6.32 per cent and 4.88 per cent of the f.o.l. price. The price spread worked out to 11.20 per cent of the f.o.l. price.

4. Price spread in Channel IV

Channel IV - Producer-Upcountry Wholesaler-(Commission Agent)-Internal Wholesaler

Item	Rs/Qtl	Per cent share
1. Net share of the producer	1126.04	89.37
2. Marketing expenses incurred by the producer	3.96	0.31
3. Selling price of the producer/buying price of the upcountry wholesaler	1130.00	89.68
4. Upcountry wholesaler's marketing cost	46.52	3.69
5. Upcountry wholesaler's profit margin	13.48	1.07
6. Selling price of the upcountry wholesalers/buying price of the internal wholesaler	1190.00	94.44
7. Internal wholesaler's marketing cost	27.08	2.15
8. Internal wholesaler's profit margin	42.92	3.41
9. Free-on-lorry price	1260.00	100.00

The functionaries in this channel included upcountry wholesalers, commission agents, brokers and internal wholesalers.

The producers share in the f.o.l. price came to 89.37 per cent. The net share of the producer was the highest among all channels in this channel. The marketing expenses faced by the producer worked out to 0.31 per cent of the f.o.l. price. The marketing costs incurred by the upcountry wholesaler and the internal wholesaler came to 3.69 per cent and 2.15 per cent of the f.o.l. price. The upcountry wholesaler's profit margin was the largest in this channel, among all channels, at 1.07 per cent of the f.o.l. price. This was however lower than the 3.41 per cent of the f.o.l. price cornered by the internal wholesaler. The marketing margin at the upcountry wholesaler's level worked out to 4.76 per cent of the f.o.l. price while that at the internal wholesaler's level was 5.56 per cent.

The combined marketing cost and the combined profit margin in this channel worked out to 6.15 per cent and 4.48 per cent of the f.o.l. price respectively. The price spread in this channel was located at 10.63 per cent of the f.o.l. price. The price spread was the minimum in this channel.

SUMMARY

CHAPTER VII

SUMMARY

The study on the cost of cultivation and marketing of pepper in Idukki district was undertaken in 1983. The cost of cultivation was estimated on the basis of data collected from a sample of 72 farmers. Data pertaining to marketing were also generated from the sample of farmers besides a total of 90 intermediaries and other organizations associated with the marketing of pepper.

The farmers were selected by multi-stage stratified random sampling. Stratification was done on the basis of the size of holding. The three strata created were stratum A, with holdings of size less than 0.4 hectare, stratum B with holdings of size 0.4 to 2 hectares and stratum C with holdings of size greater than 2 hectares. The cost of cultivation was analysed operationwise, inputwise and also based on the cost concepts cost A, cost B and cost C used in farm management studies. The analysis was made with respect to the strata aggregate also.

The economics of production was also studied through an analysis of the capital productivity of investment in pepper cultivation relating to each of the three strata of producers as well as to the strata aggregate. The pay back period, the benefit-cost ratio, the net present worth and the internal rate of return were computed and interpreted.

The economics of marketing was studied from the level of the producers to the terminal market at Cochin. The market structure, marketing channels, marketing practices, marketing costs, marketing margins and the price spread were studied. The price spread was built by the method of concurrent margin.

The results obtained are presented here tersely.

The total cost of cultivation of pepper, equivalent to cost C each year for the first seven years, expressed per hectare, concerning the aggregate sample were Rs.5952.54, Rs.3958.64, Rs.4150.55, Rs.4583.87, Rs.4901.45, Rs.5412.39 and Rs.5506.03 in that order. The corresponding figures in stratum A were found to be Rs.7233.45, Rs.4730.83, Rs.4486.99, Rs.5239.11, Rs.5598.53, Rs.6477.34 and Rs.6566.27. The corresponding figures relating to stratum B were Rs.6107.05, Rs.4113.04, Rs.4235.58, Rs.4555.05, Rs.4931.86, Rs.5515.76 and Rs.5684.82 while those pertaining to stratum C were Rs.5574.97, Rs.3798.58, Rs.4015.85, Rs.4553.03, Rs.4859.26, Rs.5327.57 and Rs.5330.72. The septenary total cost of cultivation at the aggregate level was Rs.34465.47. The corresponding figures relating to stratum A, stratum B and stratum C were Rs.40656.52, Rs.35143.16 and Rs.33459.98 respectively. The cost of cultivation was the highest among all years during the first year, when most of the new planting

was done. The cost of cultivation was the lowest during the second year, after which it rose every year till the seventh year in all strata. Viewed operationwise the main reason for this rise appeared to be the rising cost of harvesting and processing. The single largest cost creating operation during any year, with all strata, was the cultural operation, absorbing about one-third to one-half of the total cost at a glance. The cost of cultivation was generally the highest in stratum A and the lowest in stratum C during any year. Cost of cultivation per hectare decreased with increased holding size.

Human labour was generally the most conspicuous input in pepper cultivation. At the aggregate level a total of 1247 person-days were used for pepper cultivation during the first seven years. The yearwise figures were 205, 145, 128, 155, 176, 212 and 226 person-days. This comprised of a total of 673 family person-days and 574 hired person-days. Roughly about one-half of the total cost of cultivation occurred by way of human labour. The labour cost was the highest during the first year in all strata, when new planting of the crop was done. The employment of labour per unit area was the highest in stratum A and the lowest in stratum C. The use of hired labour was during any year the highest in stratum C and the lowest in stratum A. The ratio of family labour to

hired labour decreased from the third year onwards in all strata indicating increasing use of hired labour during the period. This was associated with the rising cost of harvesting and processing.

The share of the cost of soil additives in the total cost of cultivation was rather low, ranging roughly between one-sixteenth to one-sixth of the total cost. The share of the cost of plant protection materials was much lower. This indicated that the pepper growers were not yet fully convinced about the use of soil additives and plant protection chemicals in cultivation.

The total operating costs during the seven years per hectare of pepper occupied about three-fourths of the total cost in general. The operating cost was the highest with stratum A and the lowest in stratum C during any year. Human labour was the main cost contributing item of the operating cost.

The main item of the total fixed cost in all strata was the rental value of land, which occupied about seven-eighths of the total fixed cost roughly.

The cost A generally worked out to about one-half of cost C. The main item of cost in cost A was hired human labour. The cost B generally occupied about seven-tenths of cost C. The most conspicuous cost item in cost B was

hired human labour. Cost A was in general higher in stratum C compared to stratum B and higher in stratum B compared to stratum A. Cost B also showed a roughly similar character.

The analysis of capital productivity was done relating to a pepper cultivation project of duration twenty years. The pay back period was found to be ten years at the aggregate as well as the strata levels. The benefit-cost ratio at the aggregate level was found to be 1.09, while that relating to stratum A, stratum B and stratum C were 1.08, 1.09 and 1.10 respectively. The net present worth of capital investment at the aggregate level was Rs.4180.76. The wealth generating capacity among the strata was the highest in stratum C and the lowest in stratum B. The internal rate of return at the aggregate level was found to be 13.48 per cent. The average earning power of money invested among the strata was the greatest in stratum C and the lowest in stratum B.

The main functionaries identified in pepper marketing were village merchants, upcountry wholesalers, commission agents, brokers, exporters and internal wholesalers. The buyers of pepper at the farmer's level were found to be the village merchants and the upcountry wholesalers. The producers on the whole slightly preferred selling their produce to the upcountry wholesalers than to the village merchants.

commission agents. The commission agents generally advanced a certain part of the probable sale value of the lot to the upcountry wholesalers. Interest was charged on this advance if the lot remained unsold beyond an agreed time limit. The commission agents negotiated either directly with exporters/internal wholesalers or through the buyers' brokers to locate a sale. Salesmen were also found to be employed by the commission agents. The commission agents charged a commission of one per cent ad valorem. They made other deductions too like salesmen's fees, lot-associated expenses and a trade discount of about one per cent ad valorem which was offered to the buyers. The buyers included exporters and internal wholesalers. The exporters cleaned, garbled and agmarked the produce before exporting. There were agencies to clear and forward the export pepper who undertook various operations till the lot was on board. The internal wholesalers cleaned, sizered and packed pepper, and then it moved by road freight to several consuming centres in the country.

The total marketing cost incurred by farmers who sold pepper to village merchants averaged out to Rs.9.70 per tonne while those who sold to upcountry wholesalers incurred an average cost of Rs.39.64 per tonne of black pepper. The t marketing cost at the village merchants level worked out Rs.48.74 per tonne of black pepper. The total marketing

at the level of the upcountry wholesalers worked out to Rs.467.22 per tonne of black pepper. The total marketing cost at the commission agents' level worked out to Rs.73.80 per tonne of black pepper. The total marketing cost incurred by the exporters and the internal wholesalers worked out to Rs.488.86 and Rs.270.78 respectively.

The four marketing channels revealed by the study were the following:

Channel I

Producer-Village Merchant-Upcountry Wholesaler-(Commission Agents)-Exporter.

Channel II

Producer-Upcountry Wholesaler-(Commission Agent)-Exporter.

Channel III

Producer-Village Merchant-Upcountry Wholesaler-(Commission Agent)-Internal Wholesaler.

Channel IV

Producer-Upcountry Wholesaler-(Commission Agent)-Internal Wholesaler.

The producer's share in the free-on-board price in Channel I and Channel II were 86.06 per cent and 86.62 per cent respectively.

The producer's share in the free-on-lorry price in Channel III and Channel IV were 88.80 per cent and 89.37 per cent respectively.

The combined profit margins of the intermediaries in Channel I, Channel II, Channel III and Channel IV were 6.13 per cent, 5.74 per cent, 4.88 per cent and 4.48 per cent respectively.

The combined marketing cost in Channel I, Channel II, Channel III and Channel IV were 7.81 per cent, 7.64 per cent, 6.32 per cent and 6.15 per cent respectively.

The marketing margin or the price spread was the largest in Channel I with 13.94 per cent of the final price while it was the smallest in Channel IV with 10.63 per cent. The price spread in Channel II was 13.38 per cent of the final price while that in Channel III was 11.20 per cent.

PROBLEMS, SUGGESTIONS AND CONCLUSION

CHAPTER VIII

PROBLEMS, SUGGESTIONS AND CONCLUSION

In the nations production of black pepper Kerala occupies a position that approximates monopoly. This, however, appears to be the only bright part of the matter. The production system looks far from optimal.

Going by the available indications, a global expansion in the demand for black pepper is for sure. To merely maintain it's share in the growing international market, India will have to more than double it's current production by 2000 AD. What is more, the demand for pepper at home is ascending too. Unless systematic efforts are taken to increase pepper production, the country will be failing in maximising it's foreign exchange earnings from pepper as well as in helping it's farmers get the best. The intensification of pepper production is a thing, overdue. Export oriented crops like pepper can be easily integrated into the prevailing cropping pattern. Crop displacement can also be thought of. This expansionary process is possible even at the existing level of on-field technology, with little added cost. It would of course be better if the process of expansion could couple with it greater production efficiency, instead of merely duplicating the existing conditions of production. The bolstering of production requires planned

tackling of the production and marketing problems relating to pepper. There are attitudinal changes to be made too. Using the exposure got to these problems in the course of this study, this chapter intends to briefly explore them and to make certain views and suggestions in the matter.

One of the striking problems encountered was the low productivity of vines. The results obtained indicate that the average productivity of vines is around 0.7 kg. This is about one-third of the level attained in our research stations. The experience with progressive farmers suggests that an yield of 1 kg per vine can be easily achieved. This is a realistic target that can be set to begin with in bridging the gap between the actual and the potential productivity.

Barring a few strains like Karimunda, the genetic stock occupying much of the area appeared to be of mediocre quality. There were promising local strains to be encountered here and there. The genetic variability, as to be expected, in this, the homeland of pepper, appeared to be quite vast. The germplasm collection of pepper if intensified will definitely help to identify several superior strains suited for the area. Instead of being complacent with a few super-vines like Panniyur-1, the plant breeding efforts must be accelerated. It would be better if more location-specificity could be built into the plant breeding output in the case

of pepper. The cultivators in the tract studied were not particularly enthusiastic about the performance of Panniyur-1. Several farmers stated that there were local strains better suited for their land.

The cultivators mostly appeared reluctant to undertake systematic replanting of old vines. Many let out a tendency to stretch the production period to the very limits of vine senility. A casual attitude towards pepper cultivation also surfaced, and this is perhaps for historical reasons. In the past, moderate yields could be obtained with little effort, on the fertile virgin soils and the ideal climate of the high ranges. The inherent fertility of the soil has come a long way since then, and the climate has been steadily changing for the worse, thanks to the rampant denundation of forest-land. But the belief that the vines need only a little care, persists.

Several farmers entertained an idea that the use of inorganic fertilizers was detrimental to pepper. The use of such fertilizers was markedly low in spite of their availability at subsidised rates. The cultivators appeared to be unduly biased to the use of organic fertilizers. Many farmers did not appear to be confident regarding the efficacy of liming materials. An attitudinal problem does exist in the use of soil additives, which must be given serious consideration in extension work.

Several farmers were inclined to do nothing much against prevalence of pests and diseases in the area. The use of plant protection chemicals was meagre. Diseases like quick-wilt and slow-wilt were observed in the area, posing serious threats to pepper cultivation. The presence of soil nematodes that debilitate the vines and the pollu beetle that destroys the berries were also noticed. An integrated pest and disease management method has to be chalked out to handle this problem, and the farmers have to be convinced about the difference that it will be making.

The soil conservation measures adopted by the farmers appeared to be quite inadequate. In view of the undulating topography of the high-ranges much emphasis has to be laid on soil conservation. An alarming quantity of top soil is getting washed away each year. The provision of long term loans for soil conservation is of great importance in hilly districts like Idukki.

Many farmers tended to ease off in undertaking agronomic practices like training vines and shade regulation. The crop management system if improved could certainly push up the yield of pepper. This is again a problem to be handled by the extension agencies.

The field population of vines tended to exceed the optimum. There are debatable matters relating to the standards

also. The most common **Erythrina** standards have certain disadvantages. It sheds **leaves in** summer when the vine requires shade most. It is also a known collateral host of the rootknot nematodes which attack the pepper vines. It is also very vulnerable to the attack of a stem borer (<u>Ramphan</u> sp.) that leads to its collapse with the vine. The economics of growing pepper on non-living standards like concrete posts and teak poles remains to be worked out.

It would be more rewarding if a standard is located for pepper cultivation which will yield timber of good quality. The use of Erythrina wood is limited to the soft wood industries like toy making. If on terminating a project the farmers can expect a handsome return through the sale of timber from the standards, this will be of great use. An ideal live standard would be one which, besides facilitating pepper production, yields good timber and checks soil erosion. This is not only because it will result in greater returns for the farmers but also because it will stimulate systematic replanting of pepper.

The permeation of the results of research to the farmers fields has to be made more efficient. For instance all the farmers contacted, knew of or tried Panniyur-1, but few were aware that it was not a shade tolerant strain. Most of the farmers did not appear to be very convinced of the advantages

associated with scientific crop management. Some were even skeptical of it. The **extension** system has to be toned up to eliminate the bottlenecks in the diffusion of technology. More rapport has to be established between the research personnel, the extension agents and the farmers. The training and visit programme recently implemented by the Department of Agriculture appears to be a step in the right direction.

While clamouring for higher production, one tends to overlook the problems associated with the marketing of pepper. On account of the inflexibility of production in the short run the producers are more concerned about the price per unit, rather than the volume of sales. As for the price of pepper, it is wrought with violent daily monthly and yearly fluctuations. Since agriculture is already susceptible to the vagaries of nature, it becomes all the more necessary to stabilize prices to assure fairly stable income to the cultivators. The uncertainty associated with prices creates a feeling of insecurity among the producers, which may impede the improvements in the cultivation of pepper. The price of pepper within a year usually is higher by an amount greater than the cost of storage towards the end of the harvesting season. This can be exploited only by those farmers who have good holding capacity. But the small growers who typically have low holding capacity are forced to sell out at

lower prices. A co-operative marketing arrangement can be thought of in this regard, to enable the farmers get better prices. The co-operatives can assemble the produce of several growers on a certain down payment, grade and standardize the produce to fetch better prices. This arrangement will also reduce the marketing costs, provide market finance and ensure correct weighment of the produce.

Good marketing is more than just ensuring a high share for the producers in the consumers rupee. The existing markets should be widened and deepened. Newer markets should be captured or created. Several importing countries are showing increasing interest in the various processed forms of pepper like buff coloured pepper and dehydrated green pepper, and various processed derivatives like pepper oleoresin and pepper oil. About a fifth of all the pepper imported by the U.S.A. is converted to oleoresins before use. This is the case with several other importers too and the Indian farmers are deprived of the gains that can be made through processing. Besides bringing in financial benefits processing will also generate employment opportunities. Processing must also be thought of along co-operative lines since farmers would often be individually lacking the skill and capital involved. The market intelligence activities abroad should be made more intense, to avoid being drowned in the growing competition put up by the other producing nations.

The internal intermediaries in the marketing of pepper do not seem to be making any exorbitant profits. They appear to be trying to keep their profit margin constant from the business. It would of course be unreasonable to expect the intermediaries to stay in business for reasons other than profit. Neither can they be expected to be any more altruistic than the government.

More governmental administration has to be conferred on the production and marketing of pepper. The pepper producers have to be organized into production and marketing co-operatives. The setting up of a Pepper Board, on the lines of such organizations like the Cardamom Board and the Rubber Board must be given serious consideration. In subsistence economies like ours no amount of stress on the welfare of peasant producers will be exaggerated. There has to be more purposive efforts at trade streamlining.

This is not to mean that nothing is being done at improvements along these lines. Much work is being done, but surely a lot remains to be done. It is with the hope that a vigorous drive will be launched to save not only pepper production and the pepper growers, but also the face of the homeland of this highly sought spice, that this study is concluded.

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APPENDICES

APPENDIX I

QUESTIONNAIRE
Part A
Cost of cultivation of pepper

I. Fundamental details:-

    1. Name of respondent:

    2. Address   :

    3. Ward   :

    4. Panchayat   :

    5. Block   :

    6. Total area owned :

    7. Total area cultivated:

    8. Details regarding fragments:

Fragment number	Total area cultivated	Area under pepper

    9. Total area under pepper   :

II. Family details

Sl. No.	Name of members (beginning with head of family)	Sex	age	Relation with head	Education	Occupation		Annual income			Remarks
						Main	Secondary	Main source	Secondary source	Other sources	

III. Further details regarding land

Sl. No.	Fragment number	Area	Irrigated area	Sources of irrigation				Crops raised	Unirrigated area	Crops raised	Remarks
				Canal	Well	Tank	Other				

IV. Crops grown (a) Pepper

Sl. No.	Frag-ment number	Area under pepperplant-ing	Year of planting	Variety grown	Stan-dard used	No. of vines	No. of bearing vines	Approximate production						Remarks
								Green pepper		Black pepper		White pepper		
								Qty.	Value	Qty.	Value	Qty.	Value	

IV(b) Other crops

Sl. No.	Crops	Fragment number	Area under crop	Number of trees	Number of yield-ing trees	Approximate annual production				Remarks
						Main product		Other product		
						Qty.	Value	Qty.	Value	

V. Borrowings for Agrl. purposes

Sl. No.	Source	Amount borrowed	Time of borrowal	Purpose of borrowal (indicate crop)	Rate of interest	Amount outstanding	Remarks regarding utilization	Remarks

VI. Pumpset use

Sl. No.	Make of pump	H.P.	Year of purchase	Price paid	Total area irrigated	Total pump employment (hrs/year)	Pump employment for pepper (hrs/year)	Annual repair and maintenance charges	Remarks

VII. Implements and machinery

Sl. No.	Item	Numbers	Year of purchase	Price paid	Annual operation and maintenance charges	Depreciation	Remarks

VIII. Temporary dead stock

Sl. No.	Item	Numbers	Year of purchase	Price paid	Deprecia-tion	Present value	Remarks

IX. Taxes paid annually

```
--------------------------------------------------------
Sl.No.          Item                      Amount paid
--------------------------------------------------------
        Land revenue


        Water tax


        Panchayat tax


        Income tax


        Agricultural income tax

        Others:

        a)


        b)


        c)
--------------------------------------------------------
```


X. Constraints in cultivation

XI. Total area under pepper:

    Variety used:

Year I(a) Materials

Sl. No.	Item	Qty.	Rate	Value	Remarks
1	Standards				
2	Organic manures				
	a)				
	b)				
	c)				
3	Pepper cuttings (including gap filling requirement)				
4	Fertilizers:				
	a)				
	b)				
	c)				
	d)				
5	Liming material:				
	a)				
	b)				
6	Plant protection chemicals				
	a)				
	b)				
	c)				
	d)				
7	Irrigation				
8	Weedicides				
9					
10					
11					
12					

Labour rates (a) Men
(b) Women

Sl. No.	Items	Wage labour				Family labour				Remarks
		Men		Women		Men		Women		
		Hours	Amount	Hours	Amount	Hours	Amount	Hours	Amount	
1	Clearing the land									
2	Taking pits for standards									
3	Planting standards									
4	Taking pits for pepper									
5	Application of organic manures, if split									
	1									
	2									
6	Planting cuttings and filling									
7	Gap filling									
8	Digging around standard									
9	Training vines									
10	Fertilizer application, if split									
	1.									
	2.									
11	General digging									
12	Weeding									
13	Shading									
14	Mulching									
15	Irrigation									
16	Application of plant protection chemicals									
17	Application of lime									
18	Application of weedicides									
19										
20										

Year II(a) Materials

Sl. No.	Item	Qty.	Rate	Value	Remarks
1	Organic manures				
	a)				
	b)				
	c)				
2	Pepper cuttings for gap filling				
3	Fertilizers				
	a)				
	b)				
	c)				
	d)				
4	Liming materials				
	a)				
	b)				
5	Plant protection chemicals				
	a)				
	b)				
	c)				
	d)				
6	Irrigation				
7	Weedicides				
8					
9					
10					
11					

Year II(b) Labour

| Sl. No. | Item | Wage labour | | | | Family labour | | | | Remarks |
| | | Men | | Women | | Men | | Women | | |
		Hours	Amount	Hours	Amount	Hours	Amount	Hours	Amount	
1	Application of organic manure									
	1)									
	2)									
2	Gap filling									
3	Digging around the standard									
4	Fertilizer application									
	1)									
	2)									
5)	Training vines									
6	General digging									
7	Weeding									
8	Shading									
9	Mulching									
10	Irrigation									
11	Application of plant protection chemicals									
12	Application of lime									
13	Application of weedicides									
14										
15										
16										

Year (   ) (a) Materials

Sl. No.	Items	Qty.	Rate	Value	Remarks
1	Organic manures				
	a)				
	b)				
	c)				
2	Fertilizers				
	a)				
	b)				
	c)				
	d)				
3	Liming materials				
	a)				
	b)				
4	Plant protection chemicals				
	a)				
	b)				
	c)				
	d)				
5	Irrigation				
6	Weedicides				
7					
8					
9					
10					

Year (   ) (b) Labour

Sl. No.	Items	Wage labour				Family labour				Remarks
		Men		Women		Men		Women		
		Hours	Amount	Hours	Amount	Hours	Amount	Hours	Amount	
1	Application of organic manure									
	1.									
	2.									
2	Digging around standard									
3	Application of fertilizers									
	a.									
	b.									
4	Training vines									
5	General digging									
6	Weeding									
7	Shading									
8	Mulching									
9	Irrigation									
10	Application of plant protection chemicals									
11	Application of Lime									
12	Application of weedicides									
13	Cost of harvesting									
14										
15										

Details regarding output	Item	Qty	Rate	Value
	a) Green pepper			
	b) Black pepper			
	c) White pepper			
	d)			

XI. Practice of University Recommendations

Sl. No.	Recommendation	Whether aware	Source of information	Whether practised	Reasons
1	Planting material				
2	Propagation				
3	Spacing				
4	Manures and fertilizers				
	Organic manure				
	N				
	P				
	K				
5	Liming				
6	Plant protection				

Part B

Marketing of pepper

A. Producer's Level (1a)

Sl.No.	Items	Quantity produced in the current year	Quantity retained for home-use	Quantity given as wages	Quantity given as gifts	any other	Quantity marketed
1	Green pepper						
2	Black pepper						
3	White pepper						
4							
5							
6							
7							

1(b) Marketing details

Sl. No.	Designation of product and quantity	Date of marke-ting	Place of marke-ting	Who sold Pro-ducer/ agent	To whom sold (Type of buyer)	Dis-tance to mar-ket	Mode of trans-port	Cost of trans-port	Market charges			Any other cost	Price recei-ved per unit
									Cess	Commi-ssion	Broke-rage		

2. Description of marketing practices actually adopted:

3. Amount of advance if any obtained from the prospective buyer and date of receipt:

4. Details regarding utilization of advance:

5. What are the reasons for

   a) Choice of product

   b) Choice of method of sale

   c) Choice of timing of marketing

   d) Choice of place of marketing

   e) Choice of buyer

6. Deductions made, quantities; reasons why.

7. Method of arriving at price

8. Basis for agreeing with price actually received

9. Degree of awareness of Ruling Price

10. Comments on family labour expenditure in drying, washing, cleaning, etc.

11. Driage allowance per quintal of Black Pepper

12. Packing costs per quintal

13. Any other costs

14. Other relevant details:

APPENDIX II

QUESTIONNAIRE

Marketing of Pepper

I. Type of Intermediary
   Village Merchant/Wholesaler/Commission Agent/Export
   Wholesaler/Internal Wholesaler/Retailer

II. Basic Details

   a) Name & address   :

   b) Product(s) dealt with :   BP/WP

   c) Volume of transactions:

   1. Pepper

      Peak average

      Lean average

   2. Others:

      i.

      ii.

      iii.

      iv.

      v.

III. Overheads & Operating Expenses:

                     Rent   Original   Depreciation   Remarks
                              value
----

1. Building

2. Storage structures
   a)
   b)

3. Furniture

4. Equipments & Machinery
   a)
   b)
   c)

Expenditure   Remarks

5. License fee

6. Electricity

7. Communication charges

  a) Postal

  b) Telephone

8. Travel

9. Cost of material

  a) Packing

  b)

  c)

10. Other costs:

  a)

  b)

  c)

11. Labour charges	Owned		Hired	
	No.	Wages	No.	Wages
a) Permanent staff				
b) Casual labour				

12. Taxes paid:

  a) Local cess

  b) Professional tax

  c) Sales tax

  d) Income tax

  e)

13. Capital investment details:

  Total capital

  a) Owned

  b) Borrowed*

*Market finance

Source	Period	Amount	Interest rate

IV. Sale proceeds

    1. From whom purchased

    2. Mode of purchase

    3. Qty. purchased/year

    4. Average price paid/kg

    5. Place of purchase & distance
       from market

    6. Loading & unloading charges

    7. Mode of transport

    8. Transporting charges

    9. Packing costs

    10. Average loss in handling

    11. Weighment charges

    12. Deductions, if any

    13. Drying charges

    14. Brokerage

    15. Others, if any
        a)
        b)
        c)

V. Sales:
    1. Average retention time
    2. To whom sold

3. Mode of sales

4. Market fees

5. Other charges:
   a)
   b)
   c)

6. Price received/kg

VI. Price information:
   a) B.P.

   Date of purchase   Price paid/kg

   1.

   2.

   3.

   4.

   Date of sales   Price paid/kg

   1.

   2.

   3.

   4.

   b) W.P.
   Date of purchase   Price paid/kg

   1.

   2.

   3.

   4.

   Date of sales   Price paid/kg

   1.

   2.

   3.

   4.

VII. Marketing problems & suggestions:

APPENDIX III(a)

Computation of pay-back period at the aggregate
level

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Cumulative gross value product (Rs)	Cumulative total cost (Rs)
1	0	0	5952.54	0	5952.54
2	0	0	3958.64	0	9911.58
3	108.35	1191.85	4150.55	1191.85	14061.73
4	294.54	3239.94	4583.87	4431.79	18645.60
5	565.20	6217.20	4901.45	10648.99	23547.05
6	754.89	8303.79	5412.39	18952.78	28959.44
7	757.87	8336.57	5506.03	27289.35	34465.47
8	757.87	8336.57	5506.03	35625.92	39971.50
9	757.87	8336.57	5506.03	43962.49	45477.53
10*	757.87	8336.57	5506.03	52299.06	50983.56

* Break-even occurs during this year

APPENDIX III(b)

Computation of pay-back period relating to stratum A

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Cumulative gross value product (Rs)	Cumulative total cost (Rs)
1	0	0	7233.45	0	7233.45
2	0	0	4730.83	0	11964.28
3	163.58	1799.38	4846.99	1799.38	16811.27
4	358.75	3946.25	5239.11	5745.63	22050.38
5	633.54	6968.94	5598.53	12714.57	27648.91
6	878.12	9659.32	6447.34	22373.89	34096.25
7	885.85	9744.35	6560.27	32118.24	40656.52
8	885.85	9744.35	6560.27	41862.59	47216.79
9	885.85	9744.35	6560.27	51606.94	53777.06
10*	885.85	9744.35	6560.27	61351.29	60337.33

* Break-even occurs during this year

APPENDIX III(c)

Computation of pay-back period relating to stratum B

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Cumulative gross value product (Rs)	Cumulative total cost (Rs)
1	0	0	6107.05	0	6107.05
2	0	0	4113.04	0	10220.09
3	80.83	889.13	4235.58	889.13	14455.67
4	259.73	2857.03	4551.05	3746.16	19006.72
5	550.37	6054.07	4931.86	9800.23	23938.58
6	770.88	8479.68	5515.76	18279.91	29454.34
7	782.83	8611.13	5684.82	26891.04	35139.16
8	782.83	8611.13	5684.82	35502.17	40823.98
9	782.83	8611.13	5684.82	44113.30	46508.80
10*	782.83	8611.13	5684.82	52724.43	52193.62

* Break-even occurs during this year

APPENDIX III(d)

Computation of pay-back period relating to stratum C

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Cumulative gross value product (Rs)	Cumulative total cost (Rs)
1	0	0	5574.97	0	5574.97
2	0	0	3798.58	0	9373.55
3	110.82	1219.02	4015.85	1219.02	13389.40
4	296.33	3259.63	4553.03	4478.65	17942.43
5	556.78	6124.58	4859.26	10603.23	22801.69
6	735.68	8092.48	5327.57	18695.71	28129.26
7	735.68	8092.48	5330.72	26788.19	33459.98
8	735.68	8092.48	5330.72	34880.67	38790.70
9	735.68	8092.48	5330.72	42973.15	44121.42
10*	735.68	8092.48	5330.72	51065.63	49452.14

* Break-even occurs during this year

APPENDIX IV(a)

Computation of the benefit-cost ratio and the net present worth relating to the aggregate level

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Discount factor 10% (Rs)	Present worth of returns 10% (Rs)	Present worth of costs 10% (Rs)
1	0	0	5952.54	0.909	0	5410.86
2	0	0	3958.64	0.826	0	3269.39
3	108.35	1191.85	4150.55	0.751	895.08	3117.06
4	294.54	3239.94	4583.87	0.683	2212.88	3130.78
5	565.20	6217.20	4901.45	0.621	3860.88	3043.80
6	754.89	8303.79	5412.39	0.564	4683.34	3052.59
7	757.87	8336.57	5506.03	0.513	4276.66	2824.59
8	757.87	8336.57	5506.03	0.467	3893.18	2571.32
9	757.87	"	"	0.424	3534.71	2344.56
10	757.87	"	"	0.386	3217.92	2125.33
11	757.87	"	"	0.350	2917.80	1927.11
12	757.87	"	"	0.319	2659.37	1756.42
13	757.87	"	"	0.290	2417.61	1596.75
14	757.87	"	"	0.263	2192.52	1448.09
15	757.87	"	"	0.239	1992.44	1315.94
16	757.87	"	"	0.218	1817.37	1200.31
17	757.87	"	"	0.198	1650.64	1090.19
18	757.87	"	"	0.180	1500.58	991.09
19	757.87	"	"	0.164	1367.20	902.99
20	757.87	8336.57	5506.03	0.149	1242.15	820.40
20	300 M^3 of wood	15000.00	3000.00	0.149	2235.00	447.00
Total					48567.33	44386.57

APPENDIX IV(b)

Computation of the benefit-cost ratio and the net present worth relating to the stratum A

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Discount factor 10% (Rs)	Present worth of returns 10% (Rs)	Present worth of costs 10% (Rs)
1	0	0	7233.45	0.909	0	6575.21
2	0	0	4730.83	0.826	0	3907.66
3	163.58	1799.38	4846.99	0.751	1351.33	3640.09
4	358.75	3946.25	5239.11	0.683	2695.29	3588.79
5	633.54	6968.94	5598.53	0.621	4327.71	3476.69
6	878.12	9659.32	6447.34	0.564	5447.86	3636.30
7	885.85	9744.35	6560.27	0.513	4998.85	3365.42
8	885.85	9744.35	6560.27	0.467	4550.61	3063.65
9	"	"	"	0.424	4131.60	2781.55
10	"	"	"	0.386	3761.32	2532.26
11	"	"	"	0.350	3410.52	2296.09
12	"	"	"	0.319	3108.45	2092.73
13	"	"	"	0.290	2825.86	1902.48
14	"	"	"	0.263	2562.76	1725.35
15	"	"	"	0.239	2328.90	1567.90
16	"	"	"	0.218	2124.27	1430.14
17	"	"	"	0.198	1929.38	1298.93
18	"	"	"	0.180	1753.98	1180.85
19	"	"	"	0.164	1598.07	1075.88
20	885.85	9744.35	6560.27	0.149	1451.91	977.48
20	300 M^3 of wood	15000.00	3000.00	0.149	2235.00	447.00
Total					56593.67	52562.45

Computation of the benefit-cost ratio and the net present worth relating to stratum B

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Discount factor 10% (Rs)	Present worth of returns 10% (Rs)	Present worth of costs 10% (Rs)
1	0	0	6107.05	0.909	0	5551.31
2	0	0	4113.04	0.826	0	3397.37
3	80.83	889.13	4235.58	0.751	667.74	3180.92
4	259.73	2857.03	4551.05	0.683	1951.35	3108.37
5	550.37	6054.07	4931.86	0.621	3959.58	3062.69
6	770.88	8479.68	5515.76	0.564	4782.54	3110.89
7	782.83	8611.13	5684.82	0.513	4417.51	2916.31
8	782.83	8611.13	5684.82	0.467	4021.40	2654.81
9	"	"	"	0.424	3651.12	2410.36
10	"	"	"	0.386	3323.90	2194.34
11	"	"	"	0.350	3013.90	1989.69
12	"	"	"	0.319	2746.95	1813.46
13	"	"	"	0.290	2497.23	1648.60
14	"	"	"	0.263	2264.73	1495.11
15	"	"	"	0.239	2058.06	1358.67
16	"	"	"	0.218	1877.23	1239.29
17	"	"	"	0.198	1705.00	1125.59
18	"	"	"	0.180	1550.00	1023.26
19	"	"	"	0.164	1412.23	932.31
20	782.83	8611.13	5684.82	0.149	1283.05	847.04
20	300 M^3 of wood	15000.00	3000.00	0.149	2235.00	447.00
Total					49418.52	45507.39

APPENDIX IV(d)

Computation of the benefit-cost ratio and the net present worth relating to
stratum C

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Discount factor 10% (Rs)	Present worth of returns 10% (Rs)	Present worth of costs 10% (Rs)
1	0	0	5574.97	0.909	0	5067.65
2	0	0	3798.58	0.826	0	3137.63
3	110.82	1219.02	4015.85	0.751	915.48	3015.90
4	296.33	3259.63	4553.03	0.683	2226.33	3109.72
5	556.78	6124.58	4859.26	0.621	3803.36	3017.60
6	735.68	8092.48	5327.57	0.564	4564.16	3004.73
7	735.68	8092.48	5330.72	0.513	4151.44	2734.66
8	735.68	8092.48	5330.72	0.467	3779.19	2489.45
9	"	"	"	0.424	3431.21	2260.23
10	"	"	"	0.386	3123.70	2057.66
11	"	"	"	0.350	2832.37	1865.75
12	"	"	"	0.319	2581.50	1700.50
13	"	"	"	0.290	2346.82	1545.91
14	"	"	"	0.263	2128.32	1401.98
15	"	"	"	0.239	1934.10	1274.04
16	"	"	"	0.218	1764.16	1162.10
17	"	"	"	0.198	1602.31	1055.48
18	"	"	"	0.180	1456.65	959.53
19	"	"	"	0.164	1327.17	874.24
20	735.68	8092.48	5330.72	0.149	1205.78	794.28
20	300 M^3 of wood	15000.00	3000.00	0.149	2235.00	447.00
Total					47409.05	42976.04

Computation of the internal rate of return relating to the aggregate level

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Incremental benefit (cash flow) Rs	Discount factor 12%	Present worth of cash flow 12%	Discount factor 14%	Present worth of cash flow 14%
1	0	0	5952.54	-5952.54	0.893	-5315.62	0.877	-5220.38
2	0	0	3958.64	-3958.64	0.797	-3155.04	0.769	-3044.19
3	108.35	1191.85	4150.55	-2958.70	0.712	-2106.59	0.675	-1997.12
4	294.54	3239.94	4583.87	-1343.93	0.636	- 854.74	0.592	- 795.61
5	565.20	6217.20	4901.45	1316.45	0.567	746.43	0.519	683.38
6	754.89	8303.79	5412.39	2891.40	0.507	1465.94	0.456	1318.48
7	757.87	8336.57	5506.03	2803.54	0.452	1267.20	0.400	1121.42
8	757.87	8336.57	5506.03	2803.54	0.404	1132.63	0.351	984.04
9	"	"	"	"	0.361	1012.08	0.308	863.90
10	"	"	"	"	0.322	902.74	0.270	756.96
11	"	"	"	"	0.287	804.62	0.237	664.44
12	"	"	"	"	0.257	720.51	0.208	583.14
13	"	"	"	"	0.229	642.01	0.182	510.24
14	"	"	"	"	0.205	574.73	0.160	448.57
15	"	"	"	"	0.183	513.05	0.140	392.50
16	"	"	"	"	0.163	456.98	0.123	344.84
17	"	"	"	"	0.146	409.32	0.108	302.78
18	"	"	"	"	0.130	364.46	0.095	266.34
19	"	"	"	"	0.116	325.21	0.083	232.69
20	757.87	8336.57	5506.03	2803.54	0.104	291.57	0.073	204.66
20	300 M^3 of wood	15000.00	3000.00	12000.00	0.104	1248.00	0.073	876.00
Total						1445.49		-502.92

Computation of the internal rate of return relating to stratum A

Year	Gross phy-sical pro-duct (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Incremental bene-fit (cash flow) Rs	Discount factor 12%	Present worth of cash flow 12%	Discount factor 14%	Present worth of cash flow 14%
1	0	0	7233.45	-7233.45	0.893	-6459.47	0.877	-6343.74
2			4730.83	-4730.83	0.797	-3483.55	0.769	-3361.17
3			4846.19	-3058.61	0.712	-2177.73	0.675	-2064.56
4				-1292.86	0.636	- 822.26	0.592	- 765.37
5				1370.01	0.567	776.80	0.519	711.04
6		9699.98		3211.98	0.507	1628.47	0.456	1464.66
7		9744.38		3184.08	0.452	1439.20	0.406	1273.63
8		9744.38		3184.08	0.404	1286.37	0.351	1117.61
9				"	0.361	1149.45	0.308	980.70
10				"	0.322	1025.27	0.270	859.70
11				"	0.287	913.83	0.237	754.63
12				"	0.257	859.70	0.208	662.29
13				"	0.229	729.15	0.182	579.50
14				"	0.205	652.74	0.160	509.45
15				"	0.183	582.69	0.140	445.77
16				"	0.163	519.01	0.123	391.64
17				"	0.146	464.88	0.108	343.88
18				"	0.130	413.93	0.095	302.49
19				"	0.116	369.35	0.083	264.28
20		9744.38		3184.08	0.104	331.14	0.073	232.44
		12000.00		12000.00	0.104	1248.00	0.073	876.00
Total						1446.97		-765.13

Computation of the internal rate of return relating to stratum B

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Incremental benefit (cash flow) Rs	Discount factor 12%	Present worth of cash flow 12%	Discount factor 14%	Present worth of cash flow 14%
1			5574.97	-6107.05	0.893	-5453.60	0.877	-5355.88
2				-4113.04	0.797	-3278.09	0.769	-3154.70
3				-3346.45	0.712	-2382.67	0.675	-2258.85
4				-1694.02	0.636	-1077.40	0.592	-1002.86
5				1122.21	0.567	636.29	0.519	582.43
6				2963.92	0.507	1502.71	0.456	1351.55
7		8092.48		2926.21	0.452	1322.65	0.400	1170.48
8		8092.48		2926.21	0.404	1182.19	0.351	1024.17
				"	0.361	1056.36	0.308	901.27
				"	0.322	942.24	0.270	790.08
				"	0.287	839.82	0.237	693.51
				"	0.257	752.04	0.208	608.65
				"	0.229	670.10	0.182	532.57
				"	0.205	599.87	0.160	468.19
				"	0.183	535.96	0.140	409.67
				"	0.163	476.97	0.123	351.15
				"	0.146	427.23	0.108	316.03
				"	0.130	380.41	0.095	277.99
				"	0.116	339.44	0.083	242.88
20		8092.48		2926.21	0.104	304.33	0.073	213.61
20		15000.00		12000.00	0.104	1248.00	0.073	876.80
Total						1986.90		-962.05

Computation of the internal rate of return relating to stratum C

Year	Gross physical product (kg black pepper)	Gross value product (Rs)	Total cost (Rs)	Incremental benefit (cash flow) Rs	Discount factor 12%	Present worth of cash flow 12%	Discount factor 14%	Present worth of cash flow 14%
				-5594.97	0.893	-4996.31	0.877	-4906.79
				-3798.58	0.797	-3027.47	0.769	-2921.11
				-2796.83	0.712	-1991.34	0.675	-1887.86
				-1293.40	0.636	- 822.60	0.592	-765.69
				1265.32	0.567	717.44	0.519	656.70
				2764.91	0.507	1401.81	0.456	1260.80
				2761.76	0.452	1248.32	0.400	1104.70
				2761.76	0.404	1115.75	0.351	969.38
				"	0.361	996.99	0.308	850.62
				"	0.322	889.29	0.270	745.68
				"	0.287	792.63	0.237	654.54
				"	0.257	709.78	0.208	574.45
				"	0.229	632.44	0.182	502.64
				"	0.205	566.16	0.160	441.88
				"	0.183	505.40	0.140	386.65
				"	0.163	450.17	0.123	339.70
				"	0.146	403.22	0.108	298.27
				"	0.130	359.03	0.095	262.37
				"	0.116	320.36	0.083	229.23
				2761.76	0.104	287.22	0.073	201.61
		15000.00	3000.00	12000.00	0.104	1248.00	0.073	876.00
Total						1806.29		-126.23

COST OF CULTIVATION AND MARKETING
OF PEPPER IN IDUKKI DISTRICT

By
VINOD G.

ABSTRACT OF A THESIS
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ABSTRACT

This study was done in 1983. Data for estimating the cost of cultivation were generated from a multi-stage random sample of 72 farmers stratified on the basis of the size of holding. The cost was analysed operationwise and inputwise. The economics of production was also studied by a capital productivity analysis. Pepper marketing was studied from the level of the producers to the terminal market at Cochin. The price spread was arrived at by the concurrent margin method.

The annual cost of cultivation, per hectare, for the first seven years, were Rs.5952.54, Rs.3958.64, Rs.4150.55, Rs.4583.87, Rs.4901.45, Rs.5412.39 and Rs.5506.03 in that order, at the level of the aggregate sample. In general the most conspicuous cost creating operation was the cultural operation, while the corresponding input was human labour. Roughly one-fourth of the total cost was fixed and the rental value of land was predominant in this. The cost of cultivation was found to decrease as the size of holding increased, viewed on a unit area basis.

The analysis of capital productivity revealed that, on the whole, investment in pepper cultivation had a pay-back period of 10 years, a benefit-cost ratio of 1.09, a net

present worth of Rs.4180.76 and an internal rate of return
of 13.48 per cent.

The market structure, market practices and marketing
costs were explored fairly in detail. The marketing
channels identified were Channel I: Producer-Village Mer-
chant-Upcountry Wholesaler-(Commission Agent)-Exporter,
Channel II: Producer-Upcountry Wholesaler-(Commission Agent)-
Exporter, Channel III: Producer-Village Merchant-Upcountry
Wholesaler-(Commission Agent)-Internal Wholesaler and
Channel IV: Producer-Upcountry Wholesaler-(Commission Agent)-
Internal Wholesaler. The price spread in these four
channels were found to be 13.94 per cent, 13.38 per cent,
11.20 per cent and 10.63 per cent in that order.