Production and Marketing of Vegetables

L.P. Rupasena

Research Study No. 102 **February 1999**

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FOREWORD

This study explores the production and marketing system of vegetables in Sri Lanka. Vegetable farming is an important source of livelihood for many farmers because it gives income in between short intervals, e.g., every week. Also, next to rice, vegetables are the most important item in the Sri Lankan diet and the cheapest source of many of the elements required for human nutrition.

The report underlines the major changes that are taking place in the vegetable sector. It shows that the centralized marketing system based on the Colombo and Kandy markets has now shifted to a more decentralized system in which production areas link with demand areas, by passing the terminal markets. This has made more opportunities for farmers to sell their vegetables and consumers are also benefited with quality vegetables at lower price. The study found that credit is one of the most important inputs in vegetable growing in the face of high input prices, but money lenders are no longer playing a major role in lending. SANASA is becoming very popular due to easy access. It is also found that majority of vegetable farmers are still depending on rain to water crops and hence weather is the highest risk factor.

The study stresses that many marketing problems are associated with production, and therefore a system of production planning in line with market demand is imperative. A suggestion has been made to implement area wise specialized production programmes, which ensures year round production.

This study was initiated by Mr. L.P. Rupasena Senior Research and Training Officer, and financial assistance was granted by the Sri Lanka Council for Agricultural Research Policy. My thanks are due to all of them.

Dr. S.G. Samarasinghe
Director.

ACKNOWLEDGMENT

I initiated this study to provide detailed information on vegetable production and marketing system operating in the growing areas, to diagnose problems and constrains faced by the farmers and to find ways and means to improve the production and marketing system for vegetables.

I wish to acknowledge the Sri Lanka Council for Agricultural Research Policy for financial assistance and the Director , Hector Kobbekaduwa Agrarian Research and Training Institute, for administrative support.

I am grateful to the members of the Research and Training committee, especially Professor Karunanayake of the University of Jayawardanepura, for their valuable suggestions on the draft report. Mr. R.L.N. Jayatissa, Research and Training Officer, of HARTI, assisted me in conducting field work. Thanks are due for his services.

This study heavily depended on the primary data collected by a well trained team consisting of Messes T.G. Somaratne, N.S.J.K. Nissanka, M.L. Nandasiri, U.A.S. Edussuriya, Ranjith Karunaratne, and P.G. Prasanna Kumara. Mr. K.A.S. Dayananda, Head of the Publication Unit made arrangements for publication. Mr. W. Ranasinghe edited the report and type setting of the final report was done by Mr. L.A. Palitha Gunaratne. I express my deepest thanks to all of them.

A work of this magnitude and nature cannot be carried out without the help of farmers, traders and field officers, who should provide basic information. Hence I appreciate their cooperation with much gratitude.

L.P. Rupasena

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EXECUTIVE SUMMARY

This study was initiated by the Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI) for which the Sri Lanka Council for Agricultural Research Policy (CARP) provided funds. Since early 1990s vegetable has been a key commodity addressed by the Members of Parliament and media personnel. Their main concern is high prices of vegetables, which indicates that production does not match the existing demand. Why production was not increasing in line with the market demand is the research question addressed in this study.

The study is basically based on primary data collected from the sample survey. The survey was undertaken in six major vegetable producing districts; viz. Nuwara-Eliya, Badulla, Kandy, Matale, Kurunegala, and Anuradhapura. Both farmers and traders were interviewed using a well structured questionnaire. The farmers were chosen following the multistage random sampling technique. Market intermediaries were selected purposively. Apart from the primary data, secondary data were used to provide more information on the subject.

An analysis of secondary data shows that vegetable production has declined from the mid 1980s. This is due to the reduction of extent under cultivation and productivity of the land (average yields). The area occupied with vegetables declined mainly due to the reduction of chena cultivation resulting from large scale irrigation projects, which aim at developing paddy cultivation, and cultivation of high value crops such as tobacco on regular vegetable plots. The productivity of vegetable cultivation is low because of the inferior quality of seeds and poor cultural practices.

The vegetable consumption data reveal that the per capita vegetable consumption has declined in the recent past. This is due to the decline of purchasing power of the consumers. Price analysis indicates that real prices of vegetables have increased over time. This means that prices of vegetables have gone up faster than the inflation rate. However, the price variation within the year has been somewhat curtailed, indicating that off-season cultivation has improved.

The external statistics show a rapid improvement of vegetable exports over the last two decades. Nevertheless, competition from other exporting countries, especially India, has now become a problem. As a result, vegetable exports have dropped during the last two years.

The survey data reveal that the educational level of the vegetable farmers remains at a higher level, suggesting that an incentive farming system could be developed. Similarly, farmers have long experience in vegetable farming. Then majority of farmers have only one vegetable plot. About 50% of vegetable plots are less than one acre in size. The owner himself grows vegetables in most cases and family labour is used extensively. Vegetable farming is the principal source of income for many vegetable farmers.

There are three methods of cultivation: (1) mono-cropping, (2) mixed-cropping, and (3) multi-cropping. The selection of the appropriate method varies from farmer to farmer and from location to location. The overall results show that single cropping is dominant (50%) followed by mixed cropping (31%). Farmers' preference to undertake single cropping is due to convenience (65%) and habits (30%), while risk minimization (45%) and maximum use of lands (34%) are the major two factors for adoption of mixed cropping. It was also observed that the majority of farmers follow crop rotation in order to increase land productivity and pest protection.

Seeds, fertilizer, agrochemicals, labour and credit are major inputs used by the vegetable farmer. Input market is dominated by the private sector. Transactions are mainly done on immediate cash payment basis. However, money lenders are not prominent in the credit market due to the accessibility to "Sanasa", Rural Development Banks and `output traders' who purchase vegetables from the farmer. In the case of labour, family labour is widely used.

The major production problems faced by farmers are high input cost, lack of finance, water availability, quality seeds and poor extension service.

The marketable surplus for vegetables is 90.62% on an average. The wastage at farm level is around 5% of the production. Farmers undertake some marketing functions such as cleaning, sorting, transporting and packing, but they do not pay proper attention to these activities. The private sector is handling the entire marketing of vegetables in the study area. Although farmers have options in selling vegetables, the village collector dominates at the farm level. The quantum of supply is the principal factor which influences price setting. The farmers' bargaining power is weak due to the absence of timely and reliable market information. Farmers receive price information from traders, which is not an independent source.

Farmers mainly complained about the low prices received by them, poor road facilities, difficulties and malpractices in selling.

Recommendations to develop the vegetable sector are presented in the final chapter. Here, the need for a production plan in line with the market demand, improvement of research and extension, organization of farmers, development of infrastructure facilities and enhancement of market competition have been stressed.

CHAPTER ONE

Introduction

1.1 Background

Next to rice, the vegetable sub-sector is the most important in the agricultural sector. As with rice, vegetables are grown throughout the country and a large number of farmers are engaged in it. Most of the farmers in the hill country derive their primary income from vegetable farming. Similarly, some of the paddy fields in urban areas are occupied by vegetables and this tendency is on the increase.

Vegetables are not only important for the farming community, but also for the consumer as well. An average consumer spends nearly 6% of his expenditure on vegetables (Consumer Finance Survey, 1986/87, Central Bank of Sri Lanka). Since vegetables account for 9% of the consumer basket of the Cost of Living Index (CPI), prices of vegetables affect the cost of living significantly. Vegetable consumption contributes to an increase in the nutritional level of the people, especially the poor, because vegetables are the cheapest source out of many of the elements required for human nutrition.

From the export point of view, this sub-sector has a vast potential. The total fruit and vegetable exports have increased from Rs. 29 million in 1979 to Rs. 945 million in 1995 with a peak of Rs 1099 in 1994. The export of processed fruits and vegetables has increased from Rs 24 million in 1979 to Rs 528 million in 1995.

1.2 Research Problem

In spite of vegetables being one of the most important sub-sectors in the Sri Lankan economy, its development has been relatively poor. The per capita availability of vegetables was 90.10 grams/day in 1991, which is almost similar to the 1975 level of 90.23 grams/day. The situation is even worse when we examine the actual consumption. The per capita vegetable consumption in 1986/87 was

80.81 grams/day, a decline by over 5% from 85.45 grams/day in 1981/82. According to the Medical Research Institute recommendations, the per capita requirement of vegetables amounts to 156.69 grams/day. Thus it is visible that there is a big gap between the requirements for human nutrition and the availability, as well as the actual consumption.

This study attempts to examine problems and constraints hindering the development of the vegetable sector through an indepth analysis of the existing situation.

1.3 Objectives of the Study

The principal objective of the study is to describe and analyze the organization, operation and performance of the vegetable industry, with special reference to the farming sector. The specific objectives are:

1. To examine the production characteristics of vegetable farming,
2. To ascertain marketing activities operated at farm level,
3. To identify and diagnose problems and constraints to the efficiency as well as the productivity and profitability of vegetable farming, and
4. To make policy recommendations towards the development of the vegetable industry.

1.4 Methodology of the Study

This study is basically based on primary data collected from the two sample surveys; one from farmers and the other from market intermediaries. In addition, key personnel who are knowledgeable on the subject concerned were interviewed. Apart from the primary data, secondary data from the Department of Census and Statistics and the Department of Customs, and published records such as seminar papers, articles, monographs and research studies were gathered as supplementary information for the study.

In the case of farmers, the sample was selected in four stages. In stage one, districts were selected purposively taking into account the volume of production and the type of vegetables. Accordingly six districts were identified for the study. They are Nuwara Eliya, Badulla, Kandy, Matale, Kurunegale and Anuradhapura. These districts contribute more than 50% to the total production in the country.

In stage two, major producing areas were selected through consultation with the district staff related to agriculture. The sample unit in this stage was the Agrarian Service Centre (ASC) and two were chosen from each district, except in Kandy where one ASC was selected because vegetable cultivation is spread only in a limited area in comparison to other districts.

In the third stage, one area consisting of at least 150 farm families, which grow vegetables, from each ASC were selected after discussing with the ASC officers.

In the final stage, farm families were chosen randomly from the each area selected. The sample size was originally fixed at 30 per village, but some families had to be left out at the time of editing the data. Information on sample is presented in Table 1.1.

Selection of intermediaries was performed purposively, because random selection was not possible due to lack of information. Intermediaries at primary level, that is at farm level, were identified through the farmer survey and the following links were identified through them. The same procedure was applied for other steps as well.

Data were collected through personal interviews by a research team consisting of two Research Officers and five Research Assistants using a well structured questionnaire. The entire team was in the field during the time of the farm survey which was conducted from April to August in 1994.

1.5 Organization of the Report

This report consists of five chapters. The first Chapter is the introduction in which importance of the study area, the need for the study , and methodology adopted for the study are explained. A historical review of the vegetable sector with special reference to production, consumption, prices and external trade is discussed in Chapter two. The primary data collected through the survey are reviewed in Chapters three and four. The report ends with conclusions and recommendations which appear in Chapter five.

CHAPTER TWO

Historical Review of the Vegetable Industry

This Chapter reviews the past performance of the vegetable sub-sector with special reference to production, consumption and prices. Production is an indicator to monitor progress of vegetable farming. A review of consumption shows the change in vegetable consumption. Price analysis indicates the market operation. Time series data collected by the Department of Census and Statistics (production data) and the Central Bank of Sri Lanka (consumption data) and the Hector Kobbekaduwa Agrarian Research and Training Institute (price data) are used for this exercises.

2.1 Vegetable Production

Table 2.1 shows the vegetable production by varieties for the period 1973-94. Vegetable production has increased from 118,574 mt in 1973 to 683,665 mt in 1984. Since then production shows a declining trend and thereafter it has never reached the 1984 level. Production in 1994 was 484,325 mt, which was the lowest level since 1983. This declining trend is due to the reduction of the extent under vegetable cultivation and the average yield.

The decline in the area under vegetables could be attributed to two major factors: (1) cultivation of other crops in the regular vegetable plots and (2) decreasing *chena* cultivation with large scale irrigation projects like Mahaweli. Selling of vegetables is risky due to their high perishability. Prices fluctuate significantly even during the day. Similarly, the marketing system of vegetables is not efficient, creating a high marketing cost, which is the difference between the consumer price and the retail price. Consequently, farmers' share is below 40% of the consumer price. Due to these circumstances, vegetable farmers have shifted to other crops such as tobacco, sugar cane and big onions. Tobacco is the principal crop which occupies the traditional vegetable lands. This move is evident in the districts of Kandy, Matale, Kurunegala and Anuradhapura. Sugar cane cultivation

has reduced the vegetable extent in the Moneragala district where ash-plantain is gaining prominence.

Most of the low country vegetables are traditionally grown on shifting cultivation (*chena*) lands in the dry zone. Shifting cultivation is limited mainly due to two reasons: (1) government restrictions, and (2) transformation of these lands into irrigated lands in which paddy and high value crops like chillies are grown.

The data from the Department of Census and Statistics show that the average yield of most vegetables is on the decline, especially since mid-1980s, and some are stagnated. The average yield is mainly determined by quality of seeds, cultivation practices, and fertilizer application. Most of the farmers use their own seeds which are often inferior in quality. Imported seeds are very expensive. Incentives given for vegetable cultivation with the adoption of new technology and high levels of fertilizer application have been curtailed by low returns.

Vegetable Consumption

Information on vegetable consumption is available in the Consumer Finance Surveys conducted by the Central Bank of Sri Lanka and such information is reviewed in this section.

During the period 1978/79 to 1986/87 three consumer surveys were conducted and the results reveal that the per capita vegetable consumption has declined slightly from 2969 to 2790.40 grams per month, but remains above the 1978/79 level of 2683.52 (Table 2.2). This decline was mainly due to a drop in the consumption of low country vegetables. With regard to demand for different vegetables, beans, brinjals, and potatoes have a higher demand than others. Only these three vegetables have a per capita consumption over of 200 grams per month in the period concerned. It was found that the consumption of beans has gone up significantly by nearly 50% from 1978/79 to 1986/87. Due to this high demand, the Pettah traders have observed that the prices of other vegetables are determined by the availability of beans in the market. More stocks of beans lead to low prices for other vegetables and vice versa.

It was also observed that cabbage consumption has dropped to 173.10 grams in 1986/87 from 215.27 in 1978/79, which reflects a 20% decline. The declining trend appears to continue over time. One of the main reasons for the decline of consumption is high level of chemical application. Due to this low demand, cabbage has a marketing problem during the peak harvesting time.

It was found that the per capita vegetable consumption varies according to sectors such as urban, rural and estate. As shown in Table 2.3, the vegetable consumption is highest in the estate sector, followed by the urban sector. In the estate sector the most popular vegetables are beans, cabbage, brinjals and potatoes respectively, while leafy vegetables have a very low demand. The per capita consumption of leafy vegetables in the estate sector in 1986/87 amounted at 129.90 grams, where as the figure for the rural sector was 372.70 grams and 480.70 grams for the urban sector, recording the highest consumption of leafy vegetables. In the rural sector, the consumption of low country vegetables is highest, while in the urban sector upcountry vegetables are consumed mostly.

2.2 Prices

Prices are analyzed in two ways: seasonal variations and annual variations. Seasonal variations occur mainly due to seasonality of production and its relatively high perishability. The change in annual prices indicates a balance in demand and supply over time. The increase in real price, which is a nominal price deflected by the Consumer Price Index (CPI), shows that production is inadequate to meet the demand and vise versa. The retail prices in Colombo and suburbs collected by the Marketing and Food Policy Division of the Hector Kobbekaduwa Agrarian Research and Training Institute are used in this analysis.

The vegetable prices are relatively higher during two periods: May to July and November to December (Table 2.4). This directly links with the pattern of production. During these two periods, the production is low. A price decline after July takes place with the increased supply from Marassana and Hanguranketha areas. Similarly the price increase after October is due to the completion of the vegetable season in the Welimada area. After December, the price decline is mainly due to the arrival of *chena* vegetables from the Dry Zone and the stocks from Matale.

The amplitude of the seasonal price variation could be examined by working out the difference between the highest and lowest value of the index. The results are given in Table 2.5. Among the selected vegetables, tomatoes have the highest seasonal price difference, followed by beetroot and leeks. This indicates a greater instability with regard to supply. A study done by Gunawardana and Chandrasiri found that the amplitude of the seasonal price variation within the year was considerable, but comparison of figures in this study shows a considerable decline. It indicates stability in vegetable production than in the past. Although it was believed that the so-called upcountry vegetables could be grown only in areas where they have been traditionally established, this notion has now

changed. There are various locations in the country where some of these vegetables could be grown. For instance, beetroot is grown at Sigiriya in Matale and at Madahapola in Kurunegala.

With regard to annual prices of vegetables, an upward trend in the nominal price could be seen for all the vegetables with a sharper rise since 1989 (Table 2.6). The sharp price increase was recorded in the years 1990 and 1994. The annual price increase during 1986 -95 was 13 to 15% for many vegetables as shown in Table 2.7. A similar trend was observed for real price, that is nominal price deflated by the Consumer Price Index (Tables 2.8 and 2.9). The increasing trend in the real price reveals that vegetable prices have increased due to factors other than the increase in the general price level in the economy of Sri Lanka. The declined production appears to be a major contributing factor to the increase of vegetable prices.

2.3 Foreign Trade

Until late 1970s, the vegetables produced were essentially for domestic consumption and no imports were made except for very few vegetables such as cauli flower in small quantities. This situation changed with the introduction of the open economy where non traditional crops like vegetables also began to be exported. Since then the fruit and vegetable sector has been identified as an export potential area. The export earnings from this sector increased to Rs 1095 million in 1994 from Rs 29 million in 1979, an increase of 38 times within 16 years. Nevertheless the country exports only about one percent of the production.

Sri Lanka mainly exports vegetables to the Middle East countries and Maldives. The amount exported to the Middle East was 65% followed by Maldives with 22% in 1995. The Middle East has a good market due to the Asian working population. Upcountry vegetables are mainly sent to the Maldives, while low country vegetables are sent to the Middle East countries. The major competitor for Sri Lanka is India for Maldives, and India, Thailand, Malaysia, China, Philippines, Egypt, Kenya for Jordan Saudi Arabia and Oman in Middle East.

The major problems faced by exporters are: (1) high cost of production, (2) absence of continuous supply, (3) poor quality, (4) high air fare and (5) high cost of export services. Due to these problems, they are unable to compete with other competitors, especially India. In Indi, the cost of production is low due to low wage rates for hired labour along with subsidies. There is a continuous supply and some are from big farms.

CHAPTER THREE

Vegetable Farming Systems in the Study Area

This chapter commences with a review of the socio-economic conditions of the vegetable farmers in the study locations, because characteristics such as family size, educational level and occupational patterns are directly associated with cultivation practices. Having discussed these aspects, cultivation and production practices adopted by the sample farmers are explained.

3.1 Socio-Economic Conditions

The family size and the age distribution of the sample population are explained in Tables 3.1 and 3.2. The number of farm families in the sample was 281 and the total population was 1261 consisting of 671 males and 590 females. The average family size of the entire sample was 5 and only two districts, Badulla and Nuwara Eliya had families of 6.

The labour force which ranges above 14 and below 65 years, was 67% of the sample population. There is no marked variance among the districts concerned. The highest percentage of 73% was reported from Nuwara Eliya followed by Badulla with 72%. The lowest was 67% from the Matale district. The labour force participation rate was 52% for males which was a little higher than females.

Table 3.3 shows the educational level of the sample population. The literacy rate of the sample population was 98%, which is above the national level. Except for Badulla, where the literacy rate was 96%, all other districts studied had the figure as high as 99%. There was no marked difference in the literacy level between males and females: Female literacy rate was 97%, a mere 2% below the males. The lowest literacy rate of 94% for females was found in the Badulla district. The educational level in the study areas appears to be quite high. Some 65% of the population had secondary education, while nearly 25% was highly literate having qualifications equal to or above the G.C.E. Ordinary Level. However the

educational level in the districts of Kurunegala, Anuradhapura and Matale, where primary education receivers were above 40%, remained below in comparison to the others.

An attempt was made to examine the occupational pattern of the sample population. Results are given in Table 3.4. The number of respondents to this issue was 626, of which 395 or 63% reported agricultural operations as the major occupation, while 76% of those who reported secondary occupations were employed in agriculture. Government employees in the employed population was only 7% or 45 out of 626. The labourers who reported wage as the main income source both in agriculture and in other areas in the work force was insignificant; only 5 out of 626. This means that members of vegetable farm families might not have time to involve in such activities having spent considerable time in their own farm. Of the employed population of 626, some 298 or nearly 50% reported secondary occupations.

3.2 Vegetable Production

This section will focus on production practices, input use and farmers' problems in relation to production. Production is the most important area that should be examined in detail because all other activities like marketing are linked with it.

3.3 Production Practices

As shown in Table 3.5, the majority of farmers have experience in vegetable farming for more than 10 years. Nearly 45% of the farmers interviewed had experience in vegetable farming for 10 to 20 years. Nuwara Eliya farmers have much longer experience than others. Nearly 80% of Nuwara Eliya farmers have been cultivating vegetables for over 10 years. However in the Matale and Kandy districts the situation differs; some 45% of the farmers have less than ten years of experience. Almost all the farmers mentioned that they grow vegetables mainly for sale. Only three farmers out of 281 said that they grow vegetables for own consumption.

Almost all the farmers in Kandapola and Meepilimana in Nuwara Eliya district grow only vegetables in both *Yala* and *Maha* Season (Table 3.6). In Badulla district, the situation varies depending on the location. In other districts studied, the majority of farmers grow vegetables and other crops, mainly paddy, in *Maha* season, whereas in *Yala* the cultivation procedure differs from area to area.

An attempt was made to examine the importance of growing vegetables

as an income generating activity of the family. The results are presented in Table 3.7. It was found that 253 out of 281 or 90% of the sample farmers, mentioned that income gained from vegetable farming was the major source of income. Similar results were found in the districts as well in other study locations.

There are a number of vegetables that can be chosen by the farmers. Reasons given by the farmers in selecting crops for cultivation are given in Table 3.8. High price is the principal factor in crop selection (42%) followed by suitability of the location (31%) and convenience to cultivate (13%). Farmers always responded to the current market price but not to the future price. Consequently there was a glut of certain vegetables when prices of such vegetables went up in the previous season and vice versa. The attitude in crop selection indicated that farmers are less market-oriented, which means they look for the market after production.

Table 3.9 provides information on the number of plots grown by a farmer. Nearly 55% of the sample farmers had only one vegetable plot both in *Maha* and *Yala* seasons. Just over 25% of the farmers had two vegetable plots, while none of the farmers had more than five vegetable plots. The number of vegetable plots grown by a farmer does not vary much between *Maha* and *Yala*. The district-wise situation was somewhat different, but over 40% of the farmers in all the districts concerned had one plot. In the districts of Nuwara Eliya and Kurunegala over 60% of farmers cultivated one plot in both seasons, while in Badulla about 35% of farmers had two plots. In Anuradhapura the number of farmers with three vegetable plots was nearly 25% in Maha season, but the figure was only 4% in Yala. The reason is that chena cultivation exits in some parts of the Anuradhapura district. For instance, Wellaragama in the Mihintale Divisional Secretariat area, where 'chena' cultivation takes place, nearly 40% of the farmers grow vegetables in three plots in Maha.

It is well known that the majority of Sri Lankan farmers are small-holders. There is no exception for the vegetables. The study found that over 75% of the vegetable plots were less than 1.5 acres, while about 50% of the plots were less than one acre (Table 3.10). There was not much difference among the districts, except in Kurunegala and Anuradhapura, where the majority of vegetable plots were larger, 1.5 acres in extent.

Table 3.11 shows the ownership pattern of vegetable plots. Most of the vegetable plots belonged to the owner himself. About 56% in *Maha* and 62% in *Yala* vegetable plots were operated by the owners. There were 88 out of 388 veg-

etable plots or 23% in *Maha*, which came under LDO lands, of which 66 plots were in the Anuradhapura District. The LDO lands in Anuradhapura were cultivated with vegetables during *Maha* season only. There were 66 vegetable plots which were under LDO out of 103 in *Maha*, whereas in *Yala* only one plot out of 35 belongs to the category of LDO. The reason was probably lack of water in LDO lands in *Yala*.

It was found that 90% of the vegetable plots are regularly occupied by vegetables. The change from vegetables to other crops is not a dominant factor. Nevertheless, the types of vegetables grown vary from time to time. The majority of farmers (238 out of 275 or 87%) follow the crop rotation system as shown in Table 3.12. The major reason stated was increased productivity of the land followed by pest protection. It is also identified that there are three methods of cultivation: (1) single cropping (one crop in one plot), (2) mixed cropping (two or more crops together in one plot), and (3) multi-cropping (two or more crops separately in one plot). The overall results show that single cropping is dominant (48%) followed by mixed cropping (31%). Table 3.13 gives more information on this aspect. However, there is a marked variation among the districts as well as between locations within the district, indicating that cultivation practices are location-specific. In the Anuradhapura District, single cropping is the most important (60%) followed by the multi-cropping (32%), whereas in Nuwara Eliya mixed cropping is leading (50%) followed by single cropping (42%). When the location in a district is considered, the situation differs; mixed cropping is dominant (65%) in Kandapola and single cropping is prominent (50%) in Meepilimana in the same district of Nuwara Eliya. Farmers' preference to undertake single cropping is due to convenience (65%) and habits (30%). The major reasons for adopting mixed cropping are risk minimization (45%) and maximum use of available land (34%).

Vegetable cultivation is mainly under rainfed conditions during the Maha season (Table 3.14). The study found that 173 vegetable plots out of 387 or 45% were rainfed, followed by 18% under minor irrigation and 18% with water pump irrigation, which is directly linked with rains. In Anuradhapura nearly 90% of the vegetable cultivation is under rainfed in Maha season. In Yala season the source of water supply varies depending on the locations. Yala vegetable cultivation in the districts of Badulla, Nuwara Eliya, Kandy and Matale mainly takes place under rained and minor irrigation. In the Kurunegala district, 40 out of 73 vegetable plots or 55% were cultivated with water pumps and 20% under agro-wells. In Anuradhapura, the use of agro-wells for vegetable cultivation is significant. Our investigations show that 25 plots out of 35 or 71% were cultivated with vegetables using agro-wells.

3.4 Input Use

Seeds, fertilizer, agrochemicals, labour and credit are the major inputs required for vegetable cultivation. An attempt was made to ascertain the sources of input, type of payment and amounts used in respect of different inputs.

Seed farmers cannot produce seeds of most of the upcountry vegetables such as leeks, cabbage, beetroot and carrot. The study found that beans is the only upcountry vegetable where the majority of farmers (nearly 60%) use their own seeds (Table 3.15). Use of own seeds in tomato cultivation is only 15% or 10 out of 66 farmers. Then majority of potato farmers use their own seeds for *Yala* cultivation. With regard to low country vegetables, the situation differs. The majority of farmers use own seeds. None of the farmers in the sample use purchased seed in the cultivation of pumpkin. Nevertheless, over 50% of farmers who grew ladies finger, bittergourd and luffa have used purchased seeds. Private traders are dominant in vegetable seed trading. Over 80 farmers who cultivated upcountry vegetables obtained seeds from the private traders. Both private and government outlets are equally important in selling low country vegetable seeds. There is no relationship between seed purchasing and vegetable selling by farmers. In other words, the seed seller and the vegetable purchaser are not the same in most cases. This is further proved by the finding that less than 10% of farmers purchase seeds on credit (Table 3.16). If the purchase is made on credit, the farmer is bound to sell his produce to the trader from whom the purchase was made.

3.5 Fertilizer Use

Both chemical and organic fertilizer are applied in vegetable farming depending on the crop and locations. It was found that over 75% of the farmers applied both chemical and organic fertilizer in cultivation of upcountry vegetables such as potatoes, cabbage, carrot, leeks and beetroot, whereas over 80% farmers who grow low country vegetables such as luffa, ladies fingers, bittergourds and brinjal applied only chemical fertilizer (Table 3.17). Only four farmers who used only organic fertilizer were found in the field survey. The combined use of both chemical and organic fertilizer is prominent only in the Nuwara Eliya district with 50% of such farmers in the sample. The balance is almost from Badulla (22%) and Kandy (19%). As for the seeds, the private sector plays a bigger role in fertilizer sale as well. The majority (83%) of the farmers purchase fertilizer from traders and only 11% of the sample farmers go to the Agrarian Service Centre (ASC) for buying fertilizer. However, none of the farmers interviewed in the Nuwara Eliya,

Badulla and Anuradhapura districts purchased fertilizer from the ASC. In the case of Kurunegala, the figure is only 2%. Cash payment is mainly undertaken in purchasing fertilizer both chemical and organic (Table 3.19).

Only 11 farmers out of 281 reported that agrochemicals were not used. As shown in Table 3.20, over 90% of the farmers who applied agrochemicals obtained their requirements from the private trader, but only 10% of farmers purchased from the trader to whom they sell vegetables. The number of farmers who go to the ASC to obtain chemicals is only 7% and the majority of them are from the Matale and Kandy districts. Purchasing is made on cash. About 83% of the farmers in the sample reported that they purchase agrochemicals on cash. In none of the districts credit purchases were dominant. The highest percentage of 35% was observed in Matale district followed by Anuradhapura with 21%.

3.6 Labour

Since vegetable is a labour intensive cultivation, family labour is not adequate in most cases. The survey results reveal that only 54 farmers out of 281 or 19% used family labour solely in vegetable cultivation. Similarly only 16 farmers used hired labour alone. When operational activities are considered, family labour is dominant on all occasions except for land preparation and harvesting where much labour is required (Table 3.23).

3.7 Credit

Credit has been an important agricultural input in the face of high input prices, which increase at a higher rate than output prices. The survey results show that 218 farmers out of 281 or nearly 80% of the farmers borrow money for their cultivation. The principal lending sources are the Cooperative Banks (mainly Sanasa), State Banks (mainly Rural Development Bank) output traders who purchase vegetables, and relatives/friends (Table 3.24). The money lender does not play an important role in any of the study locations. In Badulla and Matale Districts the most important source is the output trader, while in Nuwara Eliya and Anuradhapura districts, State Banks are prominent. In the Kurunegala District, the Cooperative banks are popular among the farmers. The main criteria considered by the farmer in obtaining loans are convenience followed by low interest. This is the main reason for Sanasa and Rural Development Bank being popular among the farmers.

3.8 Productivity

Productivity is a measurement of efficiency. Here land productivity (often called yield) of vegetables is examined. The average yield is mainly determined by weather, quality of seeds, and fertilizer use. A question was asked from farmers in regard to the variation of vegetable yields, minimum, maximum and average (mode). The results are presented in Table 3.25. As seen from the Table, there is a big variation in yield among the districts. Also yield fluctuations over the years are significant. For many vegetables, differences between the maximum and the average is severe. Farmers also have reported that yield is on a declining trend. It is also argued that the average yield of vegetables is considerably low compared to other countries. The principal reason might be the weather, because vegetables are grown under rainfed condition.

3.9 Production Problems reported by farmers

The total number of farmers who reported production problems is 179 out of 231, which is nearly 80%. Although some problems such as damage by wild animals are location specific, five common problems were found as shown in Table 3.26. The major problems are;

1. High input cost - Farmers mainly complained about high cost of agricultural equipments such as water pumps, and agro chemicals. They reported that manufacturers change prices several times in a year, especially of agro chemicals.

2. Lack of finance - Input prices increase at a higher rate than that of output, causing declined net return. As a result, financial difficulties have become a serious problem and access to credit is also a problem.

3. Lack of water - Since vegetables heavily depend on rains, water becomes a problem. Due to this farmers have to grow vegetables like brinjal which are drought resistant but fetch low price in the market.

4. Seed problems - Farmers complained about quality and non-availability.

5. Poor extension services - Farmers criticized about transferring KVS into Gramaniladari service. Because since then farmers had to depend on traders who always recommend items which brings high commission to them. Most farmers mentioned that they tend to use excess agro chemicals due to use of different brands; if one does not respond, another is applied.

CHAPTER FOUR

Marketing System in the Study Area

The distribution surplus of vegetables from the producing areas to consuming areas is discussed in this chapter. It is well known that bulk of the surplus is moving to urban areas located far away from producing areas. As a result, a large number of intermediaries such as collectors, brokers, transporters, wholesalers and retailers are involved in the system and they perform various activities which are essential to operate the system.

4.1 Marketable surplus

This can be defined as the quantity available for sale. It is generally worked out by subtracting quantity retained for home consumption, seed, payments in kind and wastage from the harvested production. It was found that marketable surplus is as high as over 85% of the production for all the vegetables with an average of 91% (Table 4.1).

4.2 Marketing channels

The marketing channels explain how vegetables move from producers to consumers. As shown in Table 4.2., there are various options available for the farmer to sell his vegetables. An attempt was made to identify the popular channels with the reasons, and results are summarized in the Table 4.2.

The most popular trader at farm level is the collector. The number of farmers who have given first preference to the collector is 174 out of 262 or 66%. There are two types of collectors: village collector and 'outside collector'. The former lives in the village and the latter comes from mainly a town situated in consuming areas. The village collector often sells to the 'outside collector' who in turn sells to retailers in the town. Transactions between the two parties take place on mutual understanding and purchasing on credit basis is usually practiced. The role of the village collector is to collect vegetables from the farmer to meet the

demand of the outside collector. Since the tendency of outside traders going to the producing areas by passing the terminal markets such as Colombo and Kandy has been on the increase after late 1970s. The number of collectors are growing. However the possibility to sell directly to the outside collector by the farmer is restricted by two factors. Firstly, individual farmer cannot fulfill the requirements of outside collectors who need various vegetables in bulk form. Secondly, the village collector does not allow 'outside collector' to develop a relationship with the farmer in most cases. Therefore village collector is prominent at farm level. Farmers prefer him mainly due to three reasons: i) close market outlet (42%) ii) indebtness (22%) and iii) spot payments (12%).

The second most important mode of selling vegetables is on commissions basis. There are two commission markets, namely, Colombo and Kandy used by the farmers in the study areas. The commission system mainly operates based on mutual trust. Payments are made after sale. Price paid to the farmer is worked out by reducing a 10% commission, unloading charges and transport cost from the selling price. Money is sent on the same day or later on request by cheques or through the lorry driver. It was found from the study that some farmers in the Welimada area prefer to get money after the entire crops is harvested.

Although the Kandy market is more closer to the farmers in the Nuwara Eliya and Badulla districts than Colombo, they are used to send stocks to Colombo. This is due to doing business with them for a long period of time. All the farmers interviewed in the Kandy district have given first preference to the Kandy Commission Agents. The principal reason is being a closeness of the market. Some 52% of the farmers interviewed in the Badulla district sell to the Colombo Commission Agents (Manning) mainly because of indebtness and easy credit facilities. Selling vegetables to the Pettah market on a commission basis is no longer important in the Nuwara Eliya district. Only 18% of the farmers send to Pettah. When questioned for reasons for not selling to Pettah traders, they said risk and uncertainty in price. The price paid to farmer is known only after effecting sale in Colombo trading.

The fair (*Pola*) is also important in Badulla and Kurunegala Districts. The most popular fair in Badulla District is situated at Welimada. Nevertheless, farmers complained about irregularity in weighing. Due to this only 12 farmers out of 52 gave first preference to the fair. In the Kurunegale Distric, fair and rural collector were equally important. The principal reason given to choose the fair is the high prices fetched.

None of the farmer in the sample sold vegetables to the government market outlets such as the Cooperatives and the CWE. Not a single farmers' organization operates in vegetable marketing. Also, Purchasing Centers introduced in the late 80s are inactive. Under these circumstances vegetable trade at farm level is entirely handled by the private sector.

4.3 Marketing Functions

Marketing functions include all the activities from harvesting to consumption. These activities can be grouped into three: 1) exchange functions i.e. mainly buying and selling 2) distribution functions i.e mainly transport and storage and 3) facilitating functions i.e mainly standardization, market research, market information, and marketing credit. In this section, marketing functions undertaken by farmers in the study area are reviewed.

Farmers undertake cleaning and sorting before selling. Our observations show that they do not give due attention to these aspects. For instance, over matured ladies finger and damaged brinjal are not sorted out and they are packed in the middle of the sack. Most of the retailers are aware of that and it tends to lower price. Vegetables are not graded at farm level or even at other levels. Most of the vegetables are packed with poli sacks, which contains usually 45 - 55 kgs. Wooden boxes are used to pack tomatoes, and snakegourd are wrapped in cadjan.

Most of the vegetable plots are away from the motorable roads and farmers have to bring vegetables to the nearest motarable roads, home or assembly points mainly on head using either family or hired labour. Few farmers use two wheel tractors depending on the loads and road condition. In sending vegetables to Colombo/Kandy for sale on commission basis, farmers bring vegetables to the road and hand them over to the transport agent who takes vegetables to the market. The 'outside collector' comes with a lorry.

4.4 Price Formation

The economic theory says price is determined by demand and supply. Buyer of vegetables at farm level is the trader and his demand is derived from his customer; retailer or sub wholesaler, whose demand in turn depends on the consumer. In short, trader has a derived demand. Since consumption of vegetable does not vary in the short run, price is mainly determined by supply, which is seasonal. Vegetables cannot be stored except for potatoes. Consequently during the season,

buyers' market exists with excess supply. After harvesting farmer has to sell for whatever the price prevailed as vegetables are not stored. In a buyers market the price is low. Many farmers complained that a few collectors operate in a location and they determine the price. Such traders do not allow to develop a relationship between the farmer and the 'outside trader'.

In the Pettah market, the price is mainly determined by supply. Price varies daily depending on the supply. It is argued that there is a difference between the price received by farmer and the market price. Commission agents mentioned that their profits depend on sales. Therefore, they try to retain the farmers with them by paying a better price. Today farmers have options in selling either to Colombo/ Kandy or to the assemblers. From the farmers' point of view, they have to depend on the Commission agents due to indebtness even if they offer a lower price. Farmers received price information from traders and not from an independent source (Table 4.3).

4.5 Marketing Problems Reported by Farmers

Marketing is a major problem faced by the farmers. Problems related to marketing varies depending on the commodity group. For instance, the price fluctuation is a major problem for vegetables but not for rice. The major problems as shown inTable 4.4 are;

1. Unreasonable price - Farmers argue that the price received by them is not adequate in comparison to input cost and cost of living.

2. Poor road facilities - This created high transport cost at farm level. Also it affects loss of vegetables and takes time to move stocks from farm level to other areas.

3. Malpractice in selling -Underweight, over reduction for pack weight, and unnecessary sorting are reported.

4. Difficulties in selling - This happens during the harvesting time for some vegetables like cabbage and, tomatoes. Also traders do not go to the remote areas for purchasing during the season.

5. Price fluctuation - Vegetables have a high risk in price due to its perishability. Prices change even within a day, significantly.

CHAPTER FIVE

Conclusions and Recommendations

In this chapter, some conclusions are made based on the analysis of study findings. Since this study has covered most of the major producing areas and major vegetables, it could be reasonably assumed that conclusions drawn from this study applicable to the entire vegetable sector.

5.1 Conclusions

1. Since mid 1980s vegetable production is on a decreasing trend. This is due to both drop in extent under cultivation and average yield. The declined extent is due to two major factors: 1) cultivation of other high value crops, such as tobacco, sugar cane, and big onions in the regular vegetable plots, and 2) decreasing *chena* cultivation with massive irrigation projects like Mahaweli. Use of inferior quality seeds, poor cultural practices, inadequate fertilizer use and low level of technology adoption have caused low productivity of vegetables.

2. Vegetable consumption has declined recently causing ill-effects to the nutritional level of the people. This may be due to decline in purchasing power of the consumers. This has been aggravated by high prices of vegetables. Both nominal and real prices of vegetables have gone up over the time.

3. Seasonal price variations have curtailed with the cultivation of vegetables under agro wells and water pumps. Marketing of vegetables is highly profitable during the period of May to July. Having realized that, majority of farmers who have an assurance of water, grow vegetables to harvest during this period.

4. Vegetable exports have increased tremendously, indicating its export po-

tential. Nevertheless, market competition appears to be a major constraint with the arrival of new countries for vegetable exports. India has already captured some of the Sri Lankan export markets for vegetables.

5. Vegetable farm families are small in family size. However, their educational level remains at a higher level. Majority of them are involved in agricultural activities and principal income is derived from vegetable farming.

6. Majority of vegetable farmers have been cultivating vegetables for more than ten years. They usually have one or two vegetable plots and the size of an average plot is small. Often owner himself grows vegetables. The plot is always occupied with vegetables but not the same variety. There are three methods of cultivation; 1) mono cropping, 2) mixed cropping and 3) multi cropping. Type of method varies on locations.

7. Vegetable cultivation takes place under rainfed conditions. Nevertheless use of water pumps and agro-wells are on the increase. Vegetable farming under major irrigation is insignificant.

8. Farmers cannot produce seeds for most of the up country vegetables and hence they have to purchase them. With regard to low country vegetables, farmers use their own seeds. The seed market is dominated by the private sector. Transactions take place on spot payments.

9. Both chemical and organic fertilizers are used in vegetable farming depending on the crop and the location. Both chemical and organic fertilizer are applied in cultivation of most of the up country vegetables, while only chemical fertilizer is used in cultivation of many of the low country vegetables. As for the seeds, private sector mainly operates in fertilizer trading. Payment is made with cash on the spot.

10. Vegetable farming could be considered as a family business, because use of family labour is extensive for all the activities, except harvesting.

11. Agricultural credit has been the most important input in vegetable cultivation. Nearly 80% of the vegetable farmers require credit. They mainly borrow money from the "Sanasa", Rural Development Bank, and 'output trader' who purchases vegetables. Money lenders do not play an impor-

tant role in lending. The main criteria considered by the farmer in obtaining loans is easiness followed by the low interest.

12. Land productivity of vegetables varies considerably over the time. Also, yield is on a declining trend. There are big variations in yield among the farmers as well as among the localities.

13. High input cost, lack of finance, inadequacy of water, non availability of quality seeds and poor extension service are major production problems faced by vegetable farmers.

14. Marketable surplus is around 85% of the farm production. Although farmers have options in the selection of market outlets, village collector dominates the market at assembly level due to a number of reasons. Among them, being close to market outlet and indebtedness are prominent.

15. Farmers undertake some marketing functions such as cleaning, sorting, packing and transporting, but they give meager attention to these activities. With regard to packing, poli sacks are widely used while wooden boxes are used to pack tomatoes. Facilitating functions such as standardization, market research, market information, and marketing credit have not been given due attention. As a result vegetable distribution system is unsatisfactory, and causes high marketing costs which is the wide difference between the consumer price and the farm price.

16. Vegetable price is mainly determined by the market supply. Hence, the price fluctuation is subject to the supply variation. However, traders have more influence in price formation than farmers. Farmer's bargaining power has been limited by lack of market information, indebtedness to the trader, and weak institutional power (unorganized farmers).

17. Major marketing problems faced by farmers are: low prices along with high price fluctuation, poor road facilities, difficulties in selling and malpractices in selling.

5.2 Recommendations

Vegetables have been a political issue in the country due to its impact on cost of living and income of the farmers. Also the vegetable sub-sector has a vast

export potential. Under these circumstances, development of the vegetable subsector is inevitable in any government development plan. In any programme towards the development of the vegetable sector, actions should be taken to solve the farmers problems, because decisions to grow vegetables are taken by them. In this section, some recommendations are made for the consideration of policy formulation. In fact, farmers' views were taken into account in developing these recommendations. We asked from farmers the problems they have and solutions to them at the time of interview.

1. Attitudinal change of the vegetable farmers is a requirement in order to develop a commercial vegetable farming system. Farmers' perception is that government should be directly involved in purchasing whatever they produce. Direct government intervention in marketing is a high cost to the society and even government cannot bear the cost. Therefor it is an urgent requirement to educate farmers on these issues and train them to become commercial farmers who think of profit before production decisions are taken.

2. Absence of production planning in line with the market demand is a major factor leading to most of the production and marketing problems. Since vegetables are perishable and there are no storage facilities (even if they are made are costly) production planning is imperative to ensure year round production and to avoid high price increases/decreases. Exporters also require continued supply in order to meet their requirements. In production planning, the first step is to work out the domestic and international demand for different vegetables on monthly basis. The second step is to estimate the extent necessary to meet the country requirement. The third would be to identify suitable locations through consultations with the technical staff. Finally divisional staff at the Agrarian Center have to prepare production plans in concurrence with the Farmer Organization. This development plan should include input needs, activities by time target and monitoring mechanisms.

3. In production planning, emphasize should be given to develop home gardens and market gardens. Development of home garden for vegetable farming ensures food security and healthy foods. Market gardens means cultivation of vegetables near principal cities (population centers) to cater to the city consumers. This will provide fresh vegetables to the users. It was observed that farmers in Colombo and Gampaha districts tend to do away with paddy farming due to high labour cost. Similarly they have

ability to purchase rice from the market. Possibilities should be explored to cultivate vegetables on these land through group farming. A group can be organized to take a land and cultivate vegetables with group labour.

4. Strengthening research and extension to reduce production cost is necessary, because the prices of most of the vegetables are exorbitant and beyond the reach of the common man. Also vegetable exporters tend to loose their markets due to high vegetable prices. Under the South Asian Preferential Trade Agreement (SAPTA), imports will be liberalized. If it happens, cheaper vegetables would arrive at the market from India. The country is facing globalization so that the production efficiency has to be taken very seriously. In this regard, government allocation for research and development need to be increased.

5. Since vegetable farmers are small holders, they have to be organized to minimize their cost and increase returns. Although farmers organizations have been established, no participatory production and marketing of vegetables was observed. It is recommended to establish a 'People's Company' by organizing interested farmers. Such a company can provide agricultural inputs, such as fertilizer and agro chemicals at a price below the market through bulk purchasing, increasing accessibility to credit and obtaining maximum price possible for their produce through group marketing.

6. Improvement of support services in relation to the production is necessary to increase vegetable production. Extension system has to be revitalized as almost all the farmers stress the need of effective extension system. In this regard, a number of options are available. The first option is to train the "*Govi Niyamaka*" on extension and make available him for farmers. The second option is to provide extension services through media. Third would be provision of extension service through the Farmers' Organization. In addition to improvement of the extension system, provision of water for vegetable cultivation is an urgent need. This problem as well as solution are location specific. Therefore, Development Officer (DO) are the Agrarian Service Center should pay due attention to solve this problem. Provision of quality seeds at correct time is also needs due attention. Easy access to agricultural credit should be ensured. Vegetable farmers appreciate the services rendered the "SANASA" and Rural Development Bank.

7. As production improves, support services in relation to marketing are required to be improved. The condition of roads in vegetable producing areas appears to be the major constraint to marketing improvement programme for vegetables. Market accessibility is restricted due to the absence of proper link roads. The large buyers are discouraged to visit producing areas owing to unfriendly roads. Bad roads damage produce in transit and make it uneconomical resulting in too high transportation cost. Also market places, the networks of primary, assembly, wholesale and retail transaction points are critical components of marketing infrastructure. At such market outlets, lack of basic facilities like permanent huts, parking places, water supply, toilets, and electricity are evident. With regard to marketing support services, marketing research especially on post harvest activities, training and extension on marketing, market information and marketing credit need to be strengthened in order to enhance marketing efficiency of vegetable trading.

8. Since distribution cost of vegetables from producer to consumer is considerable, the ways and means to reduce the distribution cost has to be explored. There are some intermediaries like assemblers and brokers who perform small business and hence keep big margins. If farmer organization could undertake their activities, the above mentioned intermediaries could be eliminated. Also it was observed that most retailers keep bigger margin due to small transactions. If steps such as provision of marketing credit and bigger store facilities could be provided to expand their turnover, the unit margin will decrease. If intermediaries get abnormal profit, it could be reduced through provision of incentives to the newcomers to enter the vegetable marketing system. Rural youth could be involved in vegetable trading with the support of the government. The new marketing network through the farmer organizations could be developed with the youth from farm families. For instance, the youth from Gampaha district can link with the youth from Nuwara-Eliya in selling low country vegetables from Gampaha and up country vegetables from Nuwara Eliya.

9. Market regulations need to be implemented effectively and new regulations should be imposed if necessary to avoid market malpractices such as underweight, marker entry barriers and illegal payments.

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ANNEXES

Table 1.1 Study Location and Sample Size

District	ASC Area	Loction	Sample Size
Badulla	Ambagasduwa	Kumarapattiya	24
Busdulla			
Kurundugolla			
Keppetipola	Himbiliyagolla		30
Hewanakumbura			
Uva- Ambewela			
Nuwara Eliya	Kandapola	Kandapola	24
Nuwara Eliya	Jayawardenapura		24
Meepilimana			
Blackfool			
Kurunegala	Madahapola	Morottha	24
Welipitiya			
Kobbeigane	Hathalawa		25
Assedduma			
Maulla			
Anuradhapura	Mihintale	Wellaragama	29
Katukeliyawa			
Ipalogama	Dampelassagama		26
Ipalogama			
Punchikulama			
Matale	Dambulla	Puwakattawela	25
Yatawatta	Nikagolla		26
Deewilla			
Kandy	Thalatuoya	Ethulgama	24
TOTAL			281

Table 2.1 - A Vegetable Production - Sri Lanka (M.T.)

Year	Beans	Carrot	Leeks	Beetroot	Knol-Khol	Cabbage	Raddish	Tomato
1973	10360	1647	2087	2940	2635	1647	5014	7075
1974	9409	1031	1169	3015	2545	1031	5317	6421
1975	9862	2869	8661	3379	4118	2869	7599	20893
1976	12132	3035	8232	3796	4561	3035	7174	17785
1977	10538	2035	8153	3466	3272	2035	6136	15491
Avg	**10460**	**2123**	**5660**	**3319**	**3426**	**2123**	**6248**	**13533**
1978	10882	4020	2855	3992	2686	4020	7421	13063
1979	18435	6715	6741	9142	15080	6715	12939	24735
1980	20632	5814	6765	10477	13527	5814	22598	27984
1981	18146	3915	6111	7152	6667	3915	18603	26667
1982	17493	2741	5571	6928	6318	2741	17164	13333
Avg	**17118**	**4641**	**5609**	**7538**	**8856**	**4641**	**15745**	**21156**
% Change	64	119	-1	127	158	119	152	56
1983	31687	9424	14583	16328	9752	9424	21398	26109
1984	36337	8359	14180	13726	12907	8359	30012	28820
1985	35567	10210	12698	12322	10436	10210	28706	33864
1986	36976	11038	5727	13810	10807	11038	24619	32945
1987	37333	11111	10756	14018	9270	11111	18332	27059
Avg	**35580**	**10028**	**11589**	**14041**	**10634**	**10028**	**24613**	**29759**
% Change	108	116	107	86	20	116	56	41
1988	37733	10337	10244	13998	9680	10337	16470	35182
1989	36144	11907	9558	13315	9865	11907	17412	33031
1990	35716	13121	7913	11492	11319	13121	16539	34528
1991	35040	20601	10883	12712	12107	20601	18974	32234
1992	35481	25439	12506	14954	12183	25439	18910	34708
Avg	**36023**	**16281**	**10221**	**13294**	**11031**	**16281**	**17661**	**33937**
% Change	1	62	-12	-5	4	62	-28	14
1993	28028	24621	15423	15371	12430	34021	20252	30932
1994	26158	23415	15590	14649	11986	34781	19929	31746

Table 2.1 - B Vegetable Production - Sri Lanka (M.T.)

Ladies-Fingers	Brinjals	Capsicum	Red-Pumpkin	Cucumber	Bitter-Gourd	Snake Gourd	Ash-Plantain	Ash-Pumpkin	Total
10157	12473	--	11176	4176	2752	7458	32167	4810	118574
6711	19866	--	13463	4941	4474	8966	34758	3446	126563
9545	20646	--	41716	12902	12526	11505	54172	11601	234863
9334	30425	--	36089	11672	10020	14991	54093	9418	235792
9113	35191	--	30924	9842	9012	12996	53504	7334	219042
8972	**23720**	**--**	**26674**	**8707**	**7757**	**11183**	**45739**	**7322**	**186967**
12867	31860	--	25060	11080	10037	13865	52681	6781	213170
22998	32964	--	42446	22349	11718	24832	96819	10591	365219
23843	42597	--	42794	24034	13717	22231	96734	9258	388819
22750	45462	--	55064	20566	13519	20662	107485	8157	384841
18733	37748	--	39763	17862	12703	17594	73874	8022	298588
20238	**38126**	**--**	**41025**	**19178**	**12339**	**19837**	**85519**	**8562**	**330127**
126	61	--	54	120	59	77	87	17	77
37549	74214	--	82039	22808	22437	23923	81168	10543	493386
44311	87701	14077	131320	26486	21120	26368	164669	14913	683665
43706	90279	17030	94052	25692	21208	29831	190750	14786	681347
41402	82732	15923	101050	22865	19463	27244	167966	12996	638601
44554	74268	15253	94477	20427	19482	24232	166424	8297	606404
42304	**81839**	**15571**	**100588**	**23656**	**20742**	**26320**	**154195**	**12307**	**620681**
109	115	--	145	23	68	33	80	44	88
43320	80906	17590	139987	22854	21631	25920	146671	10624	653484
40245	73631	13967	81097	22065	20794	27483	128647	5952	557020
39969	69725	11024	87717	25436	19877	27788	109436	6655	541376
38799	65583	11965	64414	19087	20553	22311	95970	6081	507915
37949	62824	10469	65429	17502	22160	23074	84014	6688	509729
40056	**70534**	**16254**	**87729**	**21389**	**21003**	**25315**	**112948**	**7200**	**553905**
-5	-14	4	-13	-10	1	-4	-27	-41	-11
37856	62841	12595	60490	18312	21656	22355	81917	9267	508367
37653	62601	10713	58247	17838	20683	20828	69682	7826	484325

Source: Dept. Of Census and Statistics.

Source: Dept. Of Census and Statistics.

Table 2.2 Per capita vegetable consumption(gms/Month) - All Island

Variety	1978/79	1981/82	1986/87
Beans	217.83	234.20	319.70
Carrot	44.30	41.70	66.40
Leeks	82.08	64.80	63.10
Beetroot	84.06	101.20	103.10
Knol Khol	N.A.	48.10	42.80
Raddish	51.97	67.10	49.70
Cabbage	215.27	192.70	173.10
Tomatoes	73.84	65.80	48.50
Ladies Finger	88.61	106.30	86.00
Brinjals	266.11	296.00	260.00
capsicum	35.22	46.20	50.50
Pumpking	132.91	202.70	194.30
Ash Pumpkin	9.09	13.40	6.00
Cucumber	23.86	29.90	30.80
Bitter Gourd	45.44	50.80	64.60
Snake Gourd	80.94	78.10	70.40
Drumstic	119.56	114.80	95.70
Luffa	72.99	78.50	66.40
Long Bean	134.62	156.60	131.50
Ash Plantain	114.17	139.40	106.40
Other	132.34	153.30	70.50
Grand total	**2025.21**	**2281.60**	**2099.50**
Leafy vegetables			
Mukunuwenna	204.76	N.A.	154.60
Kankun	36.35	N.A.	28.70
Gotukola	44.30	N.A.	72.80
Kathurumurunga	15.05	N.A.	24.50
Sarana	11.36	N.A.	10.00
Thampala	17.89	N.A.	12.40
Nivithi	22.44	N.A.	31.80
Cabbage Leaves	17.04	N.A.	17.50
Kohila	17.04	N.A.	20.70
Other	63.05	N.A.	83.20
Total	**449.28**	**434.10**	**456.20**
Potatoes	209.02	253.30	234.70
Total vegetables consumption	**2683.51**	**2969.00**	**2790.40**

Source : Various issues of consumer finance surveys Central Bank of Sri Lanka

Table 2.3 Vegetable consumptions by sectors (gms/Month)

Varieties	1978/1979			1981/1982			1986/1987		
	Urban	Rural	Estate	Urban	Rural	Estate	Urban	Rural	Estate
Up country									
Beans	242.25	186.02	405.27	262.80	201.80	515.40	390.60	274.10	582.40
Carrot	73.84	33.51	50.27	81.10	32.40	31.90	124.70	53.60	52.50
Leeks	74.12	72.99	174.94	75.00	56.20	231.80	99.00	44.60	106.80
Beetroot	76.68	68.16	229.76	111.10	86.70	234.80	120.00	84.80	234.80
Knol Khol	N.A.	N.A.	N.A.	23.50	47.70	125.10	31.40	42.30	73.00
Raddish	34.36	59.64	37.49	38.80	74.40	68.40	35.60	54.50	40.90
Cabbage	185.17	192.84	472.58	199.90	161.70	520.60	173.70	147.80	406.90
Tomato	54.24	74.41	119.28	55.70	68.00	69.60	40.90	49.50	56.20
Potatc	235.72	198.52	221.52	293.60	243.60	245.70	229.00	222.40	221.10
ALL	**976.38**	**886.09**	**1711.11**	**1141.50**	**972.50**	**2043.30**	**1244.90**	**973.60**	**1774.60**
Low country									
Ladies Finger	80.37	94.29	65.04	93.60	114.20	54.20	80.40	89.30	67.80
Brinjals	187.72	272.07	423.73	215.30	306.70	410.60	152.30	272.30	393.50
capsicum	40.90	36.92	21.87	52.20	45.90	31.30	53.30	50.50	43.70
Pumpking	99.12	145.69	122.12	154.80	213.90	214.50	160.20	206.50	158.60
Ash Pumpkin	6.82	10.79	2.27	7.30	15.30	5.70	5.00	6.80	1.00
Cucumber	26.70	24.42	9.94	30.50	31.60	9.10	48.10	29.20	6.90
Bitter Gourd	37.20	51.40	21.30	34.90	56.30	23.60	58.00	71.20	18.20
Snake Gourd	62.76	90.88	59.36	58.20	86.10	46.80	47.90	77.80	52.60
Drumstic	96.28	121.84	163.58	101.90	116.30	134.80	85.50	97.80	99.30
Luffa	24.42	93.72	17.89	206.60	97.00	20.50	36.40	78.40	23.30
Long Beans	74.12	164.72	57.37	96.10	182.60	39.80	68.10	156.80	40.40
Ash Plantain	94.86	122.12	88.89	108.10	150.60	103.50	89.60	113.40	79.60
ALL	**831.27**	**1228.86**	**1053.36**	**1159.50**	**1416.50**	**1094.40**	**884.80**	**1250.00**	**984.90**
Leafy vegetables									
Mukunuwenna	286.27	185.45	140.86	N.A.	N.A.	N.A.	241.10	144.20	54.20
Kankun	69.30	28.40	7.38	N.A.	N.A.	N.A.	52.80	24.90	9.60
Gotukola	33.51	50.84	22.44	N.A.	N.A.	N.A.	66.40	79.70	23.80
Kathurumurunga	21.87	13.92	5.54	N.A.	N.A.	N.A.	36.40	24.10	0.90
Sarana	13.63	11.64	1.42	N.A.	N.A.	N.A.	16.60	9.30	1.60
Thampala	19.88	19.28	3.69	N.A.	N.A.	N.A.	10.20	13.90	3.80
Nivithi	19.88	25.56	5.68	N.A.	N.A.	N.A.	29.80	34.30	12.50
Cabbage Leaves	10.51	17.61	28.40	N.A.	N.A.	N.A.	10.20	18.90	20.50
Kohila	11.93	20.45	1.99	N.A.	N.A.	N.A.	17.20	23.40	3.00
ALL	**486.78**	**373.15**	**217.41**	**451.90**	**457.20**	**190.30**	**480.70**	**372.70**	**129.90**
Grand Total	**2294.43**	**2488.10**	**2981.87**	**2752.90**	**2846.20**	**3328.00**	**2610.40**	**2596.30**	**2889.40**

Source : Various issues of consumer finance surveys - Central Bank of Sri Lanka

Table 2.4 Seasonal price index - Vegetables

Month	Beans		Carrot		Leeks		Beetroot		Knolkhol		Raddish		Cabbage		Tomatoes	
	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index
January	26.24	101	29.41	112	28.17	108	29.62	109	19.74	97	13.18	94	18.28	94	29.89	97
February	25.04	96	27.38	104	26.91	103	29.89	110	20.41	100	11.96	85	18.87	97	25.35	82
March	24.90	96	26.64	101	26.31	101	29.02	107	21.04	104	12.80	91	19.71	101	27.11	88
April	24.52	94	26.16	99	26.80	103	26.29	97	20.44	101	13.47	96	20.04	103	28.05	91
May	28.70	110	26.59	101	28.47	109	26.05	96	20.95	103	14.63	104	19.90	102	27.73	90
June	31.31	120	30.83	117	32.13	123	29.11	108	22.88	113	16.30	116	21.82	112	34.09	110
July	26.37	101	29.56	112	27.84	107	27.90	103	20.55	101	15.18	108	19.95	103	34.29	111
August	25.95	100	23.38	89	23.36	90	23.82	88	18.30	90	14.01	100	19.26	99	26.14	84
September	23.54	90	20.22	77	20.07	77	20.65	76	17.13	84	12.86	91	17.39	89	26.04	84
October	21.93	84	20.07	76	19.88	76	20.71	77	17.32	85	12.84	91	16.48	85	32.02	103
November	26.68	102	24.88	94	24.15	93	27.64	102	20.95	103	15.21	108	19.70	101	34.77	112
December	27.24	105	31.31	119	28.82	111	34.14	126	24.18	119	16.47	117	22.03	113	46.05	149
Year Average	26.04	100	26.37	100	26.08	100	27.07	100	20.33	100	14.08	100	19.45	100	30.96	100

Month	Ladies Fingers		Brinjals		Capsicum		Pumpking		Cucumber		Bitter gourd		Snake gourd		Luffa	
	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index	5 year average Rs/Kg	Seasonal price index
January	21.39	90	22.70	100	35.36	100	11.41	86	14.60	95	23.25	93	15.84	93	18.75	88
February	23.84	101	20.84	92	34.74	99	10.85	82	14.92	97	22.90	92	16.27	96	19.13	90
March	23.83	101	20.06	88	33.88	96	11.60	88	14.35	93	22.88	92	16.28	96	19.95	94
April	22.82	97	21.00	93	32.60	93	12.72	96	15.13	98	23.23	93	16.06	94	20.69	97
May	24.79	105	21.93	97	31.20	89	13.59	103	16.41	107	25.24	101	17.27	101	22.34	105
June	27.12	115	24.57	108	36.06	102	14.15	107	17.24	112	26.98	108	18.78	110	24.07	113
July	24.36	103	23.22	102	38.16	108	14.16	107	15.86	103	24.88	100	16.74	98	21.75	102
August	22.21	94	21.88	97	35.13	100	14.37	109	14.51	94	23.67	95	16.30	96	19.64	92
September	20.44	86	21.66	96	31.75	90	13.82	104	13.17	86	22.56	91	14.38	84	18.75	88
October	21.75	92	22.70	100	33.74	96	13.88	105	14.59	95	24.94	100	16.44	97	21.44	101
November	26.08	110	25.09	111	38.72	110	14.31	108	17.04	111	29.07	117	20.06	118	24.99	118
December	25.00	106	26.42	117	40.95	116	13.86	105	16.93	110	29.14	117	19.84	117	23.60	111
Year Average	23.64	100	22.67	100	35.19	100	13.23	100	15.40	100	24.90	100	17.02	100	21.26	100

Source : Marketing & Food Policy Division, ARTI

Table 2.5 Amplitude of seasonal price variance

Vegetables	Index of Season				Difference
Upcountry	Low		High		
Beans	84	(Oct.)	120	(June)	36
Carrot	89	(Sept.)	119	(Dec.)	30
Leeks	76	(Oct.)	123	(June)	47
Beetroot	76	(Sept.)	126	(Dec.)	50
Knolkhol	84	(Sept.)	119	(Dec.)	35
Radish	91	(Sept./Oct.)	117	(Dec.)	26
Cabage	85	(Oct.)	113	(Dec.)	28
Tomato	84	(Aug./Sept.)	149	(Dec.)	65
Low country					
Ladies Finger	86	(Sept.)	115	(June)	29
Brinjals	92	(Feb.)	117	(Dec.)	25
Capsicum	89	(May.)	116	(Dec.)	27
Pumpking	82	(Feb.)	109	(Aug.)	27
Cucumber	86	(Sept.)	112	(June)	26
Bitter Gourd	91	(Sept.)	117	(Nov./Dec.)	26
Snake Gourd	84	(Sept.)	118	(Nov.)	34
Luffa	88	(Jan./Sept.)	118	(Nov.)	30

Source : Marketing and Food Policy Division, HARTI

Table 2.6 Annual average retail prices of vegetables (Rs/Kg)
1985 - 1995

Variaty	Year										
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Beans (Butter)	9.87	11.65	12.22	14.60	16.26	21.66	23.07	24.93	26.15	34.37	34.66
Beans(Green)	9.88	11.67	12.22	14.60	16.29	21.66	22.87	24.89	26.15	34.34	34.68
Carrot	10.83	13.56	13.83	14.69	17.61	21.06	22.58	25.91	26.81	35.48	37.84
Leeks	10.53	12.88	12.37	13.57	15.08	20.87	22.66	24.03	28.35	34.48	35.27
Beetroot	10.74	12.10	11.80	13.48	14.54	20.47	24.34	24.25	28.94	37.36	40.95
Knolkhol	6.94	8.48	8.55	9.77	11.46	15.78	18.29	19.51	21.31	26.74	29.18
Raddish	5.40	6.05	6.71	7.20	8.83	10.60	11.98	14.96	15.34	17.50	19.45
Cabbage	7.89	8.86	10.24	11.26	12.60	15.49	16.32	18.34	20.21	26.92	29.88
Tomatoes	11.80	14.78	15.40	16.85	21.95	25.99	29.46	36.13	42.11	47.20	47.58
Ladies Finger	10.55	10.66	10.79	13.05	14.78	19.94	21.26	23.32	24.86	29.04	28.50
Brinjal	8.16	9.48	9.53	11.51	14.43	18.68	19.61	22.12	24.49	28.46	27.16
Capsicum	12.49	13.81	13.68	16.84	21.29	28.32	32.95	34.77	37.19	42.79	41.34

Table 2.7 Precentage change in vegetable price 1986 - 1995

Variaty	Year										
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Ave. Change per year
Beans (Butter)	18.03	4.89	19.48	11.37	33.21	6.51	8.06	4.89	31.43	0.84	13.87
Beans(Green)	18.12	4.71	19.48	11.58	32.97	5.59	8.83	5.06	31.32	0.99	13.86
Carrot	25.21	1.99	6.22	19.88	19.59	7.22	14.75	3.47	32.34	6.65	13.73
Leeks	22.32	-3.96	9.70	11.13	38.40	8.58	6.05	17.98	21.62	2.29	13.41
Beetroot	12.66	-2.48	14.24	7.86	40.78	18.91	-0.37	19.34	29.09	9.61	14.96
Knolkhol	22.19	0.83	14.27	17.30	37.70	15.91	6.67	9.23	25.48	9.12	15.87
Raddish	12.04	10.91	7.30	22.64	20.05	13.02	24.87	2.54	14.08	11.14	13.86
Cabbage	12.29	15.58	9.96	11.90	22.94	5.36	12.38	10.20	33.20	11.00	14.48
Tomato	25.25	4.19	9.42	30.27	18.41	13.35	22.64	16.55	12.09	0.81	15.30
Ladies Finger	1.04	1.22	20.95	13.26	34.91	6.62	9.69	6.60	16.81	-1.86	10.92
Brinjal	16.18	0.53	20.78	25.37	29.45	4.98	12.80	10.71	16.21	-4.57	13.24
Capsicum	10.57	-0.94	23.10	26.43	33.02	16.35	5.52	6.96	15.06	-3.39	13.27

Table 2.8 Real price of vegetables (Rs/Kg)

Variaty	Year										
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Beans	1.76	1.92	1.87	1.96	1.96	2.15	2.04	1.98	1.86	2.25	2.11
Carrot	1.93	2.24	2.12	1.97	2.12	2.09	2.00	2.06	1.90	2.32	2.08
Leeks	1.88	2.13	1.89	1.82	1.82	2.07	2.00	1.91	2.01	2.26	2.30
Beetroot	1.91	2.00	1.81	1.81	1.75	2.03	2.15	1.92	2.05	2.45	2.14
Knolkhol	1.24	1.40	1.31	1.31	1.38	1.56	1.62	1.92	2.05	2.51	2.49
Raddish	0.96	1.00	1.03	0.97	1.06	1.05	1.06	1.19	1.09	1.15	1.77
Cabbage	1.41	1.46	1.57	1.51	1.52	1.54	1.44	1.46	1.43	1.76	1.18
Tomatoes	2.10	2.44	2.36	2.26	2.54	2.58	2.60	2.87	2.99	3.09	1.82
Ladies Finger	1.88	1.76	1.65	1.75	1.78	1.98	1.88	1.85	1.77	1.90	2.89
Brinjal	1.45	1.56	1.46	1.55	1.74	1.85	1.73	1.75	1.74	1.86	1.73
Capsicum	2.23	2.28	2.10	2.26	2.56	2.81	2.91	2.76	2.64	2.80	1.65
Pumpkin	1.11	1.21	1.08	1.04	1.14	1.08	1.12	1.12	0.94	1.00	1.00
Cucumber	1.13	1.23	1.26	0.90	1.15	1.29	1.21	1.25	1.16	1.20	1.00
Bitter Gourd	1.68	1.79	1.67	1.71	1.73	1.98	1.97	1.88	1.85	2.13	1.23
Snake Gourd	1.10	1.18	1.11	1.06	1.16	1.34	1.23	1.29	1.28	1.53	1.97
Drumstic	2.36	3.23	2.00	2.15	2.32	2.31	0.96	1.14	1.06	1.09	1.47
Luffa	1.59	1.60	1.49	1.44	1.56	1.68	1.63	1.69	1.59	1.76	2.33
Long Beans	1.36	1.50	1.45	1.46	1.52	1.62	1.58	1.59	1.51	1.63	1.80
Ash Plantain	1.51	1.73	2.01	1.94	1.88	2.07	2.16	2.31	2.35	2.22	1.62
Green Chilli	2.94	2.88	2.85	3.37	3.57	3.59	3.67	3.20	3.18	3.62	2.01
Lime	3.67	4.78	4.99	4.22	3.41	4.38	5.10	5.17	2.83	4.84	3.39
Sweet Potato	0.90	1.13	1.19	1.09	1.16	1.16	1.34	1.21	1.13	1.22	1.01
Manioc	0.70	0.69	0.76	0.67	0.73	0.69	0.66	0.77	0.74	0.78	1.01
Mukunuwenna	0.18	0.18	0.19	0.27	0.27	0.26	0.26	0.27	0.31	0.32	0.36
Kankun	0.17	0.18	0.18	0.22	0.21	0.20	0.22	0.22	0.23	0.25	0.32

Source : Marketing and Food Policy Division, HARTI

Table 2.9 Percentage Change in Real Price of Vegetables

Vegetable	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Ave.change per/year
Beans	9.31	-2.63	4.82	-0.18	9.65	-5.06	-2.99	-6.13	21.19	-6.32	2.17
Carrot	15.95	-5.32	-6.81	7.44	-1.56	-4.43	3.01	-7.42	22.05	-10.31	1.26
Leeks	13.27	-10.84	-3.76	-0.40	13.92	-3.22	-4.80	5.58	12.15	1.92	2.38
Beetroot	4.33	-9.47	0.22	-3.32	15.88	5.99	-10.56	6.80	19.04	-12.40	1.65
Knol Khol	13.16	-6.40	0.25	5.13	13.34	3.32	19.03	6.80	22.03	-0.68	7.60
Raddish	3.75	2.96	-5.86	9.92	-1.19	0.74	12.78	-8.78	5.13	54.95	7.44
Cabbage	3.99	7.29	-3.53	0.30	1.19	-6.09	0.88	-1.40	22.85	-32.90	-0.74
Tomato	15.99	-3.27	-4.01	12.34	1.29	1.04	10.10	4.30	3.35	-41.21	-0.10
Ladies Finger	-6.43	-6.04	6.11	1.51	11.05	-4.96	-1.53	-4.60	7.68	52.25	5.50
Brinjals	7.59	-6.68	5.96	12.37	6.56	-6.42	1.26	-0.92	7.16	-7.00	1.99
Capsicum	2.39	-8.04	8.00	13.31	9.49	3.71	-5.27	-4.46	6.29	-41.07	-1.56
Pumpkin	8.96	-10.34	-3.97	9.06	-4.94	3.71	-0.20	-16.41	6.97	-0.20	-0.70
Cucumber	8.65	2.43	-28.92	28.39	12.08	-6.40	3.66	-6.93	3.47	-16.83	-0.40
Bitter Gourd	6.88	-7.08	2.50	1.41	14.33	-0.68	-4.58	-1.12	14.80	-42.31	-1.58
Snake Gourd	7.64	-6.79	-3.76	8.75	15.89	-7.96	4.30	-0.69	19.70	28.51	6.60
Drumstic	36.71	-38.16	7.93	7.52	-0.31	-58.59	19.31	-6.71	2.05	35.70	0.55
Luffa	0.82	-6.79	-3.44	8.61	7.40	-3.18	3.87	-5.84	10.89	32.13	4.45
Long Beans	10.45	-3.60	0.63	4.43	6.49	-2.46	0.52	-5.19	8.51	10.21	3.00
Ash Plantain	15.18	15.80	-3.44	-2.98	9.98	4.39	6.96	1.85	-5.82	-26.91	1.50
Green chilli	-2.00	-1.00	18.17	6.03	0.32	2.25	-12.82	-0.58	13.59	-44.53	-2.02
Lime	30.30	4.33	-15.34	-19.24	28.54	16.26	1.54	-45.24	70.80	-29.96	4.20
Sweet Potato	26.23	4.86	-8.43	6.45	-0.23	16.05	-9.46	-6.94	8.14	8.14	4.48
Manioc	-1.03	8.97	-11.38	9.07	-5.60	-4.06	15.82	-3.92	5.56	30.62	4.40
Mukunuwenna	-0.13	3.80	41.94	2.24	-4.63	-0.35	5.35	13.10	4.26	4.09	6.97
Kankun	1.11	2.37	21.93	-4.91	-3.02	7.40	-0.50	4.79	10.82	27.19	6.76

Source : Marketing and Food Policy Division, HARTI

Table 3.1 Frequency Distribution of Family Size

Family Size	All sample		Badulla		Nuwara Eliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No of house holds	cumu. house holds	No of house holds	cumu. house holds	No of house holds	cumu. house holds	No of house holds	cumu. house holds	No of house holds	cumu. house holds	No of house holds	cumu. house holds	No of house holds	cumu. house holds
1	1	1	0	0	0	0	1	1	0	0	0	0	0	0
2	13	14	1	1	1	1	5	6	2	2	2	2	2	2
3	37	51	8	9	8	9	6	12	5	7	6	8	4	6
4	79	130	11	20	13	22	16	28	14	21	21	29	4	10
5	65	195	12	32	11	33	10	38	17	38	10	39	5	15
6	50	245	12	44	10	43	6	44	10	48	6	45	6	21
7	23	268	6	50	4	47	5	49	4	52	2	47	2	23
8	5	273	2	52	1	48	0	49	1	53	1	48	0	23
9	4	277	1	53	0	48	0	49	0	53	2	50	1	24
10	2	279	0	53	1	49	0	49	1	54	0	50	0	24
>10	2	281	0	53	1	50	0	49	0	54	1	51	0	24
Total	281		53		50		49		54		51		24	

Source : Survey data

Table 3.2 Age and Sex Distribution of the Sample Population

Age	All sample						Badulla						Nuwaraeliya					
Group	M	%	F	%	T	%	M	%	F	%	T	%	M	%	F	%	T	%
<=6	62	9.24	55	9.32	117	9.28	10	7.46	19	14.07	29	10.78	10	7.46	6	4.96	16	6.27
6-14	137	20.42	108	18.31	245	19.43	21	15.67	15	11.11	36	13.38	24	17.91	22	18.18	46	18.04
15-24	131	19.52	135	22.88	266	21.09	30	22.39	39	28.89	69	25.65	29	21.64	33	27.27	62	24.31
25-34	132	19.67	113	19.15	245	19.43	28	20.90	21	15.56	49	18.22	27	20.15	25	20.66	52	20.39
35-44	88	13.11	94	15.93	182	14.43	13	9.70	18	13.33	31	11.52	19	14.18	18	14.88	37	14.51
45-54	66	9.84	49	8.31	115	9.12	13	9.70	14	10.37	27	10.04	14	10.45	10	8.26	24	9.41
55-64	31	4.62	22	3.73	53	4.20	13	9.70	5	3.70	18	6.69	5	3.73	6	4.96	11	4.31
>=65	24	3.58	14	2.37	38	3.01	6	4.48	4	2.96	10	3.72	6	4.48	1	0.83	7	2.75
Total	671	100	590	100	1261	100	134	100	135	100	26	100	134	100	121	100	255	100

Age	Kurunegala						Anuradhapura						Matale					
Group	M	%	F	%	T	%	M	%	F	%	T	%	M	%	F	%	T	%
<=6	8	6.67	8	8.25	16	7.37	9	10.34	10	13.51	19	11.80	20	14.71	11	10.19	31	12.70
6-14	31	25.83	23	23.71	54	24.88	22	25.29	12	16.22	34	21.12	31	22.79	27	25.00	58	23.77
15-24	23	19.17	19	19.59	42	19.35	17	19.54	18	24.32	35	21.74	20	14.71	16	14.81	36	14.75
25-34	20	16.67	14	14.43	34	15.67	16	18.39	14	18.92	30	18.63	29	21.32	29	26.85	58	23.77
35-44	20	16.67	21	21.65	41	18.89	11	12.64	9	12.16	20	12.42	18	13.24	16	14.81	34	13.93
45-54	14	11.67	7	7.22	21	9.68	7	8.05	9	12.16	16	9.94	10	7.35	5	4.63	15	6.15
55-64	0	0.00	3	3.09	3	1.38	4	4.60	1	1.35	5	3.11	6	4.41	2	1.85	8	3.28
>=65	4	3.33	2	2.06	6	2.76	1	1.15	1	1.35	2	1.24	2	1.47	2	1.85	4	1.64
Total	120	100	97	100	217	100	87	100	74	100	161	100	136	100	108	100	244	100

Age	Kandy					
Group	M	%	F	%	T	%
<=6	5	8.33	1	1.82	6	5.22
6-14	8	13.33	9	16.36	17	14.78
15-24	12	20.00	10	18.18	22	19.13
25-34	12	20.00	10	18.18	22	19.13
35-44	7	11.67	12	21.82	19	16.52
45-54	8	13.33	4	7.27	12	10.43
55-64	3	5.00	5	9.09	8	6.96
>=65	5	8.33	4	7.27	9	7.83
Total	60	100	55	100	115	100

M = Male, F = Female, T= Total

Source : Survey data

Table 3.3 Educational Level of Sample Population

Level of education	All sample						Badulla						Nuwaraeliya					
	M	%	F	%	T	%	M	%	F	%	T	%	M	%	F	%	T	%
No schooling but can read	0	0.00	3	0.55	3	0.26	0	0.00	1	0.79	1	0.40	0	0.00	1	0.89	1	0.41
No schooling & cannot read	5	0.80	14	2.55	19	1.62	2	1.64	8	6.30	10	4.02	1	0.77	1	0.89	2	0.83
Primary grades (1-5)	209	33.60	173	31.57	382	32.65	36	29.51	37	29.13	73	29.32	24	18.46	21	18.75	45	18.60
Grade 6 - O/L	269	43.25	224	40.88	493	42.14	45	36.89	39	30.71	84	33.73	61	46.92	53	47.32	114	47.11
O/L. Passed	81	13.02	91	16.61	172	14.70	22	18.03	26	20.47	48	19.28	28	21.54	25	22.32	53	21.90
A/L. Passed	40	6.43	36	6.57	76	6.50	9	7.38	14	11.02	23	9.24	12	9.23	9	8.04	21	8.68
Undergraduate	5	0.80	0	0.00	5	0.43	4	3.28	0	0.00	4	1.61	1	0.77	0	0.00	1	0.41
Graduate	6	0.96	3	0.55	9	0.77	2	1.64	1	0.79	3	1.20	2	1.54	1	0.89	3	1.24
Others	7	1.13	4	0.73	11	0.94	2	1.64	1	0.79	3	1.20	1	0.77	1	0.89	2	0.83
Total	622	100	548	100	1170	100	122	100	127	100	249	100	130	100	112	100	242	100

Level of education	Kurunegala						Anuradhapura						Matale					
	M	%	F	%	T	%	M	%	F	%	T	%	M	%	F	%	T	%
No schooling but can read	0	0.00	0	0.00	0	0.00	0	0.00	1	1.49	1	0.68	0	0.00	0	0.00	0	0.00
No schooling & cannot read	1	0.88	1	1.09	2	0.97	0	0.00	2	2.99	2	1.37	1	0.83	1	1.02	2	0.92
Primary grades (1-5)	46	40.35	38	41.30	84	40.78	36	45.57	25	37.31	61	41.78	55	45.83	40	40.82	95	43.58
Grade 6 - O/L	52	45.61	46	50.00	98	47.57	38	48.10	28	41.79	66	45.21	50	41.67	41	41.84	91	41.74
O/L. Passed	8	7.02	5	5.43	13	6.31	4	5.06	8	11.94	12	8.22	9	7.50	9	9.18	18	8.26
A/L. Passed	4	3.51	2	2.17	6	2.91	1	1.27	3	4.48	4	2.74	3	2.50	4	4.08	7	3.21
Undergraduate	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Graduate	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.83	1	1.02	2	0.92
Others	3	2.63	0	0.00	3	1.46	0	0.00	0	0.00	0	0.00	1	0.83	2	2.04	3	1.38
Total	114	100	92	100	206	100	79	100	67	100	146	100	120	100	98	100	218	100

Level of education	Kandy					
	M	%	F	%	T	%
No schooling but can read	0	0.00	0	0.00	0	0.00
No schooling & cannot read	0	0.00	1	1.85	1	0.92
Primary grades (1-5)	12	21.82	12	22.22	24	22.02
Grade 6 - O/L	23	41.82	17	31.48	40	36.70
O/L. Passed	10	18.18	18	33.33	28	25.69
A/L. Passed	9	16.36	6	11.11	15	13.76
Undergraduate	0	0.00	0	0.00	0	0.00
Graduate	1	1.82	0	0.00	1	0.92
Others	0	0.00	0	0.00	0	0.00
Total	55	100	54	100	109	100

Table 3.5 Experience in Vegetable Farming

Period	All sample		Badulla		Nuwara Eliya		Kurunegala		A'pura		Matale		Kandy	
No. of years	No.	%	No	%	No	%	No	%	No	%	No	%	No	%
0-10	91	32.38	14	25.93	10	20.83	17	34.69	17	30.91	22	43.14	11	45.83
11-20	122	43.42	15	27.78	22	45.83	27	55.10	30	54.55	21	41.18	7	29.17
21-30	37	13.17	8	14.81	8	16.67	5	10.20	5	9.09	7	13.73	4	16.67
31-40	22	7.83	11	20.37	6	12.50	0	0.00	3	5.45	0	0.00	2	8.33
41-50	7	2.49	4	7.41	2	4.17	0	0.00	0	0.00	1	1.96	0	0.00
Over 50	2	0.71	2	3.70	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	281	100	54	100	48	100	49	100	55	100	51	100	24	100

Source : Survey data

Table 3.6 Classification of Vegetable Farmers by Crops

District	Area Location	Type of farmers				% of sole veg. farmers	
		Veg. only		Veg. & others			
		Maha	Yala	Maha	Yala	Maha	Yala
Badulla	Uva Paranagama	5	22	19	2	20.83	91.67
	Hewanakumbura	18	29	12	1	60.00	96.67
Nuwara Eliya	Kandapola	23	24	1	0	95.83	100.00
	Meepilimana	24	24	0	0	100.00	100.00
Kurunegala	Madahapola	0	18	24	6	0.00	75.00
	Hathalawa	4	18	21	7	16.00	72.00
Anuradhapura	Wellaragama	6	11	23	18	20.69	37.93
	Ipalogama	1	4	25	22	3.85	15.38
Matale	Puwakattawela	8	11	17	14	32.00	44.00
	Yatawatta	0	20	26	6	0.00	76.92
Kandy	Ethulgama	3	5	21	19	12.50	20.83
Total		92	186	189	95	32.74	66.19

Source : Survey data

Table 3.4 Occupational Pattern of the Sample Population

Occupation	All sample			
	Main	%	Sec.	%
Agricultural operations	395	63.10	226	75.84
Agricultural labourer	4	0.64	23	7.72
Non agricultural labourer	1	0.16	1	0.34
Self employment	12	1.92	28	9.40
Government employment	41	6.55	4	1.34
Private sector	30	4.79	1	0.34
Others	143	22.84	15	5.03
Total	626	100	298	100

Occupation	Badulla				Nuwara Eliya				Kurunegala			
	Main	%	Sec.	%	Main	%	Sec.	%	Main	%	Sec.	%
Agricultural operations	96	66.67	48	82.76	69	60.53	45	73.77	71	66.36	43	87.76
Agricultural labourer	2	1.39	1	1.72	0	0.00	7	11.48	2	1.87	1	2.04
Non agricultural labourer	0	0.00	0	0.00	1	0.88	0	0.00	0	0.00	0	0.00
Self employment	0	0.00	3	5.17	7	6.14	7	11.48	2	1.87	4	8.16
Government employment	12	8.33	1	1.72	10	8.77	1	1.64	0	0.00	0	0.00
Private sector	7	4.86	1	1.72	8	7.02	0	0.00	1	0.93	0	0.00
Others	27	18.75	4	6.90	19	16.67	1	1.64	31	28.97	1	2.04
Total	144	100	58	100	114	100	61	100	107	100	49	100

Occupation	Anuradhapura				Matale				Kandy			
	Main	%	Sec.	%	Main	%	Sec.	%	Main	%	Sec.	%
Agricultural operations	48	64.00	29	67.44	80	68.97	45	69.23	31	44.29	16	72.73
Agricultural labourer	0	0.00	3	6.98	0	0.00	11	16.92	0	0.00	0	0.00
Non agricultural labourer	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	4.55
Self employment	0	0.00	5	11.63	2	1.72	6	9.23	1	1.43	3	13.64
Government employment	4	5.33	1	2.33	5	4.31	0	0.00	10	14.29	1	4.55
Private sector	8	10.67	0	0.00	2	1.72	0	0.00	4	5.71	0	0.00
Others	15	20.00	5	11.63	27	23.28	3	4.62	24	34.29	1	4.55
Total	75	100	43	100	116	100	65	100	70	100	22	100

Source : Survey data

Sec.= Secondary occupation Main = Main occupation

Table 3.7 Importance of Vegetable Farming as an Income Source

District	Main income	Secondary income	Total	% of main income to the total
Badulla	51	3	54	94.44
Nuwara Eliya	40	8	48	83.33
Kurunegala	45	4	49	91.84
Anuradhapura	51	4	55	92.73
Matale	44	7	51	86.27
Kandy	22	2	24	91.67
Total	253	28	281	90.04

Source : Survey data

Table 3.8 Factors Affecting the Selection of Crops

Reasons	All sample		Badulla		Nuwara Eliya		Kurunegala		A'pura		Matale		Kandy	
	No.	%	No.	%	No.	%	No	%	No	%	No	%	No.	%
Suitability	88	31.32	17	31.48	30	62.50	13	26.53	16	29.09	9	17.65	3	12.50
Followed others	7	2.49	3	5.56	1	2.08	0	0.00	1	1.82	1	1.96	1	4.17
High price	117	41.64	21	38.89	9	18.75	25	51.02	20	36.36	24	47.06	18	75.00
Availability of seeds	5	1.78	3	5.56	0	0.00	1	2.04	0	0.00	1	1.96	0	0.00
Request from buyers	2	0.71	1	1.85	0	0.00	0	0.00	1	1.82	0	0.00	0	0.00
Easy to cultivate	36	12.81	5	9.26	4	8.33	5	10.20	9	16.36	11	21.57	2	8.33
Others	26	9.25	4	7.41	4	8.33	5	10.20	8	14.55	5	9.80	0	0.00
Total	281	100	54	100	48	100	49	100	55	100	51	100	24	100

Source : survey data

Table 3.9 Number of Vegetable Plots Grown by a Farmer

No. of plots	Number of farmers All sample			
	Maha	%	Yala	%
1	126	54.31	121	53.54
2	67	28.88	60	26.55
3	29	12.50	25	11.06
4	8	3.45	17	7.52
5	2	0.86	3	1.33
Over 5	0	0.00	0	0.00
Total	232	100	226	100

No. of plots	Number of farmers Badulla				Nuwaraeliya				Kurunegala			
	Maha	%	Yala	%	Maha	%	Yala	%	Maha	%	Yala	%
1	20	40.00	14	28.00	23	63.89	21	65.62	28	75.68	33	68.75
2	18	36.00	17	34.00	8	22.22	6	18.75	7	18.92	9	18.75
3	8	16.00	14	28.00	4	11.11	4	12.50	1	2.70	2	4.17
4	2	4.00	3	6.00	1	2.78	1	3.12	1	2.70	4	8.33
5	2	4.00	2	4.00	0	0.00	0	0.00	0	0.00	0	0.00
Over 5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	50	100	50	100	36	100	32	100	37	100	48	100

No. of plots	Number of farmers Anuradhapura				Matale				Kandy			
	Maha	%	Yala	%	Maha	%	Yala	%	Maha	%	Yala	%
1	22	41.51	16	61.54	22	61.11	22	45.83	11	55.00	15	68.18
2	15	28.30	9	34.62	12	33.33	13	27.08	8	40.00	7	31.82
3	13	24.53	1	3.85	2	5.56	4	8.33	1	5.00	0	0.00
4	3	5.66	0	0.00	0	0.00	8	16.67	0	0.00	0	0.00
5	0	0.00	0	0.00	0	0.00	1	2.08	0	0.00	0	0.00
Over 5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	53	100	26	100	36	100	48	100	20	100	22	100

Source : Survey data

Table 3.10 Farm Size

Size(acres)	All sample		Badulla		Nuwara eliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 0.250	11	4.72	0	0.00	7	18.92	1	2.70	0	0.00	2	5.56	1	5.00
0.250 - 0.500	33	14.16	10	20.00	6	16.22	3	8.11	2	4.45	7	19.44	5	25.00
0.500 - 0.750	54	23.18	15	30.00	9	24.32	6	16.22	2	4.45	12	33.33	10	50.00
0.750 - 1.000	18	7.73	2	4.00	7	18.92	1	2.70	4	8.91	2	5.56	2	10.00
1.000 - 1.250	58	24.89	17	34.00	5	13.51	7	18.92	8.9	19.82	10	27.78	2	10.00
1.250 - 1.500	4	1.72	2	4.00	1	2.70	0	0.00	1	2.23	0	0.00	0	0.00
1.500 - 1.750	13	5.58	1	2.00	0	0.00	4	10.81	7	15.59	1	2.78	0	0.00
1.750 - 2.000	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
OVER 2	42	18.03	3	6.00	2	5.41	15	40.54	20	44.54	2	5.56	0	0.00
TOTAL	233	100	50	100.00	37	100.00	37	100.00	44.9	100.00	36	100.00	20	100.00

YALA SEASON

Size(acres)	All sample		Badulla		Nuwara eliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 0.250	27	11.89	4	8.16	17	48.57	1	2.08	0	0.00	3	4.05	1	14.29
0.250 - 0.500	33	14.54	14	28.57	4	11.43	1	2.08	5	20.83	14	18.92	5	71.43
0.500 - 0.750	66	29.07	15	30.61	3	8.57	12	25.00	8	33.33	7	9.46	1	14.29
0.750 - 1.000	18	7.93	4	8.16	5	14.29	0	0.00	2	8.33	10	13.51	0	0.00
1.000 - 1.250	46	20.26	11	22.45	5	14.29	13	27.08	4	16.67	6	8.11	0	0.00
1.250 - 1.500	3	1.32	0	0.00	0	0.00	1	2.08	2	8.33	2	2.70	0	0.00
1.500 - 1.750	10	4.41	1	2.04	0	0.00	4	8.33	1	4.17	1	1.35	0	0.00
1.750 - 2.000	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	2.70	0	0.00
OVER 2	24	10.57	0	0.00	1	2.86	16	33.33	2	8.33	29	39.19	0	0.00
TOTAL	227	100	49	100.00	35	100.00	48	100.00	24	100.00	74	100.00	7	100.00

Source : Survey data

Table 3.11 Ownership Pattern of Vegetable Plots

Type	Maha		Yala	
	No.	%	No.	%
Owner operator	218	56.19	223	61.60
Joint ownership	17	4.38	25	6.91
Lease	26	6.70	34	9.39
Tenant	22	5.67	40	11.05
Mortgage	1	0.26	2	0.55
LDO	88	22.68	21	5.80
Others	16	4.12	17	4.70
Total plots	388	100.00	362	100.00

MAHA SEASON

Type	Badulla		Nuwara Eliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Owner operator	69	67.65	41	77.36	33	67.35	32	31.07	21	40.38	22	75.86
Joint ownership	11	10.78	1	1.89	0	0.00	1	0.97	3	5.77	1	3.45
Lease	6	5.88	9	16.98	2	4.08	2	1.94	5	9.62	2	6.90
Tenant	10	9.80	1	1.89	1	2.04	2	1.94	4	7.69	4	13.79
Mortgage	1	0.98	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
LDO	3	2.94	0	0.00	12	24.49	66	64.08	7	13.46	0	0.00
Others	2	1.96	1	1.89	1	2.04	0	0.00	12	23.08	0	0.00
Total plots	102	100.00	53	100.00	49	100.00	103	100.00	52	100.00	29	100.00

YALA SEASON

Type	Badulla		Nuwara Eliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Owner operator	67	70.53	24	72.73	56	76.71	28	80.00	27	27.84	21	72.41
Joint ownership	9	9.47	0	0.00	0	0.00	3	8.57	12	12.37	1	3.45
Lease	5	5.26	7	21.21	3	4.11	3	8.57	12	12.37	4	13.79
Tenant	8	8.42	1	3.03	0	0.00	0	0.00	28	28.87	3	10.34
Mortgage	2	2.11	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
LDO	2	2.11	0	0.00	12	16.44	1	2.86	6	6.19	0	0.00
Others	2	2.11	1	3.03	2	2.74	0	0.00	12	12.37	0	0.00
Total plots	95	100.00	33	100.00	73	100.00	35	100.00	97	100.00	29	100.00

Source : Survey data

Table 3.12 Rotation of Crops

Respons	All sample		Badulla		N'eliya		Ku'gala		A'pura		Matale		Kandy	
	No.o.F.	%	No.o.F.	%	No.o.F.	%	No.o.F.	%	No.o.F.	%	No.o.F.	%	No.o.F.	%
Yes	238	86.55	47	90.38	45	90.00	34	75.56	46	86.79	44	86.27	22	91.67
No	37	13.45	5	9.62	5	10.00	11	24.44	7	13.21	7	13.73	2	8.33
Total	275	100.00	52	100.00	50	100.00	45	100.00	53	100.00	51	100.00	24	100.00

Source : Survey data

Table 3.13 Pattern of Cultivation

Respons	All sample		Badulla		N'eliya		Ku'gala		A'pura		Matale		Kandy	
	No.o.F.	%	No.o.F.	%	No.o.F.	%	No.o.F.	%	No.o.F.	%	No.o.F.	%	No.o.F.	%
Mono-cropping	156	50.16	25	46.30	20	38.46	20	40.00	56	71.79	20	39.22	15	57.69
Mixed-cropping	95	30.55	20	37.04	27	51.92	18	36.00	4	5.13	15	29.41	11	42.31
Multi-cropping	60	19.29	9	16.67	5	9.62	12	24.00	18	23.08	16	31.37	0	0.00
Total	311	100.00	54	100.00	52	100.00	50	100.00	78	100.00	51	100.00	26	100.00

Source : survey data

Table 3.14 Source of Water

MAHA SEASON

Type of water supply	All sample		Number of plots: Badulla		N' Eliya		Ku'gala		A'pura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Major irrigation	36	9.30	17	16.83	1	1.89	0	0.00	9	8.74	9	17.31	0	0.00
Minor irrigation	69	17.83	39	38.61	13	24.53	7	14.29	0	0.00	2	3.85	8	27.59
Rainfed	173	44.70	37	36.63	7	13.21	12	24.49	92	89.32	25	48.08	0	0.00
Water pump	69	17.83	7	6.93	24	45.28	22	44.90	0	0.00	16	30.77	0	0.00
Agro well	16	4.13	0	0.00	6	11.32	8	16.33	2	1.94	0	0.00	0	0.00
Others	24	6.20	1	0.99	2	3.77	0	0.00	0	0.00	0	0.00	21	72.41
Total	387	100	101	100.00	53	100.00	49	100.00	103	100.00	52	100.00	29	100.00

YALA SEASON

Type of water supply	All sample		Number of plots: Badulla		N' Eliya		Ku'gala		A'pura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Major irrigation	29	7.99	24	24.74	1	3.03	0	0.00	0	0.00	4	4.17	0	0.00
Minor irrigation	70	19.28	39	40.21	6	18.18	2	2.74	2	5.71	11	11.46	10	34.48
Rainfed	100	27.55	23	23.71	4	12.12	15	20.55	8	22.86	50	52.08	19	65.52
Water pump	92	25.34	3	3.09	18	54.55	40	54.79	0	0.00	31	32.29	0	0.00
Agro well	44	12.12	1	1.03	3	9.09	15	20.55	25	71.43	0	0.00	0	0.00
Others	28	7.71	7	7.22	1	3.03	1	1.37	0	0.00	0	0.00	0	0.00
Total	363	100	97	100.00	33	100.00	73	100.00	35	100.00	96	100.00	29	100.00

Source : Survey data

Table 3.15 Source of Seed Supply

Source	Potatoes		Beans		Cabbage		Carrot		Leeks		Raddish		Tomatoes		Beetroot		Capsicum	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Own seeds	11	12.09	45	58.44	2	3.23	1	2.94	1	5.26	1	6.67	10	15.15	0	0.00	0	0.00
Purchased in the market	31	34.07	24	31.17	53	85.48	33	97.06	18	94.74	14	93.33	28	42.42	44	97.78	11	84.62
Dept. of Agri.\Agrarian services	48	52.75	8	10.39	6	9.68	0	0.00	0	0.00	0	0.00	28	42.42	0	0.00	1	7.69
Purchased from a farmer on cash	0	0.00	0	0.00	1	1.61	0	0.00	0	0.00	0	0.00	0	0.00	1	2.22	1	7.69
Purchased from a farmer on credit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Exchange through farmer	1	1.10	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Others	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	91	100	77	100	62	100	34	100	19	100	15	100	66	100	45	100	13	100

Source	Pumpkin		Cucumber		Luffa		Long beans		Ladies fingers		Bitter gourd		Brinjals		G.chillies		Snake gourd	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Own seeds	28	100.00	6	66.67	20	47.62	21	84.00	9	18.00	11	39.29	43	89.58	23	54.76	16	66.67
Purchased in the market	0	0.00	2	22.22	9	21.43	1	4.00	19	38.00	3	10.71	2	4.17	12	28.57	5	20.83
Dept. of Agri.\Agrarian services	0	0.00	1	11.11	11	26.19	3	12.00	21	42.00	13	46.43	2	4.17	7	16.67	2	8.33
Purchased from a farmer on cash	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Purchased from a farmer on credit	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Exchange through farmer	0	0.00	0	0.00	1	2.38	0	0.00	0	0.00	1	3.57	1	2.08	0	0.00	1	4.17
Others	0	0.00	0	0.00	1	2.38	0	0.00	1	2.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	28	100	9	100	42	100	25	100	50	100	28	100	48	100	42	100	24	100

Source : Survey data

Table 3.16 Type of Payment for Seeds

Crop	On cash		On credit		Exchange		Other		Total
	No.	%	No.	%	No.	%	No.	%	
Potatoes	76	83.52	5	5.49	0	0.00	10	10.99	91
Beans	34	44.74	1	1.32	0	0.00	41	53.95	76
Cabbage	59	95.16	2	3.23	0	0.00	1	1.61	62
Carrot	32	94.12	2	5.88	0	0.00	0	0.00	34
Leeks	17	89.47	1	5.26	0	0.00	1	5.26	19
Tomatoes	55	83.33	1	1.52	0	0.00	10	15.15	66
Beetroot	43	95.56	1	2.22	0	0.00	1	2.22	45
Luffa	21	50.00	1	2.38	1	2.38	19	45.24	42
Ladies fingers	42	84.00	1	2.00	0	0.00	7	14.00	50
Bitter gourd	16	57.14	0	0.00	0	0.00	12	42.86	28
Brinjals	5	10.42	0	0.00	1	2.08	42	87.50	48
Green chillies	17	40.48	3	7.14	0	0.00	22	52.38	42

Source : survey data

Table 3.17 Fertilizer Use by Crops

Crop	Chemical only		Carbonic only		Both		Total
	No.	%	No.	%	No.	%	
Potatoes	23	26.14	0	0.00	65	73.86	88
Beans	40	54.05	1	1.35	33	44.59	74
Cabbage	18	31.03	1	1.72	39	67.24	58
Carrot	3	9.38	0	0.00	29	90.62	32
Leeks	2	11.76	0	0.00	15	88.24	17
Tomatoes	39	60.94	1	1.56	24	37.50	64
Beetroot	20	47.62	0	0.00	22	52.38	42
Luffa	18	85.71	1	4.76	2	9.52	21
Long beans	9	90.00	0	0.00	1	10.00	10
Ladies fingers	20	95.24	0	0.00	1	4.76	21
Bitter gourd	22	81.48	0	0.00	5	18.52	27
Brinjals	38	82.61	0	0.00	8	17.39	46
Green chillies	34	89.47	0	0.00	4	10.53	38
Capsicum	15	88.24	0	0.00	2	11.76	17

Source : Survey data

Table 3.18 Source of Supply of Fertilizer

(a) Chemical Fertilizer

Source	All sample		Badulla		N' eliya		K' gala		A'pura		Matale		Kandy	
	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%
Trader pur. crops	36	13.53	4	7.69	6	12.00	2	4.17	4	9.76	20	40.00	0	0.00
Other traders	186	69.9 2	47	90.38	44	88.00	39	81.25	33	80.49	11	22.00	12	48.00
A.S.C.	29	10.90	0	0.00	0	0.00	1	2.08	0	0.00	19	38.00	9	36.00
Other farmer	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Others	15	5.64	1	1.92	0	0.00	6	12.50	4	9.76	0	0.00	4	16.00
Total	266	100.00	52	100.00	50	100.00	48	100.00	41	100.00	50	100.00	25	100.00

(b). Organic Fertilizer

Source	All sample		Badulla		N' eliya		K' gala		A'pura		Matale		Kandy	
	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%
Own fer.	22	21.78	5	22.73	5	10.42	2	100.00	3	50.00	0	0.00	7	36.84
Bought	79	78.22	17	77.27	43	89.58	0	0.00	3	50.00	4	100.00	12	63.16
Exchange	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	101	100.00	22	100.00	48	100.00	2	100.00	6	100.00	4	100.00	19	100.00

Source : Survey data

Table 3.19 Type of Payments for Fertilizer

(a) Chemical Fertilizer

Source	All sample		Badulla		N' Eliya		K' gala		A'pura		Matale		Kandy	
	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%
On cash	220	82.71	45	86.54	45	90.00	45	93.75	37	90.24	28	56.00	20	80.00
On credit	46	17.29	7	13.46	5	10.00	3	6.25	4	9.76	22	44.00	5	20.00
Exchange	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	266	100.00	52	100.00	50	100.00	48	100.00	41	100.00	50	100.00	25	100.00

(b) Organic Fertilizer

Type	All sample		Badulla		N' Eliya		K' gala		A'pura		Matale		Kandy	
	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%
On cash	78	77.23	16	72.73	41	85.42	1	50.00	4	80.00	4	100.00	12	63.16
On credit	8	7.92	1	4.55	6	12.50	1	50.00	0	0.00	0	0.00	0	0.00
Exchange	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Other	15	14.85	5	22.73	1	2.08	0	0.00	1	20.00	0	0.00	7	36.84
Total	101	100.00	22	100.00	48	100.00	2	100.00	5	100.00	4	100.00	19	100.00

Source : Survey data

Table 3.20 Source of Obtaining Agro Chemicals

Source	All sample		Badulla		Nuwara Eliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Trader purchase products	26	9.63	3	5.77	2	4.00	1	2.08	3	7.14	17	33.33	0	0.00
Other traders	221	81.85	48	92.31	48	96.00	44	91.67	37	88.10	22	43.14	20	80.00
Purchased by a farmer	1	0.37	0	0.00	0	0.00	0	0.00	0	0.00	1	1.96	0	0.00
Agrarian services centre	18	6.67	1	1.92	0	0.00	1	2.08	0	0.00	11	21.57	5	20.00
Burrowed from a farmer	1	0.37	0	0.00	0	0.00	0	0.00	1	2.38	0	0.00	0	0.00
Exchange	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Other	3	1.11	0	0.00	0	0.00	2	4.17	1	2.38	0	0.00	0	0.00
Total	270	100.00	52	100.00	50	100.00	48	100.00	42	100.00	51	100.00	25	100.00

Source : Survey data

Table 3.21 Type of Payment for Agro Chemicals

Type	All sample		Badulla		Nuwara Eliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%
On cash	225	83.33	45	84.91	43	86.00	47	95.92	33	78.57	33	64.71	24	96.00
On credit	45	16.67	8	15.09	7	14.00	2	4.08	9	21.43	18	35.29	1	4.00
Exchange	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	270	100.00	53	100.00	50	100.00	49	100.00	42	100.00	51	100.00	25	100.00

source : Survey data

Table 3.22 Use of Labour

Type	All sample		Badulla		N' eliya		K' gala		A'pura		Matale		Kandy	
	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%	No.o.f.	%
On cash	225	83.33	45	84.91	43	86.00	47	95.92	33	78.57	33	64.71	24	96.00
On credit	45	16.67	8	15.09	7	14.00	2	4.08	9	21.43	18	35.29	1	4.00
Exchange	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	270	100.00	53	100.00	50	100.00	49	100.00	42	100.00	51	100.00	25	100.00

Source : Survey data

Table 3.23 Labour Use by Operations

Operation	All Sample		Badulla		N' Eliya		K' gala		A'pura		Matale		Kandy	
	F.L. %	H.L. %	F.L. %	H.L. %	F.L. %	H.L. %	F.L. %	H.L. %	F.L. %	H.L. %	F.L. %	H.L. %	F.L. %	H.L %
Land preperation	43	57	41	59	35	65	52	48	51	49	41	59	31	69
Planting/ sowing	55	45	63	37	53	47	63	37	51	49	47	53	47	53
Fertilizing	73	27	82	18	55	45	77	23	75	25	67	33	87	13
Insecticide spray	81	19	82	18	80	20	80	20	85	15	75	25	88	12
Weeding	58	42	75	25	55	45	61	39	49	51	50	50	59	41
Maintanance	87	13	89	11	84	16	89	11	90	10	82	18	89	11
Harvesting	51	49	51	49	41	59	64	36	49	51	47	53	57	43
Others	75	25	78	22	69	31	80	20	84	16	71	29	62	38

Source : Survey data

Table 3.24 Source of Credit

Source	All sample		Badulla		N'eliya		K'gala		A'pura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cooperative banks	26	11.93	3	6.38	1	2.63	15	40.54	1	2.63	1	2.22	5	38.46
Government banks	72	33.03	12	25.53	24	63.16	5	13.51	21	55.26	8	17.78	2	15.38
Money lender	10	4.59	4	8.51	3	7.89	0	0.00	1	2.63	2	4.44	0	0.00
Trader	56	25.69	17	36.17	2	5.26	8	21.62	2	5.26	26	57.78	1	7.69
Relations / Friends	45	20.64	10	21.28	6	15.79	7	18.92	12	31.58	7	15.56	3	23.08
Others	9	4.13	1	2.13	2	5.26	2	5.41	1	2.63	1	2.22	2	15.38
Total	218	100.00	47	100.00	38	100.00	37	100.00	38	100.00	45	100.00	13	100.00

Source : Survey data

Table 3.25 Yield Variation Over Time

Crop	Districts	Minimum yield	Maximum yield	Average yield
Potatoes	Badulla	1738.35	6265.15	3769.07
	Nuwara Eliya	2148.11	9043.24	6485.74
Beans	Badulla	1849.83	4422.00	3179.01
	Kandy	1118.42	3494.15	2295.32
Cabbage	Badulla	1583.07	10673.98	8173.98
	Nuwara Eliya	2683.33	7833.33	7083.33
	Kandy	1061.32	4980.35	4689.12
Carrot	Nuwara Eliya	2337.21	8786.34	8197.67
Leeks	Nuwara Eliya	6574.34	17857.14	8775.51
Tomatoes	Badulla	3661.91	9032.59	7403.26
	Matale	1402.19	6923.36	6406.54
	Kandy	653.32	4676.32	3177.17
Beetroot	Nuwara Eliya	5950.78	18549.22	12227.98
	Kurunegala	1851.20	12320.00	4688.00
Luffa	Anuradhapura	1209.47	4071.58	1333.33
Long beans	Kurunegala	488.28	2041.38	1468.97
Ladies fingers	Anuradhapura	1501.07	5155.75	1109.51
	Matale	795.86	4497.04	4644.97
Bitter gourd	Matale	2976.19	7710.15	7023.11
Brinjals	Anuradhapura	1757.96	6471.15	5705.96
Snake gourd	Kurunegala	6160.00	28000.00	16960.00
	Matale	3250.00	11000.00	10200.00

Source : Survey data

Table 3.26 Production Problems Reported by Farmers

Problems	No of farmers	% *
High input cost	165	92.18
Lack of financing	111	62.01
Lack of water	100	55.87
Difficulties in obtaining seeds	89	49.72
Poor extension service	62	34.64

* Percentage of the farmers who reported problems (179)
Source : Survey data

Tab le 4.1 Markatable Surplus of Selected Vegetables

Crop	Own consumption %	Retained for seeds %	Payments in kind %	Wastage at farm level %	Marketable surplus %
Potatoes	2	7	1	4	86
Beans	2	4	1	4	89
Cabbage	1	0	1	6	92
Tomatoes	2	1	1	8	88
Pumpkin	3	2	1	4	90
Beetroot	1	0	1	3	95
Luffa	1	1	1	5	92
Long beans	2	2	1	4	91
Ladies fingers	1	1	1	5	92
Bitter gourd	1	2	1	5	91
Brinjals	1	1	1	8	89
Green chillies	2	0	1	3	94
Snake gourd	1	2	1	6	90
Average	1.54	1.77	1.00	5.00	90.69

Source : Survey data

Table 4.2 Marketing Outlets

Market outlet	All sample		Badulla		Nuwaraeliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Manning market	42	16.03	27	51.92	9	18.00	4	8.16	1	2.86	1	1.96	0	0.00
Kandy market	27	10.31	0	0.00	2	4.00	0	0.00	0	0.00	0	0.00	25	100.00
Rural collector	133	50.76	15	28.85	31	62.00	30	61.22	12	34.29	45	88.24	0	0.00
Outside collector	41	15.65	10	19.23	6	12.00	4	8.16	19	54.29	2	3.92	0	0.00
Village boutique	6	2.29	0	0.00	0	0.00	1	2.04	2	5.71	3	5.88	0	0.00
Purchasing centers	1	0.38	0	0.00	1	2.00	0	0.00	0	0.00	0	0.00	0	0.00
Cooperatives	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Farmer organizations	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Fairs	10	3.82	0	0.00	0	0.00	9	18.37	1	2.86	0	0.00	0	0.00
Trader (agreement)	2	0.76	0	0.00	1	2.00	1	2.04	0	0.00	0	0.00	0	0.00
Others	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	262	100.00	52	100.00	50	100.00	49	100.00	35	100.00	51	100.00	25	100.00

Source : Survey data

Table 4.3 Source of Market Information

Market outlet	All sample		Badulla		Nuwaraeliya		Kurunegala		Anuradhapura		Matale		Kandy	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Wholesale market	57	20.28	17	32.69	12	24.00	5	10.20	2	3.39	1	2.27	20	74.07
Rural collector	83	29.54	8	15.38	16	32.00	13	26.53	21	35.59	24	54.55	1	3.70
Outside collector	36	12.81	3	5.77	7	14.00	3	6.12	16	27.12	5	11.36	2	7.41
Village boutique	5	1.78	0	0.00	1	2.00	2	4.08	2	3.39	0	0.00	0	0.00
Purchasing centers	4	1.42	0	0.00	2	4.00	2	4.08	0	0.00	0	0.00	0	0.00
Cooperatives	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Farmer organization	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Fair	27	9.61	12	23.08	0	0.00	14	28.57	1	1.69	0	0.00	0	0.00
News paper / Radio	5	1.78	0	0.00	0	0.00	1	2.04	2	3.39	2	4.55	0	0.00
Other farmers	58	20.64	11	21.15	8	16.00	9	18.37	14	23.73	12	27.27	4	14.81
Others	6	2.14	1	1.92	4	8.00	0	0.00	1	1.69	0	0.00	0	0.00
Total	281	100.00	52	100.00	50	100.00	49	100.00	59	100.00	44	100.00	27	100.00

Source : Survey data

Table 4.4 Marketing Problems Reported by Farmers

Problems	No. of farmers	% *
Unreasonable price	141	78.77
Poor road facilities	90	50.28
Malpractices in purchasing	51	28.49
Dificulty in selling	47	26.26
Price fluctuation	47	26.26

* Percentage of the farmers who reported problems (179)

Source : Survey data

ANNEXURE ONE

STATEMENT OF FINANCEING

A. Original Allocation

Item	Rs. 1993	1994
Contractual Staff	0	120,00
Expendable Supplies	0	20,000
Travel and Subsistence	1000	323,750
Other	0	53,000
Contingencies	0	61,675
Total	1000	578,425

B. Revised Allocation for 1994

Item	Rs.
Contractual Staff	120,000
Expendable Supplies	14,000
Travel and Subsistence	296,625
Other	37,100
Contingencies	46,773
Total	514,498