SOCIO-ECONOMIC CONDITIONS OF COCONUT SMALL-HOLDING SECTOR IN SRI LANKA

Research Study No. 68

April 1986

AGRARIAN RESEARCH AND TRAINING INSTITUTE,
114, Wijerama Mawatha, Colombo 7.

SRI LANKA

SOCIO-ECONOMIC CONDITIONS OF COCONUT SMALL-HOLDING SECTOR IN SRI LANKA

(A Baseline Study of the Pre-Project Conditions of Colombo, Galle, Gampaha, Kegalle, Kalutara and Ratnapura Districts)

ASOKA C K SEPALA

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114, Wijerama Mawatha
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FOREWORD

The Coconut Development Authority at the instance of the donor agencies viz. ADB and IFAD commissioned the Agrarian Research and Training Institute to undertake the benefit monitoring and evaluation of the Small Holder Coconut Development Project (SHCDP) sponsored by them. This ex-ante study on the Socio-economic conditions in the project area prior to project implementation was undertaken as a part of the monitoring and evaluation programme.

The SHCDP is a response to a decision of the Government of Sri Lanka to revamp services directed towards the coconut small holdings sector. An underlying assumption of this decision is that the industry as a whole may gain higher incremental benefits through investments in this sub-sector. The study, a Baseline Survey examined the coconut small holdings sector and it was conducted in 1982/83 in the districts of Colombo, Gampaha, Kegalle, Ratnapura, Galle and Kalutara.

The study records a range of constraints including climatic hazards and insufficient investment incentives to the small holder which retard the capacity for higher production gains. In spite of active public sector investment since 1979 these constraints keep the small holdings at a level of production which is yet barely above subsistance.

The study surfaces a dilemma. The small holdings dominate the acreage, and potentially could yield a higher incremental output to investment than perhaps coconut 'estates'. Yet, the fact that the income from the small holdings very often occupies a subordinate position in the total household income and its production is largely for household consumption discourage the small holders from making higher investments in the crop. The study proposes a range of rectification measures

involving: an intensification of extension work, more appropriate and target group direction of credit and subsidies, group farming;intercropping and animal husbandry to improve land-labour productivities, employment and incomes; and better organisation of the marketing and processing aspects of the coconut industry.

Dr. H D Sumanasekera of the Agrarian Research and Training Institute, took part in this study in the stage of preparing the project proposal. Miss Kalaranji Maheswaran, Research and Training Officer of ARTI assisted in the data collection. Mrs. Asoka C K Sepala, Research and Training Officer served as the Coordinator and was responsbile for the planning and supervision of field work as well as for preparing the report for publication. My thanks are due to them for their efforts. It is hoped that this study would serve to focus policy attention on the issues confronting the development programmes introduced in the coconut small holder sector so that the benefits accruing from such programmes will reach the small-holder.

T B Subasinghe
DIRECTOR

ACKNOWLEDGEMENT

The Author is greatly indebted to a large number of individuals and institutions, farmers, estate managers, government and private organizations - involved in the Coconut Industry for the valuable assistance extended by way of advice, information and comments towards the completion of this study.

The following colleagues of the ARTI research staff are specifically acknowledged:

Dr. Nelson Vithanage, Mr. A Wanasinghe and Dr. H D Sumanasekera were involved in the study during its planning stages, while Messes M Malalgoda, and K Maheswaran took part in the data collection. Many thanks to them. Mr. Lalith Jayasooriya (Statistical Assistant, ARTI) assisted me in conducting the survey, collecting and tabulating the data, supervising the other investigators and in numerous other related tasks. Special thanks to him for his excellent work and the group of investigators for providing an excellent assistance in the data collection and tabulation work.

Dr. R D Wanigaratne, Deputy Director, Agricultural Planning and Evaluation Division, provided willing help through discussions and constructive comments which enabled me to widen the scope of this study.

My particular appreciation is due to the following personnel for their valuable comments on an earlier draft. Mr. Sumith de Silva (Project Director, Coconut Development Authority); Mr. Widanapathirana (Research Officer, ARTI); Prof. Jogarathnam, (Chairman, Post Graduate Institute, Peradeniya); Dr. S M Abeyratne (Director Department of

Economic Research, Central Bank of Ceylon) and Dr. Joseph O'Reilly (Univeristy of Hawaii at Manoa).

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A grateful acknowledgement to the encouragement and guidence received throughout the study period from Mr. T B Subasinghe, the Director of the Institute.

The author alone is responsible for any errors of statement and obscurities that may yet be discerned in the study.

A.C.K.S

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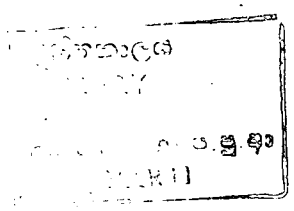

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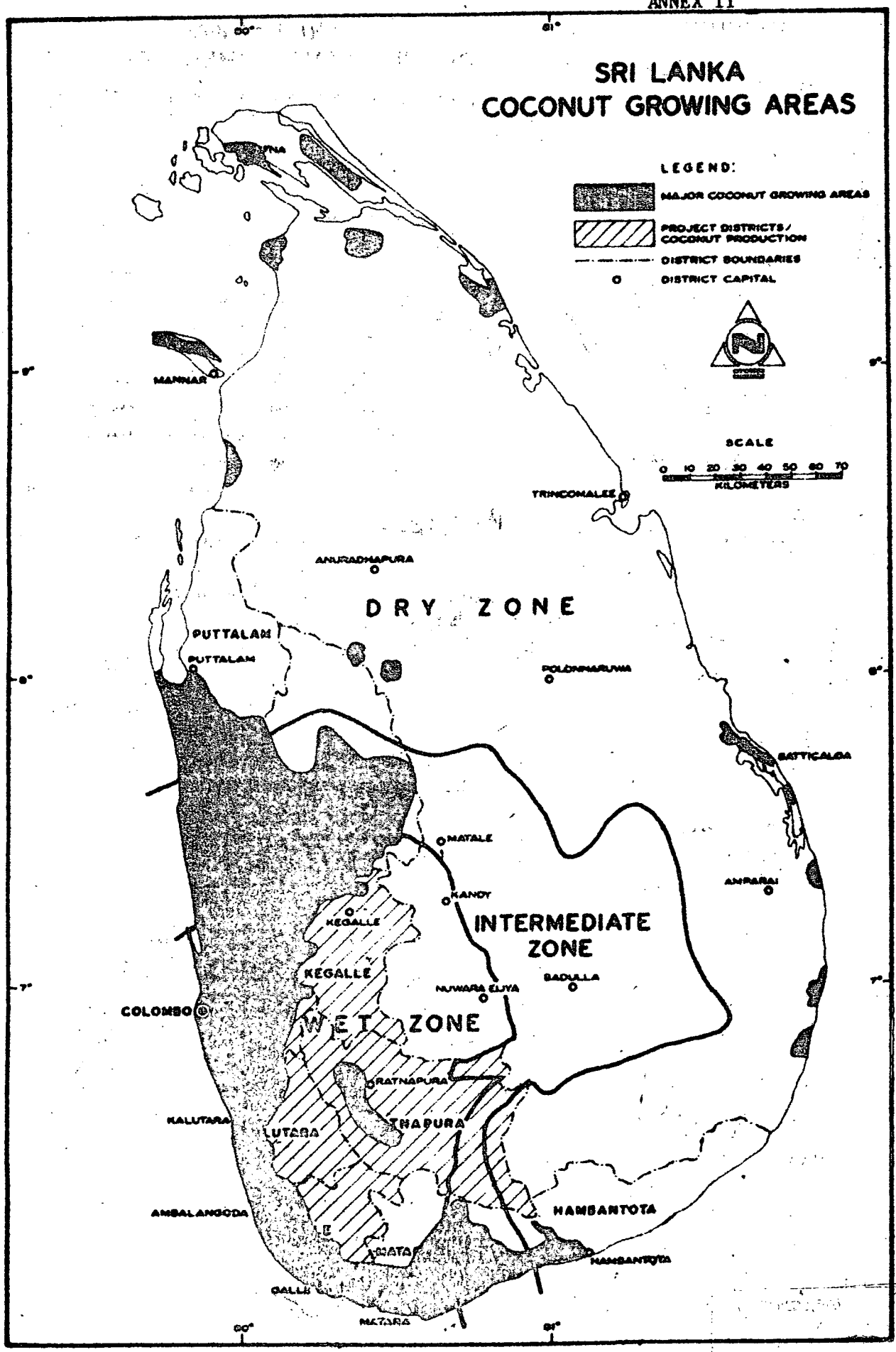
WEIGHTS AND MEASURES

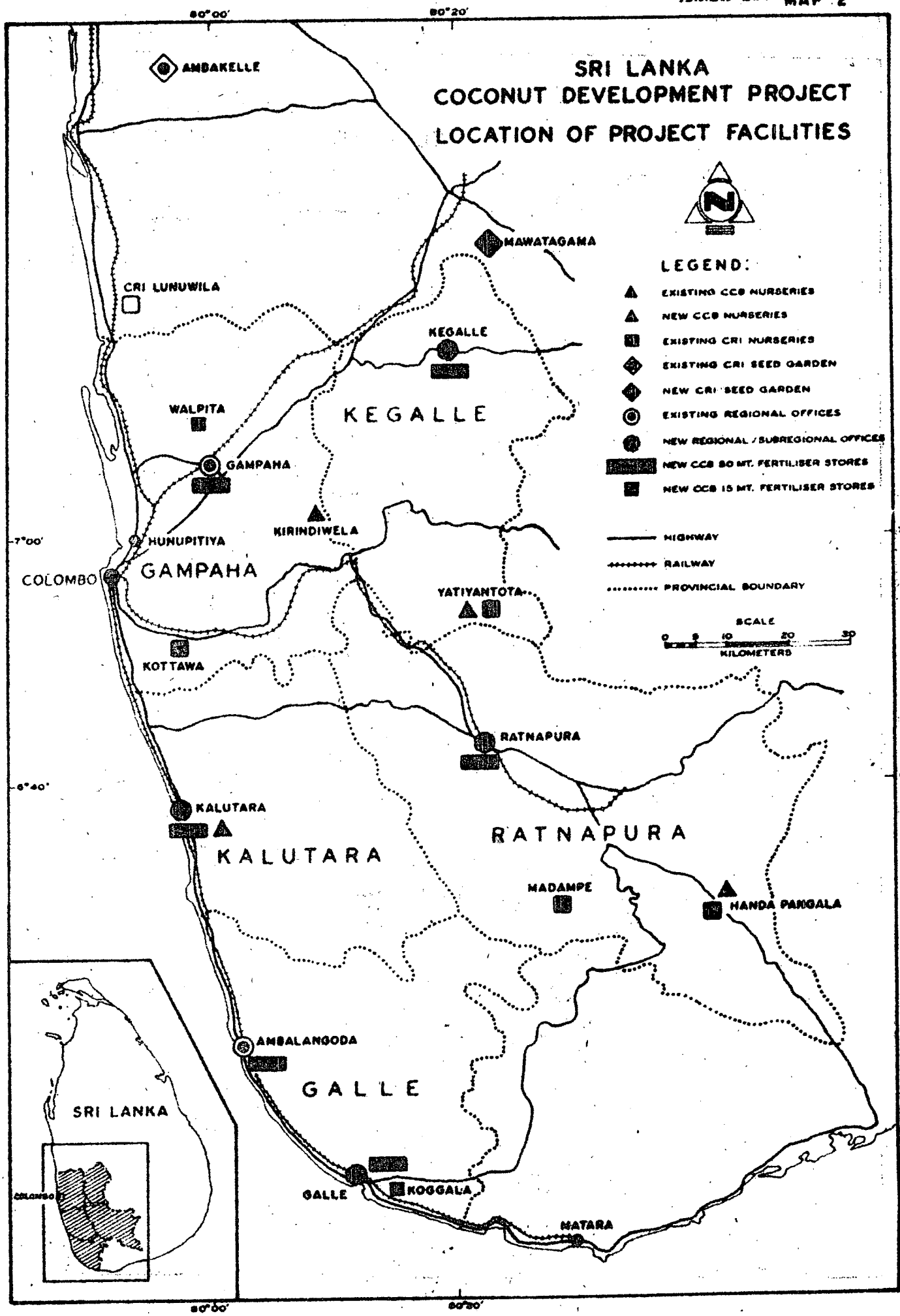
1	Hectare	- 2.471 acres
1	acre	- 0.4047 hectares
1	Kilogramme	- 2.20462 pounds
1	pound	- 0.4536 kilogrammes
1	Metric Ton	- 0.9842 long tons
1	Metric Ton	- 2204.62 pounds

ABBREVIATIONS AND ACRONYMS

A.D.B.	Asian Developmnt Bank
C.C.B	Coconut Cultivation Board
C.D.A.	Coconut Development Authority
I.R.D.P.	Integrated Rural Development Project
C.O.	Cultivation Officer
C.D.O.	Coconut Development Officer
F.A.	Field Assistant

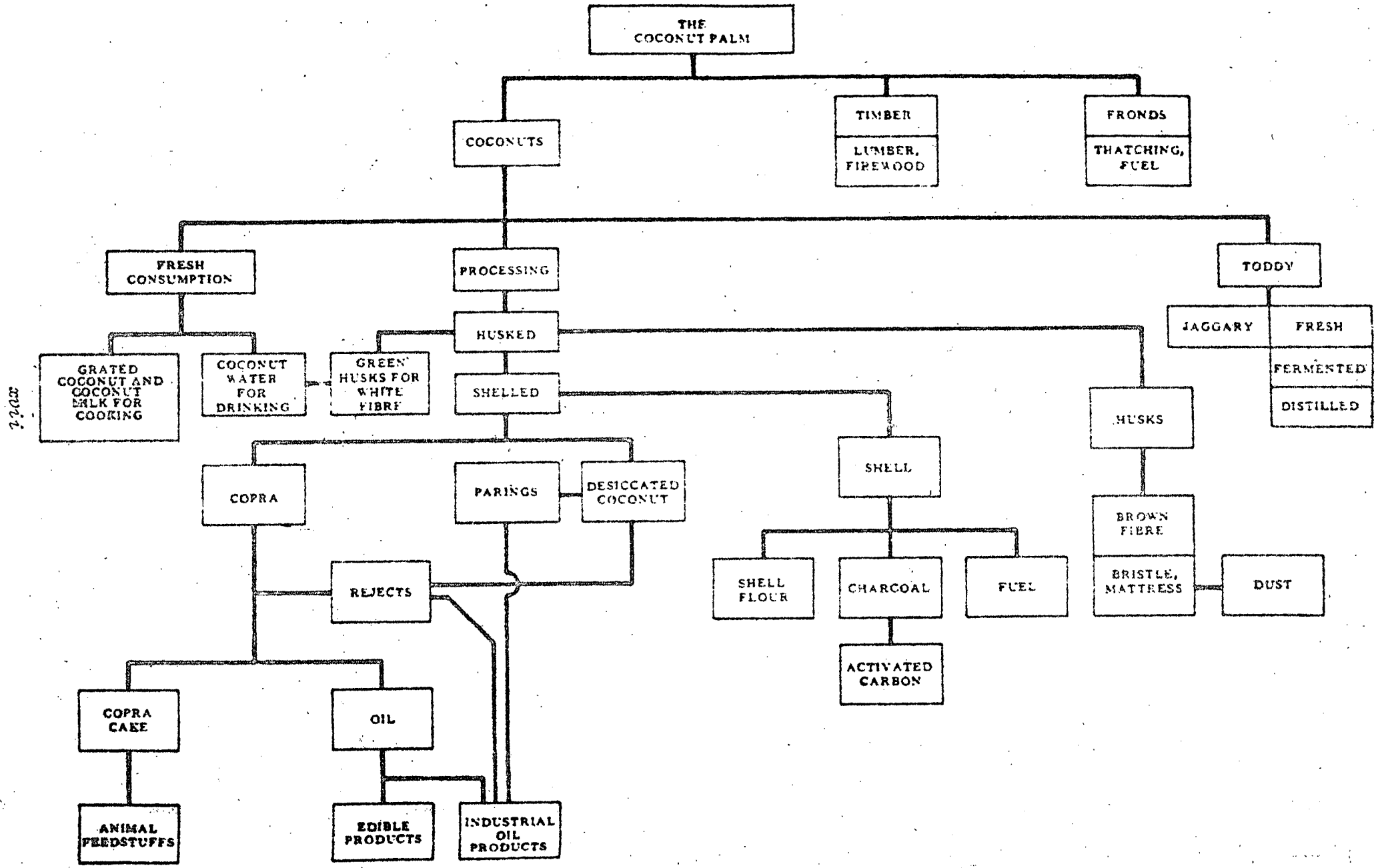
ANNEX II - MAP I




SRI LANKA
COCONUT DEVELOPMENT PROJECT
LOCATION OF PROJECT FACILITIES
LEGEND:
EXISTING CCB NURSERIES
NEW CCB NURSERIES
EXISTING CRI NURSERIES
EXISTING CRI SEED GARDEN
NEW CRI SEED GARDEN
EXISTING REGIONAL OFFICES
NEW REGIONAL / SUBREGIONAL OFFICES
NEW CCB 50 MT. FERTILISER STORES
NEW CCB 15 MT. FERTILISER STORES
HIGHWAY
RAILWAY
PROVINCIAL BOUNDARY
SCALE
0 5 10 20 30
KILOMETERS
80°00'
80°20'
7°00'
6°40'
AMBAKELLE
MAWATAGAMA
CRI LUNUWILA
KEGALLE
WALPITA
GAMPAHA
KIRINDIWELA
HUNUPITIYA
COLOMBO
GAMPAHA
YATIYANTOTA
KOTTAWA
RATNAPURA
KALUTARA
KALUTARA
RATNAPURA
MADAMPE
HANDA PANGALA
AMBALANGODA
GALLE
SRI LANKA
COLOMBO
GALLE
KOGGALA
MATARA

COCONUT PALM PRODUCTS

ANNEX II- MAP 3



CONCLUSIONS

One of the major problems in the coconut industry is the stagnation in production more or less over the past two decades. There have been some cyclical variations, with corresponding changes in prices from time to time. But, by and large these changes have been caused by adverse weather rather than by an appreciable change in productivity.

In seeking a solution to this problem the participation of the small-holder cannot be ignored, as coconut is essentially a small-holder's crop. The small size of the holdings implies that the coconut industry is not as well organized as other agricultural export crops such as tea or rubber. The smallness of the holdings has hindered the application of fertilizer, the adoption of scientific cultivation methods and the adequate maintenance. Since the income from coconut is small when compared to that from other products, the small-holder does not regard his coconut land as an important avenue for investment.

Therefore, subsidies should be aimed at the small-holder and his needs.

If the application of fertilizer, maintainance and good husbandry are difficult for a single holding because of its smallness, group farming techniques can be applied. The Coconut Development Authority can advise and assist farmers in such ventures. For instance land productivity can be increased by providing necessary subsidies and technical assistance. In addition to the present subsidy scheme, subsidizing fertilizer to mature plants can be a short term measure to improve production.

Land productivity can be increased by popularising the cultivation

of intercrops. Since at present intercrops are not favoured by coconut cultivators as income generators, the subsidy scheme should be flexible enough to cover crops like banana, pineapple, passion fruit and even vegetables. Since the project area has suitable climatic and favourable marketing facilities for animal husbandry a scheme for milk production in collaboration with the Milk Board should prove successful.

Introduction of group farming, intercropping and animal husbandry in small holdings will serve several purposes. They will increase land productivity, labour productivity and also absorb a part of the excess labour, while generating new employment. Since the intercrops are fertilized and as animal husbandry will produce organic fertilizer the coconut palms will also be fertilized and this will increase productivity. The smallness of the holding will therefore no longer be an impediment to higher productivity.

According to our survey at least 1/3 of the coconut holdings are home gardens and their products are mainly used for home consumption. Therefore, the marketable surplus of coconut is not so important to these land owners. Hence special emphasis should be placed on promoting extension, marketing facilities and awareness of the commercial value of coconut. Therefore, Coconut Development Officers should devote sufficient time for extension work.

The processing section of the coconut industry should be better organized. In Kalutara and Colombo districts more nuts should be diverted to D.C. production. The local consumption demand in these districts can be met out of production from other regions. The Authority should assist large mills and a government sponsored body should be set up to collect nuts from small-holders for D.C. and copra production.

The producers themselves wanted a floor price to insulate them from fluctuating prices. Coconut is a basic requirement of producers as well as consumers and therefore policy decisions should not inconvenience either category.

The marketable surplus of coconut should be increased, even substitutes for local consumption have to be introduced from outside. This is essential at this stage as our coconut exports are declining and competing countries are appropriating a share of our market. Hence it is not desirable to promote coconut consumption in low production periods. Exports should be promoted but quality standards should be maintained and this will be very beneficial as a long term measure.

The processing sector is handicapped by the shortage of raw material. In the case of copra and D.C., this could be done only with higher production and a higher marketable surplus. Husks should be made available to the coir industry by organizing collection from coconut consumers. Therefore the Coconut Cultivation Board's present subsidy for burying husks as a moisture retainer may not be suitable in the long term. Research can advise cultivators on the use of coir dust which is now being wasted as a substitute for husks.

The manufacture of products from coconut shells should be encouraged where marketing facilities are available. They will help to develop cottage industries which will supplement family income. The marketing of such products pose no problem in the project area where there is an extensive tourist trade.

Research can help the coconut cultivator by supplying him with drought resistant varieties of coconut and other varieties which can be grown with little irrigation or on marshy land. To improve living standards of small-holders new and better uses for other coconut products like husks, coir dust, shells, ekels etc have to be found through more research.

Finally the Coconut Development Authority should organize a scheme to collect additional data and information pertaining to coconut production, processing and other aspects of the industry. Lack of information is a drawback in the formulation of projections for the expansion of the industry.

SUMMARY

Coconut production in Sri Lanka has declined by about 1.5% a year for the last two decades. This has brought about lower export earnings in the processing sector.

The fall in production has been due to several factors, of which lower levels of fertilizer application, senile trees and bad husbandry practices are the main features while recurrent dry spells have aggravated the situation.

Coconut is a small-holder's crop, and any attempt to upgrade production must be aimed at the small-holder. These small-holders need further financial and technical assistance. The Coconut Cultivation Board however has assisted them for the last 10-15 years.

In 1980 a project was formulated by the Asian Developmet Bank to help to solve these problems and assist the smallholders. It will assist the government of Sri Lanka for a 7 year period. The expenditure is spread over 12 years because replanting and under planting need financing till development is complete.

It was proposed by the Coconut Development Authority and Asian Development Bank that this project should be evaluated from time to time for necessary feedback. The Agrarian Research & Training Institute was entrusted with the task.

The evaluation plan is designed to monitor the progress of the project during its implementation and after its completion. Studies include a bench mark survey of the project area, followed by evaluation studies at 5th, 10th and 15th years of implementation. This study

attempts to establish the baseline situation of the project area before the project is implemented.

The average family size within the project area was 5-6 persons and 50% of the population fell within the age group 15-45 years. The sex ratio of the project area was 105 and in about 1/3 of the families one family member had gone out of the project area seeking better pastures. The literacy rate was as high as 90% and 26% of the sample population had educational qualifications which were higher than the G.C.E.(ord. level). The labour force was equally distributed among males and females and the unemployment rate was about 12%. Major activities in the project area are government service and agricultural work representing 44% and 43% respectively.

In these agricultural households coconut and paddy are the main sources of income. 40% of households depend on coconut for their main income, while 39% depend on paddy and 19% on rubber. 57% of the households reported coconut as their secondry source of income.

Ninety five percent of the incomes in the project area are above the standard subsistence level and the monthly average income per family is around Rs. 2,000/-. The per capita income per year is about Rs. 5,380/- but the distribution ranges from Rs. 3,600/- per annum to Rs. 130,000/- per annum. Fifty three percent of the households had a regular monthly income from non farm activities while 18% claim that they have a steady income from farm products. Income distribution was not very satisfactory, as 54% of the households received only 34% of the total income.

In holdings less than 0.4 hectare the income generated from coconut is not more than 25% of the total income. Similarly except Gampaha and Colombo all other districts received only 1/4 of their agricultural income and about 20% of their total incomes from coconut. 30% of the holdings in the project area are less than 0.4 hectares in extent and 81% of the holdings of less than 2 hectares are either home gardens or gardens with a crop mix. The over 2 hectares group has coconut as a

monocrop. The average holding size of the project area was 0.96 hectare. This has given rise to mixed enterprises in most coconut holdings.

Thirty percent of the coconut holdings were either state owned or company owned plantations while 18% had joint owners. The rest belonged to the middle class who derived most of the benefits of the coconut development programme.

Rubber has taken root as a major monocrop over a considerable length of time in the project area with the exception of the Gampaha district. Even though the sample was specifically chosen from coconut land owners only 49% of the land holdings were coconut while 35% of land was paddy and 11% rubber.

Sixty five percent of the coconut acreage are planted with coconut as a mono-crop while 13% were mixed gardens, and 22% intercropped coconut new plantings and underplantings of coconut are about 07% of the total acreage.

Ten percent of the palms were senile, while 10% were more than 60 years old. 24% were in a state of immaturity and every year 01% reach bearing age, while 1.6% reach 60 years. According to the survey results only 139 palms are found in one hectare, instead of the recommended 160.

The estimated coconut production in the project area was 636 million which is a 14% decline over the 1979 crop. The average yield for 1982 was 3475 nuts per hectare. The productivity decline for the period 1962-1981 was 10%, but in 1977-1981 this decline was reduced to 02% which suggests that the subsidy and other rehabilitation programmes have been fruitful.

Yields vary according to holding size, the degree of fertilizer application and number of trees etc, besides climatic factors which are unavoidable. Yields were much better in large holdings, when compared to the small holdings.

Forty percent of the coconut holdings are monocropped, 16% intercropped, while 44% are mixed gardens. The mixed gardens are mostly home gardens which qualify under the less than one acre subsidy scheme.

The most popular intercrop was banana and next in importance was pineapple. 52% of the intercropped holdings reported cultivation of banana. Of the Coconut Cultivation Board approved intercrops, pepper ranks first, because of its easy husbandry. Cocoa and coffee were not very popular in the project area.

Roughly about 07% of the holdings in Kalutara and Galle reported king coconut cultivation and only 03% of the holdings had livestock.

Cost of production for coconut for the first three years, is about Rs. 3,700/- and by inter-planting with banana or pineapple a profit of over Rs. 5,000/- could be obtained.

The principal factors responsible for the variability in coconut yields in the short run are holding size, seedlings planted, fertilizer applied, rainfall in that year and the previous year and the number of drought months.

Only 24% of the holdings applied fertilizer for the year 1982. There is a direct response in yield to fertilizer application. The coconut growers are aware of this fact, but they do not use it as recommended because of the high price of fertilizer and the non availability of funds. Many cultivators fear to invest in fertilizer because of the uncertainty of weather conditions and the long time lag between fertilizer application and yields. Even the holdings which used fertilizer had used less than the recommended dosage. The full dosage was used only for new plantings, and that too was done only to qualify for the subsidy payment. Recurrent droughts reduced yields and the only way to meet this situation is to introduce drought resistant varieties.

The soil conservation measures seemed to be inadequate and only

scant attention was paid to weed and pest control.

In 1982 only 1.5% of land has been replanted and 07% under-planted. Most coconut land owners preferred under planting to new planting. Many preferred C.C.B Tall x Tall seedlings as planting material, though many would have preferred to rely on local seedlings, because of transport difficulties. 91% of the seedlings germinated and 85% of the young plants were successful at the end of three years.

C.C.B subsidy scheme included subsidies for coconut rehabilitation, replanting, under planting, new planting, intercropping, pasture development and subsidies for holdings less than one acre. The most popular subsidies were for those of less than one acre of coconut and for underplanting. Since subsidies are very popular with the holding size group of 0.4-2 hectares the subsidy programme should cater to this target group.

The weak link of the extension net work is the unplanned time schedule of the subsidy programme which calls for the attention of the C.D.Os at all times of the year. If this is remedied C.D.Os can give more attention to extension work.

Even though 78% of the households obtained loans, only 12% obtained them from Government sources for the development of coconut plantations. But the majority of the coconut land owners are in debt to the coconut collection agents.

Assistance from other ministries for the development of the coconut industry has been negligible.

Per capita consumption of coconuts is 135.5 nuts per year. In smaller holdings 94% of the nuts was consumed at home, while in holdings of more than 0.4 hectares, only 06% was consumed. But in holdings above 10 hectares it was negligible.

Fifty five percent of the nuts were consumed as fresh nuts while 24% was converted to copra and 16% to desiccated coconut. This was quite different in the non project area.

Sixty percent of the mills are situated in the project area and the percentage of coconut milled is very small. Most of the machinery in the mills are outdated but in working order.

The local demand for coconut oil is about 64,000 metric tons per year and will grow at least by 01% annually. Hence coconut production has to be increased to meet local demand and for export.

The desiccated coconut industry is mainly for the export market and Sri Lanka is second in world D.C. trade. The problem faced by the D.C. industry is the shortfall in coconut production. Therefore to maintain quality many mills had to reject inferior quality coconut and this created a severe shortage. In the project area the fibre industry is confined to Kalutara and Galle and the production was used mainly locally.

Thirty eight percent of the nuts are used for home consumption while 62% entered the market chain and of this 37% entered market through intermediates.

The demand for coconut depends upon the price of fresh nuts, size of the nut, seasonal availability, taste, preference and the size of the family. 46% of the coconut yields are obtained in the period May to August and the largest sales are also in the same period. The prices too are low during this period. Normally, a coconut producer receives 82% of the retail price of which 52% is the cost of production. Even in high price periods this producer's profit margin remains the same while the intermediary's share expands. Larger coconut holdings play a prominent role in the price bargain while the small-holders are exploited by the intermediates. The prices are influenced by cost of production, location, transport availability, season and yield.

In the event of a price increase the middleman,s share becomes

big. Hence, the producer has to seek state intervention to market his products. He would expect at least a floor price. The market margins cover about 18% of the price so that marketing cannot be considered efficient.

In order to protect both producer and the consumer of coconuts a more efficient system for the dissemination of information is needed.

Chapter One

INTRODUCTION

Coconut production which contributed significantly to the national economy over a long period, has declined sharply in recent years. Coconut exports have fallen in terms of both volume and value. Exports declined in the face of high prices in the world market, and alongside an expanding domestic demand. The decline was aggravated by falling production brought about by recurrent droughts, decline in fertilizer use, failure to replant, inferior husbandry practices and ownership ceilings imposed by land reform laws.

Coconut is predominantly a small-holder's crop so that the decline in production in coconut is especially a small-holders problem. To remedy this situation small-holder need suitable assistance both financial and technical. Even though the government has rendered assistance over a long period yet small-holders have achieved only limited success. For the small-holder a subsidy alone will not help to increase productivity, he needs better management of his holding, better agronomic practices and free access to the market, because at present, major share of the consumer's rupee is additionally absorbed by the intermediaries.

1.1 National Output

The average total production of coconuts for the last 10 years (1971-1981) was 2236 million nuts. In 1977 and in 1973 production was below 2000 million nuts (1821 million and 1953 million respectively)

while in 1972, which was the best year in the recent past, production was 2936 million nuts.

Table 1.1

Productivity Index for Coconut

Year	Index based on volume	Index based on value	Year	Index based on volume	Index based on value
1962	107	69	1972	113	90
1963	93	69	1973	74	100
1964	115	80	1974	78	155
1965	103	81	1975	92	115
1966	94	71	1976	89	178
1967	93	76	1977	70	279
1968	100	104	1978	85	403
1969	93	90	1979	92	225
1970	96	96	1980	78	517
1971	100	100	1981	87	655

Base year = 1971
Adopted from the Coconut Statistics - Coconut Devt. Authority

The contribution to GDP was about 4% and was static for the last 8-10 years. In 1981 export earnings accounted for 11% of the total earnings.

The export component consists of fresh nuts, desiccated coconut, copra and coconut oil which account for 75% of the export earnings from coconut. The rest of the coconut exports are coir fibre and coconut

shell products etc. During the period 1960-1980 total export earnings from coconut products to the GDP have varied from 19% in 1963 to about 07% in 1980. Over a long period coconut export earnings have stagnated around 12%-14% of the total earnings (except in recent years). This declining trend in the coconut export sector is the result of two factors.

(1) Variations in the yield pattern from year to year resulting from natural and climatic factors such as the quantity and pattern of rainfall,

(2) Decline in the marketable surplus available for export, particularly during periods of low production when more coconuts are diverted to local consumption.

1.2 Local Consumption

With the population increase from 7.5 million in 1951 to 14.9 million in 1981 coconut consumption has increased from 943 million nuts to 1820 million nuts per year. In 1950 local consumption approximated 50% of the production, while in 1970s it increased to 70%

The domestic consumption of coconut is conditioned by population growth and rising income levels. The average per capita consumption of coconut is about 120 nuts per year, (Consumer Finance Survey Central Bank) but in coconut producing areas it averages about 160. (Survey data)

1.3 Regional Distribution

Although coconut is cultivated in almost all parts of the country the economic importance of the crop varies considerably from region to region. In some areas its the main source of income, while in most other areas its products are used to supplement consumption needs. Annex II, Map I and Annex I Table V.

The largest extent under coconut is in the Kurunegala district which covers 1/3 of the total land area under coconut and 70% of the agricultural crop area. In Colombo and Gampaha districts coconut occupies 43% of land area and 65% of agricultural crop area while in Puttalam District it occupies 80% of the agricultural area. These four districts, and the Hambantota district where coconut occupies 58% of the agricultural area, account for 73% of the total coconut lands in the country.

In four other districts, i.e. Kegalle, Galle, Matara and Kalutara, coconut is considered as one of the main crops, where it ranks second or third in importance from the point of view of land utilization. In the districts of Kandy, Matale, Jaffna and Ratnapura, coconut assumes considerable importance and occupies about 30,000 acres of land. In other districts coconut is cultivated only as a home garden crop.

1.4 The Project

In the light of the above background the Asian Develelopment Bank has agreed to finance Subsidies for coconut in six districts namely Colombo, Gampaha, Kegalle, Ratnapura, Kalutara and Galle to help the coconut producers in increasing yields. The proposed project is expected to increase small-holder production, to up grade research and to modernise the processing sector and thereby increase export earnings as well as meet domestic consumption needs.

The objectives are achieved by;

1) provision of assistance to smallholders to replant senescent trees, rehabilitation of plantations, promotion of intercropping, improvement of supply and distribution of fertilizer and other planting materials;

2) improvement of extension services;

3) provision of support for coconut research;

4) establishment of a training centre and the conducting of training courses;

5) improvement in product processing efficiency;

6) improvement of the marketing structure, particularly to maintain the quality and to provide storage facilities; and

7) provision of consultancy services.

The production component of the project will assist the Government of Sri Lanka to increase coconut production in the short run by stepping up fertilizer use and by making available credit to small farmers. In the long run it will assist the industry through a replanting programme spread over a 5 year period. In addition the project will give institutional support to the Coconut Development Authority.

Though the project is designed for a 5 year period, its expenditure will be spread over 12 years because replanting and under planting need financing till the end of the period.

The Coconut Development Authority and the Asian Development Bank proposed that this project be evaluated from time to time and the Agrarian Research & Training Institute was commissioned for the purpose.

The evaluation plan is designed to monitor the progress of the project during the period of its implementation and at several stages after its completion. Five major studies would be undertaken in addition to four indepth studies. The major studies include a benchmark survey of the pre-project conditions of the project areas followed by evaluation studies at the completion of the project at three phases; 5th, 10th and 15th year of implementation.

The purpose of this document is to fulfil one of its objectives. That is to establish a base line for the social and economic conditions of the small-holder, prior to the commencement of development activities.

1.5 Project Area

The choice of the project area, from the production angle, was mainly prompted by the fact that the main coconut growing areas which have on-going or projected integrated rural development programmes, had to be left out from the study.

Therefore the coconut plantations of Sri Lanka situated in Kurunegala, Puttlam and Hambantota districts which compose about 60% of the coconut lands are not included in the project. The project areas cover 34% of the coconut lands in the country and include Gampaha, Colombo, Kalutara, Kegalle, Galle and Ratnapura districts. In these districts, coconut ranks as the second or third important crop.

1.6 Climate and Rainfall in the Project Areas

The topography of the project area varies from flat to rolling terrain in the coastal areas, and in the interior regions like Kegalle and Ratnapura the terrain is hilly. In the coastal regions and in parts of Ratnapura the soil is made up of red yellow podzolic soils with a well developed laterite layer. In the hilly areas of Kegalle and Ratnapura, the soil contains mainly reddish brown podzolic soils. These soils of the project area have been classified by the Coconut Research Institute as suitable for coconut.

The variations in the monthly mean temperatures and in the humidity are negligible. But the distribution of rainfall varies within the project area. The main annual rainfall in Colombo is 94.31 inches while Ratnapura records 153.06. Between the two locations, the rainfall pattern varies considerably. The high rainfall months in Colombo are April, May and June. However, from 1977 onwards, an unusually dry spell over took the country and recurrent drought was one factor responsible for the drop in coconut production.

1.7 Land Utilization

The main crop in the project area is rubber and is followed by coconut, paddy and tea in that order. 84% of Sri Lankan rubber is grown in the project area and is the main crop in all districts except in Colombo and Gampaha.

1.8 Demographic Characteristics of the Project Area

The project area had a population of 5.5 million persons in 1971. The population for 1981 (estimated by the Census and Statistics Department) was 6.8 million, an increase of about 28%. The population density of Colombo was 3306 persons per square mile and in Ratnapura this was much lower, about 529 persons per square mile (in 1971). In all other districts it was around 1100 persons per square mile. 58% of the sample population derive their income from non agricultural activities, while the rest depend on agriculture and related activities. From an occupational perspective, agriculture ranks second in importance because the project area consists of highly urbanized locations like Colombo, Gampaha, Galle and Kegalle.

1.9 Objectives of the baseline study area

1) to document the baseline situation of the project area especially with reference to the socio-economic conditions of the project beneficiaries, the management practices in the coconut lands, the methods of production, the inputs used, the farm capital and credit facilities available, and the available processing and marketing systems;

2) to identify the existing institutional support and the infra-structural facilities for farming and the social activities in the project area, prior to the commencement of

the development programmes;

3) to identify the factors that constrain small scale production, processing and marketing of coconuts and to construct a set of indicdators for the measurement of developmental changes at the post project stage; and

4) to provide the project management and implementing agencies with a better understanding of the project area and to highlight deficiencies if any in the allocation of resources and the implementation of the project.

1.10 Selection of the Locations

The study of the assessment of the preproject conditions of the project area (Colombo, Kalutara, Kegalle, Galle and Ratnapura) was done with the comparison of another area without the project effects. Kurunegala was chosen because of its higher contribution to the coconut industry; Matara because of its integrated rural development programme of which coconut was one of the development inputs, and Matale because it is a marginal coconut area, without any direct or indirect project benefits (at the time of the study). In addition, 20 estates from the study area (project and non project areas) were surveyed to collect comparative information needed for the analysis of the smallholdings. Twenty oil mills and desiccated coconut mills from the project and non project areas were surveyed to ascertain the conditions of the processing facilities available.

1.11 Study Sample

A sample of 750 small scale coconut cultivators with (less than 05 hectares) were drawn from the study area using a multi stage random sampling techniques. In the absence of a proper sample frame, the Grama Sevaka divisions were chosen as basic sample units. Since 98% of the

project area was in the wet zone the zonal effect was assumed to be negligible. Thirty Grama Sevaka divisions were therefore chosen from the project area and nine from the non project area were selected as the primary sampling units.

Secondly, the coconut holdings of each selected Grama Sevaka division were classified into three groups, on the basis of extent of land, as recorded in the highland crops register of the Department of Agriculture :

1. less than 0.4 hectares
2. 0.4 - 2 hectares
3. 2 + hectares

A proportionate sample of 25 households from each Grama Sevaka division in the project area and of 30 households from each Grama Sevaka division in the non project area, was chosen to represent the study area.

The selection of estates and oil mills was done on a random basis from a list of estates, and oil and desiccated coconut mills obtained from the Coconut Development Authority.

1.12 Limitations of the study

The predominance of the small-holder in coconut cultivation, the need to meet an expanding consumption demand, as well as its export oriented nature make coconut a unique crop among plantation crops. These special characteristics have imposed several limitations on this study.

Due to the absence of reliable information the selection of a smaple frame created a problem. Even the land holdings categorized in the high land crop register as coconut lands, were mostly mixed gardens. To overcome this difficulty every holding which had more than 30 coconut palms was identified as a coconut holding.

Since coconut is a home garden and a small holding crop for any figures on production, one has to depend entirely on the memory of the land owners. Secondly, its highly consumable nature prevents its entry to the market chain and estimates of consumption reveal that about two thirds of the crop is consumed locally. Thirdly, the possibility of double counting exists i.e. sometimes the same nut could be counted in the desiccated category as well as in the fresh nuts category. These factors gave rise to difficulties in calculating production.

Similarly the consumption levels of coconut are also estimated with several assumptions such as :

1) The competition from other substitutes is negligible;
2) Coconut consumption has a unique pattern in people's daily requirements;
3) Consumption of coconut was identified as consumption in the form of fresh nuts, desiccated coconut and oil only. Other uses were assumed to be negligible.

Therefore the estimated figures cannot be regarded as being very accurate.

The information on labour use such as employment patterns, labour days spent etc. are also only estimates. Coconut estates need little management, and employment cannot be identified as seasonal. Most of the coconut small-holders had other avenues of income and hence very little attention was paid to the coconut holding itself. The pattern of marketing is also unique to coconut. Many small-holders sell varying portions of their products as and when the need occurs. Hence the quantity marketed and the price recieved are also at most, only averages.

Table 1.2

Selection of the Sample

(a) Project Area

Colombo, Gampaha, Ratnapura, Galle Kalutara and Kegalle Districts

(b) Non-project Area

Kurunegala, Matara and Matale Districts

Step 1. (a) and (b)

Selection of G S Divisions with more than 20 hectares of coconut from the list of villages published by the Department of Public Administration and from the High Land Crop Registry of the Department of Agrarian Services.

Step 2

(a) Selection of five G S Divisions from each district to represent the sample, using random sampling techniques.

(b) Selection of three G S Divisions from each district to represent the sample, using random sampling techniques.

Step 3

Classification of coconut lands of each G S Division into three size groups of holdings, using the High Land registry.

Size group 1. less than 0.4 hectares
2. o.4 -2 hectares
3. 2 hec. and above

Step 4

Selection of a random sample of 25 households from each village, giving a proportionate weightage to the holding size groups.

Chapter Two

SOCIO ECONOMIC CHARACTERISTICS OF THE FARM HOUSEHOLDS

The socio-economic characteristics of the project area were discussed briefly in the previous chapter. This chapter is mainly concerned with the findings of the sample survey pertaining to a sample of households which own more than 0.4 hectares of coconut land.

2.1 Demographic Characteristics

The average household size in the project area was 6.5 persons, and the family size was 5.4 persons per family. Household size was assumed to be the number of people living in a house and the family size to be the size of the nuclear family. The difference could be attributed to the presence of domestics, labourers and old relatives in the households.

The age structure of the sample households reflected a similarity to the national age pattern recording the highest number of male and female population within the age group of 15-21 years. More specifically 49% of the population fell within the age group 15-44 years (Table 2.1).

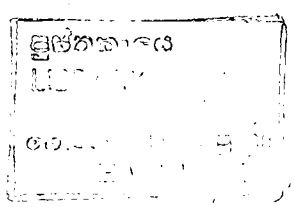


Table 2.1

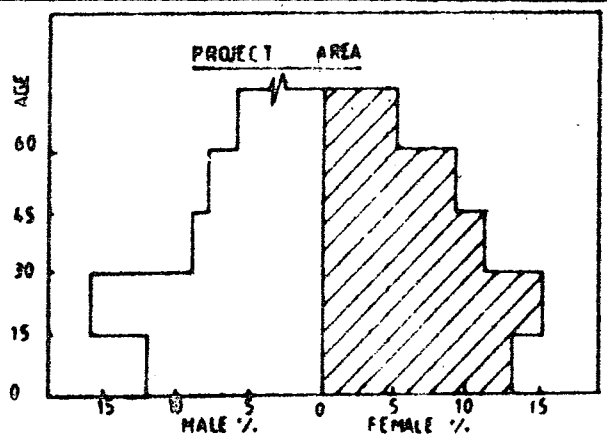
Percentage Distribution of Sample Population by Age

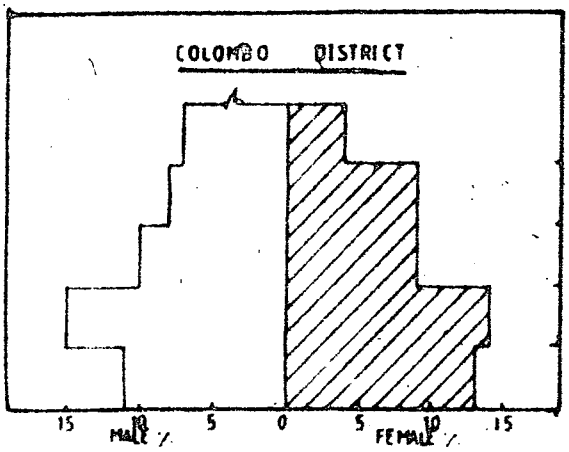
Age Group	Percentage of Population						
	Colombo	Gampaha	Ratna-pura	Kegalle	Kalu-tara	Galle	Total
0 - 14	24	32	30	24	23	21	24
15 - 29	29	31	32	32	26	34	31
30 - 44	19	19	18	18	19	16	18
45 - 64	19	18	15	19	20	19	18
65 +	09	10	05	07	12	10	09
Total	(640)	(593)	(763)	(687)	(607)	(645)	(3935)
	100	100	100	100	100	100	100
Dependancy rates	49	47	54	45	54	45	49

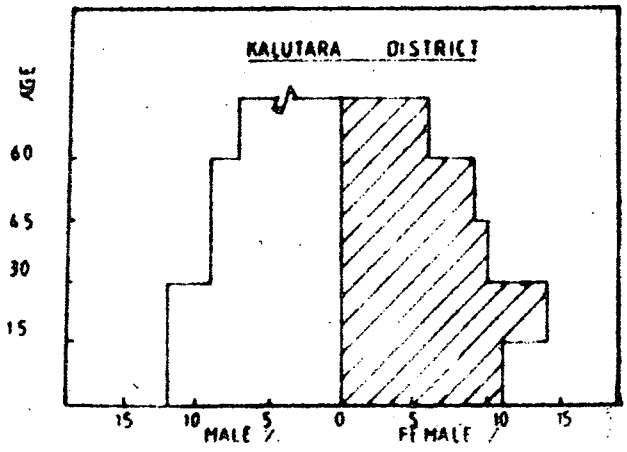
Figures in brackets are actual number of persons.

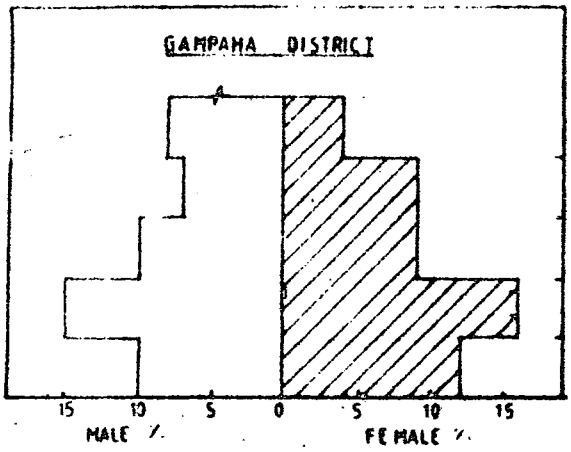
Dependancy rates = $\frac{\text{Sample population of age group 0-14 and age group 65 +}}{\text{sample population of age group 15 - 64}}$

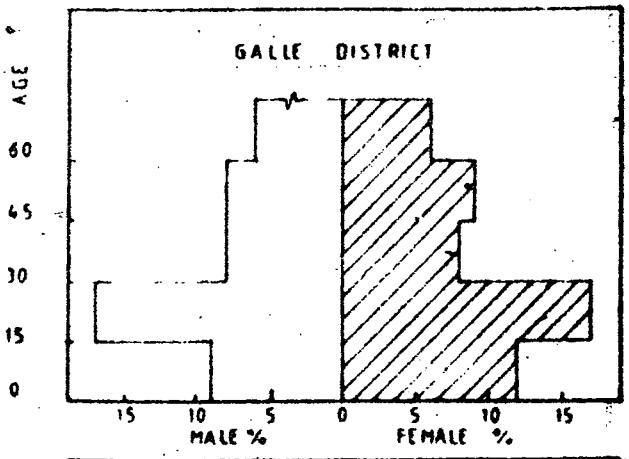
DISTRIBUTION OF SAMPLE POPULATION BY AGE & SEX

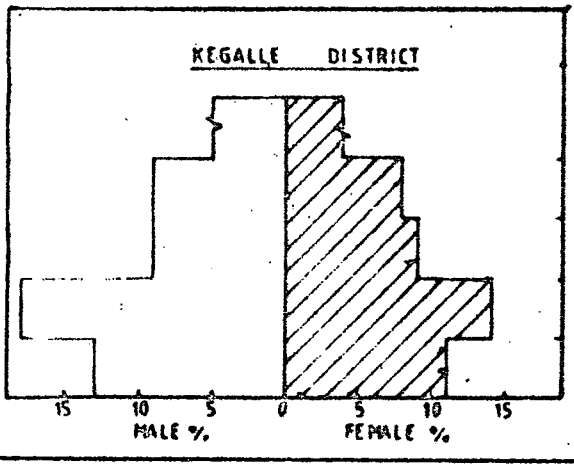


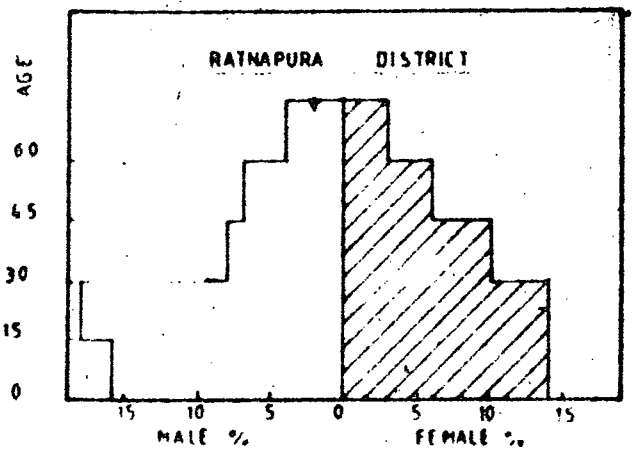












The population pyramids show that the population under 14 is however lower than that in 15-29 age group. This shows a lower natural growth rate. The population distribution by age and sex remains more or less static upto the age group of 64, except in the case of the 15-29 age group. This unchanging pattern shows that changes are only due to the changes in birth and death rates. More specifically, the age group 15-44 accounts for about 49% of the total population which forecast a larger work force in the future. The presence of a large labour force has an impact on the labour supply situation, with outward migration assuming an important position. Roughly, in about one third of the households at least one family member has gone out seeking better pastures, while one out of every eight households has one member employed abroad. This is evident in the lower dependency ratio of 48%. The sex ratio of the project area was 105 (Table 2.3) and this tallies with the national figure. In Galle, Matara, and Kalutara the sex ratio was less than one hundred, indicating the presence of a higher population of females. The national census figures are also suggestive of a similar situation for which explanations are hardly possible. (We have also included the temporary migrant family members in the sample) The avai- lability of better health facilities, lower infant death rates due to better sanitation, higher educational levels of mothers and the presence of large number of unmarried women (especially in Matara district) may be contributory factors.

The survey data included housing as an indicator of the social and economic conditions of the sample households. The analysis brings to light the fact that the coconut smallholder has reasonably adequate housing facilities. 70% of the houses were permanent structures, most of which have four or five rooms including a kitchen. Only one fifth of the sample households had electricity. In most of the areas surveyed, water was available for drinking and bathing purposes. Despite this fact, many inhabitants in the sample complained of inadequacy of this facility. The reason may be the unprecedented long drought that the regions experienced during the survey period.

Table 2.3

Percentage Distribution of Sample Population by Age and Sex

Age Group	Percentage of Population													
	Colombo		Gampaha		Ratna-pura		Kegalle		Kalu-tara		Galle		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0 - 14	11	13	10	12	16	14	13	11	12	11	09	12	12	12
15 - 29	15	14	15	16	18	14	18	14	12	14	17	17	16	15
30 - 44	10	09	10	09	08	10	09	09	09	10	08	98	09	09
45 - 64	09	10	08	10	08	07	10	09	10	10	09	10	09	09
65 +	06	03	07	03	03	02	04	03	07	05	05	05	05	04
T o t a l	51	49	50	50	53	47	54	46	50	50	48	52	51	49

2.2 Literacy

More than 85% of the heads of households in the area were able to read and write. The overall literacy rate was as high as 90%. In Colombo, Gampaha, and Galle this was even higher, recording 92%. When educational attainments are categorized according to sex, Colombo and Gampaha recorded a higher percentage of males who had obtained higher educational qualifications while females were better educated in Kalutara and Galle districts. These higher educational qualifications and the presence of an urbanized population, has created a demand for employment in the service sector rather than in agriculture (Table 2.4).

Table 2.4

Educational Status of the Sample population *

Level of education	Colombo	Gampaha	Ratna-pura	Kegalle	Kalu-tara	Galle	Total
No of schooling	09%	08%	11%	10%	10%	08%	09%
No schooling but literate	-	01%	02%	02%	01%	01%	01%
Primary grades	21%	18%	31%	30%	23%	25%	25%
Grade vi - ix	40%	37%	39%	37%	34%	38%	38%
G C E O/L passed	25%	26%	14%	12%	23%	21%	20%
GCE A/L and Higher Qualifi-cations	05%	10%	03%	09%	09%	07%	07%

Includes only the population of over 5 years of age

2.3 Labour Force

The labour force analysis presented below includes all adults between the ages 14-65 with the exception of students and invalids.

Table 2.5
Labour Force

	No of individuals
Household size	6.5
No. in the labour force	4.3
Male labour	2.2
Female labour	2.1

2.4 Activity Status

The following formula was used to calculate the activity status of the project area.

Table 2.6
Activity Status

Economically active		Economically non active		
a + b		c + d + e		
(a)	(b)	(c)	(d)	(e)
Employed-includes casual and family workers who had at least 15 days of work per month	Unemployed-includes wage labourers and casual workers without employment for at least 15 days on a month.	house wives	students	others (disabled too old, too weak etc).

No of dependants per employed person = $\frac{b + c + d + e}{a}$

Crude activity rate = $\frac{a + b}{\text{Total sample}} \times 100$

Net Activity rate = $\frac{a + b}{\text{Total sample - Persons less or over than 15-64 age group}} \times 100$

Number of dependants per employed person is more than two in all districts except Kalutara; and the dependency ratios vary within the range 45%-54%. These lower dependancy ratios and the number of dependants per person suggest that there is substantial unemployment in the project area (Table 2.7).

Table 2.7

Distribution of Sample Population by their Activity

Level of education	Colombo	Gampaha	Ratna-pura	Kegalle	Kalu-tara	Galle	Total
	%	%	%	%	%	%	%
Employed	30	30	30	30	34	29	31 (1203)
Unemployed	09	10	09	10	11	18	11 (440)
Students	27	24	33	29	22	26	27 (1065)
Housewive	17	18	16	17	15	12	16 (615)
Others, invalids, etc.	17	18	12	14	18	15	(612)
Total	100 (640)	100 (593)	100 (763)	100 (687)	100 (607)	100 (645)	100 (3935)
Labour force	67 (428)	68 (403)	65 (495)	69 (473)	65 (394)	69 (443)	67 (2636)
No. of dependants per employed person	2.3	2.3	2.3	2.3	1.9	2.4	2.2
Crude activity rate	39	40	39	40	45	47	42
Net activity rate	58	59	60	58	69	68	62

(number in brackets are totals)

The crude and net activity ratio for males and famales showed a marked difference. The lower rate for females observed in all districts is due to the omission of housewives from the economically active population.

The employment status in the project area, in brief, is as follows:

Table 2.8

Employment Status in Brief

District	Colombo	Gampaha	Ratnapura	Kegalle	Kalutara	Galle	Total
Percentage employed in the sample	30	30	30	30	34	29	31
Percentage employed in the labour force	45	44	46	43	52	42	46
Percentage employed in the economically active sector	77	75	77	75	76	61	74

Table 2.9

Unemployment Status of the Project Area

District	Colombo	Gampaha	Ratnapura	Kegalle	Kalutara	Galle	Total
Percentage unemployed in the sample	09	10	09	10	11	18	11
Percentage unemployed in the labour force	13	15	11	14	17	26	16
Percentage Unemployed in the economically active sector	23	25	23	25	24	38	26

The unemployment rate in the area was 11%. Among males unemployment was about 09% and among females it was about 14%. Districtwise analysis shows that the unemployment rate is much higher in Galle (18%) while in Colombo and Ratnapura it was 09%. The lower unemployment rate in Colombo and Ratnapura testifies to the availability of diverse avenues of employment there. But the problem is acute in Galle with a higher percentage of unemployed females. Most of the unemployed belong to the age group of 20-34, and this is the age group with a higher literacy rate. As we suggested earlier the higher unemployment rate in this range may be due to the fact that the youthful population is looking for job opportunities outside agriculture. The reason for this may be the lower income from agriculture, as well as the negative marginal contribution to agriculture production. Unless inter cropping is introduced in large scale, finding employment opportunities for this group in the coconut plantation sector, will be difficult.

2.5 Major Activities in the Project Area

Government service, farming and trading form the major occupational activities of the project area. The majority of the employed are either Government servants or those who are engaged in agricultural work. These two categories account for 44% and 43% respectively of the employed population (Table 2.10). Government Service ranks first among the avenues for employment in more urbanized areas like Colombo, Gampaha, Kegalle and Galle. Trading and other business activities have opened up significant work opportunities in Ratnapura and Galle. In Ratnapura as is well-known, a fairly larger number of people are engaged in gemming. However, in all these districts farming ranks either the first or the second most important avenue for employment. In these agricultural households coconut and paddy are the main sources of income; 40% of the households depend on coconut for their main income while 39% depend on paddy and 19% on rubber. The crops cultivated are tea in Kegalle and Galle areas, Cinnamon in Galle and Matara areas and pulses in Kurunegala and Matale areas (Table 2.11).

Similarly 57% reported their second major income is coconut while paddy ranks next, followed by rubber, tea, pineapple, pulses and tobacco in that order (Table 2.12).

2.6 Income Profile of the Sample Households

The distinctive feature that characterises the sample household, is that about 95% of the incomes are above the standard subsistance level, which is Rs. 3,600/-per annum. But the income distribution of the households ranges from Rs. 6,000/- per annum to Rs. 130,000/- per annum. The average annual income of the households in the project and non project areas, amounted to Rs.28200/- and Rs.26700/- respectively and the monthly average income of all districts is around Rs. 2,000/-.

Table 2.10

Percentage Distribution of the Employed According to Main Occupation

Main Occupation	Colombo	Gampaha	Ratna-pura	Kegalle	Kalu-tara	Galle	Total
Agriculture	29%	35%	57%	35%	52%	39%	43%
Govt. Service	59%	51%	27%	51%	39%	39%	44%
Trading and Other	07%	05%	15%	08%	07%	13%	09%
Pension and other social subsidy holders	05%	09%	01%	06%	02%	09%	04%

Excludes employed children and part time workers

Table 2.11

Percentage distribution of Households depending on Major Agricultural Crops for their Main Income in the Project Area

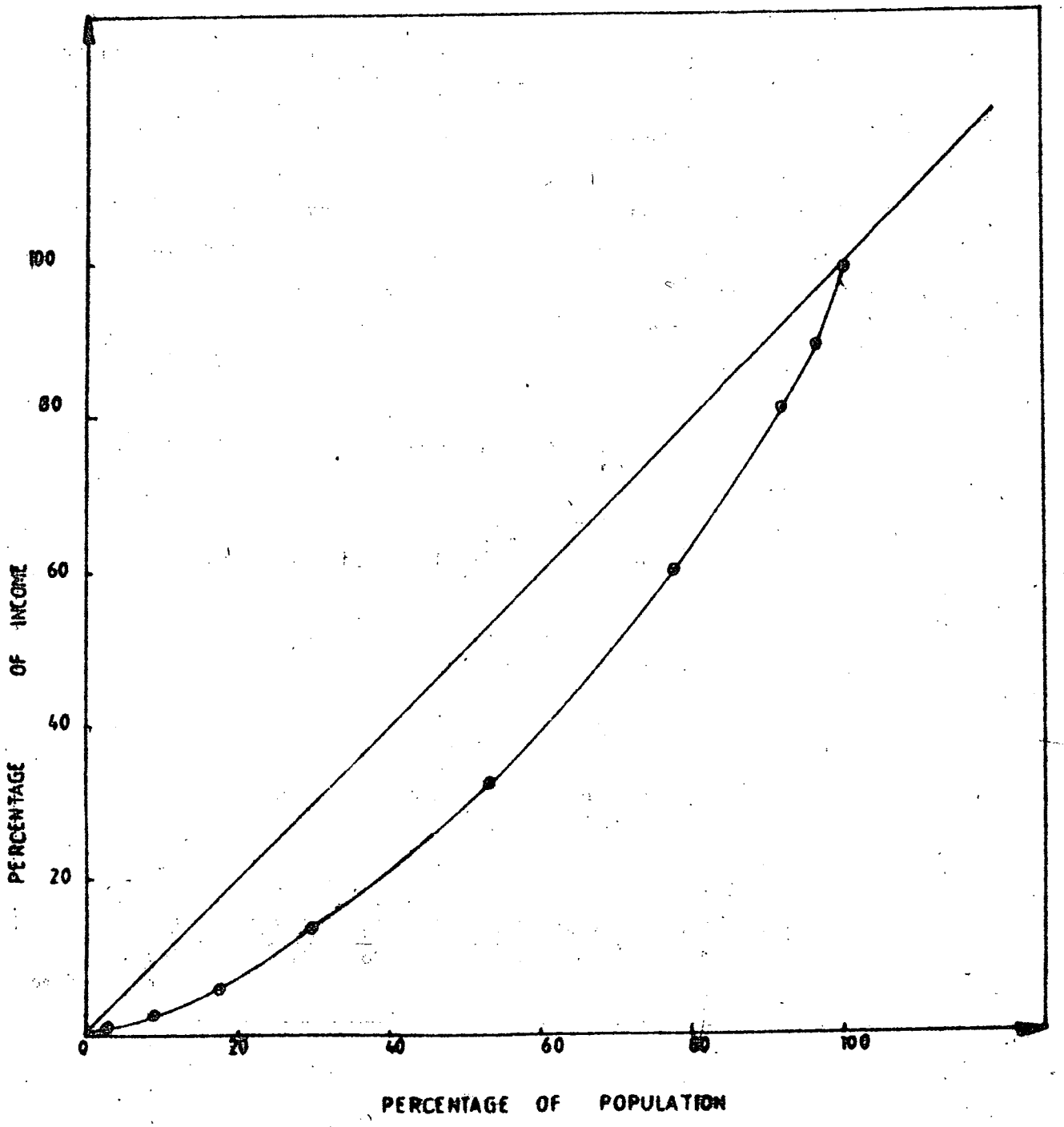
	Colombo	Gampaha	Ratna-pura	kegalle	Kalu-tara	Galle	Total
No. of households whose major income is from Agriculture	66	70	127	82	130	86	561
	Percentage No. of households						
Coconut	42	58	42	19	46	34	40
Paddy	36	24	36	44	36	43	39
Rubber	20	05	21	34	16	19	19
Other crops	02	03	01	02	02	05	02

Table 2.12

Percentage No. of Households depending on Agriculture for their secondary income.

	Colombo	Gampaha	Ratna-pura	kegalle	Kalu-tara	Galle	Total
No. of households depending on agriculture for their secondary income	123	114	101	127	89	80	634
	Percentage No. of households						
Coconut	58	58	62	57	54	51	57
Paddy	24	31	19	27	38	27	28
Rubber	13	-	12	12	05	06	08
Tea	-	-	02	-	-	11	02
other crops	05	11	05	04	03	05	05

Income Distribution of Sample Households



2.7 Composition of the Income

In the income pattern non-farm income figured prominently. 53% of the households received a regular monthly income from non-farm activities, and only 18% claimed that they earned a steady income from farm activities mainly from coconut or rubber.

Holdings less than one acre did not record any income from coconut, but declared that production met consumption needs. However, in general, most of the holdings, of less than two acres in extent do not regard coconut as a major source of income; hence the poor maintenance and unsatisfactory husbandry practices.

In Gampaha, the holdings were much larger and were the main source of income. These holdings when compared and contrasted with the smaller holdings show a marked improvement in the adoption of proper husbandry practices, and in the wider use of subsidies under the programme of the Coconut Cultivation Board.

Table 2.13
Agriculture and Coconut Incomes of the Sample Households

District	Total Income	Agri. Income / Total Income	Coconut Income / Total Income	Coconut Income / Agri. Income
Colombo	4,228,500	38%	16%	42%
Gampaha	5,133,000	43%	23%	53%
Ratnapura	2,871,000	51%	11%	22%
Galle	2,982,000	62%	22%	35%
Kalutara	2,953,500	64%	16%	25%
Kegalle	3,004,500	58%	14%	24%

Even though income from agriculture is about 53% of the total income, the income from coconut is only 17% of the total income. This is because 42% of the sample population is employed in non-agricultural activities and due to the lower prices of agriculture commodities, the income received is also very small. Many households which are self sufficient in coconut omitted their home consumption of coconut when receipt of income from coconut is calculated and this was one of the reasons for a lower recorded level of income from coconut.

This is clearly shown when we analyse the incomes received from coconut according to the holding size. The smaller holding size groups received less income from coconut while larger holding size groups received more. But in all size groups the incomes from coconut does not indicate more than half the total income.

In estates, almost 92% of the income is generated by coconut.

Table 2.14
Percentage of income from coconut
according to the holding size

Holding size	Income received from coconut as % of Total Income
Less than 0.4 hectares	08%
0.4 - 2 hectares	22%
2.01- 4 hectares	18%
4.01- 20 hectares	52%

Table 2.15

Average Incomes of the Sample Households

Annual Income in Rs.	% No. of households in the Income Group
Less than - Rs. 3,600	05
Rs. 3,601 - Rs. 12,000	14
Rs. 12,001 - Rs. 24,000	35
Rs. 24,001 - Rs. 36,000	38
Rs. 36,001 - Rs. 50,000	05
More than Rs. 50,000	03
	100

Only 1/5 of the households earn an income of less than Rs. 1,000/- a month while about 50% earn more than Rs. 2,000/- a month. Gampaha reported the highest average income, while the household which had the highest income was in the Ratnapura district.

45% of the sample households received an income of Rs. 1,500 to Rs. 2,500/- a month. Only 03% of the households receive more than Rs. 4,000/- a month. But the special feature here is that most of the households reported that income from coconut, is less than 20% of their total income.

2.8 Levels of Income

The average annual household income is presented in Table 2.15. these household incomes vary from Rs. 1,914 per month in Ratnapura to Rs. 3,422 per month in Gampaha.

Table 2.16

Average Monthly Income of a Household

District	Rs./per month
Colombo	2819
Gampaha	3422
Ratnapura	1914
Galle	1988
Kalutara	1969
Kegalle	2003
Average of the Project Area	2352

The annual income per income receiver, ranges from Rs. 14,239 to Rs. 28,037/-.

Table 2.17

Average Income per year per Income Receiver

District	Income per year per income receiver Rs.	Income per month per income receiver Rs.
Colombo	22023	1835
Gampaha	28837	2403
Ratnapura	12537	1044
Kegalle	14239	1186
Kalutara	14337	1194
Galle	15946	1329
Total Average	17899	1490

The figures suggest that the income received per receiver is more than one thousand per month. This is due to the presence of a large number of service sector workers in the sample. The closeness to the Urban Service centres and the fact that 80% of the sample villages belonging to the urban sector had created this situation.

The per capita incomes of the districts are as follows:

Table 2.18

Per capita Incomes

	Per capita income per year Rs.	Per capita income per month Rs.
Colombo	6607	550
Gampaha	8656	721
Ratnapura	3762	314
Kegalle	4373	364
Kalutara	4865	405
Galle	4623	385
Total average	5380	448

Although the per capita income for all six project areas was Rs. 5380, only Colombo and Gampaha districts recorded per capita incomes of more than the per capita income at G N P level namely Rs. 5904 at current prices.

2.9 Distribution of Income

Distribution of income is one of the indicators reflecting the socio-economic conditions of the project beneficiaries. 95% of the households in the project area receive incomes of more than Rs. 3,600/- a year, and the income profile does not vary much from district to district. About 22% of the households receive an income above Rs. 30,000/- a month. Hence a concentration of higher incomes can be seen in the higher income groups (Table 2.19).

Table 2.19
Income Distribution of Sample Households

Income Group	No. of households in each income group						Total No. of house-holds	% of households in each group
	Colombo	Gampaha	Ratnapura	Kegalle	Kalutara	Galle		
Less than Rs. 3,600	04	06	08	05	06	01	39	05%
3601 - 6000	06	03	08	08	04	12	41	05%
6001 -12000	11	03	11	17	16	11	69	09%
12001 -18000	14	08	13	19	23	26	103	14%
18001 -24000	16	12	45	23	18	24	148	21%
24001 -30000	27	33	23	41	38	18	180	24%
30001 -36000	34	36	09	08	12	07	106	14%
36001 -50000	04	17	03	03	05	06	38	05%
50001 +	04	07	05	01	03	01	21	03%
Total income Rs.	4,228,500	5,133,000	12,871,00	3,004,500	2,953,500	2,982,000	21,172,500	
Average Income Rs.	38,828	41,064	22,968	24,036	23,828	23,856	28, 230	

This concentration can be clearly seen in Table 2.19 and in the graph. 39% of the total income in the project area is concentrated in these higher income groups and in the less than Rs. 12,000 group there are only 06% of the income receivers. This leads to a fairly highly skewed distribution of income, as shown in the graph. This uneveness varies only by a small degree, in all six project districts.

Table 2.20

Income Distribution of the Project Area

Income Groups	% No of households in each income group	share of income as a % of total income
Less than Rs. 3,600	05	01
3601 - 6000	05	02
6001 - 12000	09	03
12001 - 18000	14	09
18001 - 24000	21	19
24001 - 30000	24	27
30001 - 36000	14	20
36001 - 50000	05	09
50001 +	03	10
	---	---
	100	100
	----	----

Chapter Three

LAND AND LAND UTILIZATION PATTERN OF THE PROJECT AREA

3.1 Land Use

The land utilization pattern of the project area is dominated by rubber or paddy and in all districts other than Colombo and Gampaha coconut ranks second or third in importance.

The land utilization pattern of the project area is detailed in table 3.1. Though the sample was specifically chosen from among the coconut land owners, only 49% of the holdings in the project area had coconut; while 35% consisted of paddy, and 11% of rubber. The rest of the crops including tea and cinnamon, together with barren lands formed only 05% of the sample and 0.4% of this barren land was unusable for any productive purpose.

98% of the project area is in the wet zone and covers the highly populated areas of Sri Lanka. Virgin land available for new cultivation is limited. Even in the marginal lands of Kalutara, Kegalle and Ratnapura uprooting coconut rather than rubber is quite common, for rubber fetches better prices. Furthermore, in these regions, rubber has taken root as a monocrop over a considerable length of time. This leaves only the dry zone lands for new coconut cultivation. But the development of the coconut industry on those lands as an export-oriented enterprise presents specific local problems. Thus, the only option available in the wet zone is to improve the existing coconut lands to the maximum with better husbandry practices.

Table 3.1

Land use according to the crops cultivated in sample area

Type of land	crop	Colombo acreage in ha.	Gampaha acreage in ha.	Ratnapura acreage in ha.	Kegalle acreage in ha.	Kalutara acreage in ha.	Galle acreage in ha.	Total acreage in ha.
Low lands	Paddy	63.33	45.06	174.76	57.32	76.30	71.25	402.18
High Lands)	Coconut	225.80	368.38	174.76	140.01	92.74	76.54	1078.23
and)	Rubber	116.36	10.80	8.42	71.95	43.33	10.30	260.66
Home gardens)	Tea	-	-	1.00	-	-	20.60	21.60
	Other	6.52	1.8	17.30	8.81	9.25	13.96	58.34
T o t a l	412.01	426.04	290.33	278.08	222.38	192.65	1821.50	

Another noteworthy feature that emerged in the study is that even though coconut is a consumable item of increasing demand, the acreage under coconut has dropped by about 03% during the period 1962-1973. The estimates of the 1982 agriculture census forecast the likelihood of a further decrease in acreage which points out the need for a planner programme to increase yields. The decline of acreage is the results of the massive development programmes launched recently namely the Free Trade Zone, Mahaweli Diversion Scheme, Housing Development programmes and so on.

3.2 Holding Size

Although coconut covers a greater land area, nearly 30% of the holdings are less than 0.4 ha in extent. Annex I - Table II. Table 3.2.

Table 3.2

Size Class Distribution Coconut Holdings

In the Projecr Area

District	Colombo			Gampaha			Ratnapura			Kegalle			Kalutara			Galle			Total		
No. of households surveyed	125			125			125			125			125			125			725		
Size Class	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Less than 0.4 ha.	66	14.13	6	35	7.74	2	45	8.77	5	78	16.35	12	73	14.39	15	87	16.24	21	384	77.62	7
0.41 -2 ha.	86	64.20	29	125	114.44	31	120	92.32	53	127	94.46	68	94	63.75	89	91	58.30	76	643	687.47	45
2.01- 4 ha.	09	20.87	09	27	73.30	20	12	20.65	17	07	17.20	12	06	14 60	16	01	2.00	03	62	158.02	15
4.0 - 10 ha	11	126.60	56	20	172.50	47	06	44.02	25	02	12.00	08	-	-	-	-	-	-	39	355.12	30
Total	172	368.38	100	207	368.38	100	183	174.76	100	214	140.01	100	173	92.74	100	179	76.54	100	112	1078	100

(1) No. of holdings

(2) Total acreage

(3) Acreage of size class as a percentage of total acreage of the sample.

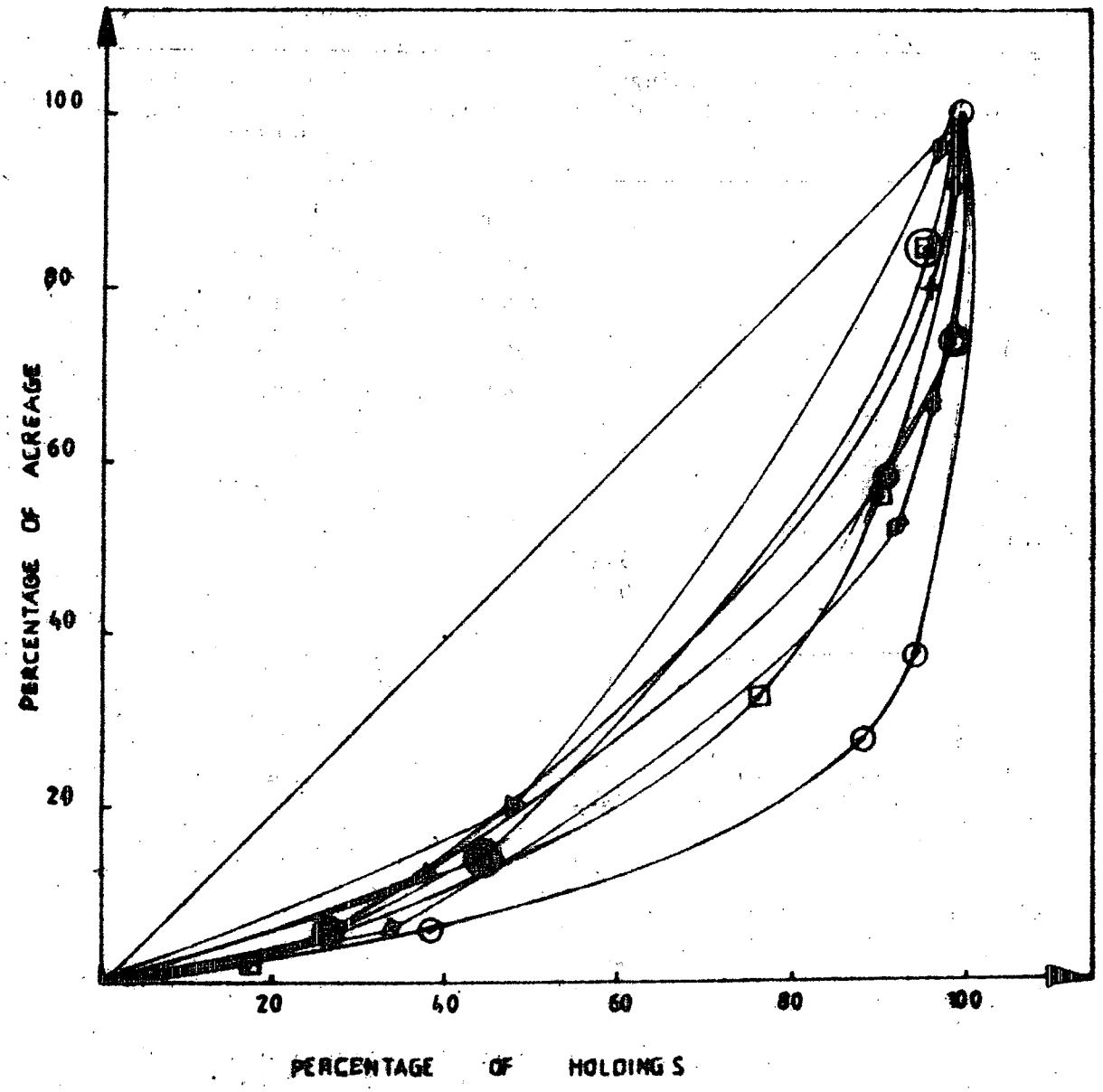
Table 3.4

Size Distribution of Coconut Lands in the Project Area

Holding size	No. of the holdings as % of total holdings	Acreage (hectares)	Coconut acreage as a % of total acreage
0 - 0.4 ha	32.3	26800	06
0.4 - 2 ha	49.4	134400	29
2.01 - 4 ha	13.1	70800	15
4.01 - 20 ha	4.8	105600	23
20 + ha	0.4	123600	27

Source: Agriculture Census 1972.

DISTRIBUTION OF LAND BY HOLDINGS



COLOMBO
RATNAPURA
GAMPAHA
KALUTARA
TOTAL
KEGALLE
GALLE

The land use pattern in the project area has not changed much since 1972 except in the case of size group 20 hectares and over, which came to be vested fully or partly in the state under the Land Reform Act of 1972.

This survey sample of 750 households also confirm this pattern of distribution. Graph 3.3

The small-holder sector is prominent in the coconut sector of the project area. The skewness of the Lorenz curve suggests this uneven pattern of distribution, dominated by the small holdings. These small holdings of less than 0.4 hectares cannot be considered as coconut gardens in the broad sense. But when selecting the sample a coconut holding was defined as a holding containing more than 30 palms and many of these small holdings fell into that category.

Table 3.5

Average Holding Sizes of the Sample Area

Size Group	Average holding size
0 - 0.4 hectares	0.20 hectares
0.4 - 2 hecatares	0.76 hectares
02 - 04 hecatares	2.54 hectares
04 - 10 hecatares	9.10 hectares
Average holding size	0.96 hectares

The smallness of the holding has created mixed enterprises in most coconut holdings so that coconut highlands are more often mixed with jak, breadfruit, mango and many other trees.

3.3 Ownership of Land

The company owned and state owned plantations do not comprise more than 30% of the overall acreage. Of this, only 05%-08% is owned by companies. The small estates between 2 -20 hectares, is owned mainly by the middle class. The benefits of the coconut subsidy scheme accrued to this latter category which had the financial backing, the awareness of the coconut development programmes and the know how of getting things done. 18% of the small holdings mostly had joint owners and their development efforts fell far short of expectations. Joint owners made no investment to improve their plantations but were satisfied with their yields.

3.4 Classification of Coconut Plantings

65% of the coconut acreage in the project area is planted with coconut as a monocrop, and 13% are mixed gardens (Table 3.5). Only 22% of the coconut acreage could be considered as intercropped. New plantings and under plantings account for 07% of the total coconut acreage and replanted acreage is only about 1.5%. The age of the palms and the poor husbandry conditions, bring into sharp focus the need for increasing the area under replantings and under plantings in the project area.

Table 3.6

Distribution of Coconut Holdings and Acreage

	Size * group	Holdings as a percentage of total holdings in the district	Acreage as a percentage of total acreage in the district
Colombo	01	38	06
	02	50	39
	03	06	09
	04	06	56
Gampaha	01	17	02
	02	60	31
	03	13	20
	04	10	47
Ratnapura	01	25	05
	02	65	53
	03	07	17
	04	03	25
Kegalle	01	37	12
	02	59	68
	03	03	12
	04	01	08
Kalutara	01	42	15
	02	54	69
	03	04	16
	04	-	-
Galle	01	48	21
	02	51	76
	03	01	03
	04	-	-
Total	01	34	07
	02	57	45
	03	06	15
	04	03	33

*Size group 01 = 0 - 0.4 ha. 03 = 2- 4 ha
02 = 0.4 - 2 ha. 04 = 4 + ha.

The holdings less than 0.4 hectares and some in the 0.4 -2 hectares group were mixed gardens. Mixed gardens in this context are defined as holdings having at least 25-30 coconut trees and with a crop mix. Most of them were home gardens. The intercropped categories of the coconut holdings are 0.4-2 hectares and 2-4 hectares size group of holdings. In these too, fully intercropped holdings were rare. The majority of the holdings were intercropped partially, only a half or 1/3 of the holdings. Even though 98% of the project area was in the wet zone the majority of the holdings were only utilized for coconut (intercropping is easy in the wet zone) and only in few estates was animal husbandry, practised.

3.5 Age of Plantings

The survey results revealed that only 56% of the palms were productive. 10% of the palms were senile, while another 10% were more than 60 years old. In addition, 24% of the plantings were in a state of immaturity, only 01% of the trees reached full bearing age each year. 1.6% of the trees had reached 60 years, the economically unproductive age. While 01% of the palms are destroyed by pests and disease and this leaves only 55.4% palms in the bearing and productive category Table 3.7.

Table 3.7

Classification of coconut planting

Size Class	No. of holdings	Type of crop	Acreage in ha.
Less than 0.4 hectares	384	mixed	77.62
0.4 - 2 hectares	113	mixed	84.32
	496		161.94
0.4 - 2 hectares	163	intercrop	130.40
2.01- 4 hectares	21	intercrop	54.27
	184		184.67
0.4 - 2 hectares	368	monocrop	272.75
201 - 4 hectares	41	monocrop	103.75
401 - 6 hectares	39	monocrop	355.12
	448		731.57
Grand Total	1128		1078.23

* a holding of mixed cultivation but with more than 30 coconut palms was categorized.

3.6 Average Number of Trees per Acre

The senile, unproductive and casualty palms require rejuvenation. Similarly, the number of vacancies in each hectare needs to be filled in. On an average only 139 trees were found in one hectare of the project area. (65 trees per acre). The recommended number of trees per hectare is 160 (64 trees per acre) Gampaha was the only district where the palms are in excess, but yet it is not very significant from the point of view of production because the competition for plant nutrients is greater (Table 3.8).

Table 3.8

Age Structure of the Coconut Palms

(Sample size 750 households)

Age group	Colombo	Gampaha	Ratna-pura	Kegalle	Kalu-tara	Galle	Total
0-1	05%	03%	08%	04%	07%	06%	06
1 - 6	28%	15%	16%	13%	25%	17%	19
7 -15	14%	98%	19%	16%	14%	19%	13
16-30	15%	21%	25%	08%	14%	19%	18
31-60	18%	35%	14%	31%	19%	30%	24
60 +	13%	09%	04%	16%	11%	07%	10
Senile trees	07%	08%	14%	13%	10%	11%	10
Total	100	100	100	100	100	100	100
Percentage number of palms in each district	21%	32%	09%	10%	15%	13%	100

Table 3.9

Average Number of Trees per Acre/Hectare

	per acre	per hectare
Colombo	47	117
Gampaha	78	193
Ratnapura	41	101
Kegalle	56	139
Kalutara	56	139
Galle	59	146

If the new plantings are ignored these figures show that there is considerable scope for development if there is underplanting and replanting in the project area.

3.7 Variety of Coconut Palms

97% of the coconut palms in the sample area belong to the tall variety, 02% are king coconuts and 01% are dwarf varieties. The highest percentage of dwarf trees were found in the Colombo district while in Kalutara and in Galle the percentage of king coconut was higher. A rough estimate of the sample holdings showed that only about 20-30% of the existing coconut palms were obtained from the nurseries of the Coconut Cultivation Board. This indicates that the demand for dwarf varieties and king coconut is limited and is mainly from home gardens in urban areas as well as from coconut small-holders in a close proximity to the urban centres.

Table 3.10

Variety of Coconut Palms

	Tall	King Coconut	Dwarf
Colombo	95%	02%	03%
Gampaha	99%	0.5%	0.5%
Ratnapura	99%	0.8%	0.2%
Kegalle	99%	0.6%	0.4%
Kalutara	94%	05%	01%
Galle	95%	04%	01%

3.8 Productivity of labour

On account of the predominance of the small-holder in the coconut industry the development programme should be aimed at him. But coconut needs only limited labour and not more than one family member can find employment in it under the present intensity of land use. Therefore, to obtain maximum returns from land and labour the development programme should aim at increasing the productivity of both these inputs.

For this purpose, alternative employment opportunities both within and outside the coconut plantation sector, should be created. Intercropping, animal husbandry and coconut processing industries are some of them. In addition to the small holdings (not home gardens) (less than 0.4 hectares) group farming projects should be introduced, if the ventures are to be profitable. For home gardens of less than one acre subsidy schemes should be intensified. The provisions under the project for the development of animal husbandry and coconut based industries are not sufficient. Since these are important from the national point of view the project should attempt to achieve these targets.

Chapter Four

COCUNUT PRODUCTION, YIELDS AND CROP MIX

The objective of this analysis is to present a picture of the present situation of coconut cultivation in the project area.

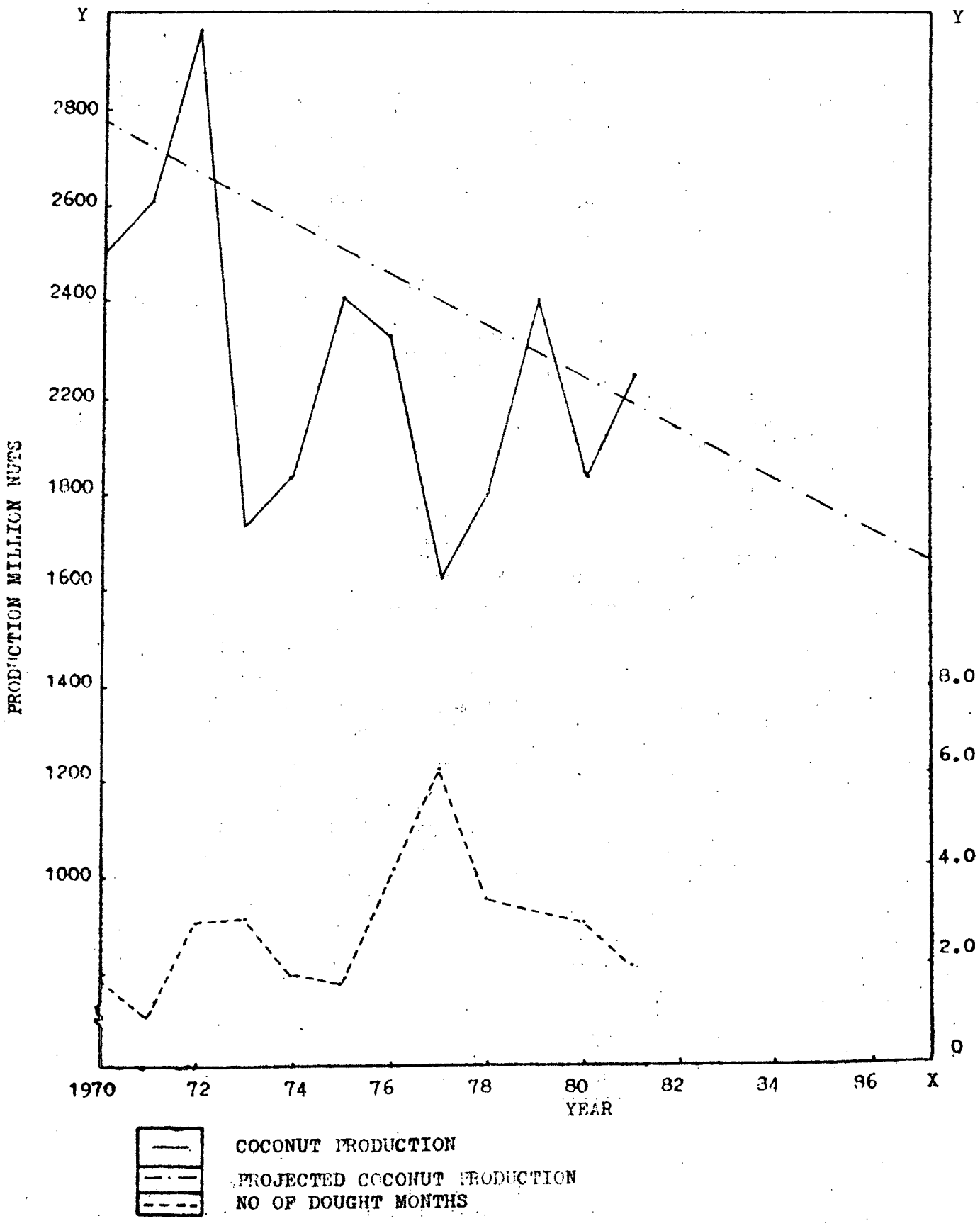
4.1 Coconut Production

Table 4.1

Estimated Coconut Production 1982.

District	Estimated no. of nuts (in millions)
Colombo	133
Gampaha	205
Ratnapura	56
Kegalle	73
Kalutara	86
Galle	83
Project Area	636

COCONUT PRODUCTION OF SRI LANKA FROM 1970



Coconut production in the project area dropped to its lowest levels in 1977 following an unprecedented drought but recovered somewhat in 1977 and 1978. 1982/1983 coconut crop showed a decline of 14% over the 1979 crop and it differs from the estimated production figures by 37%.

Table 4.2

Production and Yields of Coconut in 1982.

(Sample size 1128 coconut holdings 1078.23 hectares)

	Production Total nuts		Yield per annum, per Hectare
Colombo	608887		2696
Gampaha	2079770		6731
Ratnapura	405756		2321
Kegalle	420280		3001
Kalutara	245518		2647
Galle	264585		3457
T o t a l	4024796	Total Average	3475

The aim of the project is to popularize the subsidy scheme and thereby increase production. The project target for development are modest, but the intercropping, rehabilitation and fertilizer targets may not be fulfilled within the project period unless more attention is paid to extention facilities and availability of finance.

Table 1 annex 1 shows coconut production for the period 1962-1981

and graph 4.1 presents the same set of data commencing from 1970. The graph reflects a fluctuating downward trend.

A regression line fitted to this data reflects a declining trend of 30.85 million nuts a year from 1962-1981.

Coconut production Y = 2745.27 - 30.85X
Where X is the year of production

The standard deviation of the regression is 240.3 indicating that there is a substantial unsystematic decline in production. If we examine the systematic decline in production,a decrease of 617 million nuts could be observed over the years. In varying degrees several causes were responsible for this decline.

Since production has a direct relationship to the crop area, an attempt was made to calculate the systematic decrease in production due to the progressive decline in the coconut land area. The land area from 1962-1981 has decreased by 03%, which means that coconut production has very little relationship to the actual acreage. However, a regression line fitted to the acreage as a factor of production, while assuming all other factors remain constant, reflected its only responsibility for -.0278 or 2.8% of change in the production. Thus coconut production has declined by (617 x.0278) 17.15 million nuts due to the reduction in acreage.

Production function analysis shows that fertilizer application has a greater impact on production. Increase in fertilizer application upto a certain degree, increased production. Again a regression analysis carried out assuming that all other factors remained constant, except fertilizer, reflected that the fertilizer had a positive impact of 7.08 on production. But its impact against the number of nuts could not be calculated because the data for estimates of production, if fertilizer were applied was not available.

The other major factor which affected production was weather conditions. Again the number of drought months per year and number of rainy days per year was taken respectively on Regression analysis. The relationship was as high as 42.73. The decline in rainfall has resulted in the reduction of coconut production by 42.73 million nuts a year. But from the practical point of view this modelling is not correct, because we are considering only the rainfall as weather while several other factors like humidity, sunshine etc are not taken into consideration.

An inadequate number of seedlings planted, management and husbandry practices, and weed control, are the other factors which affected production. But there were difficulties in quantifying this qualitative data. Therefore we could assume that all the remaining unexplained decline is due to these factors. The total decline observed was 30.85 per year. The individual effects of each production input could then be assessed accordingly. Firstly .0278 reduction is due to the reduction in the acreage and a 7.08 increase in production is due to fertilizer application. The most crucial variable weather was responsbile for 42.73 of the variation. Therefore, of the systematic variation 4.82 could be attributed to production decline due to various other factors.

Decline due to
other factors = 30.85 - .0278 + 7.08 - 42.73
= - 4.8278

When all these factors are taken together, only 23% of the production increase was due to fertilizer use. The decline in land area, the decline due to poor husbandry and weed control practices were 09% and 15% respectively. In conclusion we could assume that the fall in production was mainly due to worsening weather conditions.

The non systematic variation is reflected in the higher standard deviation of 240.3. Annual change of production cannot be expected from the management practices or weed control. The annual replanting rate and the refillings also cannot have such abnormal effect, though the coconut

palms which were planted 50-60 years back need replanting. All these factors mentioned above contribute totally or individually to the systematic decline in coconut production in the long run.

Hence, if we take weather as one classical variable which causes variation in the yearly production pattern and the next factor will be the annual rate of fertiliser application. Therefore both these factors contribute to the non systematic variation in production. (In graph 4.1 the number of drought months and production pattern are plotted) and one can notice the wide variation in the production pattern moving along with the weather fluctuations. The other changes in production result from the rate of fertilizer application. In 1980, 154 holdings used fertilizer, while in 1979 this was 70 and in 1982 it was 34 holdings.

Although the regression showed a declining trend the actual production figures reflected an improvement due to various rehabilitation measures taken and this improvement could be assessed by using productivity growth rates.

Since coconut production in the project area broadly followed the national production trends, and in the absence of districtwise time series production data, trend analysis was carried out using national level data. Annex I Table 1 shows the total yearly coconut production from 1970-82 and the graph 4.3 presents the same data in graphical form.

But compared to the previous years the decline has been reduced in the later years as shown by the productivity growth rates. The productivity growth rates were calculated using the following formula.

C_{xt} = Index number of production
Quantity index for year t

V_{ko} = Unit gross value added for coconuts in the base year

C_{ko} = Quantity of output in base year

C_{kt} = Quantity of output in year t

Coconut Production in Sri Lanka

Year	(million nuts)	Year	(million nuts)
1950		1982	
1951		2238	
1952		2455	
1953		2288	
1954		2203	
1955		2420	
1956		2374	
1957		2108	
1958		2109	
1959		2313	
1960		2183	
1961		2601	
1962		2811	
1963		2549	
1964		2991	
1965		2676	
1966		2461	
1967		2416	
1968		2601	
1969		2440	
1970		2510	
1971		2610	
1972		2963	
1973		1935	
1974		2031	
1975		2398	
1976		2330	
1977		1821	
1978		2207	
1979		2393	
1980		2020	
1981		2258	

Source : CDA

$$\text{Gross value added index} = \frac{\text{Total value of coconut output} - (\text{value of seedlings} + \text{value of fertilizer}) \underline{\text{Value of pesticides + value of other inputs)}}}{\text{Quantity of coconuts produced}}$$

Table 4.4

Productivity Growth Rates.

Period	Production quantity growth	Production value growth
1962-1971	5%	16%
1972-1977	15%	53%
1977-1981	2%	38%
1962-1981	10% (base year 1971)	62%

The period prior to 1971 was taken as the period prior to the base year and before the land reform act was enforced; and 1972-1977 as the period after the land reform and 1977-1981 as the period of the open market economy when coconut fetched attractive prices.

Even though the overall decline of production was 10% the decline in the period 1972-1977 has been arrested during 1977-1981 showing that the earlier sharply decling trend is now less accentuated and further improvements are possible with the implementation of a meaningful development programme.

4.2 Fertilizer Application

Fertilizer application affects coconut production in the long run as well as in the short run and is one of the crucial inputs. Fertilizer application to coconut holdings were at its peak levels during 1970 and two years later in 1972 the country recorded a total production of 1963 million nuts. (Annex 1 Table V) Our sample survey results also indicated that there was a direct response in yields to the fertilizer application. But there is a time lag of two years for coconut, unlike in the case of a seasonal crop like paddy or pulses where the effects of fertilizer can be seen at the end of six or seven months.

This time lag together with the growers' impression that a yield is obtainable irrespective of fertilizer application has discouraged farmers from the wider use of fertilizer. Similarly, being a highly consumable item,which is produced by small-holders about 1/3 of the coconut does not enter the market chain. Thus the coconut small-holder, has no incentive to use fertilizer.

The survey results show that in 1980, 54% of the coconut acreage in the project area used fertilizer while in 1982 it has dropped to 24.5% (Table 4.6).

Table 4.5
Reasons for not Applying
Fertilizer to Coconut Holdings

Cash shortages	48%
High prices	32%
Insufficient returns	11%
Lack of interest	03%
Thought unnecessary	03%
Non availability	01%
Others	02%
	100

The number of holdings which applied fertilizer decreased from 154 to 34. Fertilizer use in the non project study area was not very much different from this pattern. The respondents indicated that the main reason for not applying fertilizer was either high prices or lack of funds. In the use of fertilizer, problems were not of extension education or non availability of fertilizer, but shortages of cash for the purchase of fertilizer (Table.4.5).

In 1981 and 1982, in addition to the higher prices, periodic droughts prevented many growers from using fertilizer. With the uncertainty of rains, many coconut land owners were reluctant to invest on fertilizer, except to qualify for the Coconut Cultivation Board's subsidy programme. All young plants, planted under the CCB subsidy scheme were fertilized for about 2-3 years. But, again once the subsidy

Table 4.6

Fertilizer Application*

No. of holdings applying chemical fertilizer

	1978		1979		1930		1981		1982		
District	No. of holdings	Acreage in ha.	No. of holdings	Acreage in ha.	No. of holdings	Acreage in ha.	No. of holdings	Acreage in ha.	No. of holdings	Acreage in ha.	Fertilized acreage in 1982 as a % of coconut acreage
Colombo	03	63.21	14	08.87	35	173.70	08	89.80	10	84.60	37%
Gampaha	20	162.50	27	178.90	75	245.60	20	94.00	15	152.20	41%
Ratnapura	05	39.82	06	22.20	10	52.65	05	39.82	01	06.30	03%
Kegalle	07	39.20	09	24.76	02	29.80	07	15.80	02	12.60	09%
Kalutara	09	11.00	06	14.60	19	32.00	03	04.20	02	22.61	03%
Galle	05	3.40	08	9.60	13	18.00	04	6.40	04	5.03	07%
T o t a l	49	319.13	70	258.93	154	551.75	47	250.02	34	264.34	24.5%

* Fertilizer application to young plants is not included here

payments were over, only a very few enthusiastic cultivators continued fertilizing their crops.

At the prevailing prices Rs. 1,700/- was needed to fertilize one hectare of coconut per year. Because of the risk of droughts and the time lag between the application and obtaining a higher yield, many growers were not interested in the use of fertilizer. On the other hand if the fertilizer application was not continued yearly, the yields would drop hence and investment of Rs. 1,700/- would not be only for one year, but a burden for a succession of years.

In some instances, holdings which delayed using fertilizer with the expectancy of rains, ended up with non application altogether which in turn led to lower productivity. Even in coconut holdings where fertilizer was applied the rate of application was low. The recommended dosage for a mature coconut tree was 3 1/2 kgs. per annum, but none of the holdings recorded use of fertilizer in such quantities. The highest dosage applied was recorded as 3 kgs. But the average dosage was 1.7 kgs. suggesting an under usage (Table 4.7). This shows that only 52% of the recommended dosage was used on a tree.

A higher degree of fertilizer application was recorded in Gampaha district where there was a positive relationship between fertilizer use and yields. Gampaha recorded the highest number of trees per acre highest fertilizer application and the highest yields.

If the risk detailed above could be offset by any subsidy scheme sponsored by a statutory body, it would be an incentive for the coconut grower to apply fertilizer to his crop.

In new plantings, the cultivator does not qualify himself for a subsidy, unless the prescribed quantity of fertilizer is applied. Hence, he applies the recommended fertilizer dosage. But once the three installments of this subsidy are drawn there is no further investment on fertilizer.

Table 4.7

Dosage of Fertilizer Application

Sample Size 384 Holdings Using Fertilizer

	Colombo	Gampaha	Ratnapura	Kegalle	Kalutara	Galle	Total
Average Dose : Kgs. per bearing palm	2.0	2.4	1.4	1.2	2.1	1.3	Average 1.7
per young palm	1	1	1	1	1	1	1
Average No. of times applied per year	1	1	1	1	1	1	1

To examine the effectiveness of fertilizer application and the results of drought conditions for the increase of yields, a sample of holdings was selected from the dry areas in Kurunegala where water availability was a crucial factor so far as coconut is concerned. Here the yield per hectare per year in the fertilized holdings were an average of 2700 nuts, while in the non fertilized holdings it was around 2400-2500 nuts. But in the wet zone holdings in Kurunegala there was a marked difference.

Wet Zone

	Fertilized coconut as a monocrop	Fertilized coconut with an intercrop	Non fertilised
Coconut yield per hectare/per year	9500 nuts	8900 nuts	6300 nuts

Compared with the yield from fertilized coconut holding in the wet zone, the dry zone yields were 60% lower irrespective of fertilizer application. Hence the yield levels obtained were not encouraging for an investment on fertilizer. In the wet zone with fertilizer application, a 30% increase in the yields were recorded. This increase in its quantity cannot be attributed solely to fertilizer application. Even in intercropped holdings the yields were high because the fertilizer applied to the intercrops would indirectly fertilize the coconut. But the intercropped and fertilized acreage is only a very small percentage (roughly about 25%) of the coconut acreage and hence for an increase in the yield levels at the national level, a substantial islandwide increase in fertilizer use is necessary.

Fertilizer use can be increased only by strengthening the extension work, lowering fertilizer prices and introducing a subsidy on fertilizer for mature plants as well.

4.3 Rainfall and Drought Conditions

The next most significant variable in the production function data is the rainfall in Year t and in Year t -1 (this year and last year) and D_1 the number of drought months.

Normally climate has its effect on any agricultural crop. But unlike for seasonal crops, the weather pattern of the previous years has its effects on coconut.

Table 4.8
Coconut Production and
Climatic Conditions

Year	Coconut Production	Average Rainfall	No. of Droughts Months
1970	2510	91	1.8
1971	2610	87	1.0
1972	2963	90	3.0
1973	1935	71	3.1
1974	2031	73	1.9
1975	2398	84	1.7
1976	2330	61	4.9
1977	1821	89	6.3
1978	2207	78	3.5
1979	2393	73	2.9

Source :Coconut Statistics
Coconut Development Authority

When 1970-72 is compared with 1973, the previous years had adequate rainfall and the production was at higher levels. But 1972 and 1973 experienced a larger number of drought months and resulted in lower yields in 1973 and 1974. Similarly lower rainfall and more drought months in 1976 effected production in 1977. Besides this usual decline in the yields, the lower rainfall was responsible for lower level of applications of fertilizer. From our observations and interviews with the project beneficiaries, the recurrent dry spells discouraged many from using fertilizer because of the risk involved in such an investment.

This problem could be solved only by introducing drought resistant varieties of coconut, because the country is experiencing droughts too often. Hence, the research should help the Coconut Cultivation Board to evolve suitable varieties of coconut.

4.4 Soil Conservation

Apart from fertilizer usage another factor which increases the productivity of coconut palms, is improved cultural practices. The practices we observed were establishment of contour drains, husk burying, establishment of terraces and bunds, pest and disease control and weeding.

In the project area only 40% of the holdings had adequately provided contour and other drains. In Kurunegala, a premier coconut growing district, the percentage of holdings which had sufficient drains amounted to about 52% (Table 4.9).

The conditions of the project districts were no better. In Gampaha provision for soil conservation seems to be satisfactory. Hence the reason may be that most of the coconut holdings draw subsidies for various purposes, and to qualify for these subsidies soil conservation is a must.

Bunding and terracing are needed for most holdings in Ratnapura,

Table 4.9

Area Under New Plantings,
Replantings and Under Plantings

	Colombo		Gampaha		Ratnapura		Kegalle		Kalutara		Galle		Total	
Total Coconut Acreage Surveyed	225.8 ha.		368.38 ha.		174.6 ha.		140.0. ha.		92.74 ha.		76.54 ha.		1078.00 ha.	
Type of Planting	Acre-age	Acreage utilised as a %	Acre-age	Acreage utilised as a %	Acre-age	Acreage utilised as a %	Acre-age	Acreage utilised as a %	Acre-age	Acreage utilised as a %	Acre-age	Acreage utilised as a %	Acre-age	Acreage utilised as a %
	ha.		ha.		ha.		ha.		ha.		ha.		ha.	
New Planting	6.24	03%	7.28	02%	25.1	14%	11.26	08%	20.1	22%	7.80	10%	77.78	07%
Under Planting	18.2	08%	61.5	14%	2.0	01%	1.54	01%	3.71	04%	0.81	01%	87.76	07%
Re-Planting	2.26	01%	7.46	02%	-	-	1.3	01%	2.1	02%	3.1	04%	16.56	1.5%

Kegalle and in some parts of the Kalutara district. Financial provision for this purpose was not adequate. Survey results reveal that only scanty attention was paid to disease and pest control. Past data on pest control reveals that other than in the case of the Red Weavil no significant action was taken by the small-holders for the prevention of pests and diseases. During the survey period many farmers in Galle, Matara and Colombo districts complained that their crop had failed due to drought. There were several instances where leaves were spattered with red patches and nuts had dropped off before maturity. But the cultivators did not seek the assistance of the Coconut Cultivation Board or some such body for any preventive measures. They just attributed it to the drought. Similarly in the case of weed control farmers just slashed the shrub jungle. But there was proper weed control mostly in the holdings where fertilizer is applied.

4.5 Removal of Excess Palms

Removal of excess palms is also an important cultural pratice which needs attention for higher productivity. The number of palms per hectare was less than the recommended number of 160 trees in all project districts other than Gampaha which had an average of 193 trees. Kurunegala averaged 160 trees per acre. In other districts there is scope for the promotion of underplanting and replanting as well as intercropping. The number of palms per acre in coastal areas was much higher so that to improve productivity in these areas excess palms have to be eliminated.

Cultural practices were not adopted because coconut growers were not aware of the benefits that could be derived from such practices. Therefore, the extension component should come into play in a more effective way. The Coconut development Officer is the main link, in this programme. His duties involve the administration of the subsidy scheme and this takes up much of his time, so that not much time is available to him for advisory and extension work.

4.6 Senile Palms

The lower replacement rate of senescent palms also causes lower yields. Even in a well fertilsed coconut holding, 60 year old palms yield only 50-60% of the yield obtained by a productively matured plant. If under planting was done before these trees reached 60 years the normal production trend would not have declined. Many palms or perhaps a good portion of the holding becomes senile and hence lower the yields. Even in instances where replacement was done, failure to remove the old trees continued to be an unhealthy husbandry practice. This was common in most replanted holdings in Gampaha and totally about 30% of the replanted acreage (mostly without CCB subsidy) needed incentives to uproot the older trees. The presence of a large number of bearing trees give rise to competition for the nutrients in the holding, and this makes the land more infertile.

Inadequate husbandry practices such as soil conservation weed control removal of excess palms and removal of senile palms too leave much to be desired. Even though the Coconut Cultivation Board has extended its subsidy scheme for pasture cultivation, the coconut growers in the project area, had not taken to pasture. In the non project control area in Kurunegala pasture was one of the major intercrops. It can make soil conservation and weed control activity redundant and also needed very little labour. Most of the people indicated their reluctance to grow pasture stating that the major reason was the lack of time.

Some others mentioned that even when the produce was available, they did not know how to dispose of it. These problems coupled with the use of palm leaves for decorations, felling of trees for timber, toddy tapping etc., had conditioned the yield levels. Hence, from the project view point, increasing fertilizer use, replacement of senescent palms, encouraged use of hybrids and intercrops are very sensible and timely measures, because no new lands are available for coconut cultivation.

4.7 Under Planting and Re-Planting

With no possibilities of opening up large scale virgin land for coconut plantations, the only possible way of increasing coconut production is by improving the yields of the lands already under coconut. The stagnating or even slightly declining acreage of coconut has been noticed by the government from 1948 onwards, and several schemes for rehabilitation has already got under way. The progress was very slow, and now it has reached situation where only about 50% of the trees are economically viable. About 20% of the sample palms has reached an age where immediate replacement is necessary while another 1.6% of the sample palms population needed replacement every year.(Table 4.9, Page 136)

But in the year 1982, only 1.5% of the land had been replanted, 7.0% under planted which amounted to only to 10% of the total acreage. Barring Gampaha all other districts had vacancies for new palms.

The Coconut Cultivation Board's replanting scheme came in for criticism on the ground that the plant nurseries, were located not to serve the big estates and not the small holdings. The locations are far apart and the transport costs, so far as the estates are concerned, are relatively less since their plant requirements are much more than those of the small-holder. In our interviews with Regional Managers and Coconut Development Officers(CDOs), they agreed that such draw backs were there earlier. But commented the present scheme was much more attractive since the purchases could be made at the nearest APC centre.

Most land owners preferred under planting to replanting. When replanted the old stand was destroyed and a new replacement palm was introduced. While in under-planting new replacements were placed first and gradually the older stand was pulled out. Under the CCB subsidy scheme replanting required the removal of 25% of the old stand, a painful task for the smallholder both from the economic and psychological perspective. Hence, in about 30%-40% of the under-plantings the older

stand was present and the owners were reluctant to pull out a nut bearing tree. But with new incentives to the subsidy scheme, (a higher payment of Rs. 250.00 for the removal of an aged tree) we can expect a better response from the smallholders. 83% of the smallholders preferred CCB planting material which they claimed to be of superior quality. The casualties were due to wrong handlings of seedlings during transport. The owners of coconut holdings of more than 2 hectares preferred Tall x Tall variety while the smallholders of less than 0.4 hectares and urban coconut land owners preferred dwarf varieties.

Of the 8.5% smallholders who replanted and underplanted their holdings, roughly about 85% adopted systematic cultural practices in order to qualify for the subsidy. These cultivators used CCB planting material and the prescribed dosages of fertilizer. The others mostly from Ratnapura, Galle, and Kegalle districts used their own planting material or bought them locally. But none of the other husbandry practices were adopted by any.

The main reason for not using CCB planting material was the high cost and the difficulties experienced in transport. But the CCB has organized a scheme to deliver the seedlings to the nearest APC centre and hence, this is expected to ease out.

The cost of seedlings varied between Rs. 3-4.50 including transport from the CCB nurseries. But within the project area in the private nurseries seedlings alone cost Rs. 3.50 - 5.00. Only 05% of the replanted/underplanted farmers purchased seedlings from private nurseries while about 10% of the cultivators used their own seedlings, for the simple reason that they could be purchased locally with no big transport costs. A common complaint of the coconut cultivators of Colombo, Kegalle and Ratnapura was the shortage of planting material; a situation precipitated by the droughts that prevailed during the latter part of 1982 and early 1983. But the drought conditions which continued in 1983 give rise to two problems. An adequate number of Seed nuts could not be planted due to non availability of water and nuts. The shortfall in the

crop in 1983 resulted in the major portion of the crop being utilized for consumption leaving little for other needs. Hence, the seed nuts were scarce and their prices soared. This unhealthy situation would go right up to 1984 warranting immediate precautionary measures to ensure the availability of seedlings.

The seedlings put down in small holdings germinated well. At the end of 12 months, 91% of the planted seedlings were alive and this rate will be much higher if we omitted the number destroyed during the age of 5-7 years just before flowering. 08% were destroyed during the years of planting due to animal and pest attacks, and 10% were destroyed due to shortages of water.

Table 4.10

Damage Caused by Pests and Disease

	% of palms affected as a total of coconut palms
Colombo	01%
Gampaha	01%
Ratnapura	02%
Kegalle	01%
Kalutara	01%
Galle	02%

The damage caused by the pests too could be considered negligible. But this shows that there is a great potential for at least 80% of the new plantings of coconut palms to be successful.

4.8 New Plantings

New land available for coconut cultivation seems to be limited in the project area. Such lands are mostly marginal rubber lands. The attractive price for rubber will not encourage the farmer to shift to coconut. Most of the new plantings in the sample holding area were the outcome of the persuasive influence of the Coconut Development Officer; or else they resorted to coconut because other crops could not be cultivated on these lands.

This attitude seems to be rational because the climates, culture and the planting techniques demanded by the next competitive crop, rubber, appeared to have suited this locality. The profitability of the crop coupled with easy access to marketing, and the availability of other facilities divert more peasants towards rubber.

Coconut cultivation as a new venture was undertaken with a keen interest by the cultivators of home gardens, who intended using coconut for their own consumption. But in the hilly areas of Ratnapura, Kegalle, Galle and Kalutara coconut cannot be considered as the most profitable, though climate, soil and other physical factors prove favourable. The coconut palms flower at the end of the fifth year in the coastal areas. Even an uneconomic tree bears about 30-40 nuts a year in the coastal areas, while in marginal areas this is the normal range of production. Special emphasis should be given to promote coconut cultivation in home gardens in non-coconut growing areas. In old coconut gardens of these areas under planting and replanting should be encouraged, rather than investment in new planting.

4.9 Crop Mix

Fourty percent of the coconut holdings are monocroped. This accounts to about 68% of the total coconut acreage in the sample area.

Table 4.11

Crop Mix of the Coconut Holdings

Size class	Mixed		Intercrop		Monocrop	
	No of holdings %	acreage %	No. of holdings %	acreage %	No. of holdings %	acreage %
Less than 0.4 hec.	34	07	-	-	-	-
0.4 -2 hectares	10	08	14	12	33	25
2.1 - 4 hectares	-	-	02	05	04	10
4.1 +					03	33
Total	44	15	16	17	40	68

Most of the coconut mixed gardens are home gardens where production is exclusively used for home consumption. These holdings contain a crop mix of jak, arecanut, mango, citrus etc., which are used for home consumption. All holdings in the less than 0.4 hectare size group belong to this category.

4.10 Intercropping

Even though the number of holdings intercropped is only about 16% special importance is assigned for this crop mix because of its predominance in the project components as well as in the development of coconut cultivation. Intercropping or the cultivation of additional crops, including pasture, is a recommended practice to increase both land productivity per acre and labour and employment opportunities. Many smallholders practised some kind of intercropping although in most cases it was only a little more than a few banana plants or a few vegetable

plots for family consumption or for local sales. Such practices can in no way be defined as intercropping in the true sense of the term.

The intercrops differed from district to district, but most commonest crop in all project districts was banana. Fifty two percent of the intercropped coconut lands had banana. Ratnapura district grew banana while in Gampaha, it was Pineapple.

Table 4.12
Intercropped Coconut Holdings According
To the Crop

	% of the crop as a % of intercropped coconut acreage
Banana	52%
Pineapple	22%
Pepper	10%
Cocoa	05%
Coffee	05%
Betal	02%
Vegetable	02%
Ginger	01%
Citrus Fruits	01%

In many instances cocoa, pepper and coffee were cultivated under Coconut Cultivation Board's subsidy scheme and a high percentage of these crops came from the Kegalle and Ratnapura districts. Vegetables and betal were commom in the Gampaha and Kalutara districts. In Galle we

came across two holdings of 2-4 hectares category intercropped with tea, and in Ratnapura 6 holdings of coconut had been intercropped with lime or citrus (Table 4.13).

The large proportion of land used for coconut as a monocrop leaves a vast area, yet to be exploited for intercropping. The smaller returns to land from coconut and the lesser usage of labour, and the lower degree of risk involved in mixed cropping rationalize this intensification. In the dry zone where water becomes a critical variable in production, coconut as a monocrop may not fit into any reasonable development strategy. But in the wet zone where water is no problem except under exceptional conditions like water logging a fair potential exists for expanding intercrops. In spite of such advantages intercropping was not practised even by a fair proportion of coconut land owners.

Thirty three percent of the coconut cultivators were not interested in intercropping, while 26% reported that their lands are not suitable for intercropping, and the rest mentioned many practical difficulties such as non availability of planting material, lack of marketing facilities, want of technical knowledge etc.

Households which obtained their secondary source of income from coconut gave these reasons. Since 42% of the sample belonged to those in the service sector, they were satisfied with the regular incomes from coconut and felt that a further investment on intercrops was not necessary. But, where sufficient labour is available, an introduction of a suitable intercrop will generate higher production. The presence of a large proportion of population, in the 15-30 age group, the lesser requirements of labour, their higher literary standards which demands white and blue collar employment, has left a large segment of youth, unemployed in the households of the coconut development project beneficiaries. Therefore, an efficient extension service and reliable processing and better marketing facilities may induce a larger proportion of youth to take to coconut cultivation for more attractive returns.

Intercropping coconut with pineapple is very common in the Gampaha district. In a new plantation of coconut where the trees have not reached the bearing age, pineapple provides a profitable income as a short term crop. According to our cost calculations, the first crop, covers the cost of investment and the income from the second and third crops as well as ratoon crops of pineapple is a plain profit. A crop of this nature under coconut provides a substantial income.

In the case of banana the income is all year round and it does not demand high management practices.

Intercropping can increase the income both at the individual and national levels.

This is very important from a national view point because even though coconut occupies a large land area its contribution to the gross national product is very low, compared to that of other plantation crops. Intercropping can utilize the excess labour and increase the labour productivity. It can invariably generate more employment opportunities in the coconut sector.

Since the cultivators fertilize intercrops, the fertility of the land will be increased and this in turn will increase the productivity of coconut palms. This can be proved by the following data.

	Coconut inter-cropped with Banana	coconut inter-cropped with Pineapple	coconut mono-cropped
Average No. of nuts per palm/	15	18	12
Fertilizer used per acre	500 Kgs.	600 Kgs.	none

But if the coconut cultivator has not fertilized the intercrop or provided adequate irrigation to the intercrop, the nutrients and the moisture available for coconut palms will be still lower, because both crops will compete for nutrients.

On the basis of the information gathered one has to conclude that Coconut Cultivation Board's intercrop programme needs to be reviewed. The preferable intercrops are banana, and pineapple and given marketing facilities, passion-fruit. These are not included in the Coconut Cultivation Board programme or in the project proposals. Therefore, the inclusion of these three types has to be considered, and with a little or no subsidy assistance, most holdings will welcome planting an intercrop. Similarly, if an intercrop like banana is included in the Coconut Cultivation Board programme intercropping could be extended to the dry zone coconut plantations as well.

The most popular intercrop in the Coconut Cultivation Board's programme is pepper. This is due to the easy husbandry practices required by this plant and the availability of a ready market. Since the Coconut Cultivation Board has no plant nurseries and has to depend on the Minor Export Crops Department for seedlings, many complained of a shortage of planting material.

Cocoa and coffee were not as popular as pepper. Cocoa is not attractive because the processing and marketing caused problems to many smallholders. The plant needs careful attention in the early stages and even though the price is higher the processing needs skilled hands. Coffee too was not popular for similar reasons.

Another procedural factor has prompted coconut growers to dislike these intercrops. They are recommended to be planted only after 20 years of planting coconut, at a time when the farmers are already receiving some income from coconut. They need financial backing mostly in the early stages of plantings. Hence, Pineapple, Banana, and Passion fruit

are most welcomed by farmers. Therefore, Coconut Cultivation Board should reconsider their recommendations on intercrops.

4.11 King Coconut

Four percent of the holdings in Kalutara and 04% of the holdings in Gampaha are reported as King Coconut plantations. In other districts most of the individual holdings had a few King coconut palms. Out of the King Coconut holdings 65% are in the category 0.4 - 2 hectares and 20% in the category of less than 0.4 hectares. The rest belongs to the category of 2-4 hectares. All these holdings are owned by single owners and almost all had not obtained CCB subsidies.

Ninety Percent of these holdings are fertilized regularly and proper husbandry practices are maintained. The crop is plucked at least 10 times a year and the yeilds seem to be attractive compared to coconut. Marketing of King Coconut was not a problem. The prices received by the producer in 1982 was less than 1.50 per nut while the retail price per nut was always over Rs. 2/-.

4.12 Animal Husbandry

Table 4.13 gives the number of coconut holdings where Animal Husbandry was practised and the average no. of animals per holding.

Table 4.13

Animal Husbandry

	Average no. of buffaloes/ diary animals per hectare*	% no. of holdings having livestock
Colombo	03	02%
Gampaha	08	06%
Ratnapura	02	02%
Kalutara	06	04%
Galle	02	03%
Kegalle	02	01%

(* The averages given are related only to the holdings which have livestock)

In many of these holdings cattle rearing was done in the usual way, without resorting to improved pasture growing. Of these holdings, improved pasture farming was found only in 1.1% of the holdings. But in the non project control area (Kurunegala district) 46% of the holdings reported improved pasture growing. If cattle rearing is to be performed on a commercial basis, it has to be associated with the improved pasture and the CCB has introduced a pasture subsidy scheme. But very few farmers in the project area had used this subsidy.

The project area can be considered as ideally suited for animal husbandry with proper climatic conditions for pasture growing, easy access to the market, and suitable infrastructure. The western province, where most of the project area is located has the highest population, and milk and other products will have a ready market.

Livestock farming on coconut lands has its own inherent advantages, in that it provides the natural manure for the palms at no additional cost.

The reasons for non adoption of animal husbandry;

(1) The smallness of the holding which prevented any form of livestock keeping. Specially in the case of those who owned 0.4 hectares, or less

(2) The non avilability of labour for animal husbandary. Despite the presence of a large segment of unemployed, there was wide spread reluctance to take to animal husbandry. The owners themselves were not very interested in such ventures.

4.13 Cost of Production

The cost of production of coconut was calculated in four ways. First the initial cost of production for the first three years was calculated. The first three years were thought of as crucial because a major part of the initial expenditure was incurred during that period. Till the palm bears fruit the costs involved are in fertilizing, weed control and maintenance. The labour cost component of coconut is very low. Labour is especially required at the initial planting stage, for cutting the drains, for occasional weeding which is done twice or thrice a year and for harvesting. Hence, there is a large amount of unutilized labour in the coconut sector, so that a comprehensive programme of intercropping should be able to absorb most of this labour.

Secondly, coconut based industries could be opened up using labour intensive techniques.

However, among intercrops, pineapple, and banana were especially selected because these were the two most preferred intercrops.

Calculations on incomes from these crops for the first three years indicate that when coconut is intercropped with either of these, productivity on both land and labour could be maximised. In addition, the operations like weed control, fertilizer application of intercrops indirectly cut down the costs of maintaining the coconut estate.

Other intercrops were not taken into account because of their limited adoption in the survey area during the survey period.

Table 4.14

Cost of Production

(A) Cost of Production New Plantings	
(1) Coconut Monocrop (First three years)	Rs.per acre 0.4 hectares
1 Clearing, digging, planting, fencing etc.	Rs. 1,500.00
2. Cutting contour drains (10 chains in the 2nd and 3rd years)	Rs. 480.00
3. Planting material (80 seedlings x 3.50) (including vacancy replacement 2nd & 3rd years)	Rs. 280.00
4 Fertilizer application (for the first, second, and third years)	Rs. 768.00
5 Weed and disease control (first 3 years)	Rs. 180.00
6. Other miscellenous expenses	Rs. 500.00
Total	Rs. 3,708.00
(2) Coconut with Intercrop Banana	
1. Planting material 250 stools x Rs.2	Rs. 500.00
2. Fertilizer (for the first three years)	Rs. 600.00
3. Weed control	Rs. 100.00
4. Labour costs (Rs. 20 per day)	Rs. 400.00
5. Protection and other expenses	Rs. 150.00
TOTAL	Rs.1,750.00
Income from banana for the three years (100 cwt. could be obtained in the 2nd year and 250 cwt. could be obtained in the 3rd year) 350 cwt. x Rs.30/-	Rs. 10,500.00
(3) Coconut with intercrop Pineapple	
1. Planting material 10,000 suckers per acre	Rs. 3,000.00
2. Fertilizer -(Rs. 1000/- per year x 3)	Rs. 3,000.00
3. Chemicals and weed control	Rs. 600.00
4. Labour costs for harvestihg, planting and weeding etc.	Rs. 800.00
Total	Rs. 7,400.00
Income from pineapple for the three years (800 cwt. could be obtained in 2nd & 3rd years)(-800 x Rs.30/-)	Rs. 24,000.00

Table 4.15

Cost of production for Mature Coconut

Per year/per 0.4 hectare (as at 1982 prices)	
1. Fertilizer application 64x3 kgs	Rs. 749.00
2. Transport and application costs	Rs. 75.00
3. Pest, disease and weed control	Rs. 75.00
4. Maintenance	Rs. 50.00
5. Picking, collection and heaping	Rs. 100.00
6. Other overheads	
(Interest on bank loans capital recovery on the development of young plantation etc. 20%)	Rs. 200.00
	Rs. 1,249.00
Income from nuts (500 nuts per acre per harvest x six harvests) 3000 nuts x Rs. 1.50	Rs. 4,500.00
Income from other sources (thatching - firewood etc)	Rs. 100.00
	Rs. 4,600.00

4.14 Yields

The yield per hectare and the total production of the project district are given in table 4.1. The yields represent the averages for the sample households, and vary from 10600 nuts per hectare in Gampaha district to 1000-1500 nuts per hectare in the Ratnapura district.

National yield levels of the past does not show much variance, and the decrease of yields is also not very sharp.

	Yield per hectare
1962	6027 nuts
1972	6563 nuts
1981	5001 nuts

In 1962, 38 nuts were picked from an average palm and in 1981 this has reduced to 31 nuts per palm. This shows that even though there were subsidy programmes etc., no concrete efforts have been made to upgrade production and increase the yields. Therefore, these minor yield variations are primarily the result of natural factors like rainfall, drought and other climatic considerations.

But the declining trend of yields even at a slower pace and the comparisons of normal yield levels of other coconut growing countries indicate that some drastic measures to increase the yield levels, is necessary at least to maintain the present targets.

The yields vary according to the size of holding, the amount of fertilizer applied and the number of trees per hectare etc, apart from the climatic factors which are unavoidable. In addition there is a maximum yield limit according to agro-climatic regions. But that does not apply here because 95% of the project area belongs to the wet zone.

The effect of fertilizer application and other husbandry practices were dealt with earlier, and the holding size and other factors are being dealt here.

The yield per hectare is mainly depending on the holding size. In small holdings this variable is highly significant compared to the others.

The regression analysis done using cross sectional data supports the assumption that there is a variation of yield due to the size of the holding.

All holdings

$$\hat{Y} = 1141 + 4678\ X_1 + 981\ X_2 + 1216\ X_3$$
$$(42.18) \quad (3.08) \quad (1.01)$$

Small holdings (less than 0.4 hectres)

$$Y = 462 + 2962.2\ X_1 + 25.3\ X_2 + 523.9\ X_3$$
$$(22.12) \quad (0.19) \quad (2.22)$$

Medium Size holdings (0.4 -2 hectres)

$$Y = 109.8 + 2983.9\ X_1 + 22.7\ x_2 + 7.8\ x_3$$
$$(6.02) \quad (0.12) \quad (.01)$$

Large size holdings (2 +)

$$Y = 11682 + 1410.4\ X_1 + 4898\ X_2 + 1608\ X_3$$
$$(19.18) \quad (2.52) \quad (0.39)$$

R^2 68.7

where Y = yield

X_1 = size of the holding

X_2 = claim to the cultivated land (1 = owner cultivators) (0 = other wise)

X_3 = price per nut

The analysis shows that neither the price nor the ownership is important in the yield variations.

The survey results reveal that the yield per hectare in large estates is 12% higher than the yields of medium size holdings and 36% higher than the smaller size holdings. Therefore, as we suggested earlier to improve the yield levels of small holdings some group farming programmes etc., will be most effective.

Even though yield levels of coconut vary from district to district the variations due to holding sizes is very significant. In large estates (more than 20 hectares) the yield levels are high compared to small holdings.

Table 4.16

Yield Per Tree

Average nuts per Tree Per Picking

	Small holdings	Estates
Colombo	05	08
Gampaha	08	12
Ratnapura	05	07
Kalutara	07	09
Galle	05	09
Kegalle	05	07

According to these statistics the normal yield per tree in small holdings in these districts is between 31-46 nuts per tree/per year and 42-72 nuts per tree per year in estates. These yield levels when compared with Puttalam or Kurunegala is 23% lower in small holdings and 11% lower in the estate sector.

Table 4.17

Estimate of Yield per Hectare

Age of the tree	No. of trees per hectare	Average No. of nuts per tree	No. of nuts per hectare
7-15	22	27	600
16-30	28	37	1025
31-60	39	45	1755
60 +	16	38	613
T o t a l	105		3993

(54 trees were assumed to be senile, unproductive or young plants)

Number of nuts per hectare is 3993 per year (1616 nuts per acre). But in many districts the number of trees in each age group is different and the number of vacancies and senile trees is large. Hence the yields may be lower than this. In districts like Gampaha where the number of mature trees are high and the holdings have less vacancies and fewer senile trees the yields are higher.

If we assume the trees to start bearing at 5 years of age the yield per tree/per year is as follows.

Table 4.18

Yield per Tree According to the Age

Age of the trees	Colombo	Gampaha	Ratnapura	Kalutara	Galle	Kegalle
6-15	26	39	22	31	21	25
16-30	34	52	30	40	32	32
31-45	42	56	39	51	42	48
46-60	39	67	31	42	46	37
60 +	37	53	24	41	40	35

According to our survey data 10% of the trees are senile and 25% are under 6 years of age and 10% are over 60 years of age.

Therefore, only in an average holding only 55% of the trees bear an economic production (on the assumption 160 trees per hectre) and only 88 trees are in full bearing. Even with this number if the palms are healthy and productive, by regular application of fertilizer we can expect 20 nuts per pick which makes the annual yield of 10,000 nuts per hectare.

This exercise indicates that the practice of rehabilitation techniques like fertilizer application pest and weed control etc. lead to yield increases in the short run and hence the project targets are not imaginary.

Table 4.19

Soil and Water Conservation

(% of holdings where the provision is required and adequate, as a % of holdings where provision is required)

	Colombo	Gampaha	Ratna-pura	Kegalle	Kalu-tara	Galle
Contour Drains	40%	61%	28%	21%	42%	43%
Bunding and Terracing	-	-	31%	33%	48%	-
Husk Burying	13%	18%	-	-	11%	10%

Table 4.20

Type of Intercrop

No. of Holdings - 284 of size groups 0.4-4 hectares

	Colombo %	Gampaha %	Ratna-pura %	Kegalle %	Kalu-tara %	Galle %	Total %
Banana	08.0	10.0	17.0	08.0	06.0	03.0	52.0
Pineapple	04.0	16.0	-	-	02.0	-	22.0
Cocoa	-	-	02.0	07.0	01.0	-	10.0
Pepper	-	01.0	01.0	02.0	01.0	-	05.0
Coffee	0.5	0.5	02.0	01.0	01.0	-	05.0
Betal	-	02.0	-	-	-	-	02.0
Vegetables	-	0.5	-	0.5	01.0	-	02.0
Tumeric-ginger 01%		0.5	0.5	-	-	-	-
Citrus Fruits	-	-	01.0	-	-	-	01.0
	13.0	30.5	23.0	18.5	12.0	03.0	100.0

Chapter Five

SUBSIDY PROGRAMME AND THE EXTENSION SERVICES

5.1 Subsidy Programme

To develop the coconut industry, the Government of Sri Lanka has introduced a series of subsidies from as far back as 1948. The Government of Sri Lanka commenced its present subsidy scheme in 1957, and from time to time the scheme was reviewed to give more assistance to the growers. Coconut was included in various integrated development programmes, and in 1980 six project districts mentioned in this study were included in the ADB assisted coconut development project.

The existing CCB scheme includes six subsidy programmes covering the entire island.

(1) Coconut rehabilitation
(establishment of drainage and contour drains, filling vacancies, removal of excess palms, replacement of unproductive palms)
(2) Replanting and under planting
(3) New plantings
(4) Intercropping coconut with other crops
(5) Pasture development
(6) Subsidy for small holdings of less than one acre

The subsidy payments are given in Table 5.1.

Although these subsidy schemes have been in progress throughout the island. The ADB project has injected more funds for strengthening the programme, in the project districts. In addition, it has allocated funds for processing, research and other infrastructure facilities.

Table 5.1

Subsidies for Production

	Subsidy payments approved in 1974	Revised payments 1984
1. Rehabilitation		
a. Establishment of contour drains per meter	Rs. 0.95 - 1.50	Rs. 2.73
b Drainage drains per meter	Rs. 0.66	Rs. 1.24
c. Filling Vacancies per palm	Rs. 3.25	Rs.10.00
d. Removal of palms per palm	Rs.20.00	Rs.50.00
e Husk burying per ha		Rs.1250.00-2500.00
2 Underplanting a Replanting per ha	Rs. 5600.00	Rs. 12,000.00
3. Holdings less than o.4 ha per seedling	Rs. 28.00	Rs. 50.00
4. Pasture per ha		supply of seeds free of charge
5. Inter crops Cocoa per ha Pepper do Coffee do	 Rs. 3700.00 Rs. 4630.00 Rs. 3400.00	 Rs. 5560.00 Rs. 6480.00 Rs. 5250.00
6. Fertilizer	52% of the price	

5.1.1 Rehabilitation Subsidy

The rehabilitation subsidy has not been very popular with coconut growers. The amount of subsidy allocated for the establishment of drains is not very attractive and it is not compatible with present labour wages. But in the 1984 proposals, this amount has been increased and it is expected that the increase would attract more farmers. Similarly inducing the farmer to remove an excess palm was also a difficult task, especially in the coastal area where no other crop could be grown. In many instances even though the removal of an excess palm, increased the productivity of other palms, the overall increase per hectare cannot be visualized instantly. Hence, many cultivators were reluctant to remove trees, but the introduction of an incentive of Rs. 150/- per palm in the 1984 proposals may encourage many land owners in this direction. Nevertheless, the extension personnel of the Coconut Cultivation Board (the CDOs) have an uphill task to persuade producers to adopt these practices.

5.1.2 Under Planting/Replanting Subsidy

It is obvious that the replanting/under planting programmes have realized significant achievements compared with other subsidy programmes launched by the Coconut Cultivation Board. The number of applications received for replanting and under planting has increased during the survey period. A greater response can be obtained for these programmes in the coming years with increasing nut prices. But presently, the main problem is that even though subsidies were in existence the under planting and replanting rate in the previous decade was low and once the old trees go out of production there are no new trees to take their place.

5.1.3 New Planting Subsidy

Many of the regional project administrators felt that the new planting subsidy allocations which are not funded by ADB are not

sufficient for the year. But one must analyse this situation with caution. The land available for new planting is either marginal rubber lands or barren lands. The present land use of the project area leaves only a small proportion of new land for coconut. In the circumstances, new planting in the project area should be encouraged only on the most suitable lands. In other cases a subsidy for less than one acre holdings should be encouraged only where a small holding of coconut would meet the family's consumption needs and also increase real incomes of small-holders. If and where vacant land is available in major coconut growing areas, a vigorous replanting programme can be launched. But in the hilly and marginal areas, the opportunity costs of cultivating other crops should be looked into, before giving subsidies for coconut.

5.1.4 Subsidies for Intercrops

It will be worthwhile if the Coconut Cultivation Board's subsidy package also carries subsidies for banana, pineapple, and passionfruit (provided marketing facilities are available). The subsidy package containing cocoa, pepper and coffee is not so popular. Pepper is the most popular of the three intercrops recommended by the Coconut Cultivation Board. In a non-project area like Matale, Cocoa is more popular. There are no convincing reasons to preclude banana and pineapple from this package, inclusion of which would facilitiate the promotion of the intercrops programme both in the wet zone and the dry zone.

Pasture development subsidy did not gain much acceptance among the recipients. This area needs further retention work to promote dairying and other form of livestock, where animals could be grazed and their waste used as manure. Even though the moisture retention of soil is essential, the popularity of cover crops is doubtful, when compared with the experience we have on pasture development.

5.1.5 Subsidy for Less than One Acre of Coconut

The subsidy for small-holders owning less than one acre of coconut should be encouraged in all parts of the Island. This is one of the popular subsidy programmes in the project area as well. In addition to these subsidies, a scheme to fertilize mature coconut would be welcome. Presently, the fertilizer on subsidy scheme covers only the young plants, and in some project areas bank loans have been arranged to finance the fertilizer cost. But with high fertilizer prices which were not subsidized many enterprising farmers were reluctant to invest on fertilizer. The uncertainty of rains during the last few years has also prevented such an investment. Hence, if the state could organize a fertilizer subsidy, it will improve coconut cultivation and the subsidy programme will yield maximum benefits.

5.2 The effect of the Subsidy Programme in the Project Area.

Interviews with project beneficiaries revealed that the subsidy programmes have contributed to the improvement of coconut cultivation in the project area.

Out of the 750 coconut small-holders we interviewed, 45% had obtained some form of subsidy for coconut cultivation. 11% had applied for subsidies but due to various reasons such as ownership, title etc. were not qualified to obtain such subsidies. 08% had applied for new planting subsidies, but were unable to get any due to the exhaustion of allocated funds. About 09% were not interested in obtaining a subsidy while 05% were not aware of the subsidy programme. 22% stated that procedural difficulties stood in the way of their obtaining a subsidy. The difficulties they mentioned were in this order:

Table 5.2

Difficulties Experienced in obtaining a Subsidy

1)	The lengthy procedure involved from the submission of the subsidy application to the final payment
2)	The difficulties in meeting the officers concerned
3)	The lack of finances to complete the preliminary work necessary to qualify for subsidy payment
4)	Lack of political influence
5)	Inefficiency of some of the officers concerned

But when we interviewed the CDOs, they explained that these difficulties arose mainly because the earlier CDO ranges were too large for one field officer. Now that the CDO ranges in the project area were small and with the assistance of the field assistants, this situation should ease. But a proper development programme could be carried out only if the CDO as well as the cultivation officers were keenly interested in developing the coconut industry. In many instances the cultivation officers do not consider coconut as falling within their purview. They always gave priority to paddy.

Table 5.3

Holding Size and Subsidy Distribtuion

Size of the holding (ha)	No of subsidy holders	Subsidy holders as % of total coconut land owners of the sample	Subsidy holders in the size group as a % of total
Less than 0.4 ha	108	28%	21%
0.4 - 2 ha	322	50%	63%
2.1 - 4 ha	52	83%	10%
4.1 - 5 ha	28	72%	06%
Average Total			
T o t a l	510	45%	100%

The receipt of subsidies had increased with the holding size. In the 2-4 hectares group, 83% had obtained subsidies; while of the less than 0.4 hecatares group only 28% had obtained subsidies. The main reason was that the farmers of the less than 0.4 hectares group had mixed gardens, which did not qualify them for a subsidy other than the less than an acre subsidy. But 0.4 - 2 hectares group had the largest number of farmers, who obtained subsidies and it is to this target group that the subsidy programme should be geared.

The subsidies were given in instalments over a period, depending on the progress of the work done. The method was acceptable to the coconut land owners, but the delay in payment was their frequent complaint.

One factor that made the programmes lag was the absence of a proper and effective extension exercise. Once the cultivator obtained his first instalment he just ignored the maintenance work. The extension workers

also were no longer interested, mainly because they cannot cope with the work load. As a result many cultivators who received the first instalment left it at that. Even though there were several reasons for the non receipt of 2nd instalment, the major reason was the lesser amount paid as compared to the first payment and this ceased to motivate the cultivator.

Table 5.4
Reasons for Not Obtaining the
Second and Third Instalments

		% No. of Cultivators
(1)	work not being completed in time	56%
(2)	lack of interest due to inadequacy of the payment	38%
(3)	Lack of know-how	02%
(4)	Inefficiency of the officers concerned	04%

Most farmers blamed the officers for not receiving the 2nd and 3rd instalments. But our investigations proved that the farmers themselves were either not interested or had not completed the work necessary to qualify for the next payment such as fertilizing, maintaining the fences, increasing productivity of the palms, weed control etc.

5.3 Services of the Extension Staff

Analysis of the subsidy programme should take into consideration

the contribution of the extension personnel. Each project district was managed by a regional manager and his staff. The extension officers were the coconut cultivation officers presently assisted by field assistants. The number of CDOs in each district was as follows:

Table 5.5

Distribution of CDOs in the Project Area

	No. of CDOs	Coconut Land Area (Hectares)
Colombo	04	77,838
Gampaha	18	18,189
Galle	09	11,838
Kalutara	08	20,836
Kegalle	08	12,529
Ratnapura	05	
	52	141,230

Each CDO had to maintain an average of about 2,716 hectares of coconut land. In Gampaha and Colombo areas CDO ranges were as extensive as 3,538 hectares, while in Kalutara it was 1,474 hectares. In Kalutara, unlike in Gampaha, the coconut area was spread all over the district.

But the number of hectares allocated to a CDO seems to be reasonble when compared with Matale, where the 4 CDOs have to look after 3,500 hectares each, in a wide spread area.

The weakest link in this extension network was not the number of personnel involved, but the time limitations. There being no calender for coconut cultivation and the unplanned time schedule of the subsidy programme called for attention of the CDO at all times of the year. Hence much time of the CDOs as well as of the staff of the regional office including the Regional Manager was taken up for the administration of the subsidy. With this short-coming being remedied with the introduction of the calendar for subsidy administration, CDOs can be expected to devote more time for extension work.

Secondly, the CDOs need proper training in extension work. Most of the CDOs had not obtained any form of training in extension work other than the job experience. Training is an essential element in the promotion drive for the development of coconut. The CDO should be in a position to get assistance from cultivation officers, special service officers, and Grama Sewakas etc. to achieve his target. In the absence of such a co-ordinated plan the village level officers show little interest in coconut, for their interests mainly centre round paddy.

Within the present time schedule for project districts for the receipt of applications and inspection etc. the CDOs and the field assistants should be able to devote more time for extension work.

When questioned on their relationship with the CDOs, the most common reply given by the farmers was that they sought their assistance for subsidies. A farmer approaching him for a remedy for a pest or disease was very rare. But in many instances most farmers accepted the services rendered by the CDOs and that they had taken special interest to promote coconut cultivation by arranging Bank Loans for the purchase of fertilizer for mature palms, organizing field demonstrations and marketing arrnagemenets etc. (given the opportunity and proper guidance the CDOs can play a much more vital role).

5.4 Credit Facilities

Other than the estate owners, only a handful of farmers have obtained credit for the improvement of coconut cultivation. Out of the total sample of 750 farmers in the project area only 12% had obtained loans from government sources. (but 62% of the farmers had obtained loans for various other purposes but not for coconut cultivation). 42% of the farmers obtained loans from their collection agents with a promise to provide the nuts of the next crop to set off the loan.

The most popular form of credit, in the project area was from informal sources where they got an advance for the crop from the coconut collector or the trader. Most private and cooperative DC mills extended advances once the cultivator informed them that he had picked the crop. But the price received in such instances (except when dealing with cooperatives) will be mostly less than the open market. In Gampaha area, where the producers cooperatives used to extend a very good service to the producers such as the distribution of fertilizer, weedicides and other chemicals to the members, they extended credit facilities as well, and paid a fair price for the crop. Even though coconut is a profitable crop many cultivators do not wish to invest on fertilizer to increase production. Unlike in paddy, the investment is considered risky.

In a crop like paddy, on application of fertilizer the outcome is clearly visible in the same crop season. But in coconut, the impact is longterm. Farmers have to wait for a long period to obtain extra incomes running risks. In between an unexpected drought which is common in Sri Lanka may destroy the crop. Therefore, coconut cultivators are not keen in obtaining loans for coconut development even though they know the value of investment.

5.5 Support From Other Institutions

Apart from the Coconut Development Ministry, support for the

improvement of cultivation from other Ministries is very limited. The extension staff of the Department of Agriculture, Agrarian Services etc. are not very much concerned about coconut. Many cultivation offiers of the Agrarian Services Department were not even aware of the current coconut subsidy programme. No government organization has offered itself to provide marketing facilities to the small-holders. Since, there is an increasing demand for coconut, marketing cannot pose any problems.

Yet, because of transport and other difficulties, many producers do not receive a fair price. An increase in production can worsen this situation. The producer will not be able to reap the profits of his efforts because the middle men will be collecting their share of profit rather than pass it on to the producer.

Chapter Six

USE OF COCONUTS

6.1 Consumption

Consumption levels of coconuts can be estimated in the same way as for production and yield. But these estimated figures are not always accurate, unlike in the case of other plantation crops which are totally export oriented where the sales figures are properly maintained.

Many coconut small holders consume a part of their produce and sell the balance wholesale or retail. Coconut consumption can be estimated by adding together

1. the number of fresh coconuts consumed as nuts(malu pol)
2 the amount consumed as coconut oil
3. the amount used for industrial products: soap, margarine, etc. and
4 the number of tender coconuts consumed as drinks.

The Central Bank's consumer finance survey reveals that the per capita consumption of coconut is 125 nuts per annum.

90 as fresh nuts and
34 to 53 as coconut oil

According to our survey the per capita consumption of coconut was as follows :

Table 6.1

Per capita Consumption of Coconut

	Per person/per annum
Colombo	136 nuts
Gampaha	163 nuts
Ratnapura	133 nuts
Kegalle	123 nuts
Kalutara	132 nuts
Galle	126 nuts
Average	135.5

In these calculations consumption of tender coconut and the quantities used for the manufacture of soap and other non edible industrial goods were not taken into consideration.

The consumption of coconut in coconut land owning households appears to be high when compared to the consumption of the urban buyers. The housewives in coconut land owning households make no effort to economise consumption, since they do not have to pay for them.

According to our observations consumption of coconut varies with the income levels and with the sector. In the urban sector, even in the higher income groups, consumption is lower than the rural sector. But in general lower income groups consume about 90 nuts per person per year, while higher income groups consume about twice that amount.

Similarly the percentage consumed varies with the holding size group

Table 6.2

Home Consumption of Coconuts

Holding Size	% of yield consumed at home
Less than 0.4 hectares	94%
0.4 - 2 hectares	36%
2 - 4 hectares	19%
4 - 10 hecatres	06%

In the size groups above 10 hectares, the percentage consumed at home is negligible. The farmers said that their patterns of consumption would not change with the fluctuation in prices. In periods of poor yields farmers even consumed some of the nuts available for sale rather than change their consumption patterns.

A comparision of the per capita consumption of a major coconut producing area like Gampaha with that of a non major coconut area like Matale, reveals a difference of 53 nuts in per capita consumption. In Gampaha it is 163 nuts per person while in Matale it is 110. However the district figures may vary slightly from the survey figures as the survey data relates only to households owning coconut lands.

Presently bacause of soaring prices coconut has given way to new substitutes like soya flour, cow and buffalo milk and various other vagetable oils. But in our sample households, the percentage using substitutes for coconuts was negligible. This may be due to the fact that all these households owned coconut lands and increasing market prices would not have had any noticeable impact on consumption. This would not be so for urban consumers. But the movement for using

substitutes in place of coconut is not catching on in spite of the mass scale sales compaigns. But only a consumer finance survey can reveal the degree of substitution.

Table 6.3

Yield Levels Consumption and Price Trends

	Year	1962	1967	1972	1977	1981
1	Yield per hectare (in nuts)	6072	5180	6563	4033	5001
	%increase/decrease of the yield from the base year (1962)	0	14%	+9%	-33%	-17%
	%change from the previous period	0	14%	+26%	-38%	+24%
2	Export volume (no. of nuts)	1537	950	1231	233	437
	% change from the base year 1962	0	-38%	-20%	-85%	-71%
	% change from the previous period	0	-38%	-29%	-81%	+87%
3	Domestic consumption (no. of nuts per person per year)	124	125	120	112	121
	% change from the 1962 base year	0	+1	-3%	-10%	-4%
	% change from the previous period	0	+1	-4%	-6%	+8%
4	Average prices (per nut)	0.17	0.20	0.21	0.92	1.80
	% change from the base year 1962	0	+17%	+23%	+44%	958%
	% change from the previous period	0	+17%	+5%	+338%	+96%

With the decrease of yield levels the export volume has decreased by about 85% while domestic consumption has decreased by only 10%. The low yield level in 1977 gave rise to a four-fold increase in the price levels and that price level doubled in 1981.

If we assume that no rehabilitation was done and when the past time series data is analysed the projected production figures show a decline from 1970 onwards. The regression equation for the production of Coconut is Coconut production = $2745.27 - 30.85 X_t$ year.

Every year there was a decline of 30.85 and in 1985 our projection shows that coconut consumption has equalled coconut production, without any exports. (Graph 6.5) A similar regression analysis from time series data shows that

Coconut Consumption = $1500 + 6.19 X_t$ year

Similarly the exports declined from 1975 onwards, reaching a negative response from 1981 and the regression equation for

Coconut Exports - $1048 - 6.9 X_t$ year

The extra quantity of coconuts needed for consumption can be met from past stocks till 1985. But thereafter if no remedial action is taken the extra comsumption will have to be met by imports. Even though there is a small variance in these, projections are well within the 95% confidence level and in the context of present trends a situation of this nature could be expected.

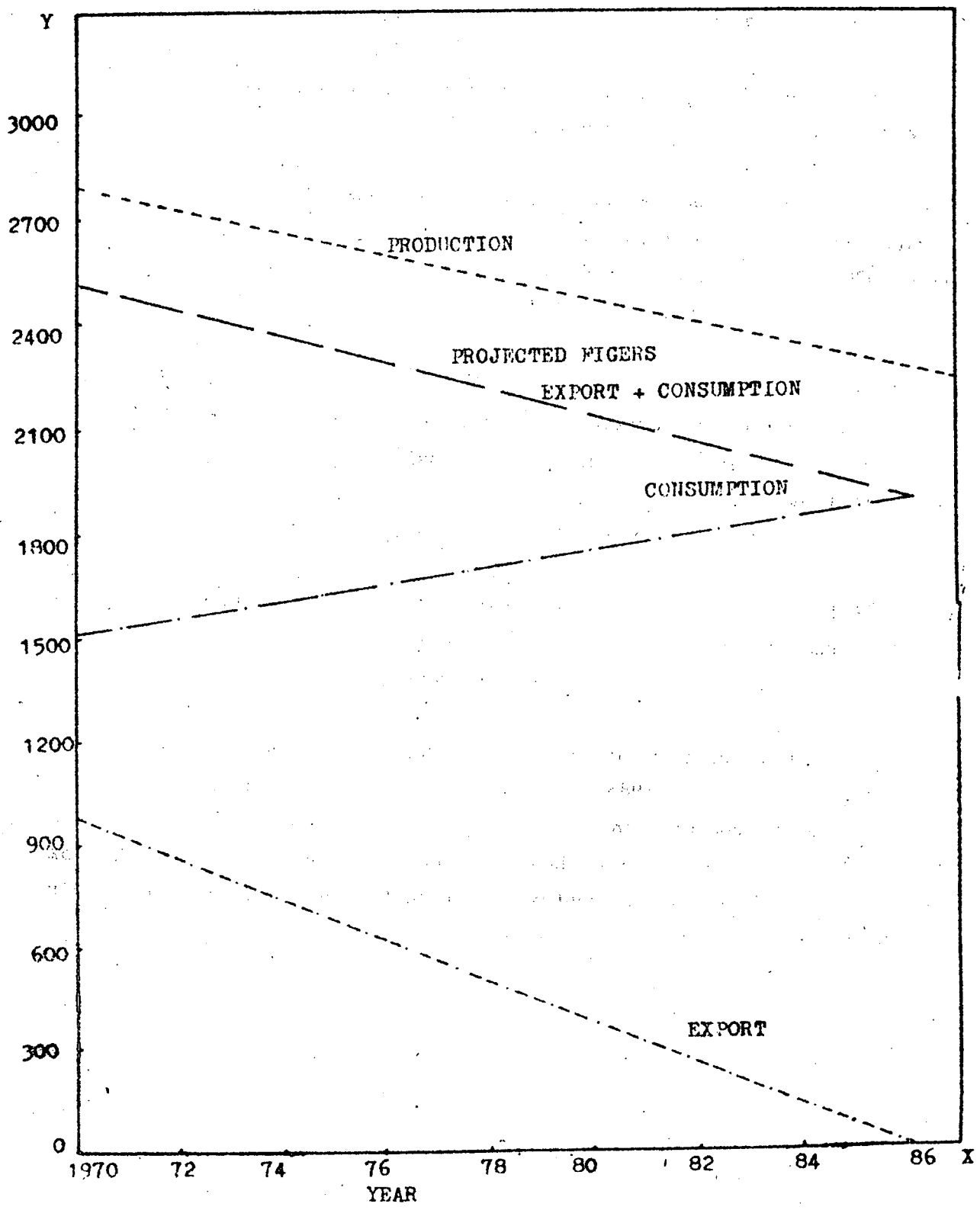

Y
3000
2700
2400
2100
1800
1500
1200
900
600
300
0
PRODUCTION
PROJECTED FIGERS
EXPORT + CONSUMPTION
CONSUMPTION
EXPORT
1970
72
74
76
78
80
82
84
86
X
YEAR

Table 6.4

Projected Production Increases

1981 - 1986

	nut requirements (in millions)					
	1981 Actual	1982 Projected	1983 Projected	1984 Projected	1985 Projected	1986 Projected
Domestic Consumption Fresh nuts	(1772)	1802	1831	1850	1880	1930
Coconut oil in nut equivalent	(48)	48	49	50	50	50
Total domestic consumption	(1820)	1850	1880	1900	1930	1980
Export in nut equivalent coconut oil	(140)	210	290	411	584	806
desiccated coconut	(250)	270	300	330	370	400
copra	(10)	15	22	30	42	60
fresh nuts	(2)	3	4	6	8	11
Total exports	(402)	498	616	777	1004	1277
Total no. of coconuts needed	(2222)	2348	2496	2677	2934	3257
Expected Production increase		05%	06%	07%	09%	11%

Explanations

1 Requirements of fresh nuts and coconut oil were calculated using the population projections of the Department of Census and Statistics. Domestic Consumption was taken as 122 nuts per head per annum inclusive of coconut oil.

2 nut equivalents of coconut products

1 MT of copra = 4925 nuts

1 MT of DC = 6800 nuts

1 MT of coconut oil = 8000 nuts

Source - Coconut Development Authority

3 Following assumptions are used in the growth rates:

Coconut oil export market expands in the first instance, by 50% (in 1982) and thereafter by 40%.

Export market of fresh nuts and copra follow the same pattern

Desiccated coconut demand grows only by 10% of the previous year's demand.

4 The figures within brackets are actual production figures.

Table 6.4 shows the growth rate needed in the coconut cultivation sector in order to fulfil domestic requirements and the same modest export requirements. But if production could be increased at a higher rate our export market could be expanded so that export earnings of coconut may regain its position in the country's foreign exchange earnings.

The expected higher output from the ADB project together with the extra development expectations in the main coconut area by the IRD could

result in a 05% increase in production. But this may be hindered by unexpected drought or some climatic variation. Therefore as a long term measure to safeguard coconut cultivation drought resistent varieties should be introduced. Hence this calls for a new area of reseach in coconut cultivation.

6.2 Processing

Manufacture of desiccated coconut and oil are the two major coconut processing industries in Sri Lanka. Desiccated coconut is mainly for the export market, while coconut oil is both for export and local consumption.

The major portion of the coconut yield is sold as fresh nuts, while copra sells more than desiccated coconut.

Table 6.5

Disposal of Coconuts

	Project Area	In Kurunegala District
Fresh nuts	58%	30%
copra	24%	38%
Desiccated coconut	16%	31%
other products	02%	01%

The breakdown is different in Kurunegala, one of the main coconut producing areas. In Kurunegala fresh nuts, D C and copra sell almost in

equal proportions, but in the project area the major portion goes as fresh nuts.

6.2.1 Copra Milling

Although about 60% of the copra mills are situated in the project area the percentage of coconuts used for milling, was not so large. 84% of the mills in the project area are situated in Colombo and Gampaha. Easier and closer access to the markets and the shipping lines is one reason.

Table 6.6

Number of Registered Copra Mills

District	No. of mills	Available capacity	Utilized Capacity
Project area		Metric tons	
Colombo	15	41,627	43%
Gampaha	14	27,635	37%
Kalutara	02	3,013	56%
Galle	01	1,120	54%
Kegalle	01	560	100%
	--	------	----
	33		
	--	------	----
Non project area			
Puttalam	08	8,988	44%
Kurunegala	05	2,187	66%
Matale	04	9,147	52%

The above statistics reveal that the mills are under utilized so that increase in milling capacity will not be a problem in the development of the copra processing industries. Only a few items of equipment and machinery were new while most were outdated but in working order. This suggests that the need for new mills and machinery will not arise in the near future (at least for another 5 years).

The demand for coconut oil increases with the increase in population. Shortfalls in supply to the export market, would result in losing export markets to other competitive vagetable oils. Coconut oil export in 1972 amounted to 86,822 metric tons. This dropped to 3043 metric tons in 1980, and to 17,476 tons in 1981. 1982 was not better than 1981.

Roughly about 64000 metric tons of coconut oil are needed for local consumption and in Sri Lanka the competition offered by other vegetable oils cannot break the monopolistic market for coconut oil unless a major cultural change takes place. Hence exports should be in excess of the local demand of 64,000 metric tons which itself will grow by at least 01% a year.

The production of poonac and oil cake too has decreased, severely affecting the animal feed industry. For want of more poonac and oil cake, the animal feed market has been dominated by subsitutes.

Most of the coconut oil mills work one shift a day. During the peak production period, May to September, only three mills work two shifts a day and during lean periods most of the mills work only two or three days a week.

The effect of this on employment in the coconut industry could not be calculated because except for the three large mills (British Ceylon Corporation, Harischandra Oil Mills and Sedawatte Oil Mills),all other mills engaged casual labour (about 96% of the work force). They were engaged only during the peak production period and on a rough

calculation, it revealed that a casual worker had only 80 days (of 8 hours) work for a year.

6.2.2 Desiccated Coconut Industry

The production of D.C. is mainly for the export market. Out of the 65 registered D.C. mills 23 are in the Gampaha district. 34 are in the Puttalam district, 6 in the Kurunegela and one each in the Kalutara and the Kegalle districts. Unlike in copra milling, D.C. production depends on the size of the mill and the yield from nuts. The outturn varies from district to district. In the Colombo and Puttalam districts, 1000 nuts give an outturn of 132 Kg while in the Kurunegala district it gives 130 Kgs. In Kegalle it is 125 Kgs. But in Kalutara 1000 nuts give an outturn of 142 Kgs.

In Kalutara D.C. production is very profitable. But in Kalutara only 12% is used for the D.C. industry, which suggestes that more nuts from Kalutara, Colombo and Gampaha should be diverted into the D.C.industry.

Desiccated coconut production absorbs about 16% of the coconut crop in Sri Lanka and produces about 50,000 metric tons of D.C. Production varies with the crop, and maximum production is during the second half of the year.

About 70% of the D.C. mills in Sri Lanka have an outturn of 500-1000 M.T. annually, but only 04% of the mills have a capacity of more than 1000 M.T. These mills had worked about 166 days on an average for the year 1982 and the capacity utilization varied with the availability of the crop.

A large labour component is involved in the D.C. industry and the present work force is about 6500 people. Of this' women comprise about 36%. The development of this industry would open up considerable employment opportunities at the village level, both for men and women.

The D.C. industry generated a range of by-products. The sweepings and the pairings are converted to coconut oil and the shells are used for making charcoal.

The machinery and the equipment used in the factories are more than 50 years old. No replacements have been made for the last 10 years, in 98% of the D.C. mills.

In the world D.C. trade Sri Lanka ranks second only to the Philippines. While the Phillippines showed an increasing trend in D.C. exports, Sri Lanka registered static or a slightly declining trend. From 53,000 M.T. of D.C in 1972 it has declined to 37,000 M.T. in 1982. (a decline of about 38%).

The existing factories now at 60% capacity suggest that there is scope for expansion, provided there is a sufficient inflow of raw materials.

But production cannot be stepped up due to the uncertainty of the coconut crop: Any further investment in D.C. mills is discouraged by the following factors.

1) Uncertainty of the crop
2) The under utilized capacity and the resultant high costs of operation.
3) Quality standards in new small scale factories which do not measure up to international standards.

The graphic presentation showing the future trends of exports, production and consumption, make it clear that unless drastic measures are taken, the present trend of production would lead to the elimination of exports by 1990. Therefore, to maintain at least the present export trends, we need a large investment to increase the supply of coconut both in the long run as well as in the short run.

6.3 Fibre Industry

In the project area the fibre industry was confined to the Kalutara and Galle districts. About 68% of the labour needed for the industry was supplied by family labour.

Of the sample households, 22% in Kalutara and 31% in Galle were engaged in the fibre industry and 75% and 62% respectively of their labour needs were supplied by family labour. In 53% of the holdings in Kalutara and 62% in Galle, the raw coconut husks were sold to these industrialists. Most of the coir produced in the Kalutara district was used within the district, because there was a great demand for coir from toddy tappers. Most of the coir produced in Sri Lanka is used locally. But still there is a large unsatisfied demand for fibre. In the coir producing areas, the presence of a large work force of skilled labour suggests the potential available for the improvement of the coir industry. But the main problem faced by the producers of fibre is the shortage of raw material, the husks. Therefore, to get more raw material coconut production must be increased.

In these areas, burying husks as a moisture retainer, is not acceptable to coconut growers. In Kalutara which has fairly high rainfall, this may not even be practical. Hence, any other measures like fertilizer application and contour drains will be acceptable for increasing production.

At present coir dust is not used for any purpose. Coconut cultivation Board can advise growers on the suitability of using coir dust rather than coconut husks for burying under the palms. This may be another area for research.

6.4 Disposal of Fresh Nuts

36% of the nuts were used for home consumption, while 62% entered

the market chain. 37% of the nuts entered the market through intermediaries. In villages the most popular intermediary was the collector. In the Gampaha district the Producer Co-operatives played this role. In Colombo and Galle the wholesale trader was the intermediary.

The major portion of the nuts disposed of was sold as fresh nuts by the producers to the wholesalers or collectors. Only the coconut cultivators who own small holdings sold directly to consumers or village boutiques. Roughly, about 2/3 were sold to intermediaries. 10% of the nuts were sold direct to the mills.

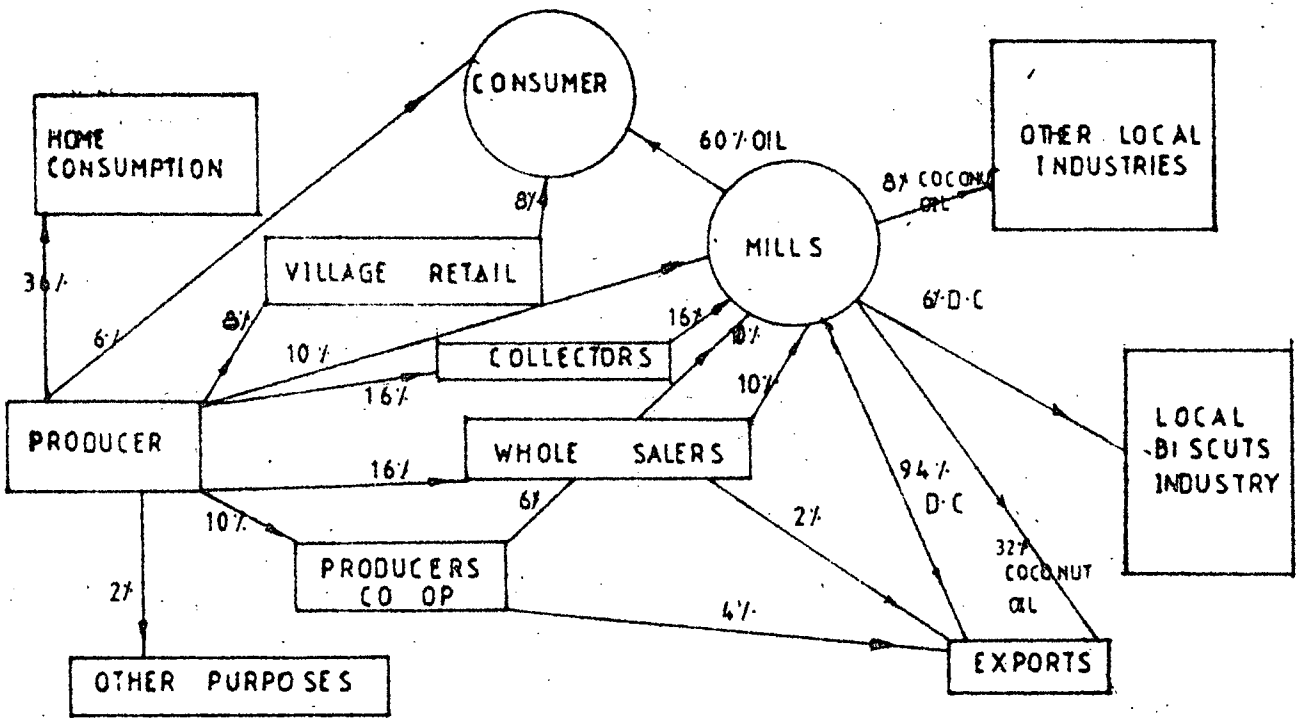
Available marketing channels as revealed in the survey data are represented in the following graph (6.9). The percentage distribution of nuts, arriving at mills, export and consumer points may vary from area to area. The chart gives the distribution of nuts, including those which were consumed at home. It was estimated that about 50% of the nuts produced were consumed locally as fresh nuts.

Table 6.7

Disposal of Coconut

Form of sale	Colombo	Gampaha	Ratna-pura	Kegalle	Kalu-tara	Galle	Total
As fresh nuts	39%	3?%	60%	76%	66%	74%	58%
As copra	39%	26%	28%	15%	21%	18%	24%
To desicca-ted coconut mills	28%	34%	11%	07%	09%	06%	16%
In other ways	03%	02%	01%	04%	02%	02%	02%

MARKETING CHANNELS OF COCONUTS



Chapter Seven

MARKETING AND PRICES

Marketing comprises all operations involved in the movement of goods from the producer to the consumer, excluding any producing operations which change the nature and use of the products. Hence coconut marketing includes plucking, assembling and transporting nuts to the consumer points.

7.1 Demand for Coconuts

The law of demand attempts to relate the level of prices to the available quantities at the market. It indicates the quantity people are prepared to buy at a given price, and not what they need, if they had the necessary purchasing power. The demand for coconuts depends upon various factors.

$$D_{ct} = + P_t + S_t + n + T + F$$

where D_{ct} = Demand for Coconut

P_t = price of fresh nuts at time t

S_t = size of the nut at time t

n = seasonal availability of coconuts (a dummy variable)

T = taste and preference for other substitutes and their prices (a dummy variable in ranking order)

F = size of the family

Variations are likely to occur when one or more variables change with other factors remaining constant. All these factors are essential elements in the local coconut demand. The family size, prices and the size of the nuts are the most significant variables respectively.

7.2 Supply of Coconuts

Supply of coconuts depends upon the acreage, yield levels, production conditions, rainfall, climate and the seasonal variations. We have discussed all these factors elsewhere, and only seasonal variations of the crop remain to be examined.

Table 7.1

Precentage of the Crop Yields for Different Seasons

(Estimated from 1981 & 1982 Yields)

(The % are the share of the annual yield)

Month	Jan	Feb	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.
Share of the annual yield	14%		16%		24%		22%		12%		12%	

From May to August the yield levels are high and more nuts can be diverted to the manufacture of copra and D.C. Understandably, the prices come down during this period. The lean months are from September to February when the coconut price rises sharply. But even during this period, the local demand is met with nuts from the previous crop's stock.

Table 7.2

Seasonal Variation of Production

Consumption and Prices

	Jan. Feb.	Mar. Apr.	May June	July August	Sept. Oct.	Nov. Dec.	Total	
Per hectare Production (nuts)	486	556	834	765	417	417	3475	100%
	14%	16%	24%	22%	12%	12%	100	
Consumption (nuts)	216	216	216	216	216	216	1200	38%
%	16.6%	16.6%	16.6%	16.6%	16.6%	16.6%	100	
Colombo & Gampaha average producer prices Rs. cts.	1.65	1.69	1.52	1.55	1.82	1.93	1.69 average for the year	
% increase/ decrease from the average prices	-2%	00	-10%	-8%	+8	+4%		
Sales(nuts)	270	340	618	549	201	201	2179	62%
%	13%	16%	28%	25%	9%	9%	100	

* The consumption figures were estimated assuming consumption to be static all the year round.

During the period May to August even though the prices are low producers get higher income from their higher yields. But among coconut small holders, withholding of stocks with speculation on future price is very rare. They are indebted to the seller and hence disposal is immediately after plucking. On the other hand, large holdings normally sell nuts direct to the mill, and hence can withhold stocks. Here again

it is not because they speculate on future price hikes, but because the crop needs seasoning before it is processed.

7.3 Price Determination

In the theory of economics supply and demand are the key factors influencing price. It is the point where demand and supply functions intercept, if all other factors remain constant. In most of the crop products, cost of production plays an important part in the formulation of prices.

The cost of production as shown in the tables were estimated, taking into consideration the entire package of husbandry practices/including weeding, fertilizer application etc. But in many coconut smallholdings the cost will be lower than this figure. Even though only the cost of production was taken into consideration in price determination many other factors affected prices.

Table 7.3

Price Determination

	Price received (cts.)	as a % of the producer's selling price	as a % of the retail selling price
Cost of production per nut (Rs. 1241/1400 nuts per acre)	0.88	64%	52%
Cost of collection, husbandry and other operations	0.02	01%	01%
Transport and other expenses	0.01	0.7%	0.1%
Total cost of production	0.91		
Total cost of production as % retail price	54%		
Producer's profit margin	0.47	34.3%	28%
Producer's selling price	1.38		
Middle man's profit margin	0.14		08%
Middle man's selling price	1.52		
Wholesale price	1.64		
Wholesaler's margin	0.12		07%
Retailer's margin	0.05		
Retail selling price	Rs. 1.69		03%
Producer price as a % of retail price	= 82%	100	

Similarly, producer prices may vary according to the location, transport facilities available and the relationship between producer and the trader etc. In areas where transport difficulties exist producers receive low prices because of little competition among traders. Despite this fact profit margins would not fall below 25% of the producer price.

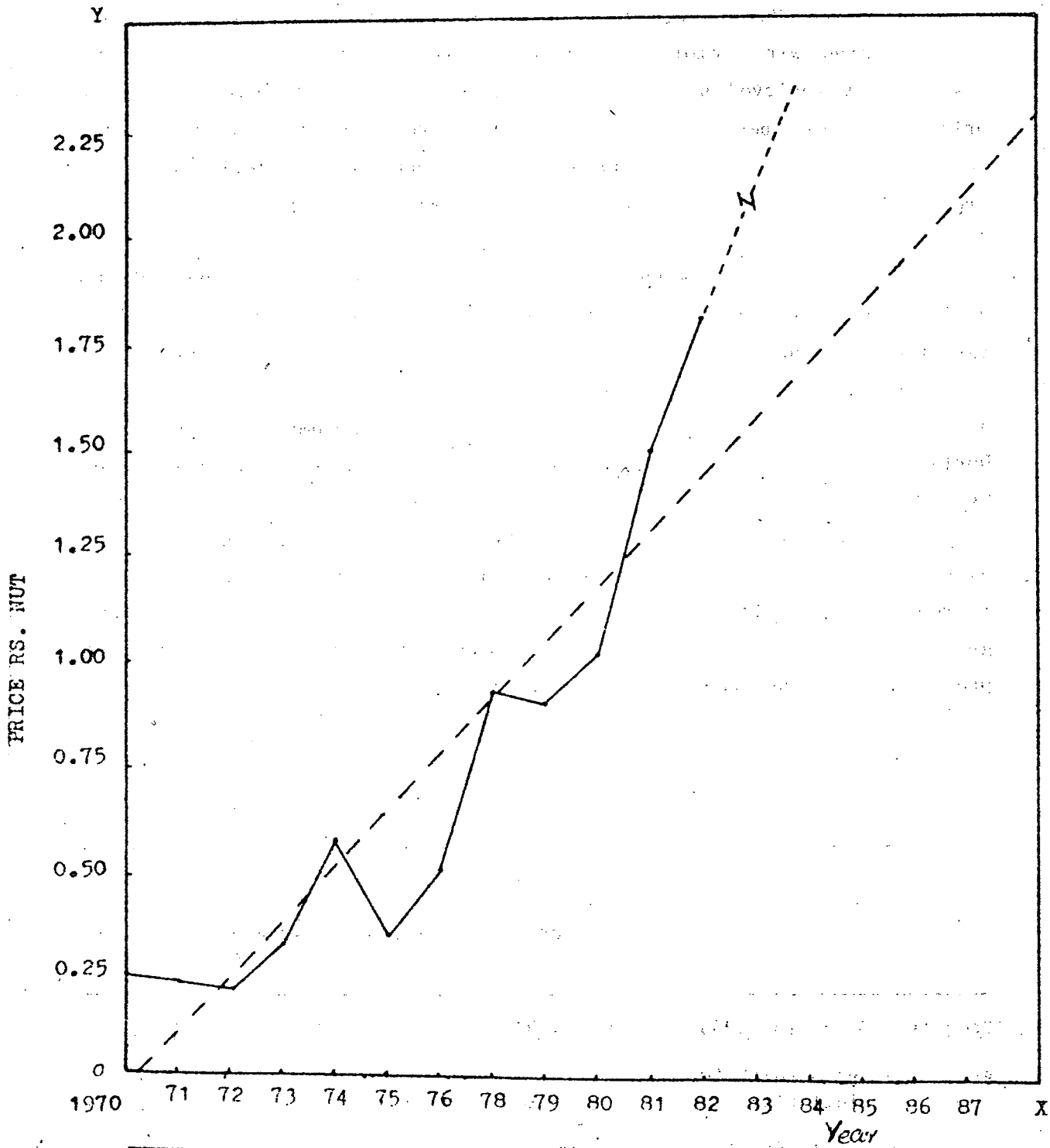
Table 7.4

Average Prices Received by the Farmers in 1982

Percentage Received by the Farmers

District	2.50-2.00 per nut	2.00-1.75 per nut	1/75-1.50 per nut	1.50-1.00 per nut	Less than 1.00
Colombo	-	12%	36%	39%	13%
Gampaha	01%	15%	41%	37%	06%
Kegalle	-	03%	23%	32%	42%
Ratnapura	-	04%	37%	22%	36%
Kalutara	-	05%	38%	34%	23%
Galle	-	02%	36%	35%	27%
Total Average		07%	36%	33%	24%

COLOMBO RETAIL PRICE OF FRESH COCONUTS



SOURCE : DEPARTMENT OF CENSUS & STATISTICS

Table 7.4 shows this trend. Many producers in Kegalle, Ratnapura areas, 42% and 36% respectively, received prices lower than Re. 1 per nut, compared with Colombo and Gampaha areas where only 13% and 06% respectively recieved such a low price, given the fact that the market price variation per nut was 5-6 cents throughout the island. This suggests that in areas where transportation and other marketing services are difficult the producers are exploited by the middlemen.

The other variables which affect the price are the season and the yields. Seasonal variation of price is not very large. But the variation or shortfalls in the yields greatly affected the price. In 1983 there were recurrent droughts throughout the year and the yields were very low particularly during the months September to December. During this period the retail prices of coconuts shot up to an average of Rs. 5/- a nut and the producer prices to at least Rs. 3/-. The Graph (7.5) shows the trend line of the price increase under normal circumstances. The projected price for 1983 was 1.68 and with an increment due to inflationary trends, (40%) the price should not have gone beyond Rs. 2.30 under normal circumstances. The trend line projected for rice and sugar behaves normally.

	Price of one measure of rice	Price of 1Kg of sugar	Price of coconut(medium size)
Projected price for 1983	Rs. 4.92	Rs. 7.78	Rs. 1.68
Projected price (with 40% inflation)	Rs. 6.88	Rs.10.89	Rs. 2.30
Open market price(between)	Rs. 6-7	Rs. 11-20	Rs. 5.50

This shows that the shortfall in supply created an unusual price increase in the cost of coconut.

The impact of this increase was not very positive as far as the producers were concerned. According to our calculations, they received 82% of the market price and the yield levels dropped by about 50% during the months of September and October. Therefore, with increased prices, producers should receive (500 x 4.10) Rs. 2,050 for 500 nuts where as under normal conditions with normal yields the projected amount they receive would have been (1000 x 1.88) Rs. 1,880, registering a difference of only Rs. 170/-.

On the other hand during the period of increased prices producers received a price in the range of Rs. 2.75-3.25. If we assume they received Rs. 3/- per nut then their total earnings would have been (500 x Rs. 3) = Rs. 1,500 which is Rs. 380/- less than the income they would have received under normal circumstances. This shows that producers do not gain much even through prices go up due to scarcity.

A major setback in the marketing of coconut is the absence of a well developed system equipped with a mechanism to choose prospective buyers who could pay a competitive price to the producers. In the absence of competition, producers have to accept whatever price is offered to them. On the other hand, due to transport difficulties they have to sell the nuts in bulk. Organizing a well laid out marketing system and a pricing policy is an indispenable condition for the development of the coconut industry. In many areas where transport is difficult and the collectors are few the farmers are exploited by buyers. These traders themselves grade the nuts and the price paid is always unfavourable to the farmers. This is specially so in the case of small farmers. Farmers owning large coconut estates with economic and other influence at their disposal and having their own transport are able to bargain for a higher price. Hence the floor price system should be protected, in the interests of the small farmers.

Although the average price at the time of the survey was Rs. 1.38 per nut, 24% of the coconut land owners received less than the average price. This was not so in Gampaha and Colombo, the reasons being access to transport and in the case of Gampaha the large size of the holdings. Poor husbandry practices in other districts tended to make the coconuts smaller in size thus fetching only a comparatively lower price. The dealers normally graded the nuts into three size groups and the larger number of nuts invariably fell into the smaller size groups.

7.4 Producer Prices

In the early part of the 1970 decade coconut prices were not favourable to the producer. The prices were very low and any investment to increase the yields was not acceptable. With the turn of the decade the prices of coconuts went up. But the producer price was not very attractive and the consumer paid more for the product while the middle man reaped the benefits.

Table 7.5

Prices Received by the Producers in 1982

District	Jan. - Feb.	March - April	May - June	July - Aug.	Sept. - Oct.	November - December
Colombo	1.28	1.47	1.25	1.25	1.25	1.29
Gampaha	1.11	1.08	1.04	1.06	1.25	1.28
Ratnapura	0.90	0.94	0.96	0.96	1.00	1.02
Kegalle	1.00	1.02	1.04	1.03	1.05	1.08
Kalutara	1.21	1.22	1.17	1.17	1.25	1.28
Galle	1.11	1.13	1.08	1.08	1.14	1.23

The projected average price for fresh nuts for the year 1982 was Rs. 1.55 and in 1983 it was Rs. 1.68. Even though this was the anticipated increase, the retail prices in 1983 increased to a level which was double this amount following the shortages in production.

This difference in the price increase, which was discussed earlier was not passed on to the producer but to the middle man. It is hence important that the producer gets a fair price in the event of a price increase.

But coconut is samll holder's crop and a highly consumable item. Therefore any decision on price will have some effect on the consumer as well. There is no doubt that when there is a shortfall in production, both producer and consumer prices increase. But the two increases are not proportional. The producer price increase is very small compared to the consumer price increase. Therefore the major share of the increase in appropriated by the middle man who is between the producer and the consumer.

In the period 1977-79 coconut became an important commodity like rice or flour in the local market due to the shortage of supply. Then the wholesalers got into the habit of withholding parts of their stocks from the market. This was mostly done during the lean crop periods and periods immediately proceeding festival times. Again when the crop was plentiful they quickly reduced the purchase price.

But the consumer price did not fall immediately. Hence even if the coconut price fell as a result of high production, the profits of the wholesalers do not change much.

The dealers claim that the high prices of coconuts are due to the shortfall in production and this in turn was due to the drought and the non use of fertilizer. They attribute non use of fertilizer to high prices of fertilizer which is more or less correct. The non application

of fertilizer is directly related to its high price, but one cannot attribute the price of coconut to the use of fertilizer.

Table 7.6

Use of Fertilizer & Coconut Prices

	Usage of fertilizer Metric tons	No. of drought months	Production (nuts in millions)	Price of coconut
1976	30690	4.09	2330	0.50
1977	29100	6.29	1821	0.92
1978	42550	3.56	2207	0.88
1979	49590	3.18	2393	1.00
1980	55774	2.92	2026	1.48
1981	37710	2.12	2258	1.80

If we take the year 1977 the drought resulted in the shortfall in production and the price increased. Higher usage of fertilizer and a shorter drought in 1979 resulted in an increase of production in 1980. This shows that production has an effect on price variations. Most coconut consumers complain of coconut prices being unstable and fluctuating. A similar complaint comes from coconut producers. Therefore some control by the state is necessary in the marketing of coconuts. A floor price to coconut producers and purchase by government when there is a glut in the market are two suggestions which are worthy of consideration.

7.5 Price Fluctuations

Coconut producers complained that coconut prices were subject to rapid fluctuations so that they could not work on a systematic farm budget. According to them most cultivators ignored fertilizing and other husbandry practices because of these changing price patterns.

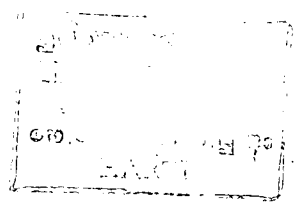
But when the fluctuating price pattern is examined the seasonality in the increase of yields plays a major part. During May-August when the yields are high prices go down and in November/December they increase showing a cyclic variation. Apart from that, adverse weather conditions and past yields should give producers some preliminary indicators of the future yields and prices.

On the other hand, storing the crop for better prices is not easy for a small holder. Thefts, inadequate storage facilities, lower prices obtained for the home processed product due to inferior quality and at times the perishability, prevent the small holders withholding stocks. In the disposal of coconut products the government has little or no say. Even in instances of price increase the prices received by the producers seems to be much less than what they are entitled to. According to our calculations only 82% of the retail price is passed on to the producer.

On the other hand the lower yields divert the crop available for export to the internal market and valuable foreign exchange earnings are lost. Since price competition is absent, the middlemen fix prices carefully studying the market trends. Since coconut is an essential item in the Sri Lankan diet, and every household needs at least one nut a day, consumers are forced to pay higher prices because there is no alternative or substitute available to them. In the entire operation it is the middleman who stands to gain.

7.6 Share of the Market

Large amounts of coconut are marketed in the form of fresh nuts



because of the big consumption demand (Malu pol). This is the common form of marketing in the project area. The production of nuts in the project areas is not quite adequate to satisfy consumer needs. The markets of Galle and Kalutara were supplemented with the production from Hambantota and Matara areas.

Shortfalls in the Colombo market were set off with nuts from Gampaha (a small proportion) and Puttalam districts. The needs of Kegalle and Ratnapura were met with fresh nuts from Kurunegala district. Kurunegala also supplies coconuts to the northern regions of the country, while Puttalam caters to the southern parts.

The size of the nuts and the entries to specific markets have positive relationship. The nuts produced in Kurunegala were smaller in size even though they were thicker and had richer kernals. This type of nut is not in great demand in the Colombo market. On the other hand, Puttalam has nuts bigger in size which are readily accepted by the Colombo consumers. These preferences effect the flow of nuts from district to district.

The quantity that comes into the market is again based on the size of the holdings. Yields from smaller holdings enter the village boutiques and consumers direct while nuts from slightly larger holdings go to the collectors.

Table 7.7

Disposal of Production by Holding Size

Size of the holding	Village boutique	Collector wholesaler	Mill	Marketing points pola, town centres
Less than 0.4 hectares	88%	07%	08%	05%
0.4 - 2 hectares	21%	52%	36%	19%
2.1 - 4 hectares	02%	33%	36%	29%
4.1 -10 hectares	-	28%	62%	10%

When the holding size becomes large the wholesaler or the miller acts as the main buying agent. But direct sales to consumers or village boutiques fetch higher prices than in the case of the other three categories.

7.7 Purchases

The purchases of fresh nuts were done on an unit basis, but for copra and D.C. on a weight basis.

Usually, the village shops and the direct consumers buy on unit basis without the husks. The price differs with the size of the nut. The variance of the prices of small nuts with those of medium and larger nuts was about 10%-20%.

Collectors purchase the nuts with the husks on an unit basis irrespective of the size. But smaller nuts are normally not purchased unless the producer has a very cordial relationship with the collector.

Yet the price paid will be much lower. Normally, it will be lower than the price paid to the smallest nut in the village shop. Since it is a wholesale price and payment is made for the whole heap small producers prefer to sell direct to the collectors or wholesalers. Besides, they have to face the problem of transport and they also have the advantage of easy credit.

Direct sales to the mills have the price advantage and easy receipt of credit etc. But mills accept copra according to weight. The suppliers to the mills are mostly collectors. Only about 35% of the suppliers are coconut cultivators of large holdings. Payment is made according to quality and standard of the half processed nuts. Normally, a profit margin of 16% can be obtained by selling copra instead of fresh nuts or speculating on future markets.

Many D.C. mills accept fresh nuts on a weight basis. The weight is calculated once the nut is shelled and peeled. If the nuts are of good quality the price obtained will be much higher. Many producer cooperatives make their payments according to this method.

Most of the producers sell their products through intermediaries, in order to avoid transport difficulties, lower quality obtained in home processing and because it is the only marketing channel available to them. However, they welcomed government intervention in market operations, at least by establishing a floor price.

7.8 Marketing Costs

Marketing costs are the total sum of the expense incurred in bringing the goods from the producer to the consumer. Every organisation tries to maintain its profits by reducing marketing costs.

A substantial portion of the marketing costs of coconut is for transport. Among other marketing costs, labour costs for various

processing operations rank high.

Skilled labour is required for husking, removing the shell, peeling the nut and for drying operations etc and to maintain the quality standards.

Milling operations are the next important cost component, and since no other raw material is involved in the processing of coconut oil and desiccated coconut the entire cost involved is in the cost of processing. (The other costs like bottling, packaging, branding etc. are embodied in the export price. Our concern here is only with the local market operations).

7.9 Market Margins

The efficiency of a marketing system should be measured by the size of the margin. If the margin between the producer and the consumer is narrow such a system can be regarded as efficient.

Table 7.8

Market Margins

	Average price for the year 1982 in the project area	Coconut price for December 1983
	per nut	per nut
Price paid to the producer	1.38	3.10
Collectors margin	0.14	0.40
Collectors price to the wholesale dealer	1.52	3.50
Wholesaler's Margin	0.12	0.75
Wholesaler's price to the ratailer	1.64	4.25
Retailer's margin	0.50	0.75
Consumer price	1.69	5.00
Total marketing margin	0.31	1.90
Marketing margin % of consumer price	18%	38%

The increase of market margins during December 1983, agrees with the laws of demand i.e. If the supply is not sufficient to meet the demand the prices increase. But the profits obtained on these high prices are not passed on to the producer but to the middleman. Hence the price increase in any form would not benefit either the consumer nor the producer.

The gap between the producer and consumer prices was about 40% which means that the system of marketing was not efficient. Even in

normal circumstances the margin was 18% which cannot be considered as being efficient.

7.10 Market Information

Market information is an essential element for an efficient marketing system. The process of collection, communication, interpretation and dissemination of market data is called market information. Coconut producers need data on:

1. The character of the market
2. The number of consumers, degree of their concentration, their purchasing power, etc.
3. The consumer preferences of the locality for substitutes, for special quality of nuts etc.
4. Social customs, habits and uses of processed products
5. The local and export prices
6. Prices and the quantity entering the market

Some producers feel that if there is a proper system of disssemination of information they could have a bargaining power over the collectors. But according to our survey results, unless coconut producers are helped with proper marketing facilities, even the awareness factor would not help them to increase their bargaining power. Competition from a state organisation in the collection (with some arrangement for transport) would be helpful to increase the market efficiency as well as provide a fair price to the producers.

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ANNEX 1

Table 1

Coconut Production in Sri Lanka

Year	(million nuts)
1950	1982
1951	2238
1952	2455
1953	2288
1954	2203
1955	2420
1956	2374
1957	2108
1958	2109
1959	2313
1960	2183
1961	2601
1962	2811
1963	2549
1964	2991
1965	2676
1966	2461
1967	2416
1968	2601
1969	2440
1970	2510
1971	2610
1972	2963
1973	1935
1974	2031
1975	2398
1976	2330
1977	1821
1978	2207
1979	2393
1980	2020
1981	2258

Source : CDA

ANNEX I

Table II
Coconut Holdings in Sri Lanka (By size and Number)[a/]

Size Holding (ha) [b/]	Extent of holdings (ha)	Extent of holdings (% of total)	Holdings (No.)	Holdings (% of total)
under 0.1	2,476	0.5	53,245	6.3
0.1 to under 0.2	7,420	1.6	92,121	10.9
0.2 to under 0.4	17,093	3.7	1,26,960	15.1
0.4 to under 1	64,248	13.8	2,47,518	29.4
1 to under 2	72,012	15.4	1,68,533	20.0
2 to under 4	71,499	15.3	1,10,246	13.1
4 to under 10	65,449	14.0	32,943	3.9
10 to under 20	41,471	8.9	7,377	0.9
over 20 c/	125,061	26.8	3,097	0.4
T o t a l	466,729	100.0	8,42,100	100.0

a/ 1964 Agricultural Census

b/ Original classification in acres.

c/ 1964 estimate-land over 20 ha has been partly transferred to public sector corporations and partly divided into lots of less than 20ha.

Source : Coconut Development Authority

ANNEX I

Table III
Oil Mills and Desiccated Coconut Mills in Sri Lanka
(by Districts) a/

	Coconut oil Mills	Desiccated Mills
	(No.)	(No)
1. Puttalam	15	23
2. Kurunegala	11	12
3. Kegalle	01	12
4. Gampaha	14	28
5. Colombo	12	03
6. Kalutara	03	02
7. Galle	02	-
8. Matara	04	-
	62	69

a/ Number of mills which are registered with CDA. The actual number is slightly higher.

Source : Coconut Development Authority

ANNEX I

Table IV

Physical and Demographic Characteristics of Project Area

	Gampaha	Colombo	Kalutara	Kegalle	Galle	Ratnapura
Population (1976 estimates)		2,891,000	780,000	706,000	795,000	716,000
Average temperature (1981)		80.5°F				80.9°F
Annual Rainfall (1981)(inches)	93.08	94.81	103.65	87.82	82.07	153.6
Number of rainy days	140	156	121	112	151	N.A
Extent (million sq. miles)		808.25	623.75	642.00	652.25	1,250.50
Extent of coconut land as a percentage of total coconut land areas in the country		19.1%	3.3%	06.1%	03.2%	02.4%
Extent of coconut as a % of total land extent of the district		43%	09%	17%	09%	04%

ANNEX I

Table V

Coconut Cultivation in Sri Lanka
(by District) a/

District	Area (ha)	Percentage of total
Kurunegala	157,000	34
Colombo b/	89,000	19
Puttalam	60,000	13
Kegalle	28,000	06
Hambantota	21,000	05
Kalutara	15,000	03
Matara	15,000	03
Galle	15,000	03
Ratnapura	11,000	02
Rest of the country (14 districts)	56,000	12
	467,000	100

Source : Coconut Development Authority

a/ Results of 1964 Agricultural Census

b/ Includes the new district of Gampaha

ANNEX I

Table VI

Fertilizer Use on Coconut Palms in Sri Lanka

Year	Quantity (Tone)
1960	42,176
1961	38,800
1962	44,983
1963	48,687
1964	46,408
1965	50,102
1966	53,952
1967	51,193
1968	63,209
1969	60,901
1970	62,358
1971	59,148
1972	44,835
1973	30,539
1974	21,496
1975	27,664
1976	10,911
1977	29,000
1978	42,500
1979	49,700
1980	59,000

Source : CDA