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CEREALS CONSUMPTION IN SRI LANKA



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CEREALS CONSUMPTION IN SRI LANKA

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This report presents the findings and recommendations of an independent specialist. It does not necessarily represent the official views of the Government of Sri Lanka or the Agency for International Development.

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EXECUTIVE SUMMARY

The purpose of this study is to undertake an analysis of cereal production, imports, and consumption, to determine how wheat (an imported commodity) relates to domestically-produced cereals in terms of price elasticities and other relevant economic coefficients; and to illustrate how free open-market operations in wheat and wheat flour could affect a domestically-produced crop such as rice.

Surveys conducted by the Statistics Department of the Central Bank of Sri Lanka (SD/CD) and the Department of Census and Statistics (DCS) of the Ministry of Policy Planning and Implementation were utilized for determination of consumption patterns and trends. These surveys are denoted throughout the report by time period. The time periods for the surveys and the responsible agencies are:

1969/70 Survey	Department of Census and Statistics
1973 Survey	Statistics Department
1978/79 Survey	Statistics Department
1980/81 Survey	Department of Census and Statistics
1981/81 Survey	Statistics Department
1985/86 Survey	Department of Census and Statistics
1986/87 Survey	Statistics Department
1990/91 Survey	Department of Census and Statistics

Consumption of Cereals

Rice and wheat-based products provide over 50.0% of calorie and protein intake in the diet, for less than 30.0% of the food budget. These staples have a strong income elasticity in low-income groups as they are major items in the diet. Per capita consumption for both rice and wheat-based foods have trended upward over time, with different wheat-based foods accounting for significant differences in diet among the population. Per capita consumption for cereals, as per surveys conducted over the last 20 years is as follows:

	<u>69/70</u>	<u>73</u>	<u>78/79</u>	<u>80/81</u>	<u>81/82</u>	<u>85/86</u>	<u>86/87</u>	<u>90/91</u>
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National

Rice	95.01	86.79	90.93	109.65	101.24	106.35	103.65	109.71
Wheat Flour	15.14	17.43	16.66	8.47	10.65	9.41	8.81	6.37
Bread	20.20	17.26	23.16	18.35	18.22	21.88	22.52	23.51
Wheat*	31.18	31.41	34.77	23.22	27.60	28.93	28.77	30.13
Wheat & Rice	126.18	118.20	125.70	132.87	128.84	135.28	132.42	139.84

*All wheat flour for flour, bread, and flour preparations and products.

In the consumption data, wheat is not substitutable for rice. Wheat is a secondary cereal product in the consumption pattern, which is in strong demand in the low-income groups. The recent tendency to limited shifts between rice and bread at higher income levels is a result of preference and convenience, which can be afforded at these income levels.

The statement of work requests the determination of which income group and sector is the largest consumer of wheat and rice. There is no one sector which neatly fits the category of being the major or largest consumer of either rice or wheat-based products. It all depends on the definition which is established for major or largest consumer. Also, the difference among the types of wheat-based foods and their uses by sector almost precludes establishing a single largest consumer category. The following table ranks the sectors from high to low by different categorizations.

Commodity/ Rank	Expenditure Percentage	Per Capita Consumption	Total Consumption	Low-Income	Low-Income
				Household Total Consumption	Household Per Capita Consumption
Rice	1	Rural	Estate	Rural	Estate
	2	Estate	Rural	Urban	Rural
	3	Urban	Urban	Estate	Urban
Wheat- Based Products	1	Estate	Estate	Rural	Urban
	2	Urban	Urban	Urban	Rural
	3	Rural	Rural	Estate	Estate

For wheat-based products expenditures, the ranking shifts between bread, wheat flour, and flour preparations and other products consumption. In the case of bread, the ranking is (1) urban, (2) rural, and (3) estate. In the case of wheat flour, it is (1) estate, (2) rural, and (3) urban. For flour preparations and other flour products, the ranking is (1) rural, (2) estate, and (3) urban.

The same is true for per capita consumption. In the case of flour, it is (1) estate, (2) urban, and (3) rural. In the case of bread, it is (1) urban, (2) rural, and (3) estate.

There has been a change in how wheat flour is consumed by the Sri Lankan customer. The change in final flour utilization between 1969/70 and 1990/91 is as follows:

Wheat Flour Utilization as a Percent of Total Consumption

	<u>1969/70</u>	<u>1990/91</u>
Wheat Flour in the Home	48.6%	24.9%
Wheat Flour in Bread	45.4%	46.7%
Wheat Flour in All Other Products	6.0%	28.5%
Total Wheat Flour	100.0%	100.0%

The percentage of wheat flour used in bread production has remained stable over time. However, the use of wheat flour in the home has declined to less than 25.0% of flour usage, while flour used in other product preparation has increased by a magnitude of four.

Government and Private-Sector Roles

Governmental intervention in domestic rough rice markets is currently minimal. Consequently, domestic rice marketing is entirely conducted by private-sector enterprises. The conduct of the private-sector rice market system is characterized by the atomistic nature of the market. There are many producers, assemblers, millers, wholesalers, and retailers. This provides for a competitive market system which is evidenced by marketing margins which are only in the range of 25.0% - 30.0%. However, the government still has control of the rice imports through use of a system of bonded warehouse storage for rice importation.

The importation of wheat for milling, the importation of flour, and the distribution of locally-milled and imported flour has been, and still is, a government monopoly. This monopoly is conducted by two government agencies: Cooperative Wholesale Establishment (CWE) and the Food Commissioners Department (FCD). There is a slight mixture of private-sector activity in the system. Prima Ceylon Ltd, the miller of wheat under contract, is a private company. FCD hires private-sector transport firms to move flour from the mill to storage. Besides the private-sector retailers, bakeries, hotels, and restaurants who are either final retailer or product users, there is no current evidence to imply that any other private-sector firms are participating in the distribution channel.

Conclusions

The predominant findings in the analysis of consumption and availability of rice and wheat-based products are:

- Consumption of rice and wheat-based products is constrained by availability. All available supplies are consumed with minimal carryover of stocks from year-to-year.
- Different sectors of the population consume rice and wheat-based products in relatively different proportions in their diet.

<u>Sector</u>	<u>Percentage of Consumption</u>	
	<u>Rice</u>	<u>Total Wheat Flour</u>
National	78	22
Urban	69	31
Rural	82	18
Estate	66	34

- Per capita consumption for rice has increased over the long-term, while per capita consumption of total wheat flour has declined over the long-term.
- Per capita consumption for rice in the recent short-term has declined due to availability. Consequently, per capita consumption for total wheat flour has increased in the recent short-term.

- Per capita consumption for both rice plus total wheat flour has a slight growth rate of 0.2% annually over the long-term.
- Per capita consumption of wheat flour, and in some cases bread, is extremely high in the lowest income decile relative to higher income groups.
- The primary cereal is rice. The secondary cereal is wheat-based products. No evidence of substitutability of wheat-based products for rice could be generated. The primary difference in use is among population sectors and upper income levels.
- Development of price elasticities and consumption sensitivity to price is constrained by levels of availability (no surpluses, everything is consumed year-to-year except modest carryover stocks) and wheat flour prices which were fixed by government until late 1992.
- Consumption of rice (in general) is not price sensitive. The question is not "to buy or not to buy rice" based on price, but what type and quality given relative prices between types and grades.
- Consumption of total wheat flour appears to be slightly price sensitive. This must be qualified by the fact that prices were fixed by government until late 1992.
- Consumption of bread is not price sensitive.
- Consumption of wheat flour as flour used in the home is motivated by other considerations than price.
- Valid price cross elasticities of demand between rice and total wheat flour cannot be generated. The results are not rational and therefore not believable.
- The income response to cereals has been:
 - * Increased consumption of rice as incomes in general increase.
 - * Increased consumption of rice over increasing income segments until the highest segment is reached.
 - * Wheat flour used in the home is considered an inferior good in general. The usage of flour in the home declines as incomes increase.
 - * Increased consumption of bread as incomes increase.
- Cultivated rough rice area has declined 17.0% from its high in the mid-1980s. Rough rice yields reached a plateau in the mid-1980s and have stabilized at approximately 3,450 kg per ha. Consequently, production has declined to a current availability of about 86 kg per capita annually (milled rice equivalent).
- Importation of rice has averaged 160,000 mt per year over the past six years with an upward trend over that time period.

- Increased levels of importation of wheat to mill into flour are being used to supplement the cereal needs of the population. The importation of wheat rather than rice has had a positive influence on the balance of trade due to the relative import costs of nearly equal caloric content cereals.
- No valid relationship between the cultivated area for rough rice and producer price could be generated. No valid relationship between the cultivated area for rough rice and production margin (producer price less cost of production) could be determined. At best, price or production margins only explain 20.0% of any change in cultivated area of rough rice. No explanation can be derived for the reduction of cultivated area, and therefore production.
- No valid relationships between production of rice and either the importation of cereals or the price of wheat products could be established.
- There is a positive production margin (producer price less cost of production) per metric ton.
- The implication is the rough rice producer as a small-scale farmer is a price-taker. The only rationale for area decline is that it is a result of technical or social factors, or some combination of these factors.

Future Demand for Cereals

Three basic scenarios were utilized in projecting demand for rice and total wheat flour. The most viable scenario, presented below, incorporates the general consumption patterns for cereals as set forth in the various consumption studies. Therefore, it implicitly incorporates the elements of price and income demand.

Year	Per Capita				Wheat Requirement	
	Rice & Wheat Demand Kg	Available Domestic Rice Kg	Import Rice Kg	Required Wheat Flour Kg	Wheat Flour 1000 Mt	Wheat 1000 Mt
1993	139.0	94.5	10.9	33.6	591.601	799.461
1994	139.7	94.4	10.9	34.4	612.124	827.194
1995	140.5	94.3	11.0	35.2	632.814	855.155
1996	141.2	94.2	11.0	36.0	654.030	883.824
1997	142.0	93.9	11.2	36.8	677.004	914.870
1998	142.7	93.4	11.5	37.8	701.953	948.585
1999	143.5	92.9	11.8	38.7	727.281	982.812
2000	144.2	92.4	12.1	39.7	753.250	1,017.905

Impact of Liberalization of the Wheat/Wheat Flour System

To test how a shift in the price of wheat flour could affect wheat flour consumption, rice prices and consumption, and rice production, two basic scenarios were utilized. Scenario I involved a higher inbound price for wheat

flour. This addresses the question of what will occur if wheat flour prices increase. Scenario II involves a lower inbound price for wheat flour. This addresses the assumption often made by others that liberalization of the system implies lower flour costs and prices.

The analysis generated the following conclusions:

1. Wheat flour price shifts (either an increase or a decrease) will not affect consumption patterns for either wheat flour or rice.
2. The primary effect of wheat flour price increases or decreases is to change the relative prices of cereals in the market place. The change in the price of wheat flour will assist in increasing or decreasing the price of rice. However, a strict correlation between this relationship cannot be quantified.
3. No impact of wheat flour price increases or decreases can be generated for the consumption of wheat flour in the home or for bread consumption. Future historical trends will continue for these wheat-based products with little or no impact from price changes.
4. Wheat flour price shifts will have no impact on rice production. The shifts will have an impact on producer price, as relative cereal prices change in the market place. Since producer price only explains 20.0% of cultivated area shifts, other factors will be more dominant.
5. There is no evidence in any of the consumption patterns or prices that the pricing and consumption of wheat flour has been a disincentive on rice production in any manner.
6. The major question is what will be the landed cost of wheat flour, whether imported as wheat to mill or as wheat flour. The author believes that prices and costs relative to current operations will not decrease if current standards are maintained. However, if the market is thrown open to a "no holds barred" flour import program, prices and costs could well decline. Hence the assumptions and hypotheses set forth in developing the scenarios.

Impact on the Low-Income Consumer

The impact of price increase for the low-income consumer is a loss in purchasing power. The low-income consumer only has two options: increase percentage of food as percent of household expenditures (forgoing other purchases to buy food), or, decrease consumption. In 1990/91, the lowest 20.0% of the population spent 65.9% of total expenditures on food. With additional costs for cereals as presented in Scenario I under price liberalization, an 18.0% increase in wheat flour prices would increase this percentage to 69.4%. If a decrease in consumption is the only option, then rice and wheat flour consumption would decrease by 10.5% and 15.7%, respectively.

The impact of price decrease for the low-income consumer, as presented under Scenario II in price liberalization, is a gain in purchasing power. The low-

income consumer now has two positive options: increase cereals or other food consumption, or expend more on other items of necessity. Given the illustrated decrease of 9.0% in wheat flour price and if consumption patterns are maintained, food expenditures as a percent of total expenditure decline 1.6%. If consumption patterns are increased, rice and wheat flour consumption increase 5.2% and 9.2%, respectively. The major impact of wheat flour price on the low-income consumer is the landed cost of wheat or wheat flour.

The overall effect is that for every 10.0% shift in price of wheat flour, the low-income consumer's percentage of food expenditure to total expenditure will shift 2.0% in the same direction. Wheat flour prices were increased from Rs 10.95 to Rs 12.30 per kilogram (supply-station price) in June 1992. This was a 12.0% increase in price. This will shift the low-income consumer's percentage of food expenditures upward by slightly over 2.0%.

The low-income consumer in the lowest 20.0% income range represents one-half of all low-income consumers, based on the definition of low income as those who do not meet the required caloric intake. In comparing this category of consumer to all consumers, it is important to note that the average income for all consumers, and therefore, average expenditures, are weighted towards the low side of the income range. This is due to the fact that:

80.7% of income receivers in the urban sector have an average income less than the average for the urban sector;

63.2% of income receivers in the rural sector have an average income less than the average for the rural sector; and

54.3% of income receivers in the estate sector have an average income less than the average for the estate sector.

For every 10.0% shift in wheat flour price the average consumer will have a shift of 1.5% in food expenditures as a percent of total expenditures. The low-income consumer will have a shift of 2.0% in food expenditures as a percent of total expenditures. This may not seem like a great difference when percentages are compared. However, the price increase affects the 20.0% lowest-income group 33.0% more than the "average" consumer.

Nutrition and Macroeconomic Reforms

- Economic structural adjustment has not affected calorie and protein intake for the general population.
- There appears to be a widening disparity between the low-income consumer group and the total population in calorie intake. This would mean relatively poorer levels of nutrition. How this disparity ranged over the different income segments in the low-income population is unknown. Since the last detailed data set ends in 1986/87, over six years have passed during which little is known about consumption. There is no recent gauge for measuring the effect of the welfare programs which were put into place since that time to support low-income households.

SECTION I

INTRODUCTION

The Government of Sri Lanka (GSL) is currently examining prospects for liberalization of the wheat market, which is regulated and controlled by two state agencies: the Food Commissioners Department (FCD) and the Cooperative Wholesale Establishment (CWE). The purpose of this study is to undertake an analysis of cereal production, imports, and consumption, to determine how wheat (an imported commodity) relates to domestically-produced cereals in terms of price elasticities and other relevant economic coefficients; and to illustrate how free open-market operations in wheat and wheat flour could affect a domestically-produced crop such as rice.

Liberalization of the wheat market (imports, prices, storage, and distribution) could possibly cause a series of impacts on the system. Such impacts could occur in some type of a consecutive sequence, where the first impact would be shifts in wheat imports and prices, the second would be shifts in bread and wheat flour consumption rates, the third would be shifts in rice prices and consumption, the fourth would be shifts in rice production, and the fifth would be shifts in production of other commodities due to a shift in rice production. Little analytical work has been done in these areas, which is the reason for this study. The statement of work for this study is attached as Appendix I.

Data

Data for analysis were compiled from many sources. Data sets for the same commodity and item differ by source. Differences in data sets were reconciled or selection of data series accomplished based upon the most reliable data reference. The years 1965 through 1992 were selected as the time boundaries for data collection and analysis. This provided a 25-year period over which long-term changes in cereals production, availability, and consumption could be appraised. Reference and data sources are listed in Appendix II. Data sets are in Appendices III through X.

Consumption Data

Surveys conducted by the Statistics Department of the Central Bank of Sri Lanka (SD/CD) and the Department of Census and Statistics (DCS) of the Ministry of Policy Planning and Implementation were utilized for determination of consumption patterns and trends. These surveys are denoted throughout the report by time period. The time periods for the surveys and the responsible agencies are:

1969/70 Survey	Department of Census and Statistics
1973 Survey	Statistics Department
1978/79 Survey	Statistics Department
1980/81 Survey	Department of Census and Statistics
1981/81 Survey	Statistics Department
1985/86 Survey	Department of Census and Statistics
1986/87 Survey	Statistics Department
1990/91 Survey	Department of Census and Statistics

SECTION II

IMPORTANCE OF CEREALS IN DIET

Cereals consumed in Sri Lanka are rice, wheat, maize, millet, and sorghum. The primary cereals are rice and wheat. Household surveys reveal that rice and wheat products account for over 99.0% of cereals consumption. Consequently, only rice and wheat will be analyzed in this study.

Household surveys by SD/CD and DCS were used as the base for analyzing consumption of rice and wheat products. The household surveys of DCS were used as the base for analysis of expenditures and incomes. The purpose was to use a time series created by one organization beginning with liberalization in the economy in the early 1980s.

Wheat-Based Products

Wheat, after being milled into flour, is destined for use in five primary products: (1) direct flour use in the home, (2) production of bread, (3) production of special flour preparations, (4) production of pastries, and (5) production of noodles. Of these five products, direct flour use and bread have historically been the primary use of flour. Available consumption surveys always list flour and bread. In some cases, flour preparations and other products were listed. By sorting through various consumption surveys, a list of data on flour preparations and products was compiled. This was utilized as a base to construct a per capita consumption of a category called flour preparations and products, which contained items 3, 4, and 5 above.

There has been a change in how wheat flour is consumed in Sri Lanka. The change in final flour utilization between 1969/70 and 1990/91 is as follows:

Wheat Flour Utilization as a Percent of Total Consumption

	<u>1969/7</u>	<u>1990/91</u>
Wheat Flour in the Home	48.6%	24.9%
Wheat Flour in Bread	45.4%	46.7%
Wheat Flour in All Other Products	6.0%	28.5%
Total Wheat Flour	100.0%	100.0%

The percentage usage of wheat flour in bread production has remained stable over time. However, the use of wheat flour in the home has declined to less than 25.0% of flour usage, while flour used in other product preparation has increased by a magnitude of four.

Expenditures

Food costs are an important part of household expenditures for Sri Lankan consumers. As shown in Table 1 and Figure 1, food expenditures as a percent of total household expenditures declined from 65.0% in the 1980/81 period to slightly under 60.0% in the 1990/91 period. There was a sharp decline from

1980/81 to 1985/86 and a rise from 1985/86 to 1990/91. However, one sector experienced a more positive result than other sectors. The urban sector continued a decreasing percentage through all survey time periods. The sector that fared the worst was the rural sector, whose food expenditure percentage increased from 1985/85 to 1990/91 to a level nearly equal to the 1980/81 period.

Expenditures on rice and wheat flour as a percentage of total food expenditures are illustrated in Figure 2. Over the ten-year period, rice has declined from 31.5% to 22.4%, with wheat-based products declining from 8.0% to 6.9% of total food expenditures. This decline is not related to a decline in consumption of these items, as shown in Figure 3. These changes are due to growth in income and relative price changes between food items. Table 2 provides a complete detail of food items as a percent of total food budget. In the wheat-based foods category, expenditure on flour has declined, expenditure on bread has been more or less stable over time, and expenditure of other flour-based products has increased.

Expenditure on cereal products as a percentage of total food budget varies by population sector as shown in Table 3. The rural and estate sector are the largest spenders on rice. The estate sector is the largest spender on wheat flour, far above the rural and urban sectors. The urban sector is the largest spender on bread, with the rural sector slightly exceeding urban in the 1990/91 survey. The urban sector is the largest spender on flour preparations and other flour-based products with the rural sector again exceeding urban in the 1990/91 survey.

The household expenditure for rice and wheat-based products was deflated to a per capita basis to remove the household size bias. The per capita expenditures for rice as a percentage of total food expenditures are illustrated in Figure 4. There is a steady decline over time with the advantage belonging to the rural sector in terms of rate of decline.

The per capita expenditures for wheat-based products as a percentage of total food expenditures are shown in Figure 5. There is an increase in percentage of all groups between the 1980/81 and 1985/86 survey periods, and a decline thereafter. The increase in percentages can only be explained by the fact that the 1980/81 survey has a lower per capita consumption than any other survey point in time and flour prices were increased in the 1980s to cover all costs of import and distribution. When the 1980/81 survey of per capita consumption is compared to per capita availability, it is 5 kg less than per capita availability. Percentage increase in flour price during this time period is not above the trend in income, so price should have had a minor impact. The decline between the initial survey point and the last survey point gives the advantage to the urban sector in terms of rate of decline.

In terms of expenditure on cereals as a percent of total food expenditures, the sectors can be ranked (high to low) as follows:

	Household Ranking		
	1	2	3
Rice	Rural	Estate	Urban
Wheat Flour	Estate	Rural	Urban
Bread	Urban	Rural	Estate
Other Flour Use	Urban	Rural	Estate

	Per Capita Ranking		
	1	2	3
Rice	Rural	Estate	Urban
All Wheat Products	Estate	Urban	Rural

Per Capita Consumption

Although expenditures as a percent of food budget have declined for cereals, per capita consumption has increased over time. The per capita consumption patterns for national and sectors are provided in Table 4. Movements of consumption for different products have shifted over time, and at times seems to be erratic. A large portion of erratic consumption between different survey periods can be explained by availability of cereal products, or possibly in some cases, sampling errors (wheat flour in 1990/81 survey).

Patterns on a national basis are illustrated in Figure 6. The product labeled wheat is total wheat flour consumed in all wheat-based products. Per capita consumption of rice has increased at a rate of approximately 0.75% a year. Wheat flour consumption has declined through the entire time period. Per capita bread consumption was relatively flat during the 1970s and then began a growth of about 3.0% a year through the 1980s. Per capita consumption of all wheat-based products declined in the 1970s, but has increased throughout the 1980s at an annual rate of slightly under 1.0%. The most important number in Figure 6 is per capita rice and wheat-based products as total per capita cereals consumption. In the 20-year period there has been a steady increase in per capita consumption of about 0.5% per annum. It should also be noted that in periods when rice consumption decreased, consumption of wheat-based products increased.

Per capita consumption patterns for sectors are presented in Figures 7, 8, and 9. As compared to the national pattern, the urban sector has lower per capita rice consumption, lower per capita wheat flour consumption, and higher per capita bread consumption. The per capita consumption of all wheat-based products is higher than the national pattern. The trend for per capita cereal consumption as a total is flat.

The rural sector has higher per capita rice consumption, and lower per capita wheat flour, bread, and wheat-based products consumption than the national pattern. However, the growth trend in per capita rice and wheat products consumption is equal to the national consumption pattern.

The estate sector has a pattern of per capita rice consumption which was lower than the national pattern in the 1970s, but increased over the national pattern in the 1980s. Per capita wheat flour consumption is far higher than the national pattern. Per capita bread consumption is lower than the national but has been increasing at a growth rate of 5.0% a year. When compared to the declining rate of per capita wheat flour consumption, it appears that there is a product switch occurring in this sector. Total wheat-based product consumption is much higher than the national average. However, there is a slightly declining growth rate for wheat-based products. Per capita consumption of cereals in the estate sector is higher than any other sector. The growth rate over time slightly exceeds the national pattern. The ranking (high to low) of sectors by per capita consumption is as follows:

	Ranking		
	1	2	3
Rice	Rural	Estate	Urban
Wheat Flour	Estate	Rural	Urban
Bread	Urban	Rural	Estate
Wheat-based Products	Estate	Urban	Rural

Nutrition

Tables 5 and 6 are provided to illustrate the nutritional aspect of cereal consumption. Rice and wheat-based products provide 62.0% of caloric intake and 68.0% of protein intake according to Table 5. This high level of caloric and protein intake is provided by slightly less than 30.0% of family food expenditures. In Table 6 the results are 53.0% and 48.0% for caloric and protein intake, respectively.

According to food balance sheets, cereals provide well over one-half of caloric and protein intake in the Sri Lankan diet. Figure 10 provides an assessment of cereals importance in nutrition over time. While this data base is computed from food balance sheets, it reveals the nutritional limitations in the Sri Lankan diet for which cereals provide fulfillment.

Income Levels and Cereals Consumption

An analysis of per capita consumption by different monthly income levels was conducted on available data from SD/CD surveys. Comparing results across a 15-year time range was constrained by the different income groupings used in various surveys as well as the broad range of income segments.

To describe consumption shifts and the income elasticities, a series of points are utilized for income groups. These points are:

Point 1: The monthly income group containing the highest percentage of spending units¹ was categorized as follows:

¹A spending unit is defined by the surveys as a unit which carries out the spending activity. It may be a household or an individual.

1973 Survey - Rs 400
1978/79 Survey - Rs 600
1981/82 Survey - Rs 1000
1986/87 survey - Rs 1500

Point 2: Monthly income groups of Rs 3000 and above.

The surveys cover time periods when different levels of government intervention were in effect. The 1973 survey covers a period when rice and wheat flour were distributed under a subsidized allocation scheme. The 1978/79 survey was conducted immediately prior to the discontinuation of the subsidized allocation scheme. The final two surveys are after the discontinuation of the subsidized allocation scheme. All four surveys will be used to assess income effects on consumption at the national level.

National. Figures 11 through 14 depict national rice and wheat-based products per capita consumption by income level for the four survey periods.

Rice

The income elasticities, as well as the figures, reveal a fairly standard pattern of rice consumption over time across income groups. The demand for rice is quite strong until annual per capita consumption of 80 kg is achieved (income elasticities could not be generated, but graphic measurement put elasticities in a range well exceeding 1.0). For the income deciles between the 80 kg point and point 1, income generated demand is quite low, and consumption remains flat (elasticities less than 0.1). From point 1 to point 2, income generated demand increases sharply with elasticities being in the range of .10 to .30 for all survey periods. After point 2 there is a downturn in demand and elasticities become negative as if rice has become an inferior good at this income level. The lone exception to the above is the 1973 survey.

Wheat-Based Products

Wheat-based product demand for each of the survey periods is different in magnitude and movement. The general similarities are: (1) high demand in the lower income ranges (elasticities of .2 to over 1.0), and (2) a generally flat demand which does not increase until monthly income exceeds point 1. Beyond this point, the demand for flour declines and the demand for bread increases. The elasticities generated between point 1 and point 2 were of the order of .2 to .6. However, there were many elasticities which were negative. The elasticities for point 2 were negative for wheat flour (implying an inferior good at that income range) and high for bread (in the range of 1.0).

Sectors. For the urban, rural, and estate sectors, only the 1981/82 and 1986/87 surveys were used for assessment. This was to provide an assessment between survey periods when radical change would have less impact on consumption patterns.

Rice

Figure 15 depicts rice per capita consumption by sector and income level for the 1986/87 survey. Rice consumption in sectors follows the same basic pattern as the national pattern, except for the magnitude of consumption. After the initial surge of consumption demand, consumption rises very slowly to point 2 (elasticity range of .10 to .30). At point 2, rice consumption continued upwards in the 1981/82 survey, but in the 1986/87 survey it declined (negative elasticities) with the exception of the estate sector.

Wheat-Based Products

In consumption of wheat-based products, there is a large divergence among sectors from the national pattern of use. Figures 16 and 17 depict wheat flour and bread per capita consumption by sector and income group for the 1986/87 survey. In the case of flour, initial surges of demand are again evident in the low-income groups with high elasticities (.4 to 4.0 range). Then begins the divergence of the sectors, with the estate sector being the predominant per capita demand sector for flour. The elasticities range from .2 to 2.0 up to point 2, where consumption declines. In 1981/82, the urban and rural sectors have a slight increase of demand which extends beyond point 1 and then begins a decline. In 1986/87, there is a gradual increase in income demand from the low-income group point to point 2 (.15 to .25 income elasticity range) and then a decline in consumption at point 2 and beyond.

In the case of bread, there are strong income elasticities (.2 to 1.0) up to the Rs 400 income group. After this, each sector again follows a divergent path with the highest consumption level being the urban sector (elasticity range of .2 to .6). The rural sector follows a linear path upwards with an elasticity range of .15 to .30. The estate sector has an erratic consumption path with a wide range of elasticities until point 2. At this level, consumption increases dramatically. When compared against the flour, it appears that a trade-off between flour consumption and bread consumption is occurring in the Estate sector at a high income level.

Summary. Three results are evident. First, in terms of income, wheat is not substitutable for rice per se. It acts as a secondary cereal product in the consumption pattern. Second, in the low-income groups, wheat flour and bread act as substitutes for rice, either due to price or availability, or both, in the quest for food. Third, at high income levels, there is a tendency to substitute bread for rice. However, according to the elasticities this is not a +1:-1 ratio; it is more like a +1:-.25 ratio. At this level of income, preference and convenience factors are beginning to be a dominating consideration in consumption.

The best summation that can be made is to segregate the sectors, income groups, and products into high, medium, and low demand categories. This segregation is presented in Table 7. The high range is from .5 to over 1.0 elasticity, the medium range is .3 to .5, and the low range is less than .3. In an effort to confirm the ranking presented in Table 7, the 1980/81 DCS survey was analyzed by

expenditure segments.² Since there were 15 segments, the division between segments and consumption is more detailed. Consequently an improved set of income elasticities was generated. The data, elasticities, and related figures are attached in Table 10, and Figures A1 - A3, in Appendix III. Assuming that the expenditure segments represent a series of income levels, then the elasticities generated confirm the rankings of income-segment demand importance for rice and wheat-based products.

Low-Income Household Cereal Consumption

Given the immense surges of demand for cereal in lower-income segments, a comparison of consumption was made between low-income consumer per capita consumption and all consumer per capita consumption to try to compare the importance of cereals at low incomes to the consumption at all incomes. The results are presented in Table 8. The results present a very mixed relationship between low-income consumers and all consumers. Only three conclusions can be drawn from this exercise.

- The 1973 and 1978/79 surveys reveal that low-income consumers had an extremely high rate of cereal consumption compared to all consumers, given limited resources. During the 1980s, the difference between low income and all consumers begins to widen, especially by sector.
- The percentage of calories provided by cereals for the low-income consumer proportioned to the national calorie intake reveals that low-income consumers are more dependent on cereals for calorie requirements, hence the demand curves exhibited over income groups. Figure 18 illustrates this demand requirement. In only one of the survey periods is the low-income consumer below the all consumer category.
- The use of wheat-based products in the diet of low-income consumers has historically been higher than for the all consumer category. Figure 19 illustrates the differences over the four survey periods. The periods of 1981/82 and 1986/87 were times of high rice production. The periods also relate well to a rice/wheat flour price index. The index was very high (wide price spread between rice and wheat-based products) during 1973 (2.72) and 1978/79 (1.91, 1.44). The price index lowered dramatically in 1981/82 (1.11, 1.04) and 1986/87 (1.05, 1.07). There was a consequent decline in the consumption of wheat-based products. Low-income consumption dropped below the all consumer category, primarily because of the huge decline in consumption of flour in the household.

It is quite obvious that low-income consumers were performing rationally. They were using subsidized flour to meet food requirements at a lower price than rice.

Total Consumption by Sector

Total consumption is calculated using the 1990/91 survey per capita consumption data in Table 4. Two caveats are in order. First, rice consumption cannot be

²Division of total household expenditures into segments as presented in the survey.

matched with rice availability. Second, the percentage of low-income households using nutritional criteria from sources listed in Appendix II, had to be calculated for 1990/91. How close it is to being accurate is open to question. It certainly is not overstated.

Wheat-Based Products							
Consumption						Low-Income	
Population	Per Capita	Total	Total	Low Income	Low Income	Households	
1000s	Kg	1000 Mt	%	1000 Mt	%	% of Total	
Total	17,247	30.13	519.95	100.00	164.33	31.60	38.06
Urban	3,585	39.21	140.96	27.11	33.29	6.40	31.67
Rural	12,703	25.30	321.39	61.81	127.59	24.54	42.01
Estate	949	60.70	57.60	11.08	3.44	0.66	9.14

Rice							
Consumption						Low-Income	
Population	Per Capita	Total	Total	Low Income	Low Income	Households	
1000s	Kg	1000 Mt	%	1000 Mt	%	% of Total	
Total	17,247	109.71	1,914.75	100.00	670.55	35.02	38.06
Urban	3,585	88.24	317.22	16.57	74.93	3.91	31.67
Rural	12,703	116.75	1,483.08	77.46	588.78	30.75	42.01
Estate	949	120.60	114.45	5.98	6.84	0.36	9.14

Summary

First and foremost, consumption data in surveys provide a guide to how rice and wheat-based products are consumed by the different sectors and income segments composing the national population. There are many factors that the consumption data cannot define because the constraining factors are availability of cereals, relative fixed- and open-market prices at different times, and lack of income for a large portion of the population.

Rice and wheat-based products provide over 50.0% of calorie and protein intake in the diet, for less than 30.0% of the food budget. These staples have a strong income elasticity in low-income groups as they are major items in the diet. Per capita consumption of both rice and wheat-based foods has trended upward over time, with distinct wheat-based foods accounting for significant differences in diet among the population.

In the consumption data, wheat is not substitutable for rice. Wheat is a secondary cereal product in the consumption pattern, which is in strong demand in the low-income groups. The recent tendency to limited shifts between rice and bread at higher income levels is a result of preference and convenience, which can be afforded at these income levels.

The statement of work requests the determination of which income group and sector is the largest consumer of wheat and rice. There is no one sector which neatly fits the category of being the major or largest consumer of either rice or wheat-based products. It all depends on the definition which is established for the major or largest consumer. Also, the difference among the types of wheat-based

foods and their uses by sector almost precludes establishing a single largest consumer category. The following table ranks the sectors from high to low by different categorizations:

Commodity/ Rank	Expenditure Percentage*	Per Capita Consumption**	Total Consumption	Low-Income	Low-Income
				Household Total Consumption	Household Per Capita Consumption
Rice	1	Rural	Estate	Rural	Estate
	2	Estate	Rural	Urban	Rural
	3	Urban	Urban	Estate	Urban
Wheat- Based Products	1	Estate	Estate	Rural	Urban
	2	Urban	Urban	Urban	Rural
	3	Rural	Rural	Estate	Estate

* For wheat-based products the ranking shifts between bread, wheat flour and flour preparations, and other products consumption. In the case of bread, the ranking is (1) urban, (2) rural, and (3) estate. In the case of wheat flour, it is (1) estate, (2) rural, and (3) urban. For flour preparations and other flour products the ranking is (1) rural, (2) estate, and (3) urban.

** The same is true for per capita consumption. In the case of flour, it is (1) estate, (2) urban, and (3) rural. In the case of bread, it is (1) urban, (2) rural, and (3) estate.

TABLE 1
FOOD AS A PERCENTAGE OF TOTAL HOUSEHOLD EXPENDITURES

<u>Sector</u>	<u>1980/81</u>	<u>1985/86</u>	<u>1990/91</u>
National	65.0	53.9	59.2
Urban	58.4	48.9	47.1
Rural	66.0	55.6	63.9
Estate	71.9	56.3	59.2

Source: Household Income and Expenditure Survey, 1990/91
Labour Force and Socio-Economic Survey, 1985/86
Labour Force and Socio-Economic Survey, 1980/81

TABLE 2
PERCENTAGE EXPENDITURE ON FOOD ITEMS PER HOUSEHOLD
NATIONAL

<u>Item</u>	<u>Survey Period</u>		
	<u>1980/81</u>	<u>1985/86</u>	<u>1990/91</u>
Total Food and Drink	100.0	100.0	100.0
Rice	31.5	25.3	22.4
Wheat Flour	2.4	2.6	1.4
Bread	4.7	5.3	4.2
Flour Preparation*	0.9	1.0	1.3
Condiments	8.0	10.4	9.1
Pulses	2.4	3.6	4.4
Vegetables	7.5	9.9	8.8
Coconuts	8.2	5.9	8.6
Meat	1.8	2.5	3.1
Fish	4.9	5.0	5.1
Dried Fish	3.2	4.0	4.0
Milk	0.9	0.9	0.5
Milk Products	2.4	3.4	4.4
Eggs	0.8	0.9	1.1
Fruits	1.2	1.2	1.4
Sugar	7.8	6.3	6.2
Other	11.4	11.8	14.0

* Flour preparations and other flour-based products, calculated from expenditure lists.

Source: Household Income and Expenditure Survey 1990/91

TABLE 3

MONTHLY HOUSEHOLD FOOD EXPENDITURES SPENT ON CEREAL PRODUCTS
BY SECTOR

Sector/ Food	<u>1980/81</u> %	<u>1985/86</u> %	<u>1990/91</u> %
<u>National</u>			
Total Food	100.0	100.0	100.0
Rice	31.5	25.3	22.4
Flour	2.4	2.6	1.4
Bread	4.7	5.3	4.2
Flour P.*	0.5	1.0	1.3
Wheat**	7.6	8.9	7.0
<u>Urban</u>			
Total Food	100.0	100.0	100.0
Rice	23.1	18.5	17.6
Flour	1.6	1.5	0.8
Bread	7.5	7.1	3.4
Flour P.	0.7	1.7	0.8
Wheat	9.9	10.3	5.0
<u>Rural</u>			
Total Food	100.0	100.0	100.0
Rice	33.9	28.1	23.9
Flour	1.8	1.9	0.9
Bread	4.0	4.9	3.7
Flour P.	0.3	0.8	1.2
Wheat	6.0	7.7	5.7
<u>Estate</u>			
Total Food	100.0	100.0	100.0
Rice	33.5	25.4	23.6
Flour	12.0	14.2	8.6
Bread	2.4	2.0	2.7
Flour P.	0.1	0.5	0.9
Wheat	14.6	16.7	12.2

* Flour preparations and other products, calculated from expenditure lists.

** Total of wheat-based products consumed.

Source: Household Income and Expenditure Survey, 1990/91
Labour Force and Socio-Economic Survey, 1985/86
Labour Force and Socio-Economic Survey, 1980/81

TABLE 4
ANNUAL PER CAPITA CONSUMPTION
Kilograms

	Survey Period							
	69/70	73	78/79	80/81	81/82	85/86	86/87	90/91
<u>National</u>								
Rice	95.01	86.79	90.93	109.65	101.24	106.35	103.65	109.71
Wheat Flour	15.14	17.43	16.66	8.47	10.65	9.41	8.81	6.37
Bread	20.20	17.26	23.16	18.35	18.22	21.88	22.52	23.51
Wheat*	31.18	31.41	34.77	23.22	27.60	28.93	28.77	30.13
Wheat & Rice	126.18	118.20	125.70	132.87	128.84	135.28	132.42	139.84
<u>Urban</u>								
Rice	84.12	80.31	77.21	86.94	87.49	85.81	82.56	88.24
Wheat Flour	8.77	17.43	8.15	6.57	5.95	6.34	5.22	4.24
Bread	30.38	27.74	38.83	34.66	32.75	35.32	36.29	39.53
Wheat	31.93	38.75	37.23	32.73	33.08	35.26	34.82	39.21
Wheat & Rice	116.05	119.06	114.44	119.67	120.57	121.07	117.38	127.45
<u>Rural</u>								
Rice	97.19	88.09	95.93	114.35	104.63	111.06	107.60	116.75
Wheat Flour	14.05	12.68	10.23	6.35	6.81	6.35	5.22	4.00
Bread	20.20	16.00	21.80	15.06	15.45	18.82	20.51	20.00
Wheat	30.09	25.78	27.39	18.79	21.83	23.72	23.78	25.30
Wheat & Rice	127.27	113.87	123.32	133.14	126.46	134.78	131.38	142.05
<u>Estate</u>								
Rice	89.40	89.62	88.42	100.16	103.00	112.90	114.89	120.26
Wheat Flour	63.65	65.77	90.10	36.73	67.30	56.08	50.32	42.26
Bread	7.30	6.08	6.86	8.33	7.31	8.57	10.07	15.91
Wheat	70.65	71.93	96.80	44.46	76.62	66.28	61.57	60.70
Wheat & Rice	160.06	161.55	185.22	144.62	179.62	179.18	176.46	180.96

* All wheat flour for flour, bread, and flour preparations and products.

Source: Food and Nutrition Statistics, 1950-1990
 Labour Force and Socio-Economic Survey, 1980/81
 Labour Force and Socio-Economic Survey, 1985/86
 Household Income and Expenditure Survey, 1990/91
 Report on Consumer Finances and Socio Economic Survey, 1973 Sri Lanka
 Report on Consumer Finances and Socio Economic Survey, 1978/79 Sri Lanka
 Report on Consumer Finances and Socio Economic Survey, 1981/82 Sri Lanka
 Report on Consumer Finances and Socio Economic Survey, 1986/87 Sri Lanka

TABLE 5
CALORIC AND PROTEIN INTAKE BY FOOD PRODUCTS
HOUSEHOLD SURVEY 1990/91

Food Products	Calorie Intake (Kilocalories/Day)	Protein Intake (Grams/Day)
Rice	1,093	24
Wheat Flour/Flour Products	240	8
Pulses, Vegetable, Fruits, Nuts	390	8
Condiments	43	2
Animal Products	93	9
Sugar	157	0
All Other	<u>122</u>	<u>2</u>
Total	2,138	53

Source: Household Income and Expenditure Survey, 1990/91

TABLE 6
CALORIC AND PROTEIN INTAKE BY FOOD PRODUCTS
1990 FOOD BALANCE SHEET

Food Products	Calorie Intake (Kilocalories/Day)	Protein Intake (Grams/Day)
Rice	970	18
Wheat Flour/Flour Products	263	8
Pulses, Vegetable, Fruits, Nuts	479	13
Condiments	N/A	N/A
Animal Products	131	13
Sugar	258	0
All Other	<u>191</u>	<u>2</u>
Total	2,292	54

Source: Food Balance Sheet, 1990

TABLE 7
 INCOME DEMAND IMPORTANCE FOR RICE AND WHEAT-BASED PRODUCTS
 ACROSS INCOME GROUPS

Sector/ Food Item	Low Income	Average Income (Point 1)	High Income (Point 2)
<u>National</u>			
Rice	High	Medium	Medium
Wheat Flour	High	Low	Medium
Bread	High	Medium	High
<u>Urban</u>			
Rice	High	Medium	Medium
Wheat Flour	High	Low	Low
Bread	High	Medium	High
<u>Rural</u>			
Rice	High	High	High
Wheat Flour	High	Low	Low
Bread	High	Low	High
<u>Estate</u>			
Rice	High	Medium	Medium
Wheat Flour	High	High	Medium
Bread	High	Low	High

TABLE 8
LOW-INCOME CONSUMPTION PATTERNS

Survey/ Sector/ Consumer Segment*	Rice Annual Ave. Per Capita	Wheat Flour Annual Ave. Per Capita	Bread Annual Ave. Per Capita	Total Rice & Wheat	Cereal as a Percent of Caloric Intake			Wheat as a Percent of Cereal Consumption	Ave. Caloric Intake Per Day**
					All	Rice	Wheat		
<u>1973 Survey</u>									
<u>National</u>									
All	86.79	17.43	17.26	118.20	65.8	48.3	17.5	26.6	1,965
Low	79.58	17.53	15.52	109.89	65.4	47.4	18.1	27.6	1,836
<u>Urban</u>									
All	80.31	17.43	27.74	119.06	69.4	46.8	22.6	32.6	1,876
Low	90.11	17.27	23.40	125.68	78.2	56.1	22.1	28.3	1,756
<u>Rural</u>									
All	88.09	12.68	16.00	113.87	63.2	48.9	14.3	22.7	1,969
Low	78.42	13.04	15.27	107.07	57.5	43.3	14.2	24.6	1,978
<u>Estate</u>									
All	89.62	65.77	6.08	161.55	83.9	46.5	37.4	44.5	2,105
Low	84.70	66.26	4.87	156.29	81.9	44.4	37.5	45.8	2,085
<u>1978/79 Survey</u>									
<u>National</u>									
All	90.93	16.66	23.16	125.70	60.2	43.5	16.7	27.7	2,283
Low	83.92	18.26	22.96	120.17	59.9	41.9	18.1	30.2	2,192
<u>Urban</u>									
All	77.21	8.15	36.83	114.44	57.5	38.8	18.0	31.3	2,174
Low	73.99	6.12	35.56	106.92	58.7	40.6	18.1	30.8	1,991
<u>Rural</u>									
All	95.93	10.23	21.80	123.32	59.1	45.9	13.1	22.2	2,283
Low	64.02	7.58	16.23	84.88	42.0	31.7	10.3	24.6	2,210
<u>Estate</u>									
All	88.42	90.10	6.86	185.22	79.2	37.8	41.4	52.3	2,558
Low	85.09	87.28	8.27	180.08	78.7	37.2	41.5	52.7	2,500

TABLE 8 (Cont.)

Survey/ Sector/ Consumer Segment*	Rice Annual Ave. Per Capita	Wheat Flour Annual Ave. Per Capita	Bread Annual Ave. Per Capita	Total Rice & Wheat	Cereal as a Percent of Caloric Intake			Wheat as a Percent of Cereal Consumption	Ave. Caloric Intake Per Day**
					All	Rice	Wheat		
<u>1981/82 Survey</u>									
<u>National</u>									
All	101.24	10.65	18.22	128.84	62.0	48.7	13.3	21.4	2,271
Low	87.77	11.35	14.76	113.65	57.0	44.0	13.0	22.8	2,180
<u>Urban</u>									
All	87.49	5.95	32.75	120.57	60.9	44.2	16.7	27.4	2,162
Low	76.64	3.78	28.31	104.44	57.6	42.3	15.3	26.6	1,981
<u>Rural</u>									
All	104.63	6.81	15.45	126.46	60.9	50.4	10.5	17.3	2,271
Low	88.20	6.45	13.51	108.31	53.9	43.9	10.0	18.6	2,198
<u>Estate</u>									
All	103.00	67.30	7.31	179.62	77.2	44.3	32.5	42.7	2,544
Low	96.48	60.15	7.86	166.33	73.1	42.4	30.7	42.0	2,487
<u>1986/87 Survey</u>									
<u>National</u>									
All	103.65	8.81	22.52	132.42	68.0	53.2	14.8	21.7	2,179
Low	96.08	7.94	17.37	120.38	66.1	52.8	13.4	20.2	1,990
<u>Urban</u>									
All	82.56	5.22	36.29	117.38	63.4	44.6	18.8	29.7	2,023
Low	72.91	3.61	31.15	102.53	61.9	44.0	17.9	28.9	1,811
<u>Rural</u>									
All	107.60	5.22	20.51	131.38	67.6	55.4	12.2	18.1	2,125
Low	97.52	4.70	16.63	118.06	65.2	53.9	11.3	17.4	1,979
<u>Estate</u>									
All	114.89	50.32	10.07	176.46	77.2	50.3	26.9	34.9	2,498
Low	106.78	40.79	11.24	159.64	72.4	48.4	24.0	33.1	2,409

* Consumer segments for low income: 1973 (Rs -400 Per Month), 1978/79 (Rs -600 Per Month), 1981/82 (Rs 1000 Per Month), and 1986/87 (Rs 1500 Per Month).

** Caloric intake for all consumers national taken from reference sources.
Caloric intake for sectors and low income created by factors derived from reference sources.

Source: Report on Consumer Finances and Socio Economic Survey, 1973 Sri Lanka
Report on Consumer Finances and Socio Economic Survey, 1978/79 Sri Lanka
Report on Consumer Finances and Socio Economic Survey, 1981/82 Sri Lanka
Report on Consumer Finances and Socio Economic Survey, 1986/87 Sri Lanka

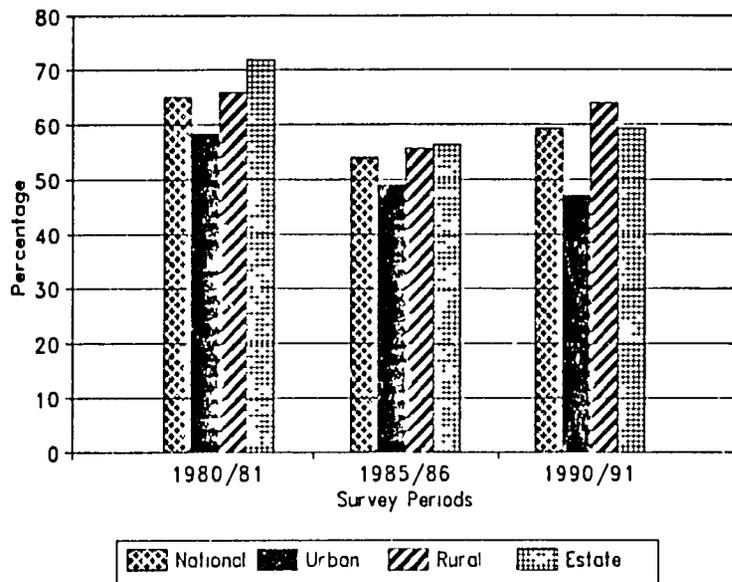


FIGURE 1. Food as a Percentage of Total Household Expenditures.

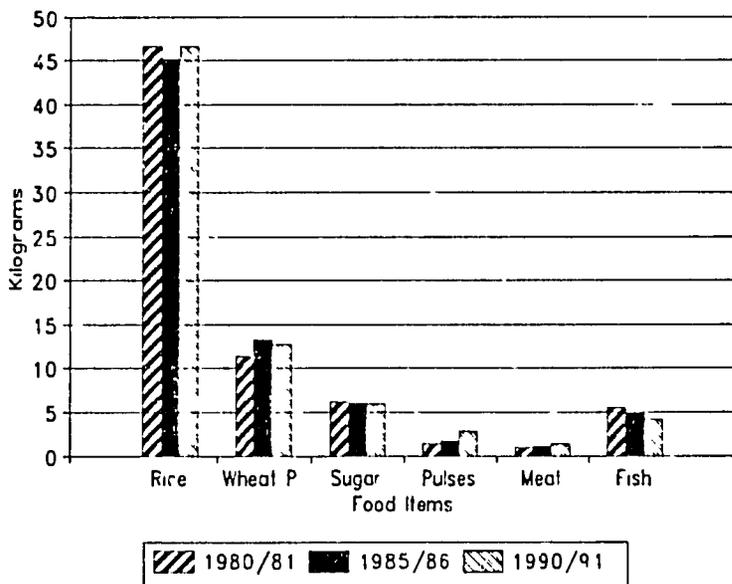


FIGURE 2. Expenditure on Selected Food Items as a Percent of Total Food Expenditures.

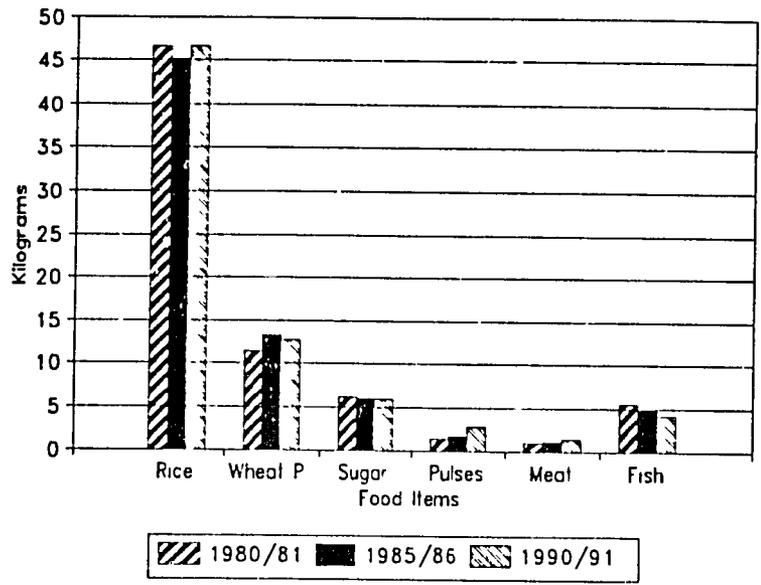


FIGURE 3. Household Consumption per Month, Selected Food Items.

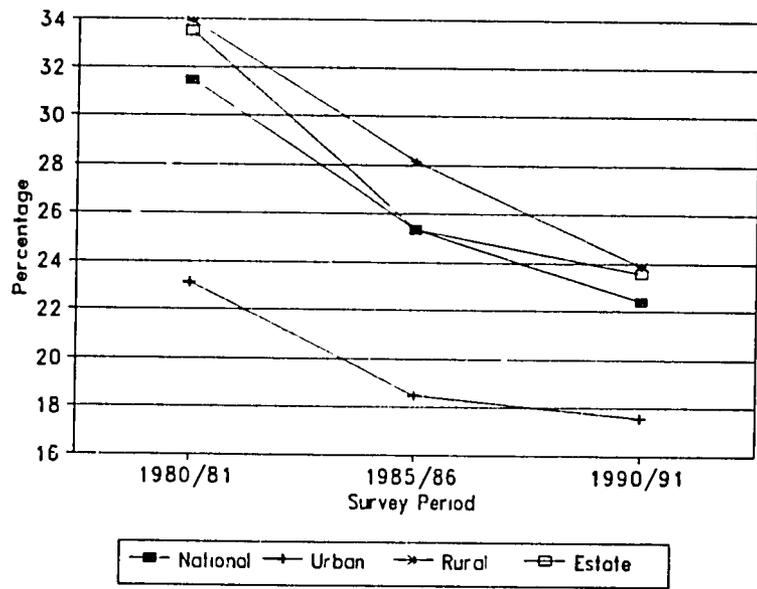


FIGURE 4. Per Capita Expenditure for Rice as a Percentage of Total Food Expenditures.

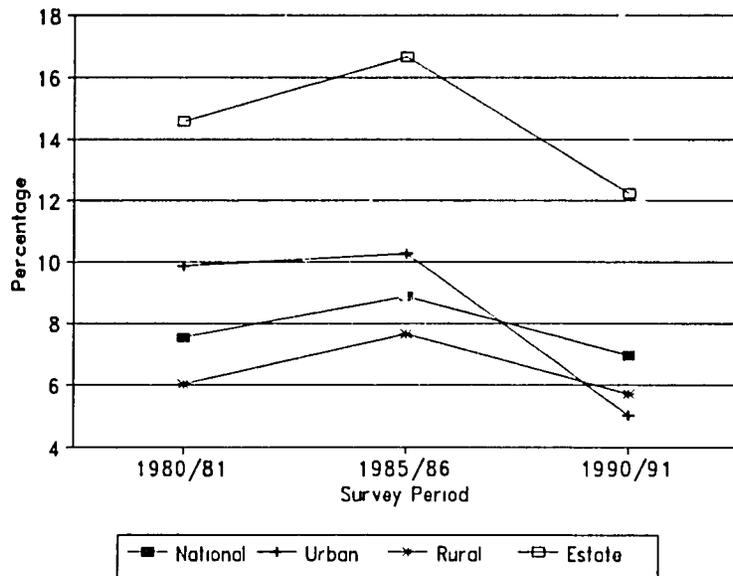


FIGURE 5. Per Capita Expenditure for Wheat-Based Products as a Percentage of Total Food Expenditures.

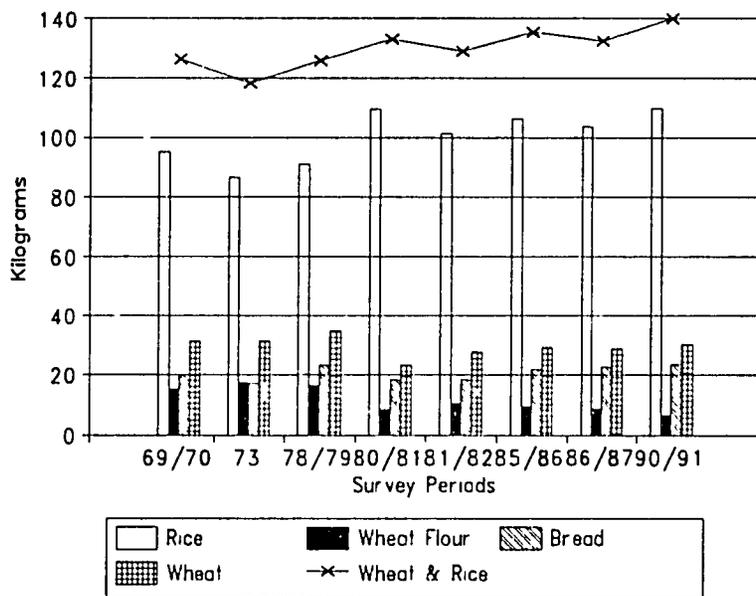


FIGURE 6. Annual Per Capita Consumption of Rice and Wheat-Based Products, National.

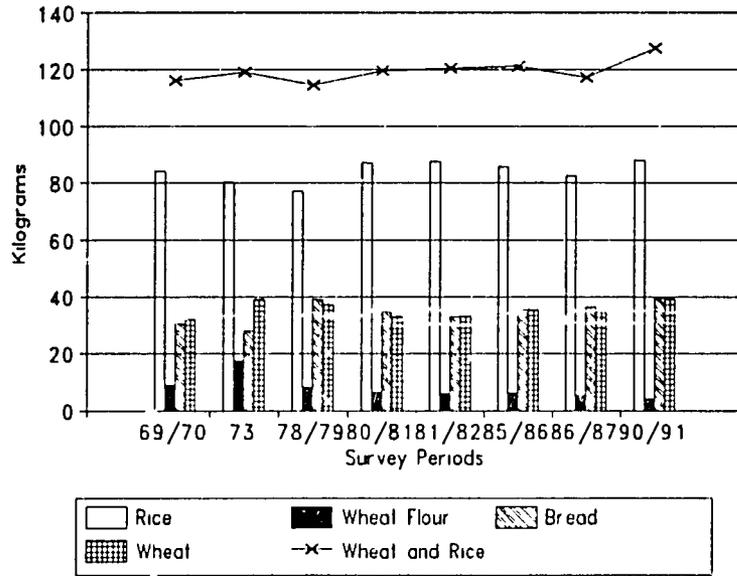


FIGURE 7. Annual Per Capita Consumption of Rice and Wheat-Based Products, Urban.

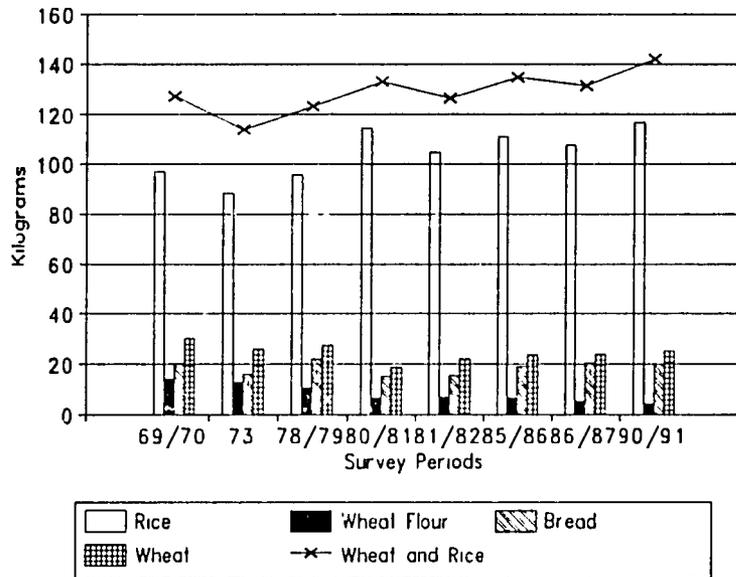


FIGURE 8. Annual Per Capita Consumption of Rice and Wheat-Based Products, Rural.

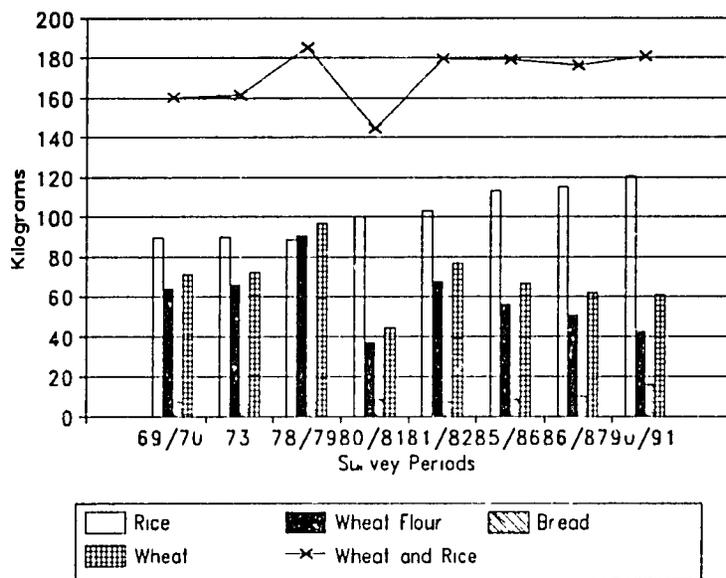


FIGURE 9. Annual Per Capita Consumption of Rice and Wheat-Based Products, Estate.

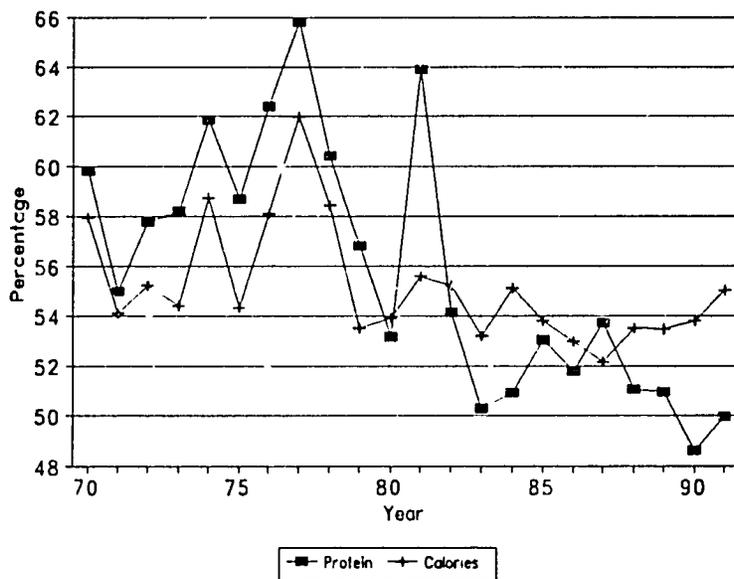


FIGURE 10. Percentage of Caloric and Protein Intake Provided by Rice and Wheat-Based Products.

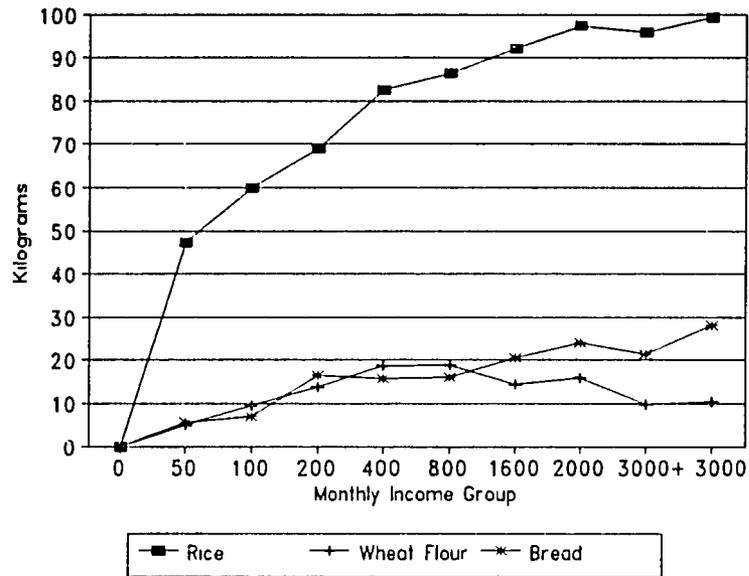


FIGURE 11. 1973 Annual Per Capita Consumption by Income Group, National.

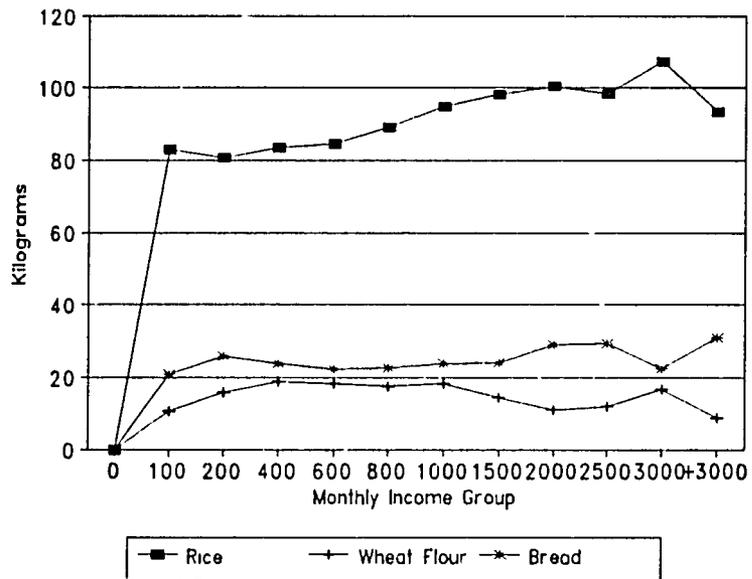


FIGURE 12. 1978/79 Annual Per Capita Consumption by Income Group, National.

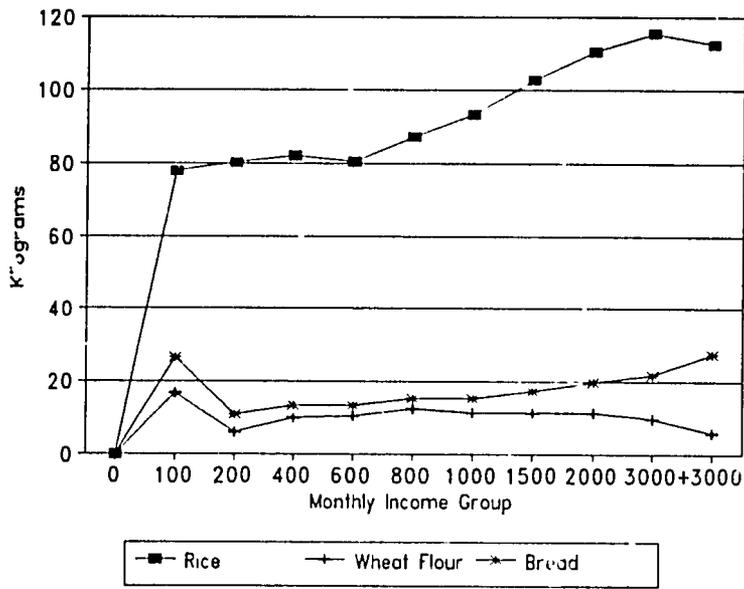


FIGURE 13. 1981/82 Annual Per Capita Consumption by Income Group, National.

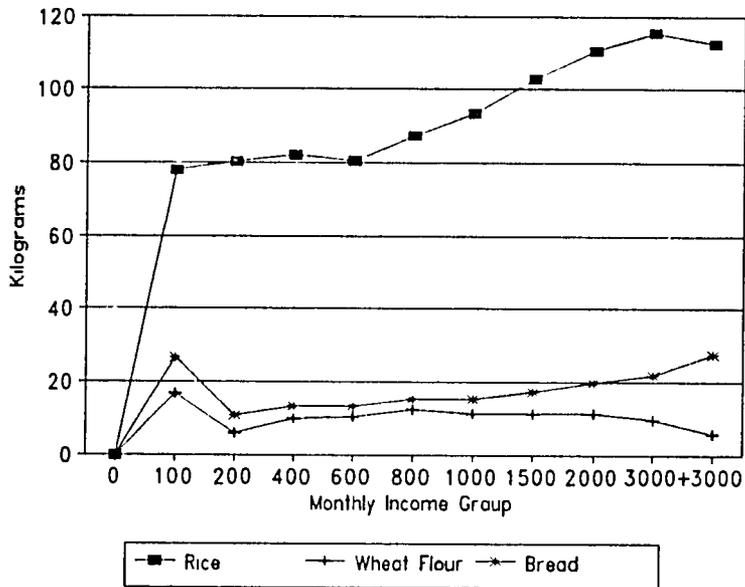


FIGURE 14. 1986/87 Annual Per Capita Consumption by Income Group, National.

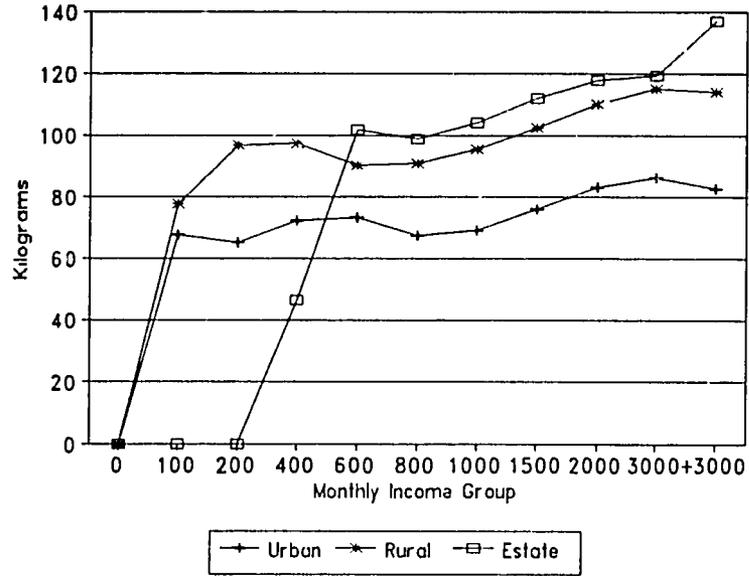


FIGURE 15. 1986/87 Sector Annual Per Capita Consumption by Income Group, Rice.

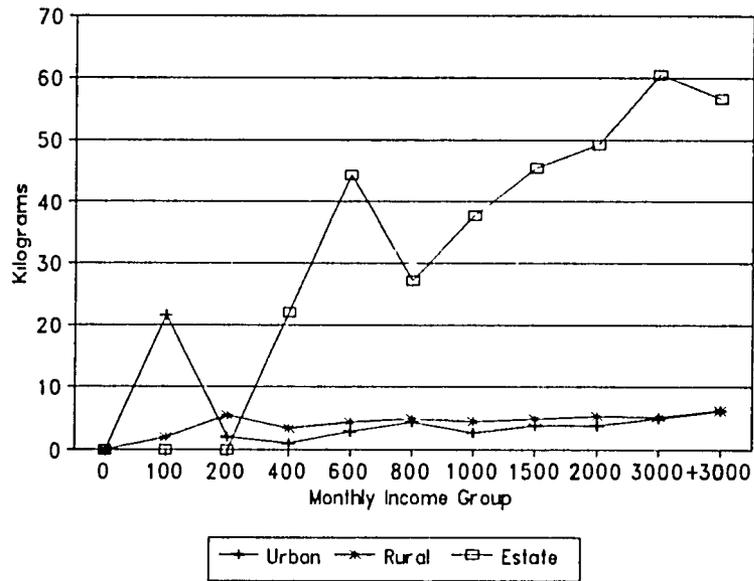


FIGURE 16. 1986/87 Sector Annual Per Capita Consumption by Income Segment, Wheat Flour.

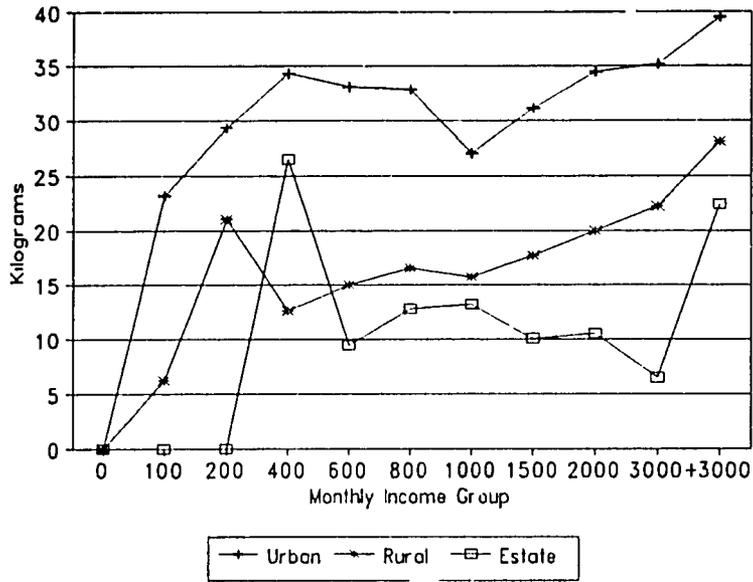


FIGURE 17. 1986/87 Sector Annual Per Capita Consumption by Income Group, Bread.

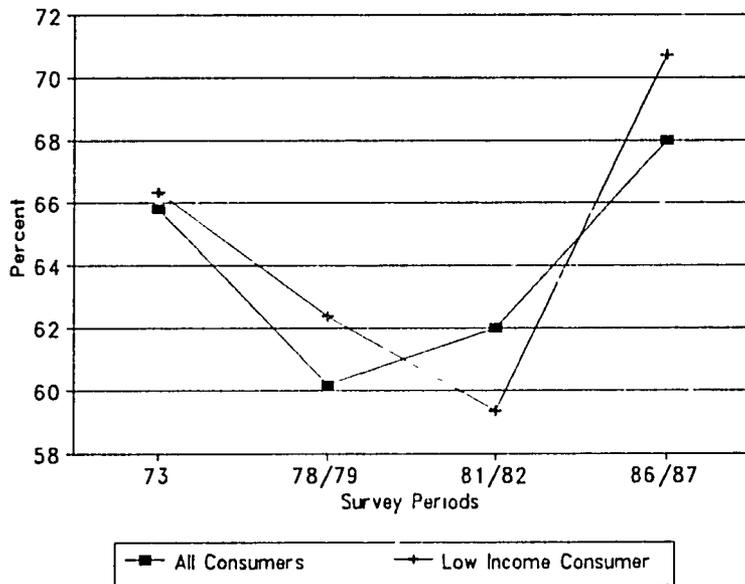


FIGURE 18. Percent of Calories Provided by Cereals For Low-Income Consumers, Prorated to National Calorie Intake.

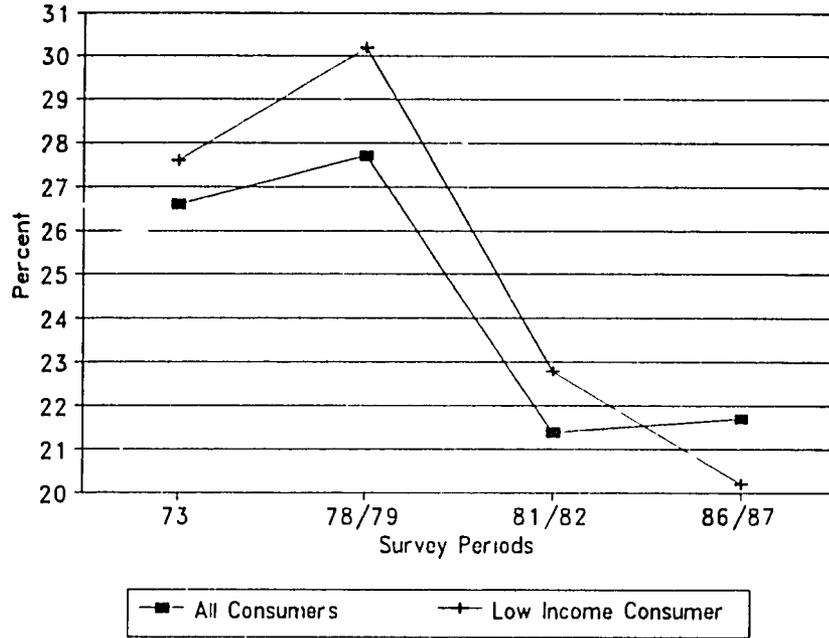


FIGURE 19. Wheat-Based Products as a Percent of Cereal Consumption.

SECTION III

GOVERNMENT AND PRIVATE-SECTOR ROLES

Rice

Since the 1940s, GSL has been directly involved in the marketing of rice. Rough rice was purchased under the guaranteed price scheme (GPS) by the Department of Agrarian Services until 1971. The Paddy Marketing Board (PMB), established by the government in 1971, then undertook the role of rough rice procurement under GPS, milling, and distribution to FCD. FCD distributed milled rice for the rice ration system which issued rice to the public at a fixed price and quantity allocation. With the discontinuation of the rice ration system in 1979, government intervention in the domestic rice market lessened over time.

Governmental intervention in domestic rough rice markets is currently minimal. Since 1979, government procurement of rough rice has declined from 28.2% of production to 0.3% of production in 1992. This decline is illustrated in Figure 20. Consequently, domestic rice marketing is entirely conducted by private-sector enterprises.

The conduct of the private-sector rice market system is characterized by the atomistic nature of the market. There are many producers, assemblers, millers, wholesalers, and retailers. This provides for a competitive market system which is evidenced by the marketing margin on domestically produced rice illustrated in Figure 21. The marketing margins in Figure 20 vary from year-to-year. Plotted against production since 1980, the margins reveal that when production is low or has declined margins increase, and vice-versa. Margins have a declining trend since 1984; this indicates an ease of movement into and out of the market by participants, adding to the competitive element of the market. Previous studies could find no dominant firm or firms in the marketplace. The movement of marketing margins confirms this. If the margins prior to 1980 are matched to percentage of rough rice purchased by the PMB, they are inversely related (the exception is the mid-1970s during a serious drought). The private sector, even under major government intervention, was apparently competitive during this period. Further, milled rice is wholesaled and retailed by variety and grade. The grading differences are not an official standard but a system used by the private sector to differentiate quality.

However, the government still has control of the rice imports. Prior to 1990, FCD was the sole importer of rice. In 1990, a system of bonded warehouse storage for rice importation was initiated. FCD, under contractual agreement, provided a sole-source license to three off-shore private-sector companies under a limited tender to import and store rice as an inventory stock for later sale. The amount to be imported was limited to 200,000 mt and divided among the three companies in the amounts of 100, 60, and 40 thousand. The rice stocks are the property of the private-sector firms and as such, stock financing, as well as handling and storage costs, are paid by the firms. Rice quality specifications are stated by contract and monitored by FCD.

The companies are allowed to sell into the private market that amount of rice in storage which is in excess of one month's inventory requirement for the firm. However, there is an established floor price for the sale of this rice so as to prevent dampening of price for domestically-produced rice. In 1991, import rice bondmen's sale price per kilogram was: January - May Rs 13.00, June - October Rs 14.50, November Rs 15.00, and December Rs 15.50. When matched against wholesale prices of raw white rice, the floor prices seem reasonable. The average whole-sale price for raw white rice was: January - May Rs 12.83, June - October Rs 12.95, November Rs 14.66, and December Rs 15.48.

There is an inherent policy in the use of the bondsmen system to have a buffer stock of rice under the control of government, with a control of sale policy that only allows a given amount of imported rice on the market at anyone time. Therefore, GSL is always able to retain a reserve stock without a financial investment.

The same procedure was used for rice imports in 1992. At the current time GSL is modifying the bondsmen system into a broad international tender, rather than restricting licenses under a limited tender.

Wheat

Wheat for milling into flour is a totally imported product. Wheat is not produced in Sri Lanka. The importation of wheat for milling, the importation of flour, and the distribution of locally-milled and imported flour has been, and still is, a government monopoly. Importation of wheat for milling since 1980, and the importation of flour was originally the responsibility of FCD. FCD was also responsible for the storage, transport, and sale of flour through the Multiple Purpose Cooperative System (MPCS). In April 1989, the importation of wheat for milling and flour was transferred to CWE, a government-owned business enterprise. FCD's role was reduced to being the transportation, storage, and sales agent for CWE in the distribution of flour.

Wheat is imported by CWE. CWE prepares a wheat procurement plan based on the production and marketing situation of food crops. On the basis of this information, an annual procurement plan is developed which indicates the quantity and timing of shipments. This plan is developed in conjunction with FCD and Prima Ceylon Ltd (PCL), the miller of the wheat. This plan is then forwarded through the Ministry of Trade and Commerce (under which CWE operates) to Treasury, Ministry of Finance, and Cabinet for final approval. Once the procurement plan is finalized, tenders are issued as required by the purchasing committee in consultation with FCD and PCL. When bids are approved, CWE negotiates the contract, opens a letter of credit if so required, and coordinates all other aspects of the delivery of wheat.

Wheat is delivered to the Port of Trincomalee for milling by PCL, a privately-owned milling company. PCL mills wheat under a 25-year contract with GSL, which began in 1980. PCL is guaranteed a minimum of 435,000 mt of wheat for milling annually. PCL's contract with GSL specifies that the government will procure, transport, and deliver wheat and flour packing material to the mill. PCL's responsibility is to mill the wheat into flour at an extraction rate of 74.0%. PCL produces flour to government specifications. This specification is a 10.5%

protein multi-purpose flour. PCL's contract with GSL provide's that PCL will retain the wheat bran and other by-products of milling as payment for milling. Bran and mill-feeds are exported by PCL as animal feed ingredients.

The flour is packed in either 67 kg jute bags or 50 kg polyethylene bags. The flour is then turned over to FCD for distribution. It becomes the responsibility of FCD to arrange transport from the mill to FCD storage facilities. Flour is primarily sold to some 300 multi-purpose cooperatives throughout the country. From this stage, it moves into the bakery, institutional, retail, or processor markets.

Title to wheat and flour milled from wheat remains with CWE. CWE receives payment for flour from agencies or firms for flour purchased from the FCD warehouse or at mill-door. FCD only acts as the physical storage and distribution contractor for CWE.

There is a buffer-stock policy of maintaining a two-month wheat supply and a two-month flour supply. Since the product is 100.0% imported, buffer stocks are considered necessary to provide a constant flow of flour to the consumer. There is also another implicit policy that seems to exist. It is stated that pricing of wheat flour at mill-door or the FCD warehouse is done on a no-profit, no-loss basis. This implies that prices are based on all costs with no margin for profit, no margin for return on investment, or no margin for return on risk. It is supposed to be a price that is sufficient to accommodate minor shifts in operating costs or import costs.

Originally, wheat flour was a product with a subsidized price in a ration system. When subsidization was discontinued in 1979, fixed prices were established at different points in the distribution channel. In October 1992, all prices were decontrolled by CSL. The fixed prices on bread were also discontinued at this time. The current policy is said to be that it is CWE's responsibility to establish price of wheat flour at mill-door or FCD warehouse based on the cost of imported wheat, cost incurred in milling, transportation and storage costs, and costs related to the conduct of business.

Although this is a government controlled monopoly, there is a slight mixture of private-sector activity in the system. PCL, the miller of wheat is a private company. FCD hires private-sector transport firms to move flour from the mill to storage. Besides the private-sector retailers, bakeries, hotels, and restaurants who are either final retailer or product users, there is no current evidence to imply that any other private-sector firms are participating in the distribution channel.

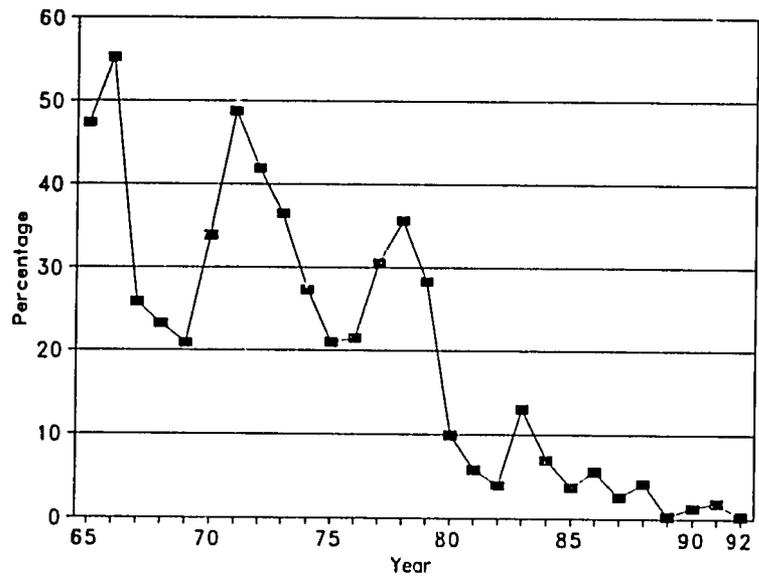


FIGURE 20. Percentage of Rough Rice Production Procured by Government.

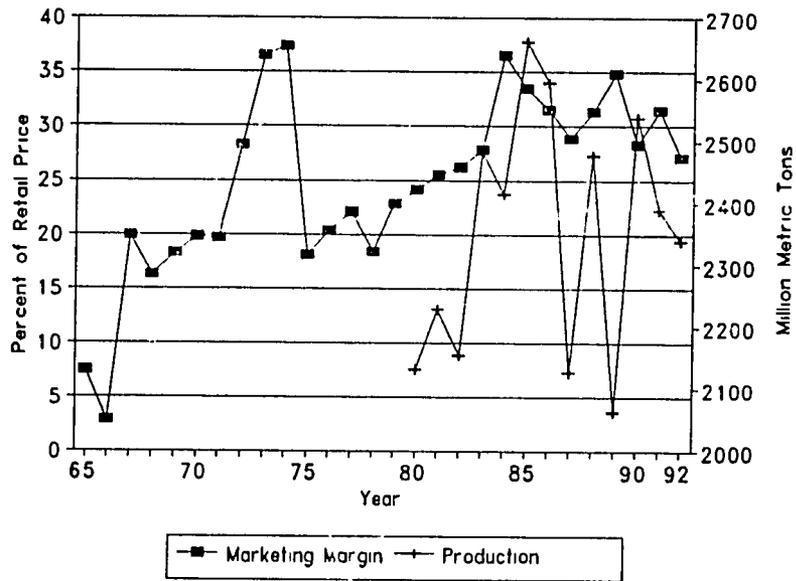


FIGURE 21. Marketing Margins for Domestically Produced Rice.

SECTION IV

WHEAT AND WHEAT FLOUR IMPORTS

Up to 1968, only wheat flour was imported. In 1968, the Sri Lanka Flour Milling Corporation (SFMC) in Colombo was established by GSL. Wheat grain was then imported for milling into flour. SFMC was a small milling operation whose output ranged from 50,000 to 90,000 mt of flour annually. In 1980, the SFMC operation was discontinued, and milling of wheat was undertaken by PCL at their Trincomalee facility. This facility has the capacity to mill 1 million mt of wheat annually (with a flour output in excess of 750,000 mt).

Quantities

Quantities of wheat imported, wheat flour produced, and wheat flour imported are presented in Table 9. After 1980, importation of wheat flour declined to less than 20,000 mt annual average. The major increases in wheat grain imports were due to the milling capacity of PCL. This shift in product imports is illustrated in Figure 22.

Total wheat flour available from milled wheat and import flour is shown in Figure 23. Over the time period 1965 to 1992, total available wheat flour has a three-step pattern: (1) sharp increases from 1965 to 1978, (2) a substantial decline from 1978 to 1982, and (3) a renewed pattern of sharp increase from 1982 through 1992. This three-step pattern is well illustrated in Figure 23. Over the entire period, the average annual rate of increase in total available flour has been slightly less than 1.0%. The annual rates of increase in total available flour for 1965 to 1978, and for 1982 to 1992, are 5.5% and 3.0%, respectively.

Availability

Availability of wheat flour to the consumer is based on wheat flour distributed. The total and per capita available quantities, as well as trends, are detailed in Table 10. The long-term per capita available trend, illustrated in Figure 24 is a slightly declining trend from 34 kg to 32 kg. This long-term trend is very misleading because of the three-step sequence of import levels over time, as described above. Short-run trend 1 (1980-1992) and short-run trend 2 (1985-1992) are depicted in Figure 25. These trends show an increasing level of per capita consumption. Trend 1 has an average annual increase of 1.25% while trend 2 has an average annual increase of less than 0.5%. Based on the estimated distribution of flour for 1993, trend 1 is the most reliable trend. In fact, it may be slightly understated.

Per capita consumption from various surveys is given in Table 10 to compare availability to wheat flour consumption data. Availability in all cases is greater than survey data. The survey closest to per capita availability is the 1990/91 survey.

The resulting conclusion is that availability is the more accurate indicator of wheat-based products consumption. Survey per capita consumption has been understated by 10.5% as an average over all survey periods.

It could be argued that the loss unaccounted for in Table 10 is the reason for this difference. However, this unaccounted for loss only amounts to 0.6 kg to 1.5 kg per capita. With this removed, survey per capita consumption is still understated by 8.0%. Further, the unaccounted for loss cannot really be physical loss. First, this amount of physical product loss of a packaged processed product would congest warehouses beyond the point of usefulness. Second, even the FCD reports allude to massive fraud in both rice and wheat flour. No quantity numbers are stated. However, some of the Rupee values given are very substantial. To summarize, the system just "leaks!"

Wheat Flour Distribution Flows

Wheat flour distribution by district, as in Appendix IV, Tables 5 and 6, tends to confirm the sector results of consumption studies. Percentage of wheat flour distributed in Colombo and surrounding districts (urban) and to primary estate districts is far greater than the percentage of national population for those sectors.

Cost of Imports

World wheat and wheat flour trade is denominated in U.S. dollars. The international trade is characterized by supply/demand price shifts over time, inter-year supply/demand price shifts, and producing-country export subsidy programs in wheat grain and wheat flour sales. The best presentation of import cost changes for Sri Lanka is to evaluate the cost in Rupees and deflate the Rupees to real terms by available deflators.

Import costs of wheat grain and wheat flour, as well as the weighted cost for all flour, are presented in Table 11. On the basis of weighted average C&F cost of wheat flour, there has definitely been an upward trend over time. This is well illustrated in the weighted average C&F cost of wheat flour per kilogram. Figure 26 provides an even more vivid picture of the dramatic import cost rise in current terms.

However, when these import costs are deflated by the CPI index and the exchange rate index, the real cost of imported wheat flour is different. Through the 1970s as international prices for wheat increased, wheat flour became a more expensive import commodity. As international wheat prices declined in the early 1980s, real procurement price declined and stabilized from 1985 onward. In this period, real price movement reflects the inter-year price movements in the international market.

Wheat/wheat flour imports as a percentage of food imports did not increase, and declined as a percentage of total imports (Table 23, Section VI). Because of this stability in import price in real terms GSL now has the ability to purchase larger quantities of wheat/wheat flour to meet the need for wheat flour.

Prices

Prices for wheat flour and bread were set by GSL until October 1992. In October 1992, (1) wholesale and retail prices were decontrolled, (2) bread prices were

decontrolled, and (3) CWE was said to be responsible for establishment of a mill-door and supply station price which covered all costs.

Wheat Flour Prices. Wheat flour is a 100.0% imported product (either as wheat to be milled or as flour). Fixed prices have existed until recently. Did these fixed retail prices cover all costs of importation and distribution?

Retail Price Versus Costs

Table 12 presents the C&F cost of wheat flour, fixed retail prices, and a series of calculated marketing costs. The marketing costs are very important. These are the costs paid entirely by the government until the early 1980s. The government still pays part of these costs, with the exception of the margins between supply station and retail point.

Retail price less the C&F cost of wheat is depicted in Figure 27. The margin between retail and import cost was very narrow and in some cases negative until 1980 when subsidization of wheat flour was eliminated. When all marketing costs are added to the import cost of wheat flour, then retail price less all costs presents a different situation. Figure 28 illustrates the margin between retail price and all costs. Until 1980, under food subsidy schemes, retail prices did not cover all costs. Over time, the deficit between retail price and all costs widen until subsidization was discontinued. Beginning with 1981, there has been a positive margin, with the exception of 1988 and 1989. Figure 29 presents a different schematic of this situation by comparing wheat flour retail price to all costs.

Retail Price and the Consumer

From 1980 to 1992, adjustments in fixed retail prices tripled the cost of flour to the consumer. However, real price declined over this time period at an average annual rate of slightly under 3.0%. These prices are illustrated in Figure 30. The consumers purchasing power for wheat-based products improved over time.

Bread Prices. Fixed prices for bread were maintained over time until decontrol in October 1992. These prices were adjusted at points in time when flour prices were changed. The price established for bread follows a very close relationship to the price set for wheat flour. This relationship is illustrated in Figure 31. The margins between retail flour price, bread price, and cost of flour in bread indicate that some type of standard formula was utilized for fixing a price on bread. However, there are some missing components in price setting. Table 13 details the bread equation. Flour used in the production of bread is usually the least-cost portion of bread production costs in terms of sale price. In this case, flour costs exceed 50.0% of the sale price. If total cost of bread production (including the minimum production and marketing margin) is compared to price, only once since 1965 has the price of bread been greater than all production costs as illustrated in Figure 32. Since 1984, this cost/price difference has widened substantially. Bakers operate under such conditions by producing wetter breads, shorter weights, using low quality ingredients, and using bread as a loss-leader to sell other higher margin bakery products.

Wheat Import Costs Versus Sales Price

While margins have been positive for 1990 through 1992, there is a question about what is going on in 1993. The last ship unloaded in 1992 had an inbound cost of Rs 8.36 per kilogram flour equivalent. When a marketing cost of Rs 3.20 for 1993 is added, this brings the total cost to Rs 11.56 per kg of wheat flour against a supply-station price of 10.95.

Wheat prices have increased in 1993. Wheat price at the Gulf averaged \$147 per mt for January through May. With the U.S. Export Enhancement Program (EEP) discount, the C&F cost to Sri Lanka should be around \$140, depending on ocean freight costs. This places C&F wheat flour cost at about Rs 8.89 per kg. Adding marketing costs brings total wheat flour cost to Rs 12.09 per kg. The sale price of flour was adjusted June 1 to 12.30 per kilogram at supply-station. This allows only a slight margin of Rs 0.29 per kg.

Wheat flour costs consist of (1) C&F import cost, (2) port and handling costs which include packaging flour, (3) distribution cost (transport, storage, loading and unloading, wholesale and retail margins), and (4) losses which are evident in the system. The cost structure for wheat flour is diagrammed in Figure 33. Two costs of conducting business have not been entered into this analysis because it is a government monopoly. They are return on investment and return on risk. If this were a private-sector business, target return on investment would be a cost, and target return on risk would be a cost. Profit in the true economic meaning is only the excess of revenues above all costs including target return on investment and target return for risk. This is private enterprise. In accounting terminology, profit is only the difference between revenues and costs of operations (which may vary substantially depending upon how fixed assets are amortized).

Commercial and Donor-Assisted Procurement

Commercial and donor-assisted procurement of wheat flour and wheat grain is presented in Tables 14 and 15. During the era of high wheat flour importation, a strong level of donor assistance was granted to GSL. Although there is great inter-year variation, the level of assistance averaged 36.0% of total imports.

After 1980, wheat grain became the predominant import. Total donor assistance again has shown large inter-year variations. Over the 1980 to 1992 time period, donor-assisted imports accounted for 45.0% of total imports. PL480 program assistance over this time frame was 77.0% of total donor assistance. The level of donor support in wheat grain importation is depicted in Figure 34.

Food Aid Programs. PL480 programs have provided the major portion of food aid in cereal to Sri Lanka. Of the total amount of cereal products made available through assistance programs, PL480 assistance has accounted for 83.0%. Assistance provided by specific donor countries is detailed below as a percentage of annualized assistance.

	Annual Average Mt	Identifiable Donor Countries				
		USA	Australia	EEC	Canada	Others
		%	%	%	%	%
Prior to 1987	320,900	63	5	13	9	10
1987-1992	330,700	83	1	5	4	7

Food aid in cereals has been a significant contribution to the welfare of the Sri Lankan consumer, providing approximately 40.0% of the cereal volume consumed in Sri Lanka. The annual average imports and annual average food aid in cereals are compared below.

	Annual Average Imports 1000 Mt	Annual Average Food Aid 1000 Mt	Annual Average of Food Aid as a % of Total Imports
Prior to 1987	818.3	320.9	40.3
1987-1992	846.2	330.7	39.1

TABLE 9
WHEAT AND WHEAT FLOUR QUANTITIES

Year	Wheat Imports (1000Mt)	Flour Produced (1000Mt)	Flour Imports (1000Mt)	Flour Available (1000Mt)
1965	0.0	0.0	316.9	316.9
1966	0.0	0.0	268.3	268.3
1967	0.0	0.0	586.4	586.4
1968	0.0	0.0	366.2	366.2
1969	76.3	52.9	394.7	447.6
1970	55.0	59.4	374.5	433.9
1971	83.0	53.6	335.7	389.3
1972	92.0	70.5	329.1	399.6
1973	83.0	65.7	371.2	436.9
1974	100.0	48.0	448.9	496.9
1975	93.0	65.3	462.5	527.8
1976	130.0	93.6	385.6	479.2
1977	115.0	73.8	532.2	606.0
1978	84.0	81.8	612.6	694.4
1979	112.0	71.4	466.6	538.0
1980	227.0	107.4	360.9	468.3
1981	439.2	380.4	0.0	380.4
1982	494.7	385.0	0.0	385.0
1983	571.8	430.6	21.9	452.5
1984	571.3	470.1	11.0	481.1
1985	655.1	506.7	0.0	506.7
1986	680.9	499.7	10.4	510.1
1987	578.6	474.2	10.0	484.2
1988	612.0	487.8	35.9	523.7
1989	637.2	540.3	38.0	578.3
1990	638.7	472.9	137.0	609.9
1991	719.7	515.4	0.0	515.4
1992	706.1	556.4	0.0	556.4

Sources: Appendix V, Tables 1, 2, 3, and 4

TABLE 10

TOTAL AND PER CAPITA AVAILABILITY OF WHEAT FLOUR

Year	Flour Distributed (1000 Mt)	Unaccounted Loss (1000 Mt)	Per Capita Kg (1)	Per Capita Survey Points Kg	Per Capita		
					Long-Run Trend Kg	Short-Run Trend 1 Kg	Short-Run Trend 2 Kg
1965	266.1	16.9	25.35		34.31		
1966	271.0	16.9	25.17		34.23		
1967	440.1	15.2	38.90		34.14		
1968	430.1	15.3	37.14		34.06		
1969	407.5	15.5	34.53		33.98		
1970	422.6	15.4	34.99	31.18	33.89		
1971	368.6	15.9	30.50		33.81		
1972	440.3	15.2	35.42		33.73		
1973	451.3	15.1	35.63	31.41	33.65		
1974	423.0	15.4	33.00		33.56		
1975	474.0	14.9	36.22		33.48		
1976	504.0	14.6	37.80		33.40		
1977	586.1	13.7	43.02		33.31		
1978	576.1	13.8	41.57		33.23		
1979	599.8	13.6	42.39	34.77	33.15		
1980	378.9	15.8	26.78		33.06	28.21	
1981	440.4	15.2	30.35	23.22	32.98	28.61	
1982	431.6	15.3	29.41	27.60	32.90	29.01	
1983	424.4	15.4	28.52		32.82	29.41	
1984	414.5	15.5	27.56		32.73	29.81	
1985	478.6	22.3	31.62		32.65	30.21	31.48
1986	482.8	25.9	31.56	28.93	32.57	30.61	31.60
1987	486.7	11.8	30.47	28.77	32.48	31.01	31.72
1988	522.7	20.4	32.74		32.40	31.40	31.85
1989	569.1	1.3	33.94		32.32	31.80	31.97
1990	494.2	21.2	30.33		32.23	32.20	32.09
1991	536.5	11.7	31.79	30.13	32.15	32.60	32.22
1992	571.3	0.0	32.82		32.07	33.00	32.34

(1) Difference between flour received and flour shipped, Food Commissioner's records with adjustment for normal waste.

Source: Appendix V, Table 4

TABLE 11

WHEAT GRAIN AND WHEAT FLOUR IMPORT COSTS, C&F

Year	Wheat Import Price C&F Rs/Mt (1)	Flour Import Price C&F Rs/Mt (1)	Weighted Average Cost of Flour C&F Rs/Mt (2)	Weighted Average Cost of Flour C&F Rs/Kg
1965	0	429	429.13	0.43
1966	0	452	451.55	0.45
1967	0	400	400.00	0.40
1968	0	598	598.00	0.60
1969	395	383	384.47	0.38
1970	416	602	584.21	0.58
1971	527	621	606.80	0.61
1972	433	657	619.47	0.62
1973	695	1,234	1,159.26	1.16
1974	1,440	2,207	2,100.98	2.10
1975	1,529	2,261	2,168.43	2.17
1976	1,602	2,024	1,941.57	1.94
1977	1,199	1,672	1,608.32	1.61
1978	1,673	3,405	3,249.37	3.25
1979	2,250	3,574	3,378.90	3.38
1980	2,809	5,056	4,342.32	4.34
1981	3,864	0	3,864.00	3.86
1982	3,612	0	3,612.00	3.61
1983	3,995	5,623	4,075.11	4.08
1984	3,642	7,724	3,745.52	3.75
1985	4,368	0	4,368.00	4.37
1986	3,689	6,346	3,742.73	3.74
1987	3,710	6,881	3,782.37	3.78
1988	4,874	8,020	5,105.07	5.11
1989	6,836	6,034	6,775.13	6.78
1990	6,921	10,047	7,623.40	7.62
1991	4,959	0	4,987.00	4.99
1992	6,121	0	6,121.00	6.12

(1) Weighted by quantities imported with flour equivalent for wheat 0.72 for 1965-1980 and 0.74 for 1981-1992.

Source: Appendix V, Tables 1 and 2

TABLE 12

WHEAT FLOUR COSTS AND RETAIL PRICES

Year	C&F Flour Price Cost Rs/Kg (1)	Estimated Port and Handling Costs Rs/Kg (2)	Estimated Distri- bution Cost Rs/Kg (3)	Cost of Losses Rs/Kg (4)	Average Fixed Flour Price Retail Rs/Kg (5)	Cost Difference C&F Less Retail Price Rs/Kg (6)	Retail Price Less All Costs Rs/Kg (7)
1965	0.43	0.28	0.21	0.03	0.51	0.08	-0.4
1966	0.45	0.28	0.21	0.03	0.55	0.10	-0.4
1967	0.40	0.28	0.22	0.02	0.62	0.22	-0.3
1968	0.60	0.30	0.23	0.03	0.73	0.13	-0.4
1969	0.38	0.32	0.25	0.02	0.73	0.35	-0.2
1970	0.58	0.34	0.26	0.03	0.73	0.15	-0.5
1971	0.61	0.35	0.27	0.03	0.73	0.12	-0.5
1972	0.62	0.37	0.29	0.03	0.73	0.11	-0.6
1973	1.16	0.41	0.31	0.05	1.09	-0.07	-0.8
1974	2.10	0.46	0.35	0.10	1.91	-0.19	-1.1
1975	2.17	0.49	0.38	0.09	2.43	0.26	-0.7
1976	1.94	0.50	0.38	0.08	2.14	0.20	-0.8
1977	1.61	0.50	0.39	0.05	1.58	-0.03	-1.0
1978	3.25	0.56	0.43	0.11	1.84	-1.41	-2.5
1979	3.38	0.62	0.48	0.11	2.67	-0.71	-1.9
1980	4.34	0.79	0.61	0.22	4.75	0.41	-1.2
1981	3.86	0.93	0.71	0.17	5.70	1.84	0.0
1982	3.61	1.03	0.79	0.16	6.53	2.92	0.9
1983	4.08	1.17	0.90	0.19	6.68	2.60	0.3
1984	3.75	1.37	1.05	0.18	7.67	3.92	1.3
1985	4.37	1.39	1.28	0.20	7.76	3.39	0.5
1986	3.74	1.50	1.33	0.20	7.90	4.16	1.1
1987	3.78	1.61	1.38	0.09	7.90	4.12	1.0
1988	5.11	1.84	1.48	0.20	7.90	2.79	-0.7
1989	6.78	2.05	1.58	0.02	8.93	2.15	-1.5
1990	7.62	2.49	1.63	0.33	13.59	5.97	1.5
1991	4.99	4.28*	1.63	0.21	12.25	7.26	1.1
1992	6.12	2.86	1.63		12.13	6.01	1.5

(1) Appendix V, Table 7.

(2) Calculated based on 1990 CWE cost and adjusted backwards over time by CPI Index to deflate costs. 1991 and 1992 based on CWE cost.

(3) Calculated based on 1990-1992 FC fees for handling flour and fixed margins between supply station and retail. Adjusted over time on CPI to deflate costs and margins.

(4) Appendix V, Table 4 - loss as a percentage of distribution cost for flour.

(5) Appendix V, Table 7.

(6) Item 5 - Item 1.

(7) Item 5 - (Item 1 + Item 2 + Item 3 + Item 4).

* Extra duties charged to reimburse government for losses in 1988 and 1989.

TABLE 13

PRICES AND COSTS, BREAD PRODUCTION
(Rupees per Kilogram)

Year	Average Flour Price Retail	Average Bread Price Retail	Value of Flour in Kg Bread*	Average Whole- Sale Price of Flour	Cost of Flour in Kg Bread*	Average Price of Bread Less Cost of Flour	Cost of Other Ingred- ients in Bread	Avail- able Marketing Margin	Minimum Production and Marketing Margin Required
1965	0.51	0.60	0.33	0.48	0.31	0.29	0.21	0.08	0.15
1966	0.55	0.60	0.35	0.52	0.33	0.27	0.21	0.06	0.15
1967	0.62	0.77	0.40	0.58	0.38	0.39	0.21	0.18	0.19
1968	0.73	0.77	0.47	0.69	0.44	0.33	0.23	0.10	0.19
1969	0.73	0.77	0.47	0.69	0.44	0.33	0.24	0.09	0.19
1970	0.73	0.77	0.47	0.69	0.44	0.33	0.26	0.07	0.19
1971	0.73	0.77	0.47	0.69	0.44	0.33	0.26	0.06	0.19
1972	0.73	0.77	0.47	0.69	0.44	0.33	0.28	0.05	0.19
1973	1.09	1.12	0.70	1.02	0.66	0.46	0.31	0.15	0.28
1974	1.91	2.05	1.23	1.80	1.16	0.89	0.34	0.55	0.51
1975	2.43	2.16	1.56	2.28	1.47	0.69	0.37	0.32	0.54
1976	2.14	1.96	1.38	2.01	1.30	0.66	0.37	0.29	0.49
1977	1.58	1.52	1.02	1.49	0.96	0.56	0.38	0.19	0.38
1978	1.84	1.74	1.18	1.73	1.11	0.63	0.42	0.20	0.44
1979	2.67	2.40	1.72	2.51	1.62	0.78	0.47	0.32	0.60
1980	4.75	4.36	3.06	4.47	2.88	1.48	0.59	0.89	1.09
1981	5.70	5.22	3.67	5.36	3.45	1.77	0.70	1.07	1.31
1982	6.53	5.88	4.21	6.14	3.95	1.93	0.77	1.16	1.47
1983	6.68	6.08	4.30	6.28	4.04	2.04	0.88	1.16	1.52
1984	7.67	6.68	4.94	7.21	4.64	2.04	1.03	1.01	1.67
1985	7.76	6.74	5.00	7.45	4.80	1.94	1.04	0.90	1.69
1986	7.90	6.83	5.09	7.45	4.80	2.03	1.12	0.91	1.71
1987	7.90	6.83	5.09	7.45	4.80	2.03	1.21	0.82	1.71
1988	7.90	6.83	5.09	7.45	4.80	2.03	1.38	0.65	1.71
1989	8.93	7.43	5.75	8.48	5.46	1.97	1.54	0.43	1.86
1990	13.59	11.09	8.75	13.14	8.46	2.63	1.87	0.76	2.77
1991	12.25	9.94	7.89	11.80	7.60	2.34	2.10	0.24	2.49
1992	12.13	9.94	7.81	11.68	7.52	2.42	2.34	0.08	2.49

* 0.644 kilograms flour in kilogram bread.

Source: Appendix V, Table 7

TABLE 14

COMMERCIAL AND DONOR ASSISTED PROCUREMENT, WHEAT FLOUR

Year	Total Imports	Commercial Imports	Total Donor Spt	Other Donor Spt	PL480 Spt %	Total Donor Spt %	Other Donor Spt %	PL480 Spt %	PL480 as Percent of Total Donor Spt
	1000Mt								
1965	316.9	316.9	0.0	0.0	0.0	0.0	0.0	0.0	
1966	288.3	288.3	0.0	0.0	0.0	0.0	0.0	0.0	
1967	586.4	515.1	71.3	0.0	71.3	12.2	0.0	12.2	100.0
1968	366.2	250.4	115.8	0.0	115.8	31.6	0.0	31.6	100.0
1969	394.7	93.6	301.1	0.0	301.1	76.3	0.0	76.3	100.0
1970	374.5	176.0	198.5	23.7	174.8	53.0	6.3	46.7	88.1
1971	335.7	164.0	171.7	112.6	59.1	51.1	33.5	17.6	34.4
1972	329.1	50.8	278.3	0.0	278.3	84.6	0.0	84.6	100.0
1973	371.2	250.3	120.9	0.0	120.9	32.6	0.0	32.6	100.0
1974	448.9	380.0	68.9	42.1	26.8	15.3	9.4	6.0	38.9
1975	462.5	261.0	201.5	86.7	114.8	43.6	18.7	24.8	57.0
1976	385.6	224.0	161.6	140.5	21.1	41.9	36.4	5.5	13.1
1977	532.2	237.0	295.2	29.5	265.7	55.5	5.5	49.9	90.0
1978	612.6	338.0	274.6	34.1	240.5	44.8	5.6	39.3	87.6
1979	465.6	323.0	143.6	32.8	110.8	30.8	7.0	23.7	77.2
1980	360.9	353.0	7.9	7.9	0.0	2.2	2.2	0.0	0.0
1981	0.0								
1982	0.0								
1982	0.0								
1983	21.9	5.0	16.9	16.9	0.0	77.2	77.2	0.0	0.0
1984	11.0	0.0	11.0	11.0	0.0	100.0	100.0	0.0	0.0
1985	0.0								
1986	10.4	10.4	0.0	0.0	0.0	0.0	0.0	0.0	
1987	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	
1988	35.9	35.9	0.0	0.0	0.0	0.0	0.0	0.0	
1989	38.0	38.0	0.0	0.0	0.0	0.0	0.0	0.0	
1990	137.0	74.7	62.3	8.6	53.7	45.5	6.3	39.2	86.2
1991	0.0								
1992	0.0								

Source: Food and Nutrition Statistics 1950 - 1990
 CWE records
 Food Commissioners Department Annual Reports and Records
 USAID/Sri Lanka

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TABLE 15

COMMERCIAL AND DONOR ASSISTED PROCUREMENT, WHEAT GRAIN

Year	Total Imports	Commercial Imports	Total Donor Spt	Other Donor Spt	PL480 Spt %	Total Donor Spt %	Other Donor Spt %	PL480 Spt %	PL480 as Percent of Total Donor Spt
1000Mt									
1969	76.3	76.3	0.0	0.0	0.0	0.0	0.0	0.0	
1970	55.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0	
1971	83.0	83.0	0.0	0.0	0.0	0.0	0.0	0.0	
1972	92.0	66.3	25.7	0.0	25.7	27.9	0.0	27.9	100.0
1973	83.0	83.0	0.0	0.0	0.0	0.0	0.0	0.0	
1974	100.0	91.0	9.0	9.0	0.0	9.0	9.0	0.0	0.0
1975	93.0	65.0	28.0	28.0	0.0	30.1	30.1	0.0	0.0
1976	130.0	130.0	0.0	0.0	0.0	0.0	0.0	0.0	
1977	115.0	115.0	0.0	0.0	0.0	0.0	0.0	0.0	
1978	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.0	
1979	112.0	112.0	0.0	0.0	0.0	0.0	0.0	0.0	
1980	227.0	63.0	164.0	10.2	153.8	72.2	4.5	67.8	93.8
1981	439.2	268.8	170.4	61.5	108.9	38.8	14.0	24.8	63.9
1982	494.7	371.6	123.1	0.0	123.1	24.9	0.0	24.9	100.0
1983	571.8	309.8	262.0	107.3	154.7	45.8	18.8	27.1	59.0
1984	571.3	220.2	351.1	185.0	166.1	61.5	32.4	29.1	47.3
1985	655.1	393.6	261.5	84.1	177.4	39.9	12.8	27.1	67.8
1986	680.9	287.8	393.1	132.2	260.9	57.7	19.4	38.3	66.4
1987	578.6	229.2	349.4	169.6	179.8	60.4	29.3	31.1	51.5
1988	612.0	338.0	274.0	0.0	274.0	44.8	0.0	44.8	100.0
1989	637.2	417.2	220.0	0.0	220.0	34.5	0.0	34.5	100.0
1990	638.7	455.3	183.4	0.0	183.4	28.7	0.0	28.7	100.0
1991	719.7	419.9	299.8	5.0	294.8	41.7	0.7	41.0	98.3
1992	706.1	381.8	324.3	34.9	289.4	45.9	4.9	41.0	89.2

Source: Food and Nutrition Statistics, 1950 - 1990
 CWE records
 Food Commissioners Department Annual Reports and Records
 USAID/Sri Lanka

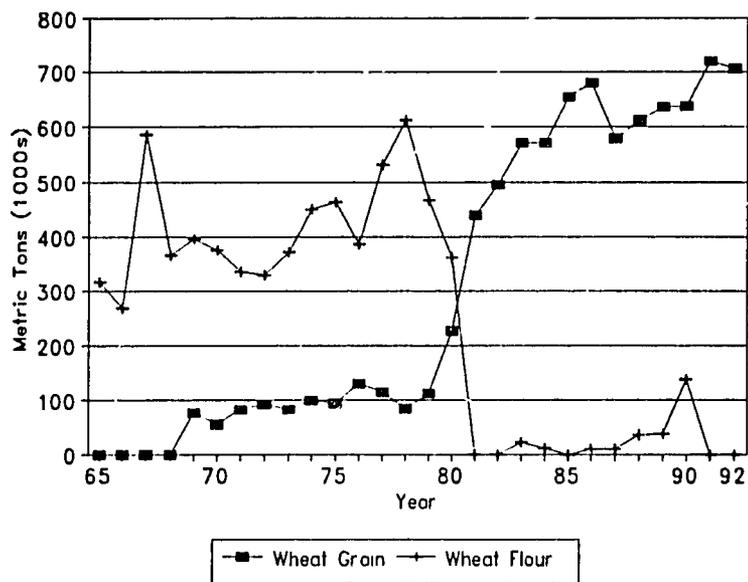


FIGURE 22. Wheat Grain and Wheat Flour Imports.

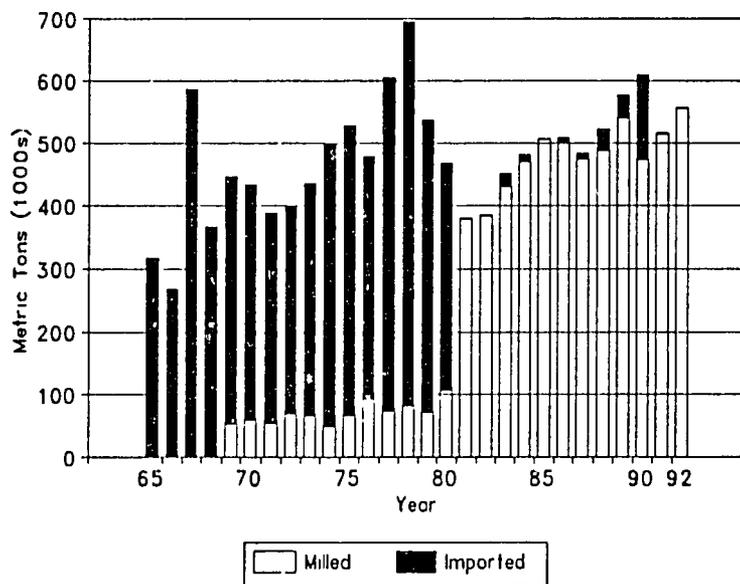


FIGURE 23. Total Wheat Flour Available.

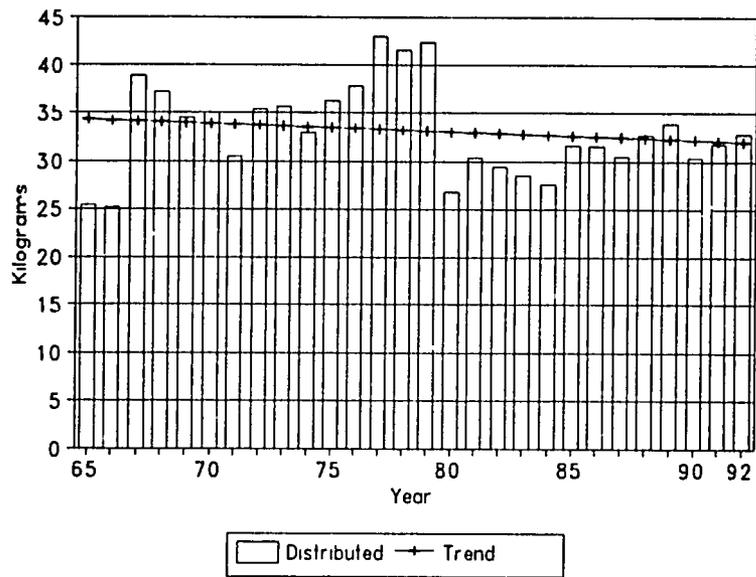


FIGURE 24. Wheat Flour Annual Per Capita Availability and Long-Run Trend, Based on Distribution.

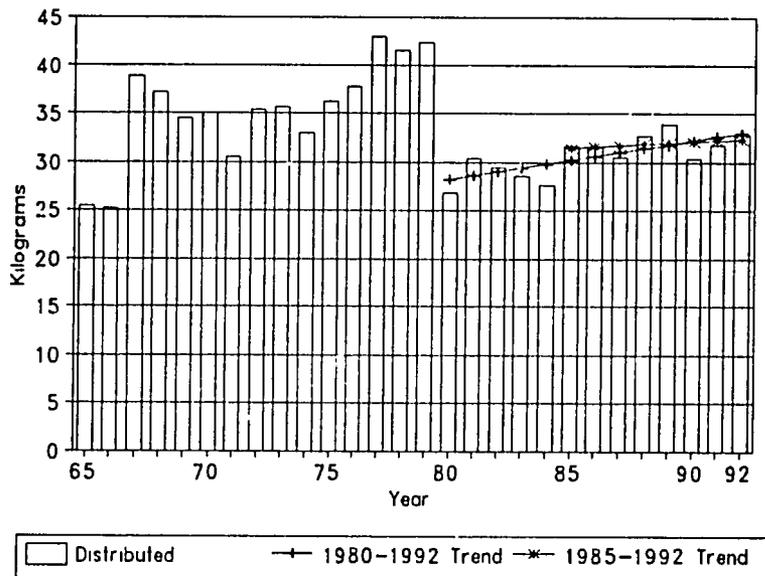


FIGURE 25. Wheat Flour Annual Per Capita Availability and Short-Run Trends, Based on Distribution.

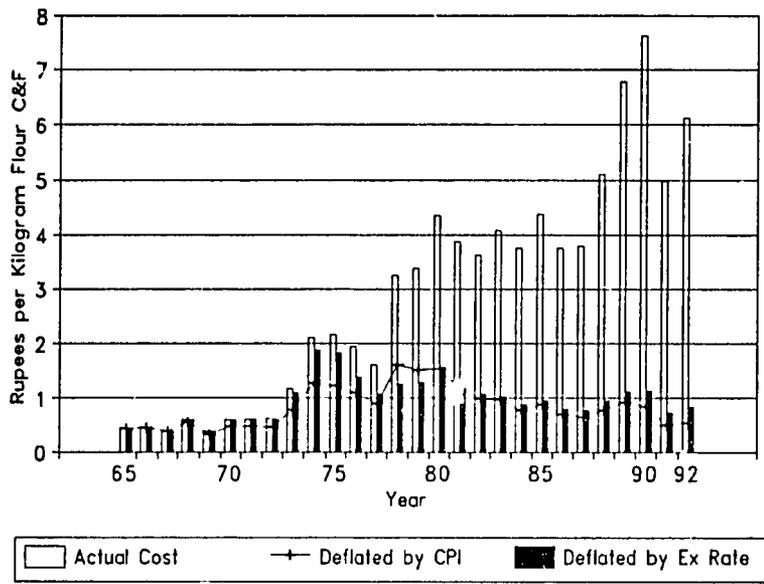


FIGURE 26. Import Cost of Wheat Flour in Rupees per Kilogram C&F

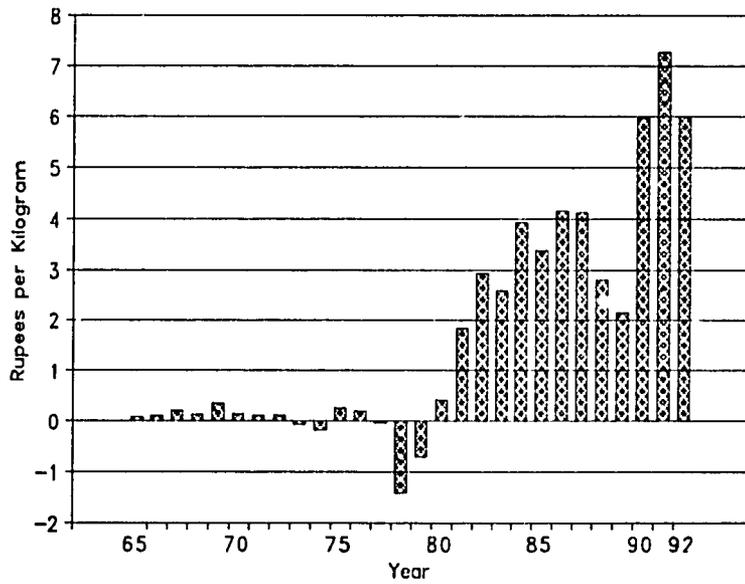


FIGURE 27. Wheat Flour Retail Price Less C&F Import Cost.

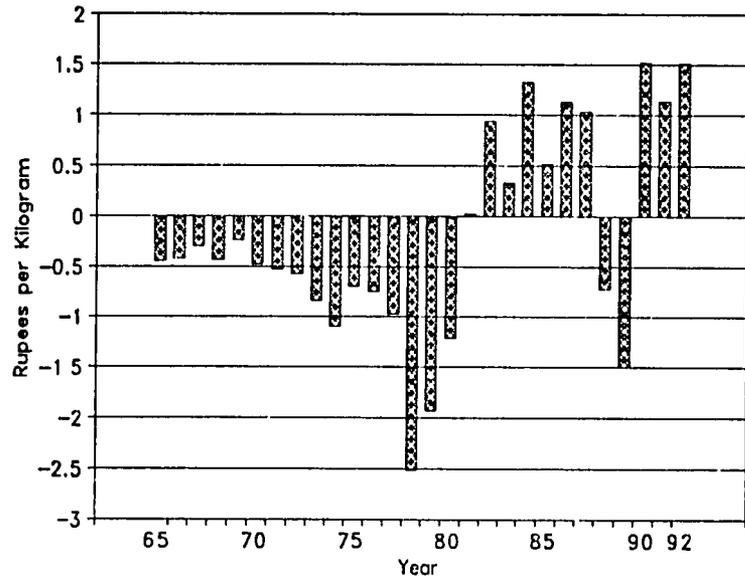


FIGURE 28. Wheat Flour Retail Price Less All Costs.

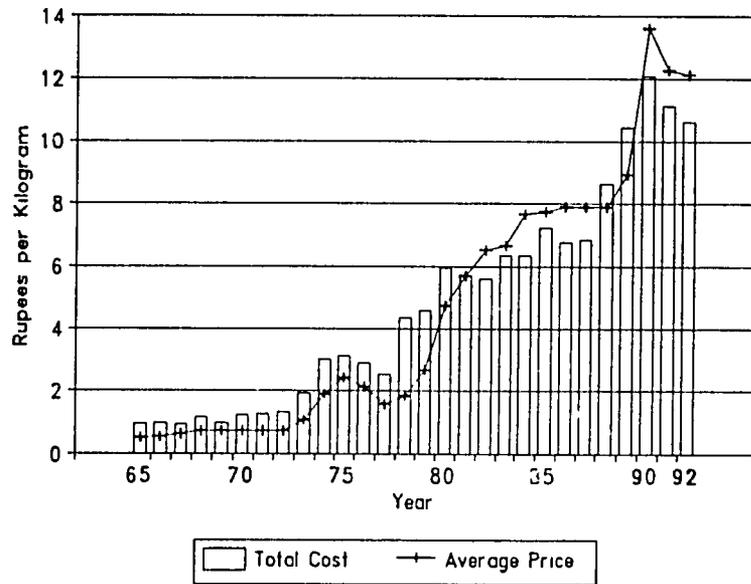


FIGURE 29. Average Wheat Flour Retail Price Compared to Total Cost of Wheat Flour.

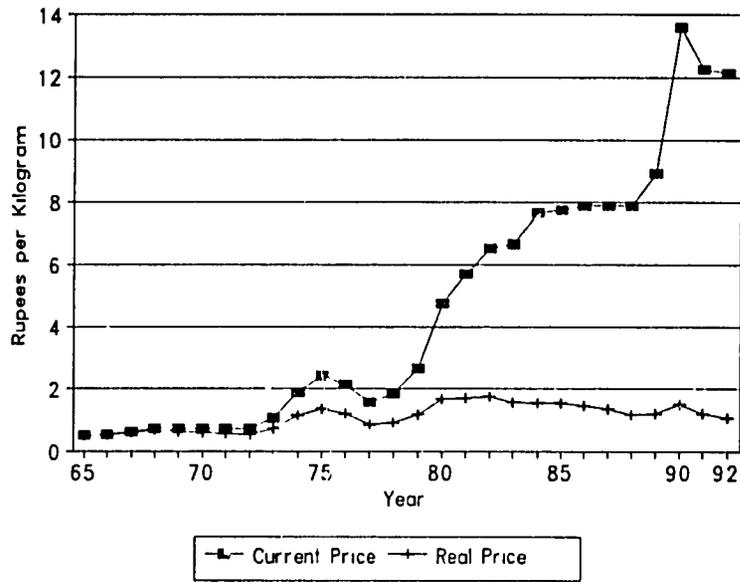


FIGURE 30. Retail Flour Prices, 1965 - 1992.

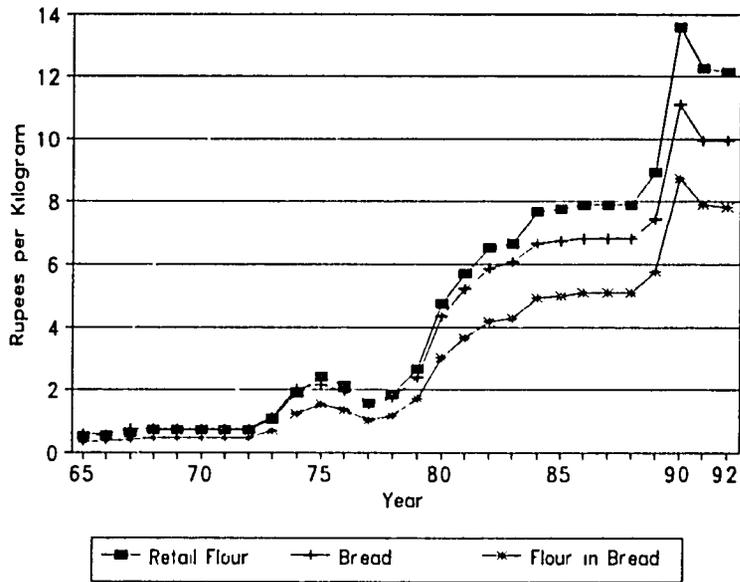


FIGURE 31. Relationship of Bread Price to Flour Price.

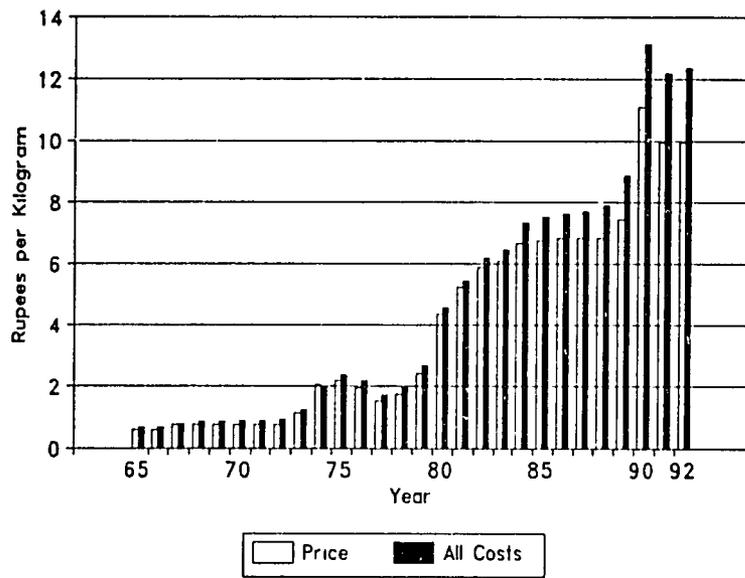


FIGURE 32. Bread Production Cost Versus Bread Price.

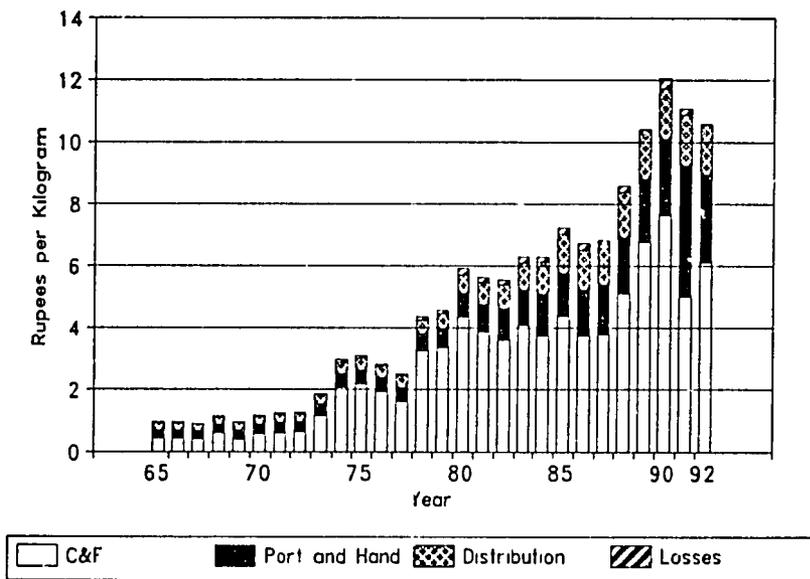


FIGURE 33. Wheat Flour Costs.

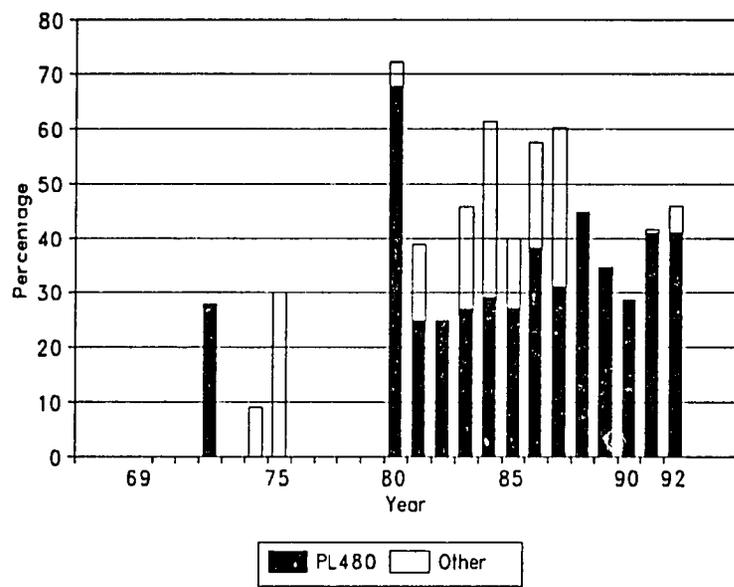


FIGURE 34. Donor Assisted Wheat Grain Imports.

SECTION V

RICE PRODUCTION AND IMPORTS

Rice is the predominant cereal crop produced in Sri Lanka as it is the traditional staple food item in the diet of the population.

Production

Cultivated area, yields, and production of rough rice are presented in Table 16. Cultivated area of rice increased 50.0% between 1965 and 1985 to a peak of nearly 1 million ha. Then cultivated area began a decline that has flattened out in the 800,000 ha range.

Yields of rough rice increased over this time period at an average annual growth rate of over 3.0%. However, in 1985, a yield plateau occurred with yields averaging about 3,450 kg per ha.

Consequently, production, which had nearly tripled in 20 years, began a decline due to the reduction of cultivated area and the lack of yield increases. It seems to have stabilized in the range of 2.3 to 2.5 million tons annually. Cultivated area, yields, and production are illustrated in Figures 35 through 37.

Trend Analysis of Production

Since production is a function of cultivated area and yield, a trend analysis was conducted for each. The rationale was to determine the directional patterns over time for the factors of production as well as production.

Cultivated Area. A linear trend for cultivated area does not really replicate what seems to be occurring, as illustrated in Figure 38. A better fit trend is a curvilinear trend (exponential at 0.2) as illustrated in Figure 39. A further test of the curvilinear trend was conducted using a range of upper and lower bounds. The highest probability places the upper and lower bounds within 5.0% of the trend line. Therefore, the curvilinear trend gives a projection probability of .90 for future cultivated area being within + or - 5.0% of the trend.

The trend projects total cultivated area being between 850,000 and 900,000 ha up to the year 2030.

Land Utilization

Cultivated area of rough rice measured against asweddumized land (land diked for rough rice cultivation) reveals a dramatic decrease since 1984. This decrease amounts to 25.0% of the land under rough rice cultivation in the late 1970s and early 1980s. Inter-year differences can be explained by weather patterns. The amount of land laying idle is approximately 125,000 ha.

Comparing asweddumized land by water source to cultivated area reveals that major irrigated cultivated area decreased by 17.0%, while minor irrigated and rainfed cultivated areas decreased by 33.0% and 50.0%, respectively.

The decline in cultivated area is further emphasized by land utilization ratios (Appendix VI, Table 13). Ratios for total cultivated area have declined 25.0%. In the case of major irrigated land, land utilization has declined over 30.0% with minor irrigated and rainfed land having a smaller decline. However, cultivation intensity ratios (Appendix VI, Table 14) are very stable over time.

All these factors indicate that the decline in cultivated area of rough rice is general in nature. The decline is occurring in both production seasons: Maha and Yala. The decline cannot be attributed to any factor arising in the first season which affects the second season or vice versa.

Price and production margin changes only explain 20.0% of the shifts in cultivated area. Declines then are due to other factors. A host of factors may be responsible: water availability, weather, opportunity cost, lack of new varieties to boost yields, lack of monetary resources for inputs or expansion of cultivated area, and smallness of scale.

Yield. In the case of yields, a linear trend does not give an accurate reflection of the changes that have occurred although the statistical results are significant. An s-curve (quadratic) trend fits the data well and has less error. This is illustrated in Figures 40 and 41.

Yields have followed a classic s-curve pattern which is a result of the introduction of high-yielding varieties and the use of fertilizers. Yields reached a plateau in 1985 and have stabilized at approximately 3,450 kg per ha.

Production. If fitted with a linear trend, it really does not give a viable answer to projection of future production based on historical data, even though the statistical results are significant. This is illustrated in Figure 42.

Since production is a function of cultivated area and yield, the best fit is a production function based on these variables. The results are illustrated in Figure 43. Then the remaining factors are to project cultivated area and yield given the best fit trends and to use these answers as the independent variables in the production equation to forecast future production. The numbers and related statistics are set forth in Appendix VI, Table 15.

Availability

Availability of rice is composed of production and imports. Rice availability from domestic production and imports is described in Table 17.

Imports. As production of rice in Sri Lanka increased, imports declined from 36.5% of available rice in the late 1960s to slightly over 10.0% in the last five years. On a per capita basis, the percentage is nearly the same, 38.5% to slightly over 10.0%.

A trend analysis is not really sufficient for analyzing imports. A linear trend projected outward in time gives a negative answer at the year 2000 as illustrated in Figure 44. This is not a realistic outcome. A curvilinear trend (exponential 0.8) gives a better fit and a more likely scenario for the near future as shown in Figure 45. However, an assessment of domestically-produced and imported milled rice available per capita indicates a relationship between these two components of rice availability. Development of a relationship for rice imports as a function of rice production was not as statistically valid as the case of rough rice production related to area and yield. However, the statistical results are as good as using linear and curvilinear trends. Further, the results presented in Figure 46 are more reliable projections of rice imports given domestic production, than are the linear and curvilinear trends.

Availability. Rice availability is presented in Table 17. The trend over time for total available rice is extremely steep, rising from 1.1 million mt in 1965 to 1.8 million mt as depicted in Figure 47.

When availability is reduced to a per capita basis, the trend in availability dampens to an increase over time of slightly over 0.25% per year. Per capita availability and its long-run trend is presented in Figure 48. Per capita consumption based on the various surveys is plotted against availability in Table 17 and Figure 48. Since Sri Lanka is not an excess rice producing country, survey per capita consumption should reliably match with per capita availability. Survey per capita consumption in kg per year ranges both above and below availability as set forth below.

<u>Survey Period</u>	<u>Annual Per Capita Consumption</u>		
	<u>Survey</u>	<u>Availability</u>	<u>Difference</u>
	<u>Kilograms</u>		
1969/70	95.0	105.9	-10.5
1973	86.8	87.6	- 0.8
1978/79	90.9	94.8	- 3.9
1980/81	109.6	105.4	+ 4.2
1981/82	107.0	103.3	+ 3.7
1984/85	106.0	109.8	- 3.8
1985/86	103.7	117.8	-14.1
1990/91	109.7	101.0	+ 8.7

With the exception of 1973 and 1985/86, the difference between the survey data and the calculated availability is close enough (less than 10.0%) to establish that the availability table is reliable. On-farm use, animal feed use, and the consumption of rice-based products which was not picked up from the survey data, could easily account for negative differences. In total, there is only 2.0% difference between survey data and calculated availability. This establishes the credibility of using both survey data and availability data to project future demand.

Short-term trends of per capita availability for rice are illustrated in Figure 49. These trends indicate a downward movement in rice availability in the short-run. However, these trends are not reflective of the long-term, but indicate

that production of rice, as well as imports, have not kept pace with population growth.

Prices

Rice prices are set forth in Table 18. Producer prices in milled-rice equivalent were substantially higher than import prices until 1978. From 1979 onwards, over various time frames, they have been above and below imported rice prices. This price movement is best reflected in the farm to import price ratio in Table 18.

The difference between weighted cost of rice (production and imports) and the average retail cost to the consumer has widened over time to reflect increased marketing margins (wholesale and retail price spreads). However, marketing margins are mostly in the range of 25.0% to 35.0%. In general, the marketing margins remain around the 30.0% range. Therefore, the farmers share of consumer price has been relatively stable throughout the 1980s and early 1990s.

A review of wholesale and retail prices in the Colombo market bears out the above findings. Utilizing the raw white rice category as the best type of rice to compare with milled-rice equivalent producer price, the following results were generated:

Year	Rupees per Kiloqram			Farmers Share of Consumer Price
	Retail	Wholesale	Farm	
1990	15.11	13.07	10.95	73.0%
1991	15.20	13.85	10.62	70.0%
1992	16.35	14.20	11.92	73.0%

Year	Margin			Marketing Margin
	Retail	Wholesale	Total	
1990	2.04	2.12	4.16	27.5%
1991	1.35	3.23	4.58	30.1%
1992	2.15	2.28	4.43	27.1%

There are no excess margins. The farmers share of consumer price is relatively high compared to countries with excess production. In fact, prices for rice may be too low. If the average annual retail price of rice is deflated to real terms, the consumer price of rice has gradually declined since 1975. This is illustrated in Figure 50.

Producer Price and the Cost of Production

Producer prices versus cost of production are presented in Table 19. Cost of production is based on only nine years of complete data and three years of very incomplete data. Consequently, cost of rice production had to be prorated from these base periods over time using an index. The cost per metric ton was calculated based on the cost per hectare using the national average yield. This really results in only a minimal overview of the relationship between producer price and the cost of production. As shown in Table 19, and illustrated in Figure 51, there is a positive production margin. The variations in "price less

cost" are reflective of inter-year yield variations since costs were converted to a metric ton basis to measure against price. The basic data for construction of cost of production is attached in Appendix VI, Tables 24 and 25.

While there seems to be an increasing trend in the production margin, this is mostly illusory. Average producer prices deflated reveal that the farmer's purchasing power is no greater in 1992 than it was in the late 1960s. This is shown in Figure 52.

Price and Production Relationships

Price/Production relationships were analyzed to determine (1) what has caused the decline in cultivated rough rice area, and (2) the variation in year-to-year changes in cultivated area.

Production is a function of area and yield. Yield factors should be mostly influenced by weather, water availability, farm management practices, and the ability to afford necessary inputs. In the case of yield, annual fertilizer use was regressed against annual yield for the period 1978 - 1990. The resulting correlation was 0.02 for the same period. Lagging fertilizer use one year did result in a correlation of 0.18. While not statistically significant, the regression analysis does raise a basic question. Even though there is a positive production margin, is this margin so narrow that the producer lacks the necessary monetary resources with which to generate higher yields?

Most farmers will respond to commodity price movements by shifting crop patterns or cultivated area of a crop. Producer prices, production margins, shifts in producer prices, and shift in production margins were regressed against cultivated area and changes in cultivated area. The best correlation that could be derived says that $price_t$ and $price_{t-1}$ explain 22.0% and 20.0% of the change in cultivated area, respectively. Again, this is not statistically significant. All other correlations were less than 0.03, meaning that no relationship existed. All the relationships analyzed are attached in Appendix VI, Table 26.

TABLE 16
CULTIVATED AREA, YIELDS, PRODUCTION
ROUGH RICE

Year	Planted Area			Yield			Production		
	Maha Ha	Yala Ha	Total Ha	Maha Kg/Ha	Yala Kg/Ha	Total Kg/Ha	Maha Mt	Yala Mt	Total Mt
1965	398,452	190,519	588,971	1,759	1,759	1,759	669,866	275,459	945,326
1966	424,956	229,386	654,344	1,852	1,807	1,837	640,651	313,022	953,673
1967	426,468	236,798	663,266	2,106	2,166	2,128	728,297	417,362	1,145,659
1968	464,168	241,000	705,168	2,449	2,297	2,397	907,763	440,317	1,348,080
1969	478,349	213,335	691,684	2,652	2,488	2,595	979,873	394,311	1,374,184
1970	482,183	276,845	759,028	2,692	2,567	2,645	1,032,662	583,288	1,615,950
1971	464,370	261,495	725,865	2,315	2,458	2,367	867,159	528,621	1,395,780
1972	480,000	246,270	726,270	2,478	2,296	2,414	883,163	429,281	1,312,444
1973	477,122	248,132	725,254	2,448	2,206	2,299	876,423	436,000	1,312,423
1974	533,314	291,477	824,791	2,461	2,152	2,354	1,098,116	504,208	1,602,324
1975	443,481	252,335	695,816	2,384	2,106	2,271	718,974	435,186	1,154,160
1976	464,169	259,785	723,954	2,432	2,078	2,319	882,140	370,483	1,252,623
1977	538,000	290,000	828,000	2,657	2,268	2,424	1,144,103	533,190	1,677,293
1978	575,000	301,000	876,000	2,732	2,403	2,465	1,285,841	604,652	1,890,493
1979	578,069	260,557	838,626	2,820	2,575	2,748	1,393,046	524,176	1,917,222
1980	573,436	271,211	844,647	2,951	2,887	2,930	1,453,324	679,872	2,133,196
1981	596,691	280,054	876,745	3,005	2,934	2,983	1,522,348	706,998	2,229,346
1982	567,246	276,918	844,164	3,150	3,332	3,218	1,362,771	792,058	2,154,829
1983	582,887	241,214	824,101	3,638	3,604	3,628	1,785,924	697,507	2,483,431
1984	606,441	383,758	990,199	3,031	3,146	3,080	1,353,354	1,060,234	2,413,588
1985	568,743	311,948	880,691	3,498	3,343	3,467	1,751,029	910,182	2,661,211
1986	555,209	340,110	895,319	3,585	3,287	3,494	1,688,138	906,966	2,595,104
1987	507,830	273,396	781,226	3,678	3,362	3,563	1,392,468	735,364	2,127,832
1988	544,628	323,182	867,810	3,440	3,370	3,414	1,524,661	951,952	2,476,613
1989	468,850	258,108	726,958	3,429	3,279	3,375	1,342,437	721,357	2,063,794
1990	530,726	325,981	856,707	3,564	3,266	3,453	1,647,000	891,000	2,538,000
1991	500,508	290,446	790,954	3,620	3,048	3,460	1,554,000	835,000	2,389,000
1992	548,190	255,050	803,240	3,512	3,252	3,424	1,630,000	709,700	2,339,700
1993							*1,688,000	734,900	2,422,900
							**1,690,317		

* Central Bank estimates.
** Agriculture estimates.

Source: Appendix VI, Tables 1, 2, 3, 4, 6, 7, 8, and 9

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TABLE 17

RICE AVAILABILITY

Year	Domestic	Milled	Rice	Total	Per	Per	Per	Per	Per
	Rough Rice Production 1000Mt	Rice Production 1000Mt	Imports 1000Mt	Rice Available 1000MT	Capita Available Kq	Capita Survey Points Kq	Capita Long-Run Trend Kq	Capita Short-Run Trend 1 Kq	Capita Short-Run Trend 2 Kq
	(1)	(2)	(3)						
1965	945.3	578.5	550.5	1,129.0	101.1	.	95.19		
1966	953.7	583.7	492.4	1,076.1	94.1		95.49		
1967	1,145.7	701.2	380.7	1,081.9	92.4		95.78		
1968	1,348.1	825.0	349.3	1,174.3	97.9		96.08		
1969	1,374.2	841.0	264.4	1,105.4	90.2		96.37		
1970	1,616.0	989.0	534.0	1,523.0	121.7	95.0	96.67		
1971	1,395.8	854.2	339.2	1,193.4	94.7		96.96		
1972	1,312.4	803.2	265.8	1,069.0	83.1		97.26		
1973	1,312.4	803.2	343.1	1,146.3	87.6	86.8	97.55		
1974	1,602.3	980.6	301.8	1,282.4	96.5		97.85		
1975	1,154.2	706.4	459.3	1,165.7	86.4		98.14		
1976	1,252.6	766.6	425.0	1,191.6	86.9		98.44		
1977	1,677.3	1,026.5	542.4	1,568.9	112.5		98.73		
1978	1,890.5	1,157.0	169.2	1,326.2	93.5		99.03		
1979	1,917.2	1,173.3	211.5	1,384.8	95.7	90.9	99.32		
1980	2,133.2	1,363.5	189.5	1,553.0	105.4		99.62	108.34	
1981	2,229.3	1,425.0	157.0	1,582.0	105.4	109.7	99.91	107.49	
1982	2,154.8	1,377.3	160.9	1,538.2	101.2	101.2	100.21	106.65	
1983	2,483.4	1,587.4	119.5	1,706.9	110.7		100.50	105.81	
1984	2,413.6	1,542.8	26.5	1,569.3	100.6		100.80	104.96	
1985	2,661.2	1,701.0	182.4	1,883.4	118.9	106.4	101.09	104.12	111.14
1986	2,595.1	1,658.8	220.2	1,879.0	116.6	103.7	101.39	103.28	108.65
1987	2,127.8	1,360.1	102.4	1,462.5	89.4		101.68	102.43	106.16
1988	2,476.6	1,583.0	188.7	1,771.7	106.8		101.98	101.59	101.67
1989	2,063.8	1,319.2	130.7	1,449.9	86.3		102.27	100.74	101.18
1990	2,538.0	1,622.3	172.0	1,794.3	105.6	109.7	102.57	99.90	98.69
1991	2,389.0	1,527.0	133.0	1,660.0	96.3		102.86	99.06	96.20
1992	2,339.7	1,495.5	237.0	1,732.5	99.5		103.16	98.21	93.72

(1) Table 16.

(2) Calculated: 1965-1979 seed usage 4.0%, postharvest loss 6.0%, milling rate 68.0%; 1980-1992 seed usage 2.0%, postharvest loss 4.0%, milling rate 68.0%.

(3) Appendix VI, Table 17.

TABLE 18
PRICES FOR RICE

Year	Average Producer Price Milled Equivalent	Base Imported Rice	Weighted Average Cost of Rice	Retail Price	Marketing Margin Domestic Produced Rice	Marketing Margin All Rice	Ratios		
	Rs/Kg	Rs/Kg	Rs/Kg	Rs/Kg	%	%	Farmers Share of Consumer Price	Farm to Import	Retail to Farm
1965	0.85	0.62	0.76	0.91	7.5	16.6	92	1.36	1.08
1966	0.85	0.52	0.74	0.87	2.8	15.6	97	1.62	1.03
1967	0.96	0.63	0.88	1.20	19.9	26.8	80	1.53	1.25
1968	1.08	0.96	1.05	1.29	16.3	18.3	84	1.13	1.19
1969	1.07	0.60	1.00	1.31	18.3	24.0	82	1.79	1.22
1970	1.04	0.66	0.95	1.30	19.8	27.1	80	1.58	1.25
1971	1.02	0.55	0.93	1.27	19.7	26.9	80	1.84	1.24
1972	1.04	0.54	0.96	1.45	28.2	34.1	72	1.95	1.39
1973	1.88	0.94	1.69	2.96	36.5	43.2	63	2.01	1.58
1974	3.14	2.61	3.06	5.01	37.4	39.0	63	1.20	1.60
1975	2.95	2.13	2.72	3.60	18.2	24.6	82	1.38	1.22
1976	2.63	1.70	2.40	3.31	20.3	27.5	80	1.55	1.26
1977	2.48	1.74	2.30	3.18	22.1	27.8	78	1.42	1.28
1978	2.87	3.75	2.94	3.52	18.4	16.4	82	0.77	1.23
1979	2.96	4.21	3.09	3.84	22.8	19.6	77	0.70	1.30
1980	3.63	4.65	3.71	4.78	24.1	22.4	76	0.78	1.32
1981	4.73	5.95	4.81	6.35	25.5	24.3	74	0.79	1.34
1982	5.02	5.78	5.07	6.80	26.2	25.4	74	0.87	1.35
1983	5.25	5.02	5.24	7.28	27.8	28.0	72	1.05	1.39
1984	5.21	4.68	5.20	8.21	36.6	36.6	63	1.11	1.58
1985	5.60	5.10	5.57	8.42	33.5	33.9	66	1.10	1.50
1986	5.70	4.57	5.61	8.32	31.5	32.5	69	1.25	1.46
1987	6.00	5.88	5.99	8.43	28.9	28.9	71	1.02	1.41
1988	6.26	8.46	6.41	9.12	31.4	29.7	69	0.74	1.46
1989	8.35	9.73	8.43	12.82	34.9	34.3	65	0.86	1.54
1990	10.95	11.09	10.96	15.28	28.3	28.3	72	0.99	1.40
1991	10.62	11.95	10.96	15.49	31.4	29.2	69	0.89	1.46
1992	11.92	12.05	11.93	16.35	27.1	27.0	73	0.99	1.37

Source: Appendix VI, Tables 17, 18, 19, 20, and 21.

TABLE 19

PRODUCER PRICES AND THE COST OF PRODUCTION
(Rupees per Metric Ton)

<u>Year</u>	<u>Average Producer Price</u>	<u>Average Cost of Production</u>	<u>Price Less Cost</u>	<u>GPS Price</u>	<u>Deflated Average Producer Price</u>
1965	539	888	(313)	575	539
1966	530	849	(274)	575	521
1967	654	749	(95)	599	623
1968	734	704	30	671	650
1969	729	698	31	671	612
1970	709	726	(17)	671	557
1971	692	832	(140)	671	534
1972	710	868	(158)	683	516
1973	1,279	999	280	922	826
1974	2,136	1,096	1,040	1,422	1,208
1975	2,005	1,213	792	1,581	1,053
1976	1,791	1,201	590	1,581	951
1977	1,687	1,164	523	1,637	890
1978	1,952	1,283	669	1,917	882
1979	2,015	1,275	740	1,917	821
1980	2,466	1,614	852	1,997	779
1981	3,216	2,202	1,014	2,526	864
1982	3,413	2,245	1,168	2,755	813
1983	3,573	2,195	1,380	2,955	757
1984	3,542	2,700	834	2,995	636
1985	3,807	2,484	1,323	3,055	683
1986	3,876	2,742	1,134	3,354	648
1987	4,078	2,783	1,295	3,354	628
1988	4,255	3,310	945	3,554	569
1989	5,675	3,736	1,939	3,834	688
1990	7,448	4,436	3,012	5,032	733
1991	7,223	4,865	2,358	6,270	635
1992	8,107	5,476	2,631	6,469	637

Source: Appendix VI, Tables 18, 24, and 25.

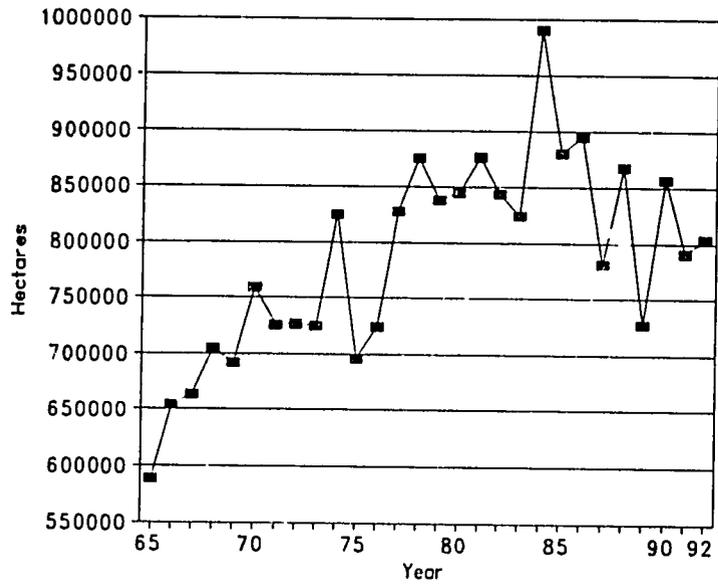


FIGURE 35. Total Cultivated Rough Rice Area.

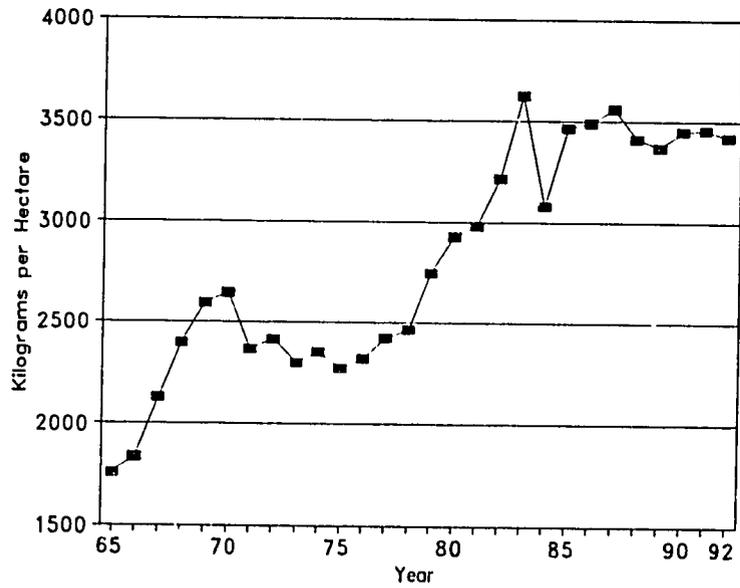


FIGURE 36. Yield per Hectare for Rough Rice.

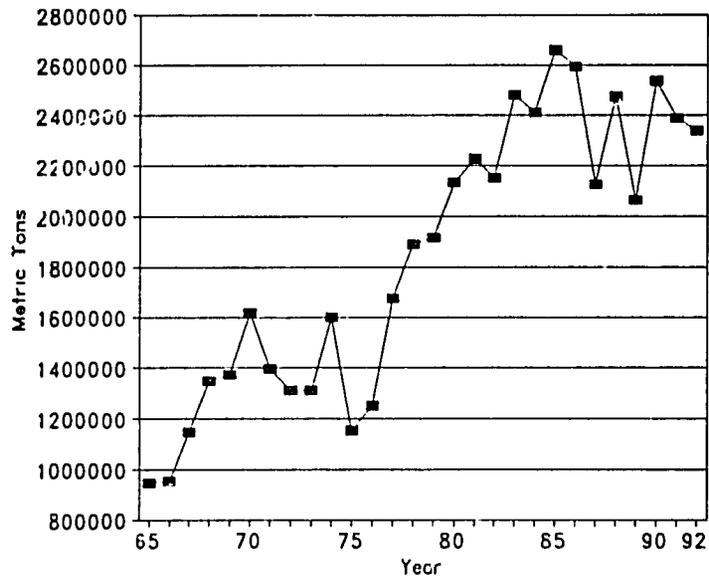


FIGURE 37. Production of Rough Rice, 1965 - 1992.

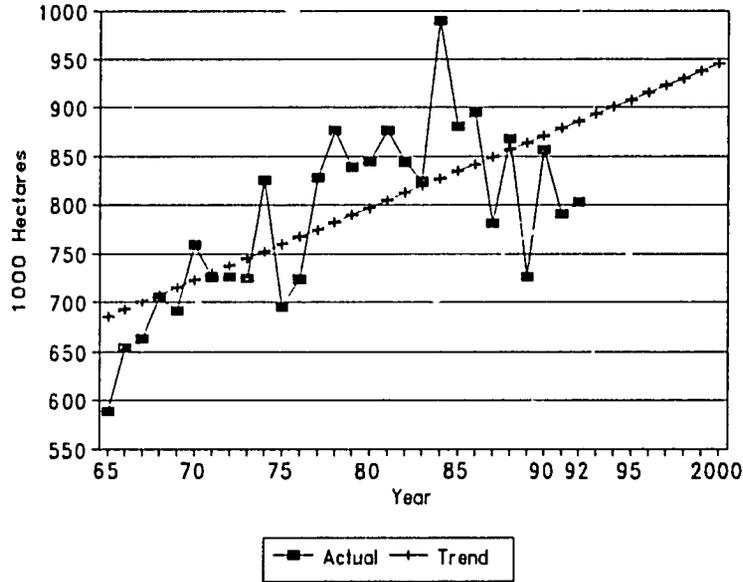


FIGURE 38. Cultivated Area of Rough Rice With Linear Trend.

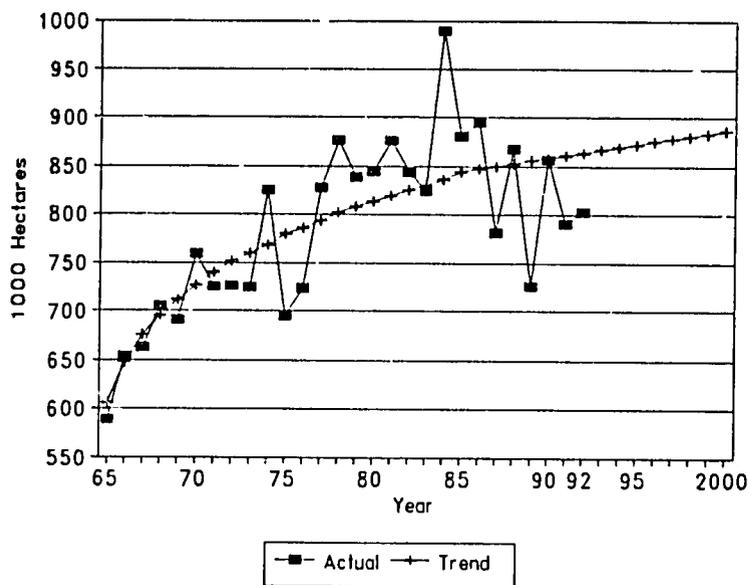


FIGURE 39. Cultivated Area of Rough Rice With Curvilinear Trend.

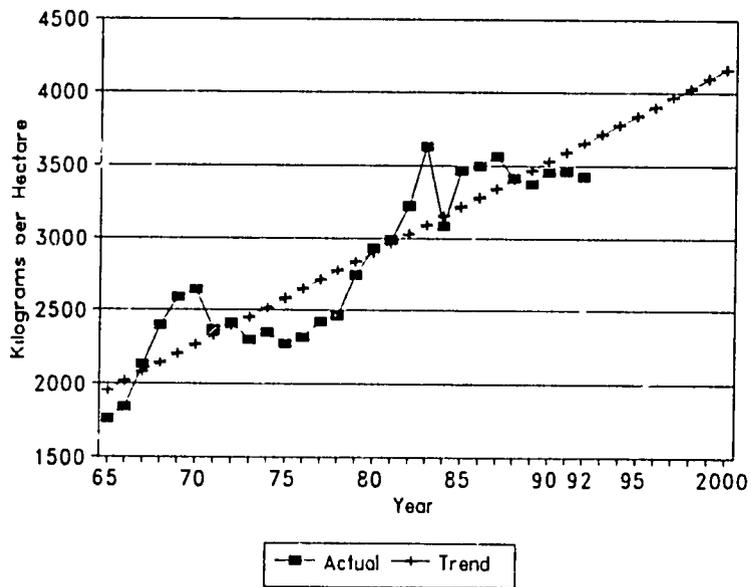


FIGURE 40. Yield per Hectare of Rough Rice With Linear Trend.

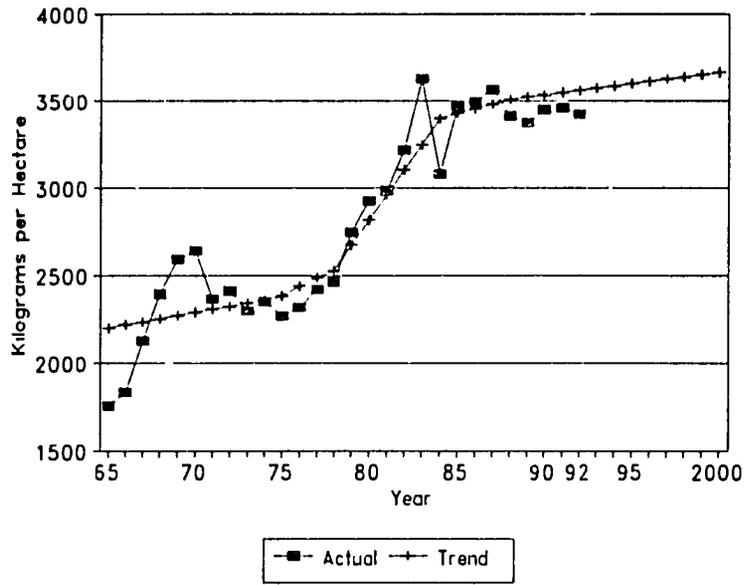


FIGURE 41. Yield per Hectare of Rough Rice With S-Curve Trend.

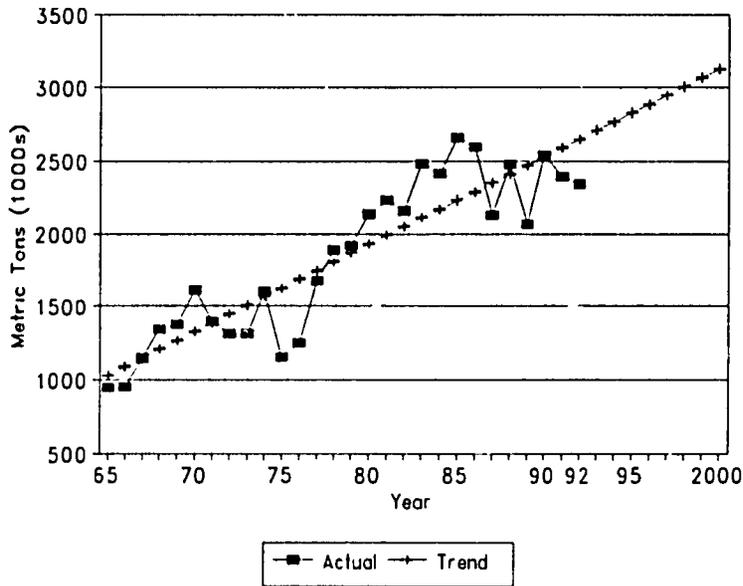


FIGURE 42. Production of Rough Rice With Linear Trend.

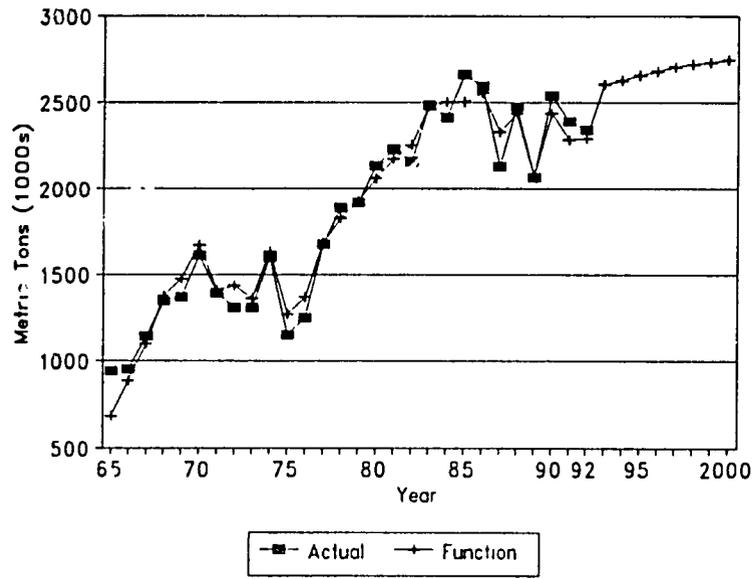


FIGURE 43. Production of Rough Rice With Production Function Based on Cultivated Area and Yield.

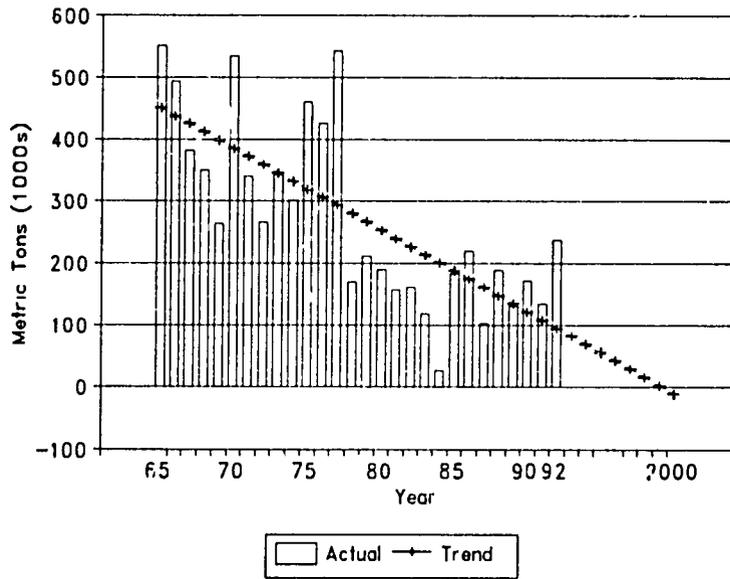


FIGURE 44. Rice Imports With Linear Trend.

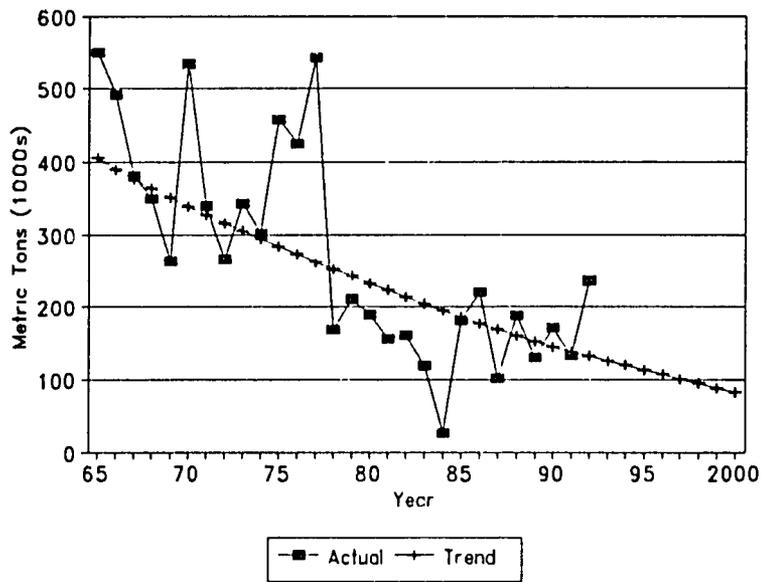


FIGURE 45. Rice Imports With Curvilinear Trend.

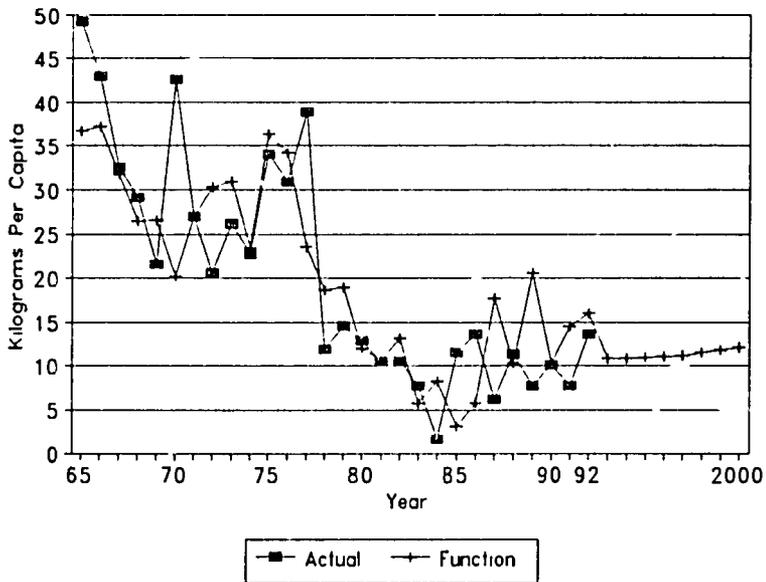


FIGURE 46. Rice Imports as a Function of Rough Rice Production.

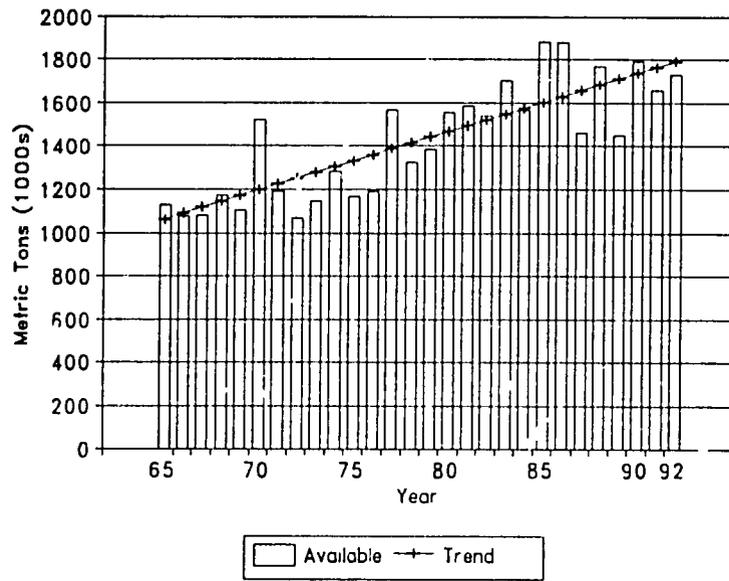


FIGURE 47. Total Rice Availability With Linear Trend.

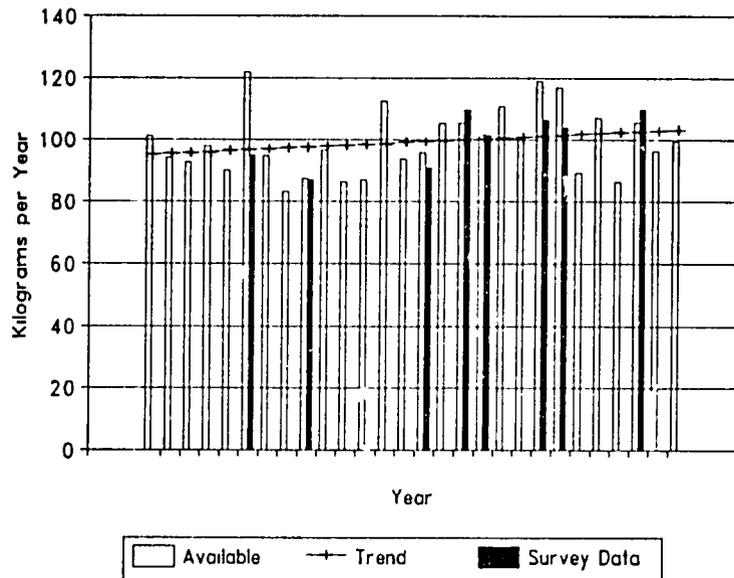


FIGURE 48. Annual Per Capita Rice Availability With Long-Term Trend.

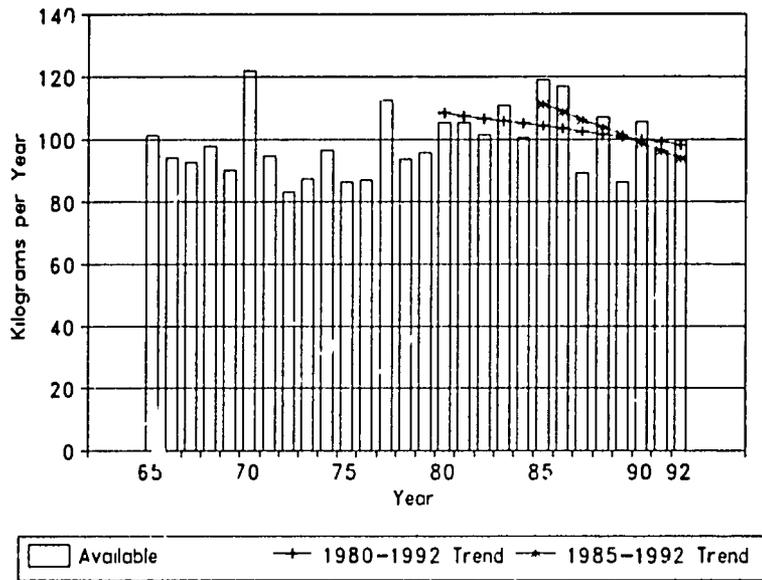


FIGURE 49. Annual Per Capita Rice Availability With Short-Run Trends.

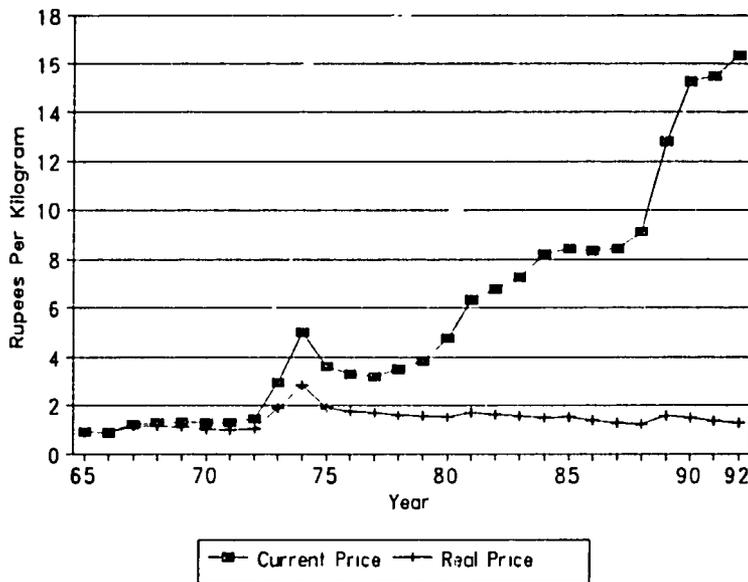


FIGURE 50. Average Consumer Price for Rice, Current and Real.

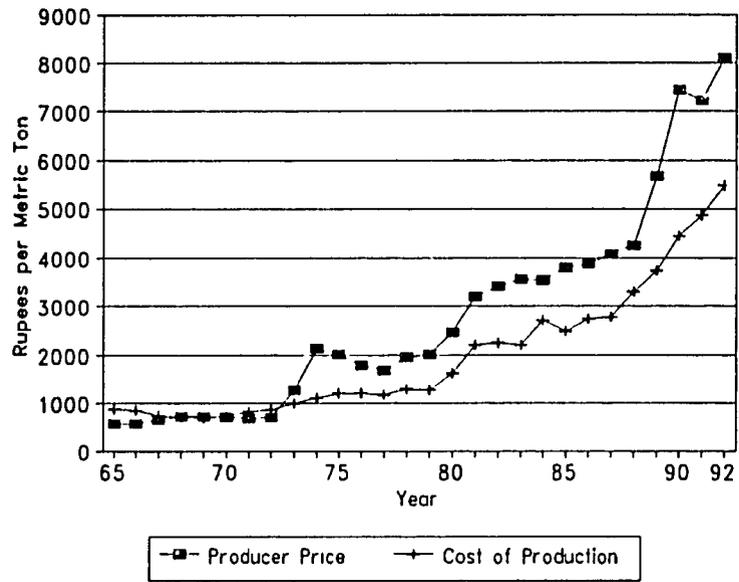


FIGURE 51. Average Producer Price for Rough Rice and the Cost of Production.

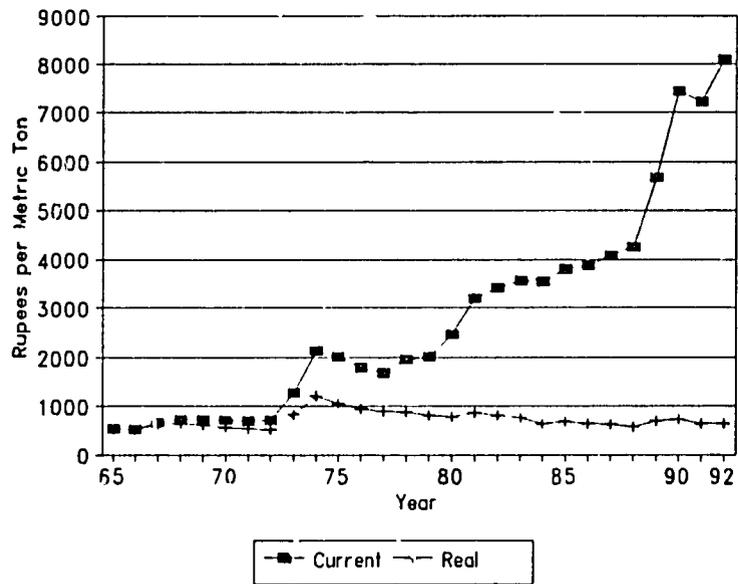


FIGURE 52. Average Producer Price for Rough Rice, Current and Real.

SECTION VI

RELATIONSHIP BETWEEN WHEAT FLOUR AND RICE

As stated in the section on consumption, survey data indicate that wheat flour is a secondary cereal to rice. However, the large demand for wheat flour at lower income levels indicates that wheat-based products are an important part of the diet for low-income consumers.

Availability

Per capita availability of rice plus all wheat flour (consumed as either flour, bread, or other products) is illustrated in Figure 53. The figure clearly shows that wheat flour added to rice consumption provides a total cereals consumption that has ranged around 130 kg per capita per annum over the 1965 to 1992 period. The per capita availability trend for these two cereals is slightly upward at a growth rate of 0.2% per year. In the case of availability, imported wheat and wheat flour is utilized to provide adequate cereal availability when rice production declines and rice imports are low.

Elasticity of Demand

The marketing definition of elasticity is the buyers reaction to a price and/or income change. For example, if there is a price change, the magnitude of the buyers response (increased or decreased purchasing in quantity terms of the product in question or related products) is called the price elasticity of demand.

Constraints in Calculating and Use of Elasticities. The major constraint in calculating price elasticities is not only the lack of adequate data, but the fact that the wheat flour system was under rigorous price control till late 1992. Although the rice market was liberalized beginning in 1980, there is not enough precise data to indicate preference due to price. As in many staple products, rice is not rice -- "to buy or not buy rice" is not the question. The question is the price versus type and quality. If one cannot afford a given type or quality of rice, then one can always buy a lesser type and/or lower quality.

Calculating income elasticities across income levels and from time point to time point is not as constrained. The important issue in utilizing income elasticities is the accuracy and alignment of income data.

A final constraint in utilizing any price and income elasticities generated is the fact that Sri Lanka is a deficit cereal producing nation. Everything produced or imported is consumed. There is no surplus in the system that allows the consumer a valid choice based on price differentials or buying power.

Price Elasticity of Demand. Only one data source could be found that had any information on price elasticity of demand. Price elasticities were calculated from household survey data for the periods 1980 to 1985, and 1985 to 1990. A summary of the results is presented in Table 20. The negative and positive indicators are wrong in some cases. Some elasticities have extremely high

values, and are considered unreliable. Cross-elasticities also have some incorrect negative and positive signs. The erratic consumption patterns described in Table 4, and the fact that price had to be derived from values, are the reasons for the unreliable results generated.

Basically, what the own-price elasticities indicate is that cereals are inelastic. In other words, a percentage shift in prices is responded to by a percentage shift in consumption that is less than the percentage shift in price. This is as expected.

Income Elasticity of Demand. Income elasticities were taken from Central Bank surveys and calculated from DCS Surveys. They are presented in Table 21. The income elasticities seem to be reliable indicators of change in consumption patterns as income increases. The negative income elasticities indicate that the product is considered an inferior good. For wheat flour, this may be the case since consumption patterns for the surveys indicate that wheat flour consumption as flour declines after reaching midpoint in the income scale. In many cases for wheat flour as flour, the high use at the very bottom of the low-income group would generate this type of result. Further, per capita consumption of wheat flour as flour has been declining over the survey time periods, while wheat flour consumed as bread has been increasing.

Income elasticities for rice show a gradual decrease over time, implying that other food preferences are more important as income increases. Bread has a strangely unstable pattern; however, the ranges of .12 - .14 are relevant given the consumption data by income group in Appendix III, Tables 9, 11, 12, 13, and 14; and the upward general per capita increase in bread consumption.

Income elasticities calculated for sectors (Appendix VII, Table 4) indicate different income related demand among various cereal products. This is especially apparent among the wheat-based product group. Increase in flour preparations and bread consumption is more responsive to income change in the estate sector than other sectors. Increase in bread consumption is more responsive to income change in the urban sector than the rural sector. In the 1990/91 survey, all sectors indicated that wheat flour as flour was considered an inferior good and consumption declined as income increased.

To summarize, three factors are evident:

- The available price elasticities are not suitable for predicting future demand or changes in future consumption patterns based on consumer reaction to price.
- Survey information for developing price elasticities in the future would be very useful, now that both the rice and wheat flour markets are deregulated in terms of price. This will require surveys that measure all the various rice and wheat-based products in the market.
- Income elasticities are not relevant in forecasting changes in consumption patterns unless changes in income can be forecast. They are extremely relevant in understanding past changes in consumption patterns and the consequent implication for the future.

Imports

Figure 54 presents the diagram of movements of total cereal imports and their related components: wheat/wheat flour and rice imports. The figure illustrates that the relative relationship between these two imports is the similarity of movement over time as both rice and wheat/wheat flour imports are utilized to provide for the difference between consumption need and local rice production.

Import relationships between quantities of wheat/wheat flour and rice, import quantities and rice production, price of imports to production, and price of imports to quantities of import were analyzed with regressions. Only one valid relationship was discovered.

Imports of these commodities are not related to each other. Neither import quantities nor import price have had an affect on rice production. However, the quantities of commodity imported are related to the comparative price of each imported commodity. This relationship states that the importation level of rice is sensitive to the relative prices of imported rice and imported wheat/wheat flour; and that 50.0% of the level of rice imports is explained by the relative prices. This implies that a major consideration by GSL in deciding on the level of rice imports is their price as related to wheat/wheat flour price. The importation of wheat/wheat flour does not have a relationship to relative import price of wheat/wheat flour and rice.

If this is the case, then decision-makers are trying to procure the least-cost comparable product.

Trade Relationships. The balance of trade, total imports, food imports, wheat/wheat flour imports, and rice imports are presented in Table 22. In terms of the relationship described above, the primary question is how do each of the grain imports affect the balance of trade for Sri Lanka. The deficit in Sri Lanka's balance of trade has increased over time as shown in Figure 55.

The balance of trade is highly correlated to food imports. Wheat and wheat flour imports have a higher correlation to the balance of trade than rice. This is the result of a far higher level of importation of wheat/wheat flour, even at lower cost per unit than rice.

All food, wheat, wheat flour, and rice imports as a percentage of total imports and food imports are described in Table 23. Food imports as a percentage of total imports have gradually declined over time. Wheat, wheat flour, and rice are a minor part of total imports. Yet they compose nearly 40.0% of food imports over the last 13 years, at times well exceeding 50.0% of food imports. This is illustrated in Figure 56.

The import of wheat/wheat flour has had a detrimental impact on the balance of trade. However, the impact of wheat/wheat flour importation was not as detrimental as only importing rice. If wheat/wheat flour imports had been replaced by rice during the 1980-1992 period, the impact on the balance of trade would have been an additional 16.065 billion Rupees deficit (equivalent to U.S.\$ 428.4 million). This impact on the balance of trade by year is illustrated in Figure 57.

By utilizing the wheat/wheat flour and rice import price trade-off, GSL has been rational in trying to do its best to minimize the effects of the need to import grain on the balance of trade situation.

Prices

Prices and how they are interrelated with other prices and elements are generally the key to understanding consumption. Since the use of price elasticities was not feasible, a series of wheat flour/rice price ratios were initially developed. Product prices and the related ratios are set forth in Table 24.

The purpose of the ratios was to compare respective price relationships over time. The ratio with the greatest implication for consumption is the retail rice/retail wheat flour ratio. This ratio declined from 1.8 in 1965 to 1.0 in 1980 and remained near this level until the late 1980s, at which time it gradually increased. Since the relative price of rice to wheat flour has become nearly equal, analysis of consumption versus price over a specific time frame should be expected to generate rice and total wheat flour consumption sensitivity to price.

To construct a data set, three principal criteria were used. First, the period 1973 to 1990 was selected because: (1) this gave a period of price index movement from high to low which should assist in generating consumption sensitivity to price, and (2) available survey data existed within this time frame. Second, the data set was constructed from survey data to hold consumption for rice and all wheat flour to a similar standard (although total wheat flour consumption is understated in the surveys according to availability tables). Third, survey data prices were considered unreliable. Therefore, national average prices for rice and wheat flour were utilized.³

Per capita consumption was regressed against a large number of variables. The meaningful results are presented below:⁴

Dependent	Independent	R Squared Value
(1) Total Wheat Flour	Price of Wheat Flour	0.102962
(2) Total Wheat Flour	Price of Wheat Flour and Rice	0.326673
(3) Total Wheat Flour	Price of Wheat, Price of Rice, Consumption of Rice	0.723618
(4) Rice	Price of Rice	0.58014
(5) Rice	Price of Rice and Wheat Flour	0.8081
(6) Rice	Price of Rice, Price of Wheat Flour, Consumption of Wheat Flour	0.92123

³There are statistical shortcomings in this approach. The short time series results in low degree of freedom. Therefore, for many of the equations the statistical significance is not valid or is extremely low. R Squared values are extremely low. Only the rice consumption equation (6) is statistically significant. Further, the general equations (3) and (6) could be considered as spurious since they have the interrelations of cereals in each equation.

⁴Regression analysis results are attached in Appendix VII, Table 5.

What these equations reveal is that the consumption of rice and wheat-based products are tightly interwoven. The two equations which explain most of the consumption are (3) and (6). These equations explain that the consumption of rice and all wheat flour are interrelated. The primary cereal is rice and the secondary cereal is all wheat flour (wheat-based product). The influence of rice in the wheat flour equation is greater than the influence of wheat flour in the rice equation. Thus the categorization of rice and wheat flour as primary and complementary cereals.

The equation for total wheat flour regressed against flour price results in a constant of 30.93 with a negative beta coefficient. A change of 1.0% in the price of wheat flour reduces quantity consumed by 0.03%. Consumption of total wheat flour to price has a slight negative sensitivity. Consumption of total wheat flour is more price sensitive to rice price than to flour price. If the price of wheat flour is held constant, and the price of rice rises 1.0%, then total wheat flour consumption rises 1.6%.

The equation for rice consumption regressed against rice price results in a constant of 90.25 with a positive beta coefficient. This essentially states that rice (in general) is not price sensitive (an increase in price of 1.0% generates an increase in consumption of 0.02%). Consumption of rice is not as sensitive to changes in wheat flour price as wheat flour is to changes in rice price. If the price of rice is held constant, and the price of wheat flour increases 1.0%, then rice consumption increases 0.9%.

Based on these equations, a price elasticity table would be as follows.

<u>Price</u>	<u>Consumption</u>	
	Rice	All Wheat Flour
Rice	0.02	1.6
All Wheat Flour	0.9	-0.03

The only statements that can be made are:

- Rice consumption is not related to price.
- Total wheat flour consumption is slightly sensitive to flour price.
- The cross-elasticities are no more rational than those previously generated and discussed. A 1.0% shift in the price of rice will not shift consumption in all wheat flour 1.6%, especially when rice consumption is not related to price. A 1.0% shift in the price of wheat flour will not shift rice consumption 0.9%. This is almost at the point of rice becoming a price elastic product.

An additional set of equations was developed, utilizing availability tables and average prices for the 1965 - 1992 time period. The purpose was to compare the results generated with the results of the survey data. Based on the equations, the resulting elasticity table is as follows.

<u>Price</u>	<u>Consumption</u>	
	Rice	All Wheat Flour
Rice	0.05	0.66
All Wheat Flour	1.3	-0.18

In general, the results are similar. Signs are the same, values are greater except for rice price change to all wheat flour consumption. There is no evidence of any factors which would change the statements made above.

Consumption of Wheat as Flour in the Home Versus Bread. Utilizing the same data base and approach, the equations generated the following results tabulated into an elasticity table.⁵

<u>Price</u>	<u>Consumption</u>	
	Flour	Bread
Flour	-7.4	4.6
Bread	16.4	0.16

The statements that can be made are:

- Wheat flour consumption in the home is elastic (a change in price of 1.0% decreases/increases consumption more than 1.0%). This is highly questionable, if not totally unbelievable.
- Bread is not price sensitive.
- The cross elasticities are even less rational than those developed for rice and all wheat flour. A 1.0% change in the price of bread will in no way increase wheat flour consumption in the home 16.0%.

Conclusions. The only rational conclusions that can be drawn from the consumption/price relationship equations are:

- Rice (all rice) consumption is not sensitive to price.
- Total wheat flour consumption may be slightly sensitive to price.
- Bread consumption is not sensitive to price.
- Levels of wheat flour consumption in the home are motivated by other factors than price.
- The primary cereal is rice and the secondary cereal is wheat-based products. No evidence of substitutability of wheat-based products for rice can be concluded.

⁵An interesting note: The regression correlations were statistically more valid than the consumption/price tests for rice and all wheat flour.

- What all of this implies is that price has little or no impact on consumption of cereals. The restrictions of availability and low income apply. The factor of fixed prices in wheat-based products really precludes a worthwhile price analysis of wheat flour use.
- Price increases alone, at best, have only caused very minimal shifts in consumption. The greatest impact of price increase has been to (1) increase food expenditures as a percent of total household expenditures, or (2) increase expenditure on a given cereal as a percent of total food expenditures. There is evidence of both of these occurrences in the consumption survey data presented in Section II.

TABLE 20

OWN-PRICE AND CROSS-PRICE ELASTICITIES

Assumed to be From 1981/82 Data Sources
Rice Wheat

	1980-1985				1985-1990			
	Wheat				Wheat			
	Rice	Flour	Bread	Flour P*	Rice	Flour	Bread	Flour P
National								
Rice	-0.09	0.59	0.83	4.13	0.02	-0.37	0.11	0.50
Wheat Flour	-0.05	0.35	0.49	2.43	0.02	-0.36	0.11	0.48
Bread	-0.05	0.34	0.47	2.35	0.03	-0.57	0.17	0.76
Flour P**	-0.04	0.25	0.35	1.77	0.02	-0.37	0.11	0.50
Urban								
Rice	0.00	0.00	0.00	5.60	0.03	-0.20	0.14	0.14
Wheat Flour	0.00	0.00	0.00	3.36	0.06	-0.40	0.27	0.28
Bread	0.00	0.00	0.00	2.83	-0.28	2.04	-1.41	-1.46
Flour P	0.00	0.00	0.00	2.62	-0.31	2.22	-1.53	-1.58
Rural								
Rice	-0.09	0.00	1.00	8.67	0.04	-0.41	0.06	0.68
Wheat Flour	-0.04	0.00	0.44	3.83	0.05	-0.48	0.08	0.80
Bread	-0.05	0.00	0.50	4.31	0.06	-0.56	0.09	0.93
Flour P	-0.04	0.00	0.39	3.35	0.04	-0.37	0.06	0.62
Estate								
Rice	0.53	2.06	0.00	15.95	0.06	-0.26	0.86	1.00
Wheat Flour	0.29	1.12	0.00	8.65	0.07	-0.30	1.00	1.17
Bread	0.26	1.02	0.00	7.90	0.09	-0.35	1.18	1.37
Flour P	0.60	2.35	0.00	18.18	0.05	-0.22	0.72	0.84

* Includes flour and bread

* Flour preparations and products.

Source: Appendix VII, Tables 2 and 4

TABLE 21

INCOME ELASTICITIES

	1973	1978/79	1981/82	1984/85	1990/91
Rice	0.19	0.18	0.26	-0.01	0.03
Wheat Flour	0.51	-1.69	-0.38	0.10	-0.48
Bread	0.52	0.12	0.47	0.14	0.14

Source: Appendix VII, Tables 1 and 3.

TABLE 22

BALANCE OF TRADE AND CEREAL IMPORTS
Millions of Rupees

Year	Balance of Trade*	Imports Total	All Food Imports	Rice Imports	Wheat Imports	Wheat Flour Imports	Wheat & Flour Imports
1980	(15,539.7)	33,637	6,940	756	554	1,788	2,342
1981	(20,492.1)	35,530	6,771	859	1,871	24	1,895
1982	(20,461.4)	36,876	10,922	488	1,318	59	1,377
1983	(10,194.5)	42,021	7,210	760	1,623	105	1,728
1984	(17,842.6)	46,913	6,998	87	1,636	25	1,661
1985	(20,486.8)	49,069	5,906	843	2,894	203	3,097
1986	(19,486.8)	54,559	6,246	1,052	2,371	90	2,461
1987	(19,395.7)	60,528	7,462	687	1,923	96	2,019
1988	(24,101.7)	71,030	10,214	1,808	2,800	303	3,103
1989	(24,050.0)	80,225	13,136	3,396	4,964	175	5,139
1990	(28,248.1)	107,729	15,624	1,756	3,791	1,357	5,148
1991	(42,264.4)	125,643	16,750	1,589	3,303	1	3,304
1992	(42,355.1)	162,407	18,396	2,952	4,549	2	4,551

* Adjusted.

Source: Central Bank Annual Reports

TABLE 23

CEREAL IMPORTS
Percentage of Total and Food Imports

Year	Wheat Imports as % of Total Imports	Wheat Flour Imports as % of Total Imports	Wheat & Flour Imports as % of Total Imports	Rice Imports as % of Total Imports	All Food Imports as % of Total Imports	Wheat & Flour Imports as % of Food Imports	Rice Imports as % of Food Imports	Cereal Imports as % of Food Imports
1980	1.65	5.32	6.96	2.25	20.63	33.75	10.89	44.64
1981	5.27	0.07	5.33	2.42	19.06	27.99	12.69	40.67
1982	3.57	0.16	3.73	1.32	29.62	12.61	4.47	17.08
1983	3.86	0.25	4.11	1.81	17.16	23.97	10.54	34.51
1984	3.49	0.05	3.54	0.19	14.92	23.74	1.24	24.98
1985	5.90	0.41	6.31	1.72	12.04	52.44	14.27	66.71
1986	4.35	0.16	4.51	1.93	11.45	39.40	16.84	56.24
1987	3.18	0.16	3.34	1.14	12.33	27.06	9.21	36.26
1988	3.94	0.43	4.37	2.55	14.38	30.38	17.70	48.08
1989	6.19	0.22	6.41	4.23	16.37	39.12	25.85	64.97
1990	3.52	1.26	4.78	1.63	14.50	32.95	11.24	44.19
1991	2.63	0.00	2.63	1.26	13.33	19.73	9.49	29.21
1992	2.80	0.00	2.80	1.82	11.33	24.74	16.05	40.79

Source: Table 23

TABLE 24

PRICES AND PRICE RATIOS FOR CEREAL PRODUCTS

Year	Rice				Wheat		Ratios		
	Producer Rs/Kq	Import Rs/Kq	Average Rs/Kq	Retail Rs/Kq	Import Rs/Kq	Retail Rs/Kq	Producer/ Import	Import/ Import	Retail/ Retail
1965	0.85	0.62	0.76	0.91	0.43	0.51	1.97	1.44	1.79
1966	0.85	0.52	0.74	0.87	0.45	0.55	1.88	1.16	1.58
1967	0.96	0.63	0.88	1.20	0.40	0.62	2.41	1.58	1.94
1968	1.08	0.96	1.05	1.29	0.60	0.73	1.80	1.59	1.77
1969	1.07	0.60	1.00	1.31	0.38	0.73	2.82	1.58	1.80
1970	1.04	0.66	0.95	1.30	0.58	0.73	1.80	1.14	1.78
1971	1.02	0.55	0.93	1.27	0.61	0.73	1.67	0.91	1.74
1972	1.04	0.54	0.96	1.45	0.62	0.73	1.68	0.86	1.99
1973	1.88	0.94	1.69	2.96	1.16	1.09	1.62	0.81	2.72
1974	3.14	2.61	3.06	5.01	2.10	1.91	1.50	1.24	2.62
1975	2.95	2.13	2.72	3.60	2.17	2.43	1.36	0.98	1.48
1976	2.63	1.70	2.40	3.31	1.94	2.14	1.36	0.88	1.54
1977	2.48	1.74	2.30	3.18	1.61	1.58	1.54	1.08	2.02
1978	2.87	3.75	2.94	3.52	3.25	1.84	0.88	1.15	1.91
1979	2.96	4.21	3.09	3.84	3.38	2.67	0.88	1.25	1.44
1980	3.63	4.65	3.71	4.78	4.34	4.75	0.84	1.07	1.01
1981	4.73	5.95	4.81	6.35	3.86	5.70	1.23	1.54	1.11
1982	5.02	5.78	5.07	6.80	3.61	6.53	1.39	1.60	1.04
1983	5.25	5.02	5.24	7.28	4.08	6.68	1.29	1.23	1.09
1984	5.21	4.68	5.20	8.21	3.75	7.67	1.39	1.25	1.07
1985	5.60	5.10	5.57	8.42	4.37	7.76	1.28	1.17	1.08
1986	5.70	4.57	5.61	8.32	3.74	7.90	1.52	1.22	1.05
1987	6.00	5.88	5.99	8.43	3.78	7.90	1.59	1.55	1.07
1988	6.26	8.46	6.41	9.12	5.11	7.90	1.22	1.65	1.15
1989	8.35	9.73	8.43	12.82	6.78	8.93	1.23	1.43	1.44
1990	10.95	11.09	10.96	15.28	7.62	13.59	1.44	1.46	1.12
1991	10.62	11.95	10.96	15.49	4.99	12.25	2.13	2.39	1.26
1992	11.92	12.05	11.93	16.35	6.12	12.13	1.95	1.97	1.35

Rice Producer = Average producer price of rice in milled rice equivalent.

Rice Import = Average import cost of rice.

Rice Average = Weighted base cost of rice, producer and import.

Rice Retail = Average retail price.

Wheat Import = Average import cost of wheat/wheat flour in flour equivalent.

Wheat Retail = Average fixed retail price of flour.

Ratio Producer/Import = Producer price of rice to flour import price.

Ratio Import/Import = Import price of rice to wheat flour import price.

Ratio Retail/Retail = Retail price of rice to retail price of wheat flour.

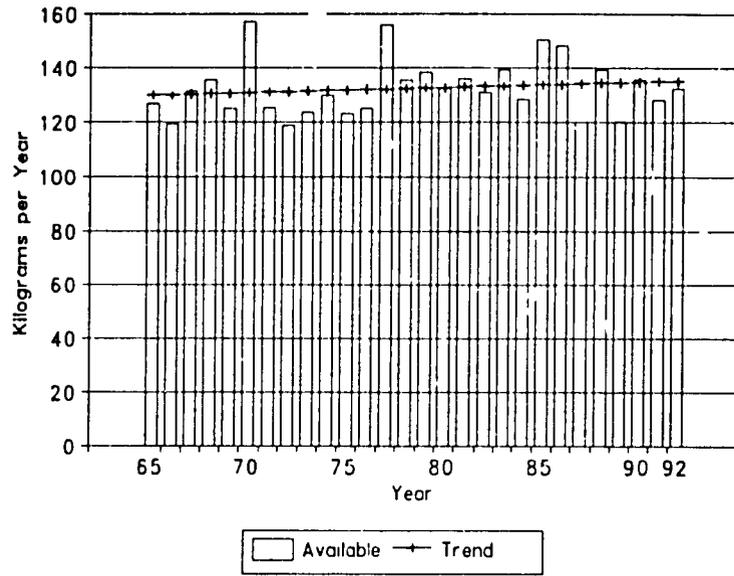


FIGURE 53. Annual Per Capita Availability of Rice and Wheat Flour With Trend.

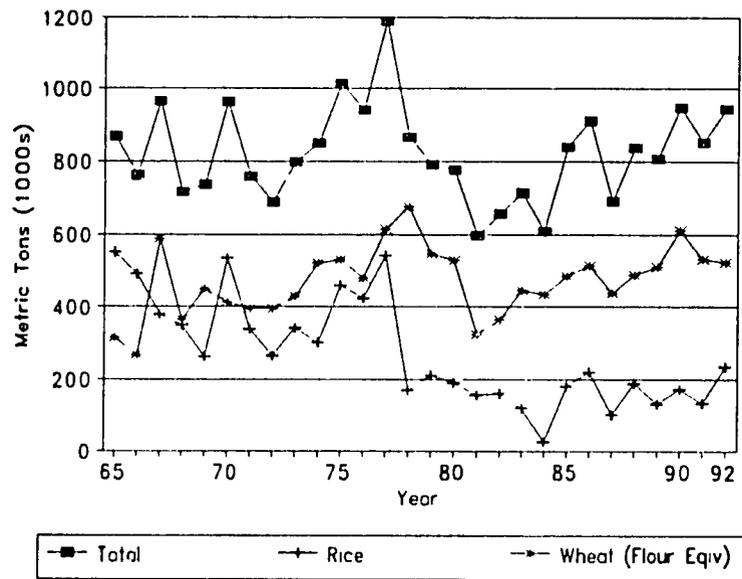


FIGURE 54. Total Cereal, Rice, and Wheat/Wheat Flour Imports.

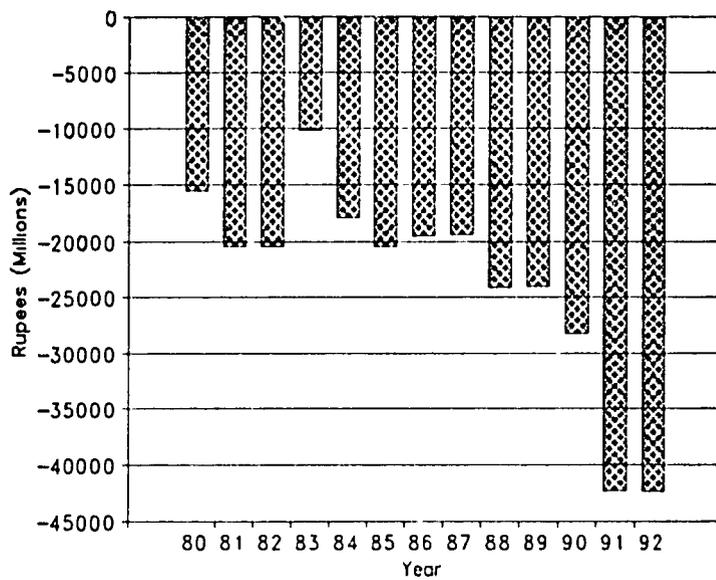


FIGURE 55. Balance of Trade.

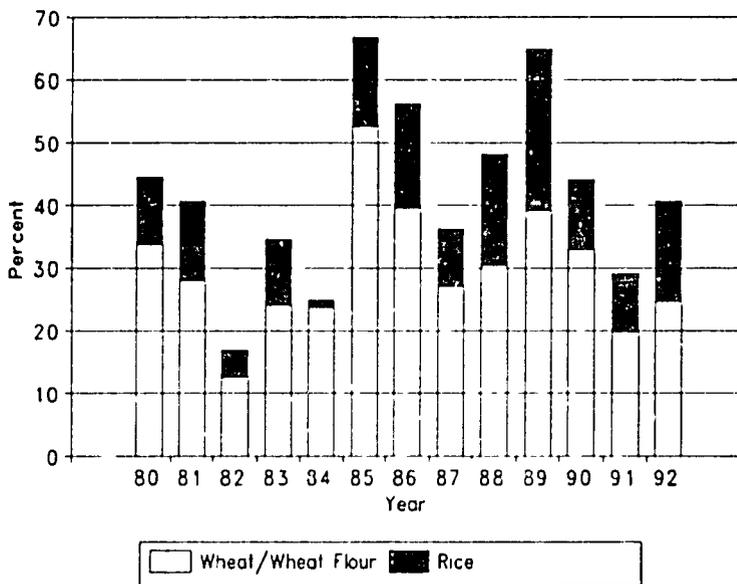


FIGURE 56. Cereal Imports as a Percentage of Food Imports.

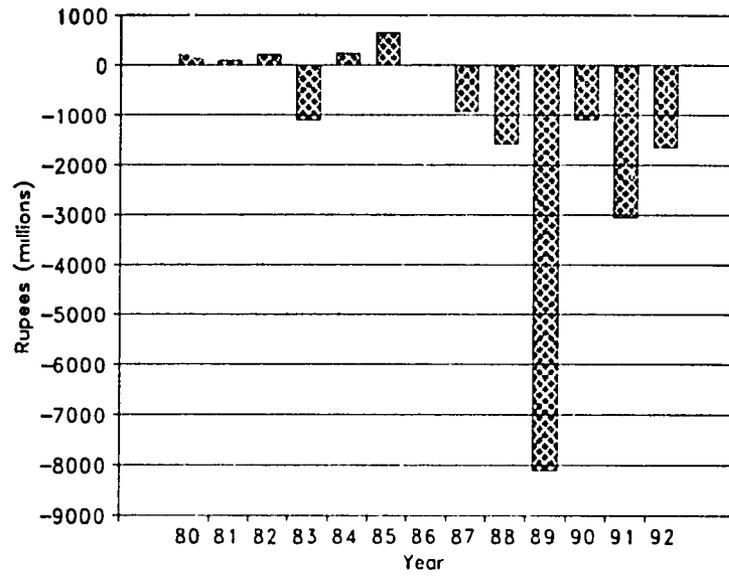


FIGURE 57. Change in Balance of Trade Resulting from Replacing Wheat with Rice.

SECTION VII

FUTURE DEMAND TRENDS AND LIBERALIZATION OF THE SYSTEM

The predominant findings in the analysis of consumption and availability of rice and wheat-based products are:

- Consumption of rice and wheat-based products is constrained by availability. All available supplies are consumed with minimal carryover of stocks from year to year.
- Different sectors of the population consume rice and wheat-based products in relatively different proportions in their diet.

Sector	<u>Percentage of Consumption</u>	
	<u>Rice</u>	<u>Total Wheat Flour</u>
National	78	22
Urban	69	31
Rural	82	18
Estate	66	34

- Per capita consumption for rice has increased over the long-term, while per capita consumption of total wheat flour has declined over the long-term.
- Per capita consumption for rice in the recent short-term has declined due to availability. Consequently, per capita consumption for total wheat flour has increased in the recent short-term.
- Per capita consumption for rice plus total wheat flour has a slight growth rate of 0.2% annually over the long-term.
- Per capita consumption of wheat flour, and in some cases bread, is extremely high in the lowest income decile relative to higher income groups.
- The primary cereal is rice. The secondary cereal is wheat-based products. There is no evidence of substitutability of wheat-based products for rice. The primary difference in use is among population sectors and income levels.
- Development of price elasticities and consumption sensitivity to price is constrained by levels of availability (no surpluses, everything is consumed year-to-year except modest carryover stocks) and wheat flour prices which were fixed by government until late 1992.
- Consumption of rice (all rice) is not price sensitive. The question is not "to buy or not buy rice" based on price, but what type and quality given relative price between types and grades.

- Consumption of total wheat flour appears to be slightly price sensitive. This must be qualified by the fact that prices were set by GSL until late 1992.
- Consumption of bread is not price sensitive.
- Consumption of wheat flour as flour used in the home is motivated by other considerations than price.
- Valid price cross elasticities of demand between rice and total wheat flour cannot be generated. The results are not rational and therefore not believable.
- The income response to cereals has been:
 - * Increased consumption of rice as incomes in general increase.
 - * Increased consumption of rice over increasing income segments until the highest segment is reached.
 - * Wheat flour used in the home is considered an inferior good in general. The usage of flour in the home declines as incomes increase.
 - * Increased consumption of bread as incomes increase.
- Cultivated rough rice area has declined 17.0% from its highs in the mid-1980s. Rough rice yields reached a plateau in the mid-1980s and have stabilized at 3,450 kg per ha. Consequently, production has declined to a current availability of about 86 kg per capita annually in milled rice equivalent.
- Importation of rice has averaged 160,000 mt per year over the past six years with an upward trend over that time period.
- Increased levels of importation of wheat to mill into flour are being used to supplement the cereal needs of the population. The importation of wheat rather than rice has had a positive influence on the balance of trade due to the relative import costs of nearly equal caloric content cereals.
- No valid relationship between the cultivated area for rough rice and producer price could be generated. No valid relationship between the cultivated area for rough rice and production margin (producer price less cost of production) could be determined. At best, price or production margin only explain 20.0% of any change in cultivated area of rough rice. No explanation can be derived for the reduction of cultivated area, and therefore production.
- No relationships between production of rice and either the importation of cereals or the price of wheat products could be established.
- There is a positive production margin (producer price less cost of production).

The implication is that the rough rice producer as a small-scale farmer is a price-taker. The producer has few other options. The only rationale for reduction of cultivated area of rough rice is that it is a result of technical or social factors, or some combination of these factors.

Future Demand and Availability

Demand needs to be defined. There are three primary definitions for demand based on how different persons use the term. The term demand is generally used to denote the amount "needed" by consumers to fulfill some expectation or requirements. Demand based on price is the amount "wanted" by consumers based on relative prices between competing products. Demand based on income is the amount "wanted" based on ability to purchase.

Domestic Production Availability. The availability projection for domestic rough rice production was based initially on projections for cultivated area and yields.⁶ The results of these trend projections were then incorporated into the production function trend to generate a projection of rough rice production.⁷ A seed and waste allowance of 6.0% and a milling rate of 68.0% was utilized to calculate milled rice availability. Population projections were based on an annualized growth rate of 1.1%.

The results of the availability projection for rice production is as follows.

Milled Rice Availability

Year	Production Projection 1000 Mt	Milled Rice Available 1000 Mt	Per Capita Milled Rice Available Kg	Population Projection 1000s
1993	2,602.2	1,663.3	94.53	17,596
1994	2,628.3	1,680.0	94.44	17,790
1995	2,654.4	1,696.7	94.33	17,986
1996	2,680.5	1,713.4	94.22	18,184
1997	2,701.8	1,727.0	93.94	18,384
1998	2,717.0	1,736.7	93.44	18,586
1999	2,732.3	1,746.5	92.95	18,790
2000	2,747.5	1,756.2	92.45	18,997

Demand Projections. Three basic scenarios were utilized in projecting demand for rice and total wheat flour.

Scenario I created a per capita demand trend based on survey data presented in Section II. The use of survey data incorporates the price and income elasticities.

⁶Appendix VI, Table 15; Figures 39 and 41.

⁷Appendix VI, Table 15; Figure 43.

ties that are inherent in the data, therefore satisfying all three of the demand definitions given above.

Scenario II created a demand trend based on income elasticities using the 1990/91 survey as the initial base period. Income growth was projected through time in real terms so as to eliminate the effect of inflationary price increases. Income demand elasticities were applied to income to create demand values for rice and total wheat flour. This implies demand based on purchasing power and deals specifically with the definition of demand as related to income.

Scenario III created a demand trend based on historic availability of rice and total wheat flour. The trend for these products in total was developed and projected into the future. This scenario involves the use of the term demand as the amount needed to fulfill requirements.

All trends were based on per capita consumption. Per capita domestic production of rice and imports were subtracted from demand trends to compute per capita availability requirement for total wheat flour. Thereafter total wheat flour and wheat grain import requirements were calculated, based on population growth. The rice import availability trend was based on the trends of imports as a function of production.⁸ The results of these scenarios are provided below.

The author believes the most viable projection is Scenario I, as it incorporates the general consumption patterns for cereals as set forth in the various consumption studies (Section II, Table 4). It also implicitly incorporates the elements of price and income demand. Scenario I^r is the upper bound for average per capita cereal demand. Scenario III is the lower bound of per capita cereal demand based on requirement.

Scenario I: Demand Trend on Survey Data

Year	Per Capita				Wheat Requirement	
	Rice & Wheat Demand Kq	Available Domestic Rice Kq	Import Rice Kq	Required Wheat Flour Kq	Wheat Flour 1000 Mt	Wheat Grain 1000 Mt
1993	139.0	94.5	10.9	33.6	591.601	799.461
1994	139.7	94.4	10.9	34.4	612.124	827.194
1995	140.5	94.3	11.0	35.2	632.814	855.155
1996	141.2	94.2	11.0	36.0	654.030	883.824
1997	142.0	93.9	11.2	36.5	677.004	914.870
1998	142.7	93.4	11.5	37.8	701.953	948.585
1999	143.5	92.9	11.8	38.7	727.281	982.812
2000	144.2	92.4	12.1	39.7	753.250	1,017.905

⁸Appendix VI, Table 15; Figure 45.

Scenario II: Demand Trend Using Income Elasticities

Year	Per Capita				Wheat	
	Rice & Wheat Demand	Available Domestic Rice	Import Rice	Required Wheat Flour	Requirement	
	Kg	Kg	Kg	Kg	Wheat Flour 1000 Mt	Wheat Grain 1000 Mt
1993	141.9	94.5	10.9	36.5	642.630	863.418
1994	143.1	94.4	10.9	37.8	671.829	907.877
1995	144.2	94.3	11.0	38.9	699.582	945.381
1996	145.3	94.2	11.0	40.0	728.008	983.795
1997	146.4	93.9	11.2	41.3	758.342	1,024.787
1998	147.5	93.4	11.5	42.5	790.804	1,068.654
1999	148.7	92.9	11.8	43.9	825.677	1,115.780
2000	149.9	92.4	12.1	45.3	861.395	1,164.047

Scenario III: Demand Based on Availability of Rice and Wheat Flour

Year	Per Capita				Wheat	
	Rice & Wheat Demand	Available Domestic Rice	Import Rice	Required Wheat Flour	Requirement	
	Kg	Kg	Kg	Kg	Wheat Flour 1000 Mt	Wheat Grain 1000 Mt
1993	136.9	94.5	10.9	31.5	553.786	748.359
1994	137.5	94.4	10.9	32.2	572.999	774.322
1995	138.2	94.3	11.0	32.9	592.356	800.481
1996	138.9	94.2	11.0	33.7	612.214	827.316
1997	139.6	93.9	11.2	34.5	633.806	856.494
1998	140.3	93.4	11.5	35.4	657.348	888.308
1999	141.0	92.9	11.8	36.3	681.243	920.599
2000	141.7	92.4	12.1	37.2	705.752	953.719

Implications on the Balance of Trade. Wheat grain imports were 706,140 mt in 1992, and projected to be about 825,000 mt in 1993. The level of imports in 1993 will provide slightly over 600,000 mt of flour which is equivalent to 35 kg per capita. This is 4.0% higher than the requirement calculated in the Scenario I demand projection. Compared to 1992, 1993 has higher wheat import cost and increased quantity. The impact on the balance of trade for 1993 will be about 800 million Rupees increase in deficit. This accounts for slightly less than 2.0% of the projected deficit.

Increased levels of consumption over the next seven years will continually add to the balance of payment deficit.⁹ Wheat imports will account for 29.0% of total food imports in 1994 and slightly under 33.0% by 2000. The average annual addition to the trade deficit will be Rs 210 million. Food imports will rise

⁹Projected wheat import costs have been held at a constant price and exchange rate. Import trends have been projected on a real terms basis. The purpose was to examine the impact of higher consumption rates less the influences of future price shifts in wheat or inflationary trends. Neither of the latter are known quantities.

from 13.0% to 22.0% of total imports. The trends and the impacts of increased wheat importation are set forth in the following tabular format.

Year	Total Imports Trend	Wheat Impact Total Imports	Wheat Impact Add to Imports	Food Imports Trend	Wheat Impact Food Imports	Wheat Imports	Food Imports as % of Total Imports	Wheat Imports as % of Food Imports
	Rs Mil	Rs Mil	Rs Mil	Rs Mil	Rs Mil	Rs Mil		
1994	167,128	167,315	187	18,936	19,123	5,559	13.38	29.07
1995	169,512	169,700	188	19,206	19,394	5,747	14.72	29.83
1996	171,896	172,088	192	19,476	19,668	5,939	16.06	30.20
1997	174,176	174,385	209	19,734	19,943	6,148	17.50	30.63
1998	176,660	176,886	226	20,016	20,242	6,374	19.03	31.48
1999	179,044	179,274	236	20,286	20,516	6,604	20.55	32.19
2000	181,427	181,663	210	20,556	20,792	6,840	22.08	32.90

Impact of Liberalization of the Wheat/Wheat Flour System

To be able to try to deduce the effect of liberalization of the wheat/wheat flour system on consumers, the following findings are reiterated. This is to prevent misunderstanding in some of the hypotheses that will be laid out in this subsection.

- Consumption of rice (in general) is not price sensitive. The question is not "to buy or not buy rice" based on price, but what type and quality given relative price between types and grades.
- Consumption of total wheat flour appears to be slightly price sensitive. This must be qualified by the fact that prices were fixed by government until late 1992.
- Consumption of bread is not price sensitive.
- Consumption of wheat flour as flour used in the home is motivated by other considerations than price.
- Valid price cross elasticities of demand between rice and total wheat flour cannot be generated. The results are not rational and therefore not believable.
- To generate impacts on the system due to price shifts under liberalization, two general equations were utilized. They are:

Rice Consumption = Constant + (b₁ Wheat price + b₂ Rice price + b₃ Wheat Consumption), R Squared Value of 0.92123.

Wheat Consumption = Constant + (b₁ Wheat Price + b₂ Rice Price + b₃ Rice Consumption), R Squared Value of 0.723618.

Assumptions. System liberalization is assumed to mean that the government monopoly on wheat importation and wheat flour distribution will be either totally or partially replaced by private-sector firms.

To address this issue requires a large number of assumptions. First, and most importantly, what will happen to the cost of imported wheat in terms of flour equivalent? The wheat/wheat flour system is a government monopoly. Monopoly implies in an economic sense that the one-firm or controlling agency derives exorbitant profits from its position as sole operator in a market. In the wheat/wheat flour system in Sri Lanka this is not the case. As described in Section IV, there is a question of whether the current sale price (supply station) of wheat flour (Rs 12.30 per kilogram) is covering all costs. The best assumption that can be made is that CWE is just "breaking even" with wheat procured under a discount system. The second major assumption is what can be imported? In other words, will wheat only be allowed to be imported; or will flour importation be allowed? The third major assumption is who will mill the wheat if it is wheat importation that is liberalized? Fourth major assumption is what wheat quality?

To test how shifts in the price of wheat flour could affect wheat flour consumption, rice prices and consumption, and rice production, two basic scenarios are laid out. Scenario I involves a higher inbound price for wheat flour. This addresses the basic assumptions above. Scenario II involves a lower inbound price for wheat flour. This addresses the assumption often made by others that liberalization of the system implies lower flour costs and prices.

Scenario I. This scenario involves the following set of assumptions.

1. International liberalization, meaning import of wheat by private sector.
2. Wheat would be milled by PCL since it is the only wheat flour mill and it has a deep-water port that can handle large commercial shipments.
3. Wheat quality would be maintained at the current CWE standards because of the limited wheat grain storage space at PCL. Regardless of the ownership of the grain, it would all have to be the same quality so it can be handled in bulk storage at PCL. There is not sufficient storage available to segregate large lots of wheat grain by ownership.
4. Blended wheat flour will be produced as it is now being produced.
5. Consumption of total wheat flour is slightly sensitive to price at 0.03.
6. No selling country discounts on sales of wheat grain to private sector.

Under the assumptions above, inbound flour prices in Rupees per kg are set forth below in comparison to current estimated prices.

	Private Sector	CWE
Flour C&F	10.90	
Insurance	0.00	
Port/Handling	2.05	
Packaging	0.49	
Storage/Distribution	0.50	
Wholesale price to cover all costs	13.94	12.30
ROI/Wholesale Margin/Risk	2.00	1.00
Wholesale price to retailer	15.94	13.30
Retail margin	1.00	1.00
Final flour price	16.94	14.30

Only the barest of margins have been utilized to construct an inbound price. Using the comparison of old price of flour of Rs 14.30 to new price of flour of Rs 16.94, the price/consumption actions in the market place are as follows:

	Wheat Flour		Rice	
	Price	Consumption (Kg)	Price	Consumption (Kg)
Old wheat flour price	14.30	30.13	16.10	109.7
New wheat flour price	16.94	29.40*	[16.10-18.94]**	113.6
Adjustment shift	16.94	30.08	[16.10-18.94]	108.1

* 0.03 wheat flour consumption sensitivity to price.

** 1.118311 rice price/wheat price ratio plus price adjustment to consumption.

The actions that take place are:

- New price of wheat flour (+18.5%) reduces consumption by about 2.4%, from 30.1 to 29.4 kg.
- According to the rice price/wheat price ratio (and corresponding analysis of ARTI price data), price of rice will begin to shift upwards in a range between Rs 16.10 to Rs 18.94. Rs 18.94 is considered the upward limit of price adjustment by the ratio equation.
- Rice consumption shifts upward as consumption of wheat flour declines by the amount given in the wheat flour price/rice consumption equation.
- Upward consumption of rice places pressure on rice prices moving prices upward through the bounds indicated [16.10 - 18.94]. Analysis of ARTI price data compared to availability and consumption indicate rice prices will increase at the rate of 3.0% for every 1 kg increase in consumption.
- Increased rice prices increase consumption of wheat flour according to the equations.

- A period of adjustment brings wheat flour consumption nearly back to original levels. The result is a reduction in rice consumption to within 1.5% of previous level. The equations do not explain all variables at work. This slight difference is due to error terms as well as the quirky results of needing to relate cereal consumption levels to each other.

A further test was conducted on how the rise in the price of wheat flour would affect the consumption of wheat flour used in the home and bread. The cost construction for bread in Rupees per kg is as follows:

	Private Sector	CWE
Bread Cost - Wheat Flour	10.84	9.15
Other Ingredients	2.34	2.34
Minimum Production and Marketing Margin	2.90	2.90
Margin to cover at least overhead	1.00	1.00
Total Bread Cost/Kg	17.08	15.39
Minimum Cost of 1 lb loaf	7.69	6.93
Price	8.25	7.50

The results of applying consumption/price equations to these closely related items generated unreliable results. By using a cross-section matrix and modifying the results to the shifts in wheat prices given above, the following answers were generated.

		<u>Wheat Flour Price</u>	
		Old	New
Total Flour Price		14.30	16.94
Flour use in the home	Kg	8.81	7.10
Bread	Kg	22.52	25.00

Given that the equations are considered unreliable, the above results are not very believable in the large amount of consumption shift generated. The best that can be implied is that flour use in the home will continue to decline, but consumption of bread will continue to increase, regardless of price.

The results indicate:

- Price increases in wheat flour will not affect consumption levels of wheat flour in total.
- Price increases in wheat flour will assist in increasing rice price due to an interim shift in wheat flour and rice consumption patterns.
- The general effect will be higher prices for wheat flour and rice, without any basic changes in consumption patterns.
- Price increases in wheat flour will not shift current patterns of wheat flour used in the home or the consumption of bread.

- Wheat flour price increases have no direct impact on rice production. Since rough rice prices explain only 20.0% of the change in cultivated areas of rough rice, the increases in rice prices would translate to an increase in cultivated area of 1.3%.¹⁰ At best, given the error range of numbers being used, the impact is negligible or nonexistent.

The losers and winners are:

- Loser: consumer -- prices increase but consumption pattern cannot be altered given availability constraints, especially in rice.
- Loser: low-income consumer -- massive erosion of purchasing power.
- Winner: rice farmer -- the indicated price shift in rice will provide an additional Rs 1.3 per kg of rice, milled equivalent to the farmers price. This translates into about Rs 850 per mt of rough rice (approximately 10.0% of average 1992 price).

Scenario II. This scenario involves another set of assumptions and is presented to derive a set of inbound flour prices which are lower than the current inbound flour prices. These assumptions are: (1) wheat flour importation is allowed with no restrictions, (2) the exporting market is highly competitive, with the willingness of export countries to discount up to 25.0% discount, and (3) no strict regulation on quality standards will be set, except for health.

Under these assumptions, inbound flour prices in Rupees per kilogram are set forth below in comparison to current estimated prices.

	Private Sector	CWE
Flour C&F	8.00	
Insurance	0.00	
Port/Handling	2.05	
Packaging	0.00	
Storage/Distribution	0.93	
Wholesale price to cover all costs	10.98	12.30
ROI/Wholesale Margin/Risk	1.00	1.00
Wholesale price to retailer	11.98	13.30
Retail margin	1.00	1.00
Final flour price	12.98	14.30

Using the comparison of the old price of flour at Rs 14.30 to the new price of flour at Rs 12.98, the price/consumption actions in the market place are as follows:

¹⁰Based on analysis of ARTI prices to availability and consumption utilizing a new rice price of Rs 17.98 as the price level derived during interim consumption shift period.

	Wheat Flour		Rice	
	Price	Consumption (Kg)	Price	Consumption (Kg)
Old wheat flour price	14.30	30.13	16.10	109.7
New wheat flour price	12.98	30.50*	[16.10-14.52]**	107.9
Adjustment shift	12.98	29.98	[16.10-14.52]	108.6

* 0.03 wheat flour consumption sensitivity to price.

** 1.118311 rice price/wheat price ratio plus price adjustment to consumption.

The same series of actions take place as described in Scenario I, only price movements are in the declining mode.

- The new price of wheat flour (-9.2%) increases consumption by 1.2% and rice consumption declines.
- The adjustment period interim takes over and rice prices which are in decline cause a reduction in wheat flour consumption to near it's previous level and rice consumption increases to near it's previous level.

The results indicate:

- Price decreases in wheat flour will not affect consumption levels of wheat flour in total.
- Price decreases in wheat flour will assist in decreasing rice price due to an interim shift in wheat flour and rice consumption patterns.
- The general effect will be lower prices for wheat flour and rice, without any basic changes in consumption patterns.
- Wheat flour price decreases have no direct impact on rice production. Since rough rice prices explain only 20.0% of the change in cultivated areas of rough rice, the decrease in rice prices would translate to a decrease in cultivated area of less than 0.5%. At best, given the error range of numbers being used, the impact is negligible or nonexistent.

The losers and winners in this case are reversed.

- Loser: Rice farmer -- the indicated price shift will reduce rough rice prices about Rs 390 per mt of rough rice (approximately 4.5% of average 1992 price).
- Winner: consumer -- prices decrease but consumption pattern cannot be altered given availability constraints, especially in rice.
- Winner: low-income consumer -- a gain in purchasing power.

Conclusions. Based on the results generated, the following conclusions are stated.

1. Wheat flour price shifts, either increases or decreases, will not affect consumption patterns for either wheat flour or rice.
2. The primary effect of wheat flour price increases or decreases is to change the level of cereal prices in the market place. The change in the price of wheat flour will assist in the change in the price of rice. A strict correlation between this relationship cannot be quantified.
3. No impact of wheat flour price increases or decreases can be generated for the consumption of wheat flour in the home or for bread consumption. Future historical trends will continue for these wheat-based products with little or no impact from price changes.
4. Wheat flour price shifts will have no impact on rice production. The shifts will have an impact on producer price, as the levels of cereal prices change in the market place.
5. There is no evidence in any of the consumption patterns or prices that the pricing and consumption of wheat flour has been a disincentive on rice production in any manner.
6. The major question is what will be the landed cost of wheat flour, whether imported as wheat to mill or as wheat flour. The author believes that prices and costs relative to current operations will not decrease if current standards are maintained. However, if the market is thrown open to a "no holds barred" flour import program, prices and costs could well decline. Hence the assumptions and hypotheses set forth.

The Low-Income Consumer

The major benefits, or distresses, due to wheat flour price changes will be borne by the low-income consumer through gain or loss of purchasing power. In the case of Scenario I, consumption changes in the lowest 20.0% income range of the population will be as follows.

	Rice	Total Wheat Flour	Total
Per Capita Consumption¹¹			
All Consumers	103.65	28.93	132.58
Lowest 20.0% Income	87.72	25.10	112.82
Price			
Old Price	16.10	14.30	
New Price	17.98 ¹²	16.98	

¹¹Table 8, 1986/87, with adjustment to 20% of lowest income groups.

¹²Calculated from ARTI price data compared to consumption and availability.

Lowest 20.0% Group

Old Expenditures	1,412.29	358.93	1,771.22
New Expenditures	1,577.21	425.20	2,003.41
Value Difference	164.92	65.27	232.19
% Decline in Purchasing Power	11.7	18.7	13.1

Increase in Food Expenditures as a % of Total Expenditures or Lower Consumption Level	78.55	21.14	3.5
% Decrease Consumption	10.5	15.7	

The low-income consumer only has two options: increase percentage of food as percent of household expenditures (forgoing other purchases to buy food), or, decrease consumption. In 1990/91, the lowest 20.0% of the population spent 65.9% of total expenditures on food. With additional costs for cereal, this percentage would rise to 69.4.

In the case of Scenario II, the low-income consumer fares better. The results would be as follows.

	Rice	Total Wheat Flour	Total
Old Price	16.10	14.30	
New Price	15.27	12.98	
Old Expenditures	1,412.29	358.93	1,771.22
New Expenditures	1,339.48	325.80	1,665.28
Value Difference	72.81	33.13	105.94
% Increase in Purchasing Power	5.2	9.2	6.0
Decrease in Food Expenditures as a % of Total Expenditures			1.6
Higher Consumption Level	92.49	27.65	
% Increase Consumption	5.2	9.2	

The low-income consumer now has two positive options: increase cereals or other food consumption, or expend more on other items of necessity. Again, the major impact is the landed cost of wheat or wheat flour.

The overall effect is that for every 10.0% shift in price of wheat flour, the low-income consumer's percentage of food expenditure to total expenditure will shift 2.0% in the same direction. Wheat flour prices were increased from Rs 10.95 to Rs 12.30 per kg (supply-station price) in June 1992. This was a 12.0% increase in price. This will shift the low-income consumer's percentage of food expenditures upward by slightly over 2.0%.

The low-income consumer in the lowest 20.0% income range represents one-half of all low-income consumers, based on the definition of low income given in Table 25. In comparing this category of consumer to all consumers, it is important to note that the average income for all consumers, and therefore average expendi-

tures, are weighted towards the low side of the income range. This is due to the fact that¹³

80.7% of income receivers in the urban sector have an average income less than the average for the urban sector;

63.2% of income receivers in the rural sector have an average income less than the average for the rural sector; and

54.3% of income receivers in the estate sector have an average income less than the average for the estate sector.

The comparison for shift in food expenditures as a percent of total expenditures due to an increase in wheat flour price of 18.0% is as follows:

	<u>All Consumers</u>	<u>Lowest 20.0% Income Consumers</u>
Old Price	59.2%	65.9%
New Price	<u>61.9%</u>	<u>69.4%</u>
Increase	2.7%	3.5%
For Every 10.0%		
Shift in Wheat Price	1.5%	2.0%

This may not seem like a great difference when percentages are compared. However, the price increase affects the 20.0% lowest-income group 33.0% more than the "average" consumer.

Wheat System Liberalization: An Editorial

Liberalization of the system implies many different perspectives. In the case of the wheat/wheat flour system, liberalization has been a continuing topic over the recent past. Yet no one either defines the term liberalization or even discusses the factors involved.

Technical Factors

- Only one flour mill.
- Flour mill operates under a contract with GSL to mill wheat imported into Sri Lanka by GSL.
- Contract specifications call for
 - * Minimal amount of wheat grain for milling given need for wheat flour.
 - * Mill will provide flour at a milling rate of 74.0% based on tonnage of inbound grain. The milling fee will be paid by allowing the miller to keep all millfeeds and other by-products.

¹³1990/91 survey data.

* Other unknown parameters.

- Contractual agreement is in effect until 2005.
- Flour mill has silo storage capacity of 120,000 mt of grain and a bulk flour storage silo of 15,000 mt capacity.

Internal Market Structure

- The wheat/wheat flour system is totally government controlled with the current exception of wholesale and retail prices for flour and bread.
- Whether this is a monopoly is open to the question of how a monopoly is defined. In most definitions, a monopoly is an organization that completely controls the market place so that it can generate profits far in excess of what could be generated in a competitive environment. In the case of the current wheat/wheat flour system, this definition does not apply.
- A monopoly may often be considered inefficient since it has total market control and can pay the costs of inefficiency through control of price. In the current wheat/wheat flour system, this is not the case.
- The end market is composed of 17 million consumers which utilize flour in the form of flour in the home, bread purchased from bakeries, and other flour-based products such as flour preparations, noodles, and pastries.
- A large number of bakeries (private-sector) which compete in the market for bread and pastry products.¹⁴
- A growing number of noodle processors (private-sector) using wheat flour as the base product.
- A relatively large hotel, restaurant, and institution (HRI) market focused on tourism and business trade.
- Consumer market dominated by a large number of low-income consumers who will be very price conscious. This provides for a market in which quality may be easily traded against price.

External Market (Importation)

- Market characterized by five major and two minor wheat exporting countries for all types and qualities of wheat and wheat flour.
- Highly competitive world market in which exporting country governments provide export subsidies on wheat grain and wheat flour.

¹⁴The author is uncertain of total number. He now has three different numbers, all of which are claimed to be authentic.

- Lack of uniform grades and standards system from export country to export country.

Liberalization

One assumes that liberalization means turning over some or all operations to the private sector. Four basic definitions for liberalization could exist, that of (1) allowing unrestricted importation of wheat, (2) allowing unrestricted importation of wheat flour, (3) allowing unrestricted importation of either wheat or wheat flour, or (4) totally privatizing the internal market.

Comments

In allowing unrestricted importation of wheat, there is only one flour mill. This flour mill has a contractual agreement with GSL. Contractual agreements cannot be violated. This causes legal actions in the private sector! If the assumption is made that the market is opened, and the flour mill agrees to mill wheat for the importer, then quality factors must be maintained. The inbound wheat of the private-sector importer must be the same as the inbound wheat for GSL. Constraints in bulk wheat storage at the flour mill mean that wheat must be intermixed. It cannot be segregated by ownership. This places the private sector in the position of competing with government, rather than another private-sector firm. Then, given GSL's position of flour provision on a "no-loss, no profit" basis, the private-sector importer is going to need a cheaper inbound product of the same quality. Is this feasible, at the same grade and standard? Once the wheat is milled, what is the market for the private-sector entrepreneur? Is he going to sell the wheat flour to GSL? This is not liberalization. The private-sector operator will need to have previously defined his market, and that market must be large enough to assimilate 37,000 mt of flour in the shortest possible time. The reason: if the importer brings in less than 50,000 tons (average full load bulk wheat cargo), he will be paying a premium in ocean transportation. This places him at a disadvantage against the main competitor, GSL. If the importer has to hold flour too long, this adds to storage costs, financial costs, and to quality loss which will discount price.

In the case of unrestricted flour imports, there is a possibility that the contractual agreement between the flour miller and GSL could be nullified. This would certainly require a legal solution. Even if limits were imposed, would enough wheat flour be imported to supply needs in a systematic fashion? How would GSL plan for procurement of wheat if they could not plan on the systematic importation of flour in some given quantity? In reality, the Sri Lanka market is very thin and therefore could be easily disrupted. If too much flour was imported, marketers would discount the product to move it. This would leave GSL with flour in stock in warehouses. Eventually, this flour would have to be discounted to sell it, possibly causing losses for GSL. If not enough flour was imported, then the system would be deficit. This system, which really works on availability, could not afford a deficit in wheat flour supply without some social comment. It would very easy for flour exporting countries to wage price wars through discounts. This would add to the systematic supply problem: huge gluts of flour at times, and deficits at other times. If this happened, it would add a further issue to international trade problems that are now the primary subjects of GATT discussions.

The above depicts a very negative picture. Why has not the emphasis on liberalization or privatization been placed in the internal market? If privatization were developed in the internal market it would become a first stage to further privatization of the total system. In this manner, the internal market of sellers and buyers from mill point forward could become a totally private-sector system. Marketers would have the opportunity to learn customer needs and wants as well as amounts, types, and qualities desired. Adequate flour storage systems and packaging sizes as well as types and qualities of flour could be developed in a systematic manner. This type of approach would not disrupt the required flour flow that is needed by the consumer. A great number of positive elements exist for internalizing liberalization. The flour miller is a private-sector operation and could easily become part of a marketing system as it has capabilities to do many things. There is a strong and growing private-sector system in Sri Lanka. It is quite possible that once marketers understood opportunities in the system, someone would even be willing to invest in a small-scale flour mill for producing flour for specialty markets. And even import wheat or quality wheat flour. Who knows!

Since fixed retail flour prices were eliminated, wheat flour is beginning to appear in small private-sector retail stores which never handled it before because it really was not worth the effort. Now, with an adequate margin, wheat flour is becoming accessible to more consumers. Product availability in an open market generally increases amount purchased. How much is this influencing the current level of wheat flour "demand?"

Further, internalizing the liberalization process would allow government to fulfill its basic role of social responsibility through regulation. In this case, regulation implies consumer food safety through quality specifications.

SECTION VIII

NUTRITIONAL ASPECTS RELATED TO CEREALS CONSUMPTION

As discussed in Section II, rice and wheat-based products provide well over one-half of calorie and protein intake in the Sri Lankan diet. Per capita availability of cereals (rice and wheat flour) from 1965 to 1992 remained at an annual average of 130 kg. Food balance sheets indicate that over time cereals have provided a lower percentage of caloric and protein intake. This would imply that other foods are becoming more available and therefore being utilized. This also further implies, in general, that the nutritional status of the population has not deteriorated.

Per capita energy intake as set forth in the food balance sheets (Appendix IV, Table 1) has a definite increasing trend in caloric intake. Protein intake as defined by food balance sheets (Appendix IV, Table 2) also has an increasing trend. While these may be good indicators of probable nutritional availability to the general population in Sri Lanka, there are differences between the food balance sheets and household surveys. These differences are presented below.

	<u>Surveys</u>		<u>Food Balance Sheets</u>	
	Calories	Protein (gms)	Calories	Protein (gms)
1969/70	2,264	53.3	2,377	52.1
1973	1,965	44.1	2,169	58.8
1978/79	2,283	--	2,321	50.0
1980/81	2,240	52.9	2,185	46.3
1981/82	2,271	--	2,195	47.3
1985/86	2,129	51.3	2,447	54.1
1990/91	--	--	2,316	55.4

The surveys present a flat trend in caloric intake. Nothing can be quantified about protein intake, except that it also appears to have a flat trend. Since cereals provide such a large amount of calories and proteins, these flat trends are very reasonable. Figure 53 in Section VI illustrates that per capita rice plus wheat flour availability had a slight upward trend of only 0.2% annual increase. This nearly flat trend line would indicate that the flat trends in survey data would be quite reliable (as cereals provide over 50.0% of the intake).

M. Khan in "Analysis of Health, Nutrition and Poverty in Sri Lanka" states four general conclusions relating to nutrition.

- "The trend in calorie availability has remained above the level considered the social minimum requirement for the country (2,200 calories per capita per day) for almost all years since 1970. An analysis of expected calorie availability until 1995 indicates that the availability will probably remain well above the requirements in the near future."
- "Although calorie availability at the macro level is higher than requirements, a large section of the population remains calorie deficient."

The size of the calorie deficient population appears to be on the rise; in 1969/70, the prevalence of calorie deficits was approximately 22 percent, while in 1981/82, the size of the calorie deficient population was approximately 39 percent."

- "The distribution of calories among the population is becoming increasingly unequal. In 1969/70, calorie consumption per AEU for the richest decile was 27 percent higher than the poorest decile's consumption. By 1980/81, the richest decile's consumption has increased to a level 50 percent higher than that of the poorest decile."
- "Calorie consumption of the poorest decile is declining at a rapid rate. Even during the years 1978/79 to 1981/82, when the prevalence of calorie deficiency increased only marginally, the extent of the calorie deficits of the poorest two decile increased significantly. Adjusted consumption for the poorest decile was 1,717 calories in 1978/79 and only 1,573 in 1981/82."

Nutrition and Structural Adjustment

Kahn's analysis primarily covers the period prior to and shortly after the time when economic structural adjustment began in Sri Lanka. Four macroeconomic adjustments are related to food and nutrition.

- The elimination in 1979 of the food ration system which provided a basket of subsidized food items to the population. A food stamp program was initiated in 1979 as a replacement for the direct food supply system. Food stamps essentially monetarized the system. The recipient, under the food stamp plan is susceptible to having the income supplement eroded as prices rise, since the recipient no longer receives the income supplement in terms of food quantity.
- The phase-out of government procurement of rough rice in 1980. The system now being dominated by the private sector with prices being a result of supply and demand factors.
- An increase in wheat flour prices in 1981 to a level that covered all costs of importation and handling with no subsidization of price.
- Privatization of government-owned enterprises throughout the 1980s which may or may not have had an impact on the level of unemployment or under-employment. Labor force surveys show 13.3% unemployment in 1980/81 and 14.1% unemployment in 1985/86. Current statements on unemployment place it at 15.5% in 1990 and 13.0% in 1992.

Addressing the changes in nutritional status due to structural adjustments will be quite limited. The major deficiency is the lack of any information for the 1990/91 time frame. Such information would have provided the ability to fully review a ten-year sequence after and during the major economic reforms listed above.

By prorating calorie and protein intake to 1990/91 on the survey/food balance sheet tabular format above, no changes in per capita calorie or protein intake occurred between 1981/82 and 1990/91.¹⁵ Structural economic adjustments had no impact on the average level of per capita calorie and protein intake for the population in general. This is further supported by the acute and chronic undernourishment levels presented below. These demonstrate that little change occurred throughout the 1980s.

	<u>1980/82</u>	<u>1988/89</u>
Acute Undernourishment	19.1%	18.4%
Chronic Undernourishment	39.1%	36.4%

The slight decline in the percentage of energy and protein deficient households between 1980/81 and 1985/86 further confirms that nutrition for the population in general has not been impacted by structural adjustment.

	Number of Households (Percentage)			
	<u>Energy Deficient</u>		<u>Protein Deficient</u>	
	1980/81	1985/86	1980/81	1985/86
National	54.5	49.2	36.9	34.9
Urban	59.0	53.8	33.2	30.2
Rural	54.3	50.2	38.9	38.0
Estate	46.1	23.3	25.9	13.9

Kahn states in his analysis that the distribution of caloric intake between the lowest income group in the population and the rest of the population became increasingly unequal between 1978/79 and 1980/81. This implies that structural adjustment (as it began in 1979) impacted the very poor to a far greater degree than the general population.

In trying to determine what shifts occurred within income groups, the question of defining low income is presented. The analysis is faced with a wide array of how incomes have been aligned in different studies. The low-income consumption patterns presented in Table 8 (Section II) were based on all groups below the midpoint in the surveys (monthly income group having the largest percentage of spending units). The difference between total population and the general low-income population is presented below:

	<u>Average Caloric Intake</u>			
	1973	1978/79	1981/82	1986/87
Total	1,965	2,283	2,271	2,129
Low-Income	1,836	2,192	2,180	1,980
Low-Income as a Percent of Total	93.9%	96.9%	96.0%	93.0%

¹⁵Proration for 1990/91 survey is based on the relationship of previous surveys to food balance sheets.

The above indicates that there was a greater impact on low-income consumers as structural adjustment proceeded throughout the 1980s. A further comparison between 1969/70 and 1985/86 which is presented using total population versus the lowest income group listed also supports this claim.

	<u>Average Caloric Intake</u>	
	1969/70	1985/86
Total	2,264	2,129
Lowest Income Group	2,064	1,864
Lowest Income as a Percent of Total	91.1%	87.6%

Without an ending set of information for 1990/91, only two general conclusions can be stated.

- Economic structural adjustment has not affected the calorie and protein intake for the general population.
- There appears to be a widening disparity between the low-income consumer group and the total population in calorie intake. This would mean relatively poorer levels of nutrition. How this disparity ranged over the different income segments in the low-income population is unknown. Since the last data set ends in 1986/87, over six years have passed during which little is known about consumption. There is no recent gauge for measuring the effect of the welfare programs which were put into place to support low-income households.

Welfare Programs

Welfare programs are designed to assist low-income households in providing for food and general welfare requirements. The exact definition of poverty in Sri Lanka is presented in different contexts in different reference sources. If nutrition, meaning calorie intake, is used as the definition, then any household below the recommended level of calorie intake is considered below the poverty line. Using this as a guideline, nearly 45.0% of the households and 40.0% of the population fall into the category of low-income as described in Table 25.

Three primary welfare programs are conducted by GSL, which commits about 4.0% of the Gross Domestic Product (GDP) to support low-income households. The programs are the Food Stamp Program, the Janasaviya Program, and the School Mid-day Meal Program.

The Food Stamp Program, which was introduced in 1979, entitles low-income households to purchase eligible food items with food stamps. These food items are rice, wheat flour, bread, sugar, pulses, milk products, and dried fish. Eligibility was initially based on a household income of Rs 300 or less per month. The value of food stamps are based on the age composition of household members. The household eligibility limits were later changed to an income of Rs 700 or less per month with a maximum subsidy of Rs 250 per month in food stamps. The number of food stamps issued by year and as a percentage of the population is detailed in Table 26. When matched against the percentage statements in Table

25 for low-income population, the percentage of population covered by food stamps is extremely close to statements of percentage of population in low-income levels.

The Janisaviya Program is primarily designed to target households on the Food Stamp Program over a two-year period, and develop these households into productive entities. The program grants a pool of resources divided into two components: one portion for consumption and one portion for savings. In return for these entitlements, the recipient is required to enter into a training/production program 20 days per month to qualify for the entitlement. The activities under this program basically involve (1) asset creation, and (2) improving human resources through training. This program is now in its third phase and has encompassed 320,000 households, approximately 20.0% of the households considered to be below the poverty line as set forth in Table 25.

The School Mid-Day Meal Program for school children was initiated in 1989. It provides a mid-day meal of 600-800 calories to every student.

The Food Stamp Program, reinforced by the Janisaviya Program should alleviate a large portion of what appears to be a structural adjustment impact causing decreased calorie consumption in low-income households. The Food Stamp Program covers that portion of the population considered as lacking in calorie intake. The Janisaviya Program provides increased entitlement for consumption with the basis for a continued level of consumption after the program ends. The Mid-Day Meal Programs provides nearly one-third of minimum calorie requirements for school children.

Measuring the impact of these programs, two of which have been initiated since the 1986/87 survey is precluded due to the lack of information.

TABLE 25

NUMBER OF HOUSEHOLDS AND POPULATION CONSIDERED TO BE BELOW THE POVERTY LINE
Based on Recommended Calorie Intake

Survey/ Sector	Households		Population	
	Number	Percent	Number	Percent
<u>1980/81</u>				
National	1,753,891	57.35	7,964,033	50.50
Urban	323,637	57.06	1,591,324	51.53
Rural	1,309,827	57.79	5,932,800	50.91
Estate	120,427	53.72	439,909	42.75
<u>1985/86</u>				
National	1,345,626	44.78	6,053,706	39.49
Urban	203,473	32.79	905,190	27.62
Rural	1,123,544	51.15	5,095,925	45.74
Estate	18,609	9.91	52,591	5.77

Source: Labour Force and Socio Economic Survey 1985/86

TABLE 26

FOOD STAMP PROGRAM

Year	Issued	Mid-Year Population (1000)	Issues as a % of Population
1979	7,362,873	14,471	50.88
1980	7,420,590	14,738	50.35
1981	7,342,345	15,011	48.91
1982	6,914,271	15,195	45.50
1983	7,088,755	15,417	45.98
1984	6,981,959	15,603	44.75
1985	6,874,887	15,842	43.40
1986	7,025,453	16,117	43.59
1987	7,363,162	16,361	45.00
1988	7,704,358	16,586	46.45
1989	8,051,508	16,806	47.91
1990	7,003,399	16,993	41.21

Source: Food and Nutrition Statistics 1950-1990.

SECTION IX

ONIONS AND CHILLIES

This section addresses Item 10 in the statement of work as to the effects on prices and consumption due to the liberalization of onion and chillie imports.

Chillies

Liberalization of imports should have relatively little effect on the consumption of chillies. Consumption has been at 3 kg per capita per year for all of the four survey periods denoted in Table 27. The difference in survey data consumption and availability data calculated in Table 27 could easily be production data or drying and processing factors. The data sets for production and importation are very imprecise. Accurate drying and processing loss rates are unknown. These differences are illustrated in Figure 58. As a condiment, the consumption possibilities for this product seem quite limited.

The 1992 import data could not be located. The quantity imported in 1991 plus domestic production provided the largest per capita availability ever. This amount certainly did not dampen consumer price. Nor did it seem to significantly affect producer price. It did shift the marketing margin in 1991 as illustrated in Figure 59. Since timing is everything in the market, it appears imports arrived in 1991 after domestic production went to market and this narrowed marketing margins on domestic production. It is interesting to note that imports in 1990 were not a very wise decision on someone's part. Imports in 1991 had no effect on 1992 domestic production, even though producer price narrowly increased. Cultivated area of chillies was up 5.0%, but yield declined 27.0%. This reduced domestic production by 24.0%. Since the market was most likely awash in chillies, it took 1992 to clear the glut. Given the marketing margin shown for 1992, imports could not have been much of a factor.

Onions

The onion data, presented in Tables 28 and 29 is even of poorer quality than the chillie data. As far as can be determined, the importation of onions was limited to big onions. Per capita consumption, availability, and production of red onions are illustrated in Figure 60. There is a downward trend in all variables. Since red onions seem to be grown in the northern part of Sri Lanka, what has probably caused the availability decline is (1) social turmoil, and (2) erosion of the market by big onions. The latter is a valid possibility in a market constrained by availability. The retail price tracks of red onions and big onions have the same characteristics. Further, the marketing margin narrowed significantly in 1992 as illustrated in Figure 61. This implies that some competing product may be eroding the market base. Big onion and red onion retail prices are relatively the same.

Importation data for big onions could not be located for 1992. Importation in 1991 was 50.0% higher than 1990. The level of availability certainly limited retail price increases and was probably the predominant factor in the decline of retail prices in 1992 as depicted in Figure 62. No data on producer prices could

be located, so the impact of imports on producer price cannot be characterized. There is a substantial margin between import and consumer price.

Figure 63 depicts per capita availability, consumption, and production. It leads one to doubt both the survey, production, and import data. There is a huge disparity between consumption and availability. One can only conjecture the probabilities of what is going on. It would appear that consumption is actually 50.0% more than given in the survey data and most likely growing at a fairly rapid trend rate. If this is not the case, then someone is losing one hell of a lot of onions. If this is the case, then the attractive marketing margin in Figure 62 does not depict the real situation. The other certainty is that importation has not dampened domestic production. However, the extent of cultivated area is extremely small. It was only 1,447 ha in 1991 and 2,395 ha in 1992.

Again, onions are a condiment. There is a limit to per capita consumption. There is little in the data to indicate that imports have increased consumption. They most likely are responsible for the decline in consumer price in 1992.

TABLE 27

PRODUCTION, AVAILABILITY, CONSUMPTION, AND PRICES OF CHILLIES

	Pro- duction Mt (1)	Pro- duction Dry Wt Mt (2)	Imports Mt (3)	Total Mt (4)	Per Capita		Retail Price Rs/Kg	Import Price Rs/Kg	Prod Price Rs/Kg
					Avail- ability Kg	Con- sumption Kg			
						(5)			
1978	38,600	28,564	6,937	33,787	2.4		21.5	13.2	17.5
1979	46,400	34,336	8,887	41,163	2.8	3.0	27.5	12.2	20.3
1980	51,000	37,740	13,384	48,860	3.3		31.2	13.1	23.5
1981	37,500	27,750	580	26,665	1.8		27.9	16.0	20.6
1982	36,500	27,010	3,362	28,751	1.9	3.0	32.1	17.3	23.7
1983	40,600	30,044	9,234	37,475	2.4		34.7	17.7	26.0
1984	73,600	54,464	8,154	59,350	3.8		38.2	28.8	28.5
1985	98,700	73,038	4,117	72,773	4.6		49.1	28.4	37.3
1986	105,800	78,292	3,712	77,306	4.8		41.8	29.5	31.8
1987	75,500	55,870	2,100	54,618	3.3	2.9	47.0	41.0	35.5
1988	82,700	61,198	3,789	66,315	4.0		67.6	34.8	51.0
1989	67,900	50,246	1,388	48,619	2.9		77.7	52.7	61.7
1990	95,000	70,300	1,327	67,409	4.0		83.5	113.7	60.7
1991	99,509	73,637	7,665	76,883	4.5	3.2	104.5	63.0	98.9
1992	75,798	56,091		52,725	3.0		129.4		102.2

- (1) DCS Data.
(2) 35.0% moisture harvest, 9.0% dried.
(3) Many sources: DCS, ARTI, Customs, Trade, CWE.
(4) Drying and processing loss of 6.0% factored out.

TABLE 28

PRODUCTION, AVAILABILITY, CONSUMPTION, AND PRICES OF RED ONIONS

	Pro- duction	Imports	Total	Per Capita		Retail Price	Import Price	Prod Price
				Avail- ability	Con- sumption			
	Mt (1)	Mt (2)	Mt	Kg	Kg (3)	Rs/Kg (4)	Rs/Kg (4)	Rs/Kg (4)
1978	58,500	466	58,966	4.2		5.2	4.7	3.5
1979	67,900	0	67,900	4.7	3.5	6.3		4.3
1980	66,900	2,150	69,050	4.7		9.0	4.9	7.9
1981	59,100	0	59,100	3.9		11.2		7.6
1982	67,500	949	68,449	4.5	3.4	10.1	8.9	6.7
1983	95,300	1,484	96,784	6.3		10.7	5.5	6.7
1984	36,700	5,478	42,178	2.7		28.0	9.7	21.1
1985	41,700	2,942	44,642	2.8		18.0	8.5	11.9
1986	57,100	0	57,100	3.5	3.4	17.7	6.6	11.9
1987	56,200	0	56,200	3.4		13.5	21.3	8.9
1988	59,200	0	59,200	3.6		17.9	86.7	11.8
1989	71,900	0	71,900	4.3		14.8		9.4
1990	52,600	0	52,600	3.1		35.8	11.7	24.1
1991	41,630	0	41,630	2.4	2.7	44.1	44.6	30.6
1992	54,515		54,515	3.1		30.9		26.8

- (1) DCS Data, assumed to be mature dry weight.
(2) Data sources: CWE, Customs, DCS.
(3) Survey Data.
(4) Data sources: CWE, Customs, DCS, ARTI, Central Bank.

TABLE 29

PRODUCTION, AVAILABILITY, CONSUMPTION, AND PRICES OF BIG ONIONS

	Pro- duction	Imports	Total	Per Capita		Retail Price	Import Price
				Avail- ability	Con- sumption		
	Mt (1)	Mt (2)	Mt	Kg	Kg (3)	Rs/Kg (4)	Rs/Kg (4)
1978	3,555	20,652	24,207	1.7		5.5	2.5
1979	5,038	14,455	19,493	1.3	0.4	5.7	2.8
1980	389	16,459	16,848	1.1		6.8	4.9
1981	558	5,250	5,808	0.4		6.7	4.5
1982	1,816	7,390	9,206	0.6	0.3	7.5	5.9
1983	2,384	6,277	8,661	0.6		9.1	6.5
1984	0	23,780	23,780	1.5		10.3	6.4
1985	2,353	26,738	29,091	1.8		11.7	7.5
1986	5,586	51,253	56,839	3.5	1.5	16.1	8.4
1987	4,215	33,927	38,142	2.3		18.0	11.2
1988	6,926	32,462	39,388	2.4		20.8	10.9
1989	9,878	22,950	32,828	2.0		23.5	12.1
1990	18,800	31,447	50,247	3.0		37.2	13.0
1991	14,046	46,331	60,377	3.5	1.5	39.7	13.5
1992	27,879		27,879	1.6		27.1	

(1) Data sources: Central Bank, DCS, assumed to be mature dry weight.

(2) Data sources: CWE, Customs, DCS.

(3) Survey Data.

(4) Data sources: CWE, Customs, DCS, ARTI, Central Bank.

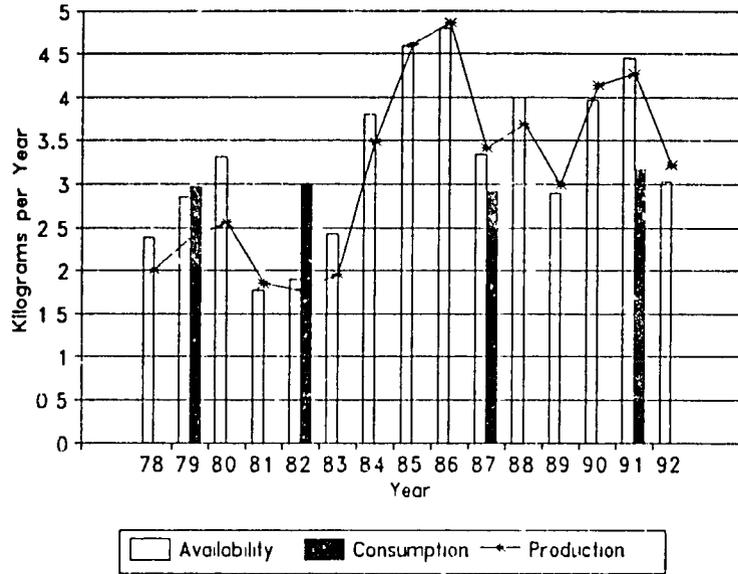


FIGURE 58. Annual Per Capita Availability, Consumption, and Production of Chillies.

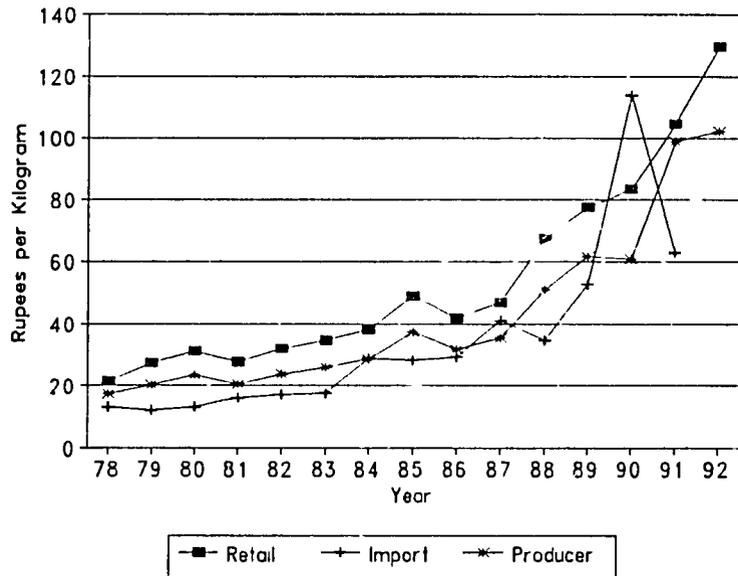


FIGURE 59. Chillie Prices.

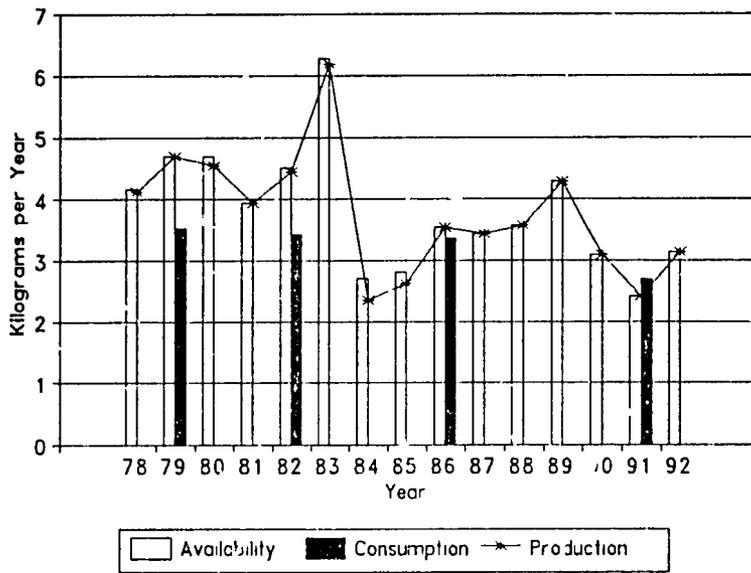


FIGURE 60. Annual Per Capita Availability, Consumption, and Production of Red Onions.

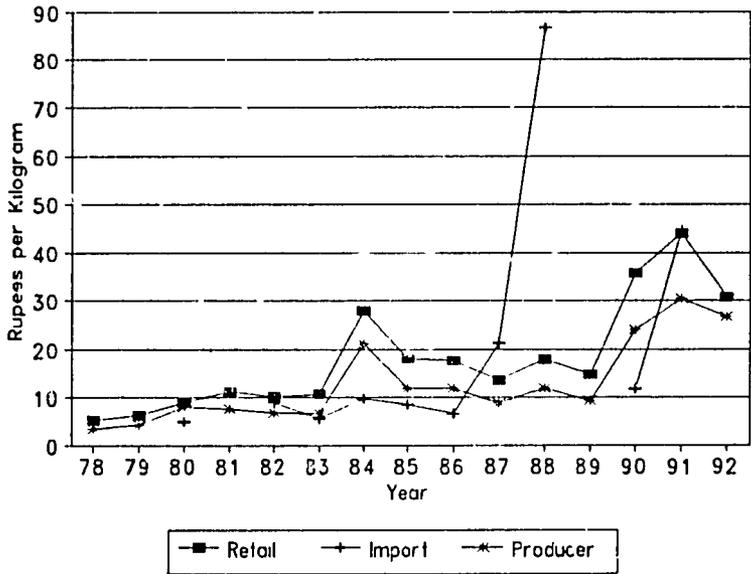


FIGURE 61. Red Onion Prices.

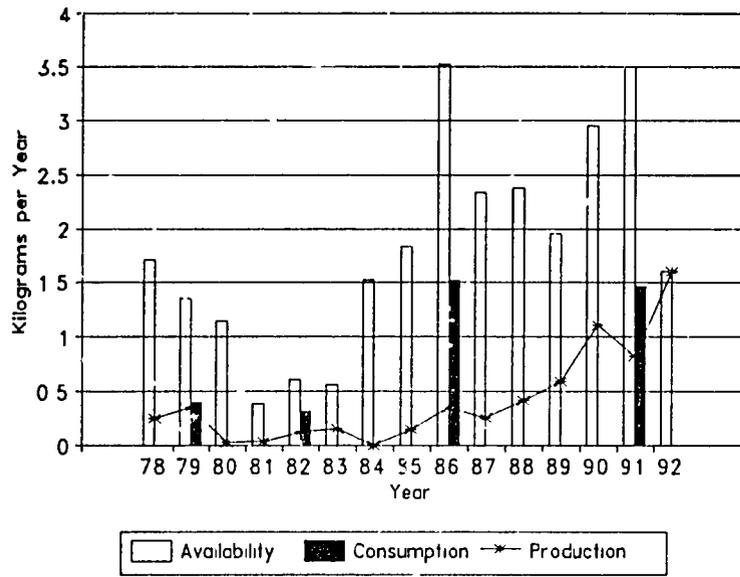


FIGURE 62. Annual Per Capita Availability, Consumption, and Production of Big Onions.

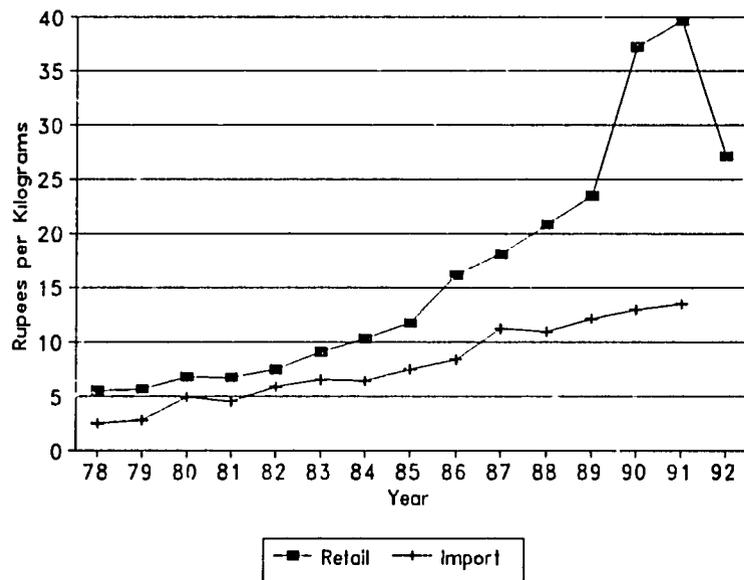


FIGURE 63. Big Onion Prices.

APPENDIX I

STATEMENT OF WORK

The study will include the following specific tasks:

1. Assess the importance of wheat and rice cereals in the Sri Lankan diet, in terms of such indicators as the share of wheat and rice in daily per capita energy and protein intake and monthly household food expenditure. Relate wheat and rice consumption to income group and sector (urban, rural, and estate). Determine which income group and sector is the largest consumer of wheat and rice.
2. Discuss extent of government involvement in the wheat and rice markets and the role of the private sector in these two markets.
3. Undertake trend analysis of wheat imports (volume, cost, unit cost), total availability, per capita availability, and consumer price during the past 10-15 years. Assess nature and magnitude of relationship between CIF price and consumer price of wheat (i.e., bread and wheat flour). Determine whether consumer price includes "hidden" subsidy.
4. Show what proportion of wheat imports consists of food aid, and what proportion of food aid consists of PL480 food assistance. Discuss the PL480 program in relation to overall food assistance to Sri Lanka.
5. Undertake trend analysis of rice production, imports (volume, cost, unit cost), per capita availability, producer and consumer prices, and costs of cultivation (per unit of output) during the past 10-15 years. Identify any possible relationships between total rice production and consumer price, producer price, or average profit (per unit of output).
6. Project total demand for wheat and rice up to the year 2000 on the basis of average apparent daily per capita intake, projected population growth, and income elasticity of demand (if recent, reliable estimates are available). Compare present and future scenarios, and the implications for the balance of payments, particularly in view of the GSL policy for promoting production of high-value export crops.
7. Assess the nutritional status of the population in terms of anthropometric indicators and per capita calorie and protein availability, and discuss the findings in the context of macroeconomic adjustments affecting the food and agricultural sector. Outline the existing safety net programs for the poor and discuss whether they are likely to be effective in dampening the possible short-term adverse effects of structural adjustment (judging from the experiences of other countries that have adopted a similar approach).
8. Provide most recent estimates of own-price and cross-price elasticities of demand for wheat and rice. Attempt to determine what would happen if wheat imports and prices were liberalized by projecting (a) how price

shifts in wheat flour could affect consumption levels and patterns for bread and wheat flour in the future, (b) how price shifts in flour (or wheat) and any resulting flour consumption shifts would affect rice prices and consumption in the future, and (c) how (b) would affect rice production in the future. Discuss results of wheat-price disincentive analysis and offer conclusions.

9. Attempt to answer the question, "How will shifts in wheat flour prices affect consumption among lowest income levels of the population, say bottom 20%, in the future?"
10. Review information in previous studies on food imports and determine likely effects on prices and consumption of liberalization of onion and chillie imports.

APPENDIX II

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APPENDIX III

SURVEY DATA

TABLE 1

CONSUMPTION PER HOUSEHOLD PER MONTH
Deflated for Difference in Household Size

National

		<u>Survey Period</u>			<u>Actual</u> 1990/91
		<u>1980/81</u>	<u>1985/86</u>	<u>1990/91</u>	
Rice	Kg	46.6	45.2	46.6	44.8
Wheat flour	Kg	3.6	4.0	2.7	2.6
Bread	Kg	7.8	9.3	10.0	9.6
Sugar	Kg	6.1	6.0	5.9	5.7
Pulses	Kg	1.4	1.7	2.8	2.7
Coconuts	No	7.3	38.3	41.8	40.2
Meat	Kg	0.9	1.1	1.4	1.3
Eggs	No	6.7	6.9	13.2	12.7
Fish	Kg	5.5	4.8	4.2	4.0

Source: Household Income and Expenditure Survey, 1990/91
Labour Force and Socio-Economic Survey, 1980/81

TABLE 2

HOUSEHOLD EXPENDITURES ON SELECTED FOOD ITEMS
AS A PERCENT OF TOTAL FOOD EXPENDITURE

	<u>Survey Period</u>		
	<u>1980/81</u>	<u>1985/86</u>	<u>1990/91</u>
Rice	31.5	25.3	22.4
Wheat P.	8.0	8.9	6.9
Sugar	7.0	6.3	6.2
Pulses	2.4	3.6	4.4
Meat	1.8	2.3	3.1
Fish	8.1	9.8	9.1

Source: Household Income and Expenditure Survey, 1990/91

TABLE 3

SURVEY HOUSEHOLD SIZE
Number of Persons

<u>Survey</u>	<u>Number of Persons in Household</u>			
	<u>National</u>	<u>Urban</u>	<u>Rural</u>	<u>Estate</u>
1990/91	4.9	5.1	4.8	4.6
1985/86	5.1	5.3	5.1	4.9
1980/81	5.1	5.3	5.1	4.9

Source: Household Income and Expenditure Survey 1990/91
Labour Force and Socio-Economic Survey 1980/81

TABLE 4

MONTHLY HOUSEHOLD CONSUMPTION AND EXPENDITURE FOR CEREALS BY SECTOR
(Flour Preparation/Products is a Calculated Quantity)

Sector/ Food	1980/81		1985/86		1990/91	
	Kgs	Rs	Kgs	Rs	Kgs	Rs
<u>National</u>						
Total Food	--	800.85	--	1,208.00	--	2,684.42
Rice	46.6	252.03	45.2	306.21	44.8	601.69
Flour	3.6	19.24	4.0	31.02	2.6	37.90
Bread	7.8	37.40	9.3	63.94	9.6	113.25
Flour P.	0.8	3.95	1.8	12.30	3.0	35.59
<u>Urban</u>						
Total Food	--	970.16	--	1,504.00	--	3,107.90
Rice	38.4	224.57	37.9	278.00	37.5	545.87
Flour	2.9	15.64	2.8	21.82	1.8	25.31
Bread	15.3	72.83	15.6	107.13	16.8	105.79
Flour P.	1.5	7.19	3.7	25.40	4.0	25.40
<u>Rural</u>						
Total Food	--	771.49	--	1,120.00	--	2,567.40
Rice	48.6	261.65	47.2	315.19	46.7	613.45
Flour	2.7	14.09	2.7	21.40	1.6	22.11
Bread	6.4	30.62	8.0	55.11	8.0	94.61
Flour P.	0.4	1.95	..3	9.26	2.5	30.12
<u>Estate</u>						
Total Food	--	669.34	--	1,252.00	--	2,691.21
Rice	40.9	224.20	46.1	317.60	46.1	634.26
Flour	15.0	80.36	22.9	178.15	16.2	230.89
Bread	3.4	16.28	3.5	24.50	6.1	73.77
Flour P.	0.2	1.00	0.9	5.99	2.0	24.50

Source: Household Income and Expenditure Survey, 1990/91
Labour Force and Socio-Economic Survey, 1980/81

TABLE 5

AVERAGE MONTHLY HOUSEHOLD INCOME
(Rupees)

<u>Year</u>	<u>National</u>	<u>Urban</u>	<u>Rural</u>	<u>Estate</u>
1980/81	831	1274	795	753
1985/86	2012	3176	1725	1551
1990/91	3506	6783	2724	2399

Source: Household Income and Expenditure Survey, 1990/91
Labour Force and Socio-Economic Survey, 1985/86
Labour Force and Socio-Economic Survey, 1980/81

TABLE 6

AVERAGE MONTHLY HOUSEHOLD EXPENDITURES
(Rupees)

<u>Year</u>	<u>National</u>	<u>Urban</u>	<u>Rural</u>	<u>Estate</u>
1980/81	1,232.95	1,662.00	1,155.39	932.51
1985/86	2,245.00	3,974.00	2,013.00	2,226.00
1990/91	4,274.76	6,413.16	3,743.52	3,464.84

Source: Household Income and Expenditure Survey, 1990/91
Labour Force and Socio-Economic Survey, 1985/86
Labour Force and Socio-Economic Survey, 1980/81

TABLE 7

IMPLICIT INCOME NOT MEASURED
(Rupees per Month)

<u>Year</u>	<u>National</u>	<u>Urban</u>	<u>Rural</u>	<u>Estate</u>
1980/81	(401.95)	(388.00)	(360.39)	(179.51)
1985/86	(233.00)	(798.00)	(288.00)	(675.00)
1990/91	(768.76)	369.84	(1,019.52)	(1,065.84)

Source: Table 6, Table 7

TABLE 8

SURVEY DATA DEFLATED BY HOUSEHOLD SIZE TO MONTHLY PER CAPITA

Sector/ Food	1980/81		1985/86		1990/91	
	Kg	Rs	Kg	Rs	Kg	Rs
<u>National</u>						
Total Food	--	157.03	--	236.86	--	547.84
Rice	9.1	49.42	8.9	60.04	9.1	122.79
Flour	0.7	3.77	0.8	6.08	0.5	7.73
Bread	1.5	7.33	1.8	12.54	2.0	23.11
Flour P.*	0.2	0.77	0.4	2.41	0.6	7.26
<u>Urban</u>						
Total Food	--	183.05	--	283.77	--	609.39
Rice	7.2	42.37	7.2	52.45	7.4	107.03
Flour	0.5	2.95	0.5	4.12	0.4	4.96
Bread	2.9	13.74	2.9	20.21	3.3	20.74
Flour P.	0.3	1.36	0.7	4.79	0.8	4.98
<u>Rural</u>						
Total Food	--	151.27	--	219.61	--	534.88
Rice	9.5	51.30	9.3	61.80	9.7	127.80
Flour	0.5	2.76	0.5	4.20	0.3	4.61
Bread	1.3	6.00	1.6	10.81	1.7	19.71
Flour P.	0.1	0.38	0.3	1.82	0.5	6.28
<u>Estate</u>						
Total Food	--	136.6	--	255.51	--	585.05
Rice	8.3	45.76	9.4	64.82	10.0	137.88
Flour	3.1	16.40	4.7	36.36	3.5	50.19
Bread	0.7	3.32	0.7	5.00	1.3	16.04
Flour P.	0.04	0.20	0.2	1.22	0.4	5.33

* Flour preparations and other products, calculated from expenditure lists.

Source: Household Income and Expenditure Survey, 1990/91
Labour Force and Socio-Economic Survey, 1985/86
Labour Force and Socio-Economic Survey, 1980/81

TABLE 9

1980/81 SURVEY CONSUMPTION DATA BY EXPENDITURE GROUP
(Per Capita)

Expenditure Groups	Wheat			Percent Households
	Rice Kg	Flour Kg	Bread Kg	
<u>National</u>				
All	109.6	8.7	18.3	100.0
Rs/Month				
0-250	19.5	1.5	3.2	4.2
250-500	43.3	3.3	5.6	17.9
500-750	73.1	6.2	9.5	42.1
750-1000	96.7	8.9	14.6	11.3
1000-1250	116.0	10.1	19.1	11.5
1250-1500	141.8	9.7	23.8	5.5
1500-1750	152.0	11.4	22.6	
1750-2000	153.3	13.3	28.9	
2000-2250	171.9	7.3	30.5	
2250-2500	162.6	12.9	33.4	↓
2500-2750	176.9	10.4	34.9	7.5
2750-3000	170.8	11.4	37.4	
3000-3500	170.1	10.0	41.7	
3500-4500	174.3	14.4	45.2	
Over 4500	162.6	7.0	53.6	↓
<u>Urban</u>				
All	92.0	6.5	34.6	100.0
Rs				
0-250	16.8	0.8	7.4	2.5
250-500	35.2	1.2	9.1	11.9
500-750	58.5	3.5	19.3	34.4
750-1000	72.9	6.0	27.4	12.2
1000-1250	87.9	7.4	29.8	13.9
1250-1500	101.1	5.8	39.4	↓
1500-1750	110.6	6.4	36.3	8.1
1750-2000	119.3	11.8	41.6	
2000-2250	117.7	4.1	44.1	
2250-2500	125.6	8.0	48.1	↓
2500-2750	142.8	7.1	46.0	17
2750-3000	124.5	12.8	47.0	
3000-3500	134.7	7.6	56.4	
3500-4500	118.4	12.1	53.9	
Over 4500	100.1	7.5	62.6	↓

TABLE 9 (Cont.)

Expenditure Groups	Wheat			Percent Households
	Rice Kg	Flour Kg	Bread Kg	
<u>Rural</u>				
All	114.4	6.4	14.9	100.0
Rs				
0-250	20.6	1.3	2.3	4.8
250-500	44.9	2.2	5.4	19.8
500-750	75.6	4.1	8.8	25.5
750-1000	100.4	5.9	13.2	28.8
1000-1250	122.2	7.0	17.2	10.4
1250-1500	151.4	8.8	19.0	↓
1500-1750	161.0	9.4	18.8	5.0
1750-2000	166.0	9.8	23.3	
2000-2250	189.6	7.5	25.7	
2250-2500	173.1	10.2	28.8	↓
2500-2750	195.8	5.2	26.4	5.7
2750-3000	191.8	10.5	31.5	
3000-3500	202.8	11.9	25.2	
3500-4500	248.2	17.0	29.5	
Over 4500	192.6	6.4	39.0	↓
<u>Estate</u>				
All	100.1	36.7	8.2	100.0
Rs				
0-250	13.4	7.4	0.1	2.9
250-500	40.0	14.2	1.7	14.5
500-750	71.1	26.4	3.9	21.6
750-1000	100.7	37.6	6.2	39.6
1000-1250	116.3	52.7	10.1	15.4
1250-1500	162.8	39.6	11.0	↓
1500-1750	189.3	57.9	13.2	4.2
1750-2000	190.6	93.4	20.9	
2000-2250	193.7	53.7	3.2	
2250-2500	205.5	73.6	4.4	↓
2500-2750	205.5	73.6	11.9	1.8
2750-3000	205.5	73.6	11.9	
3000-3500	205.5	73.6	11.9	
3500-4500	205.5	73.6	11.9	
Over 4500	205.5	73.6	11.9	↓

TABLE 9 (Cont.)

Income Elasticities by Income Segement

Income Group (Rs)	Wheat			Wheat		
	Rice	Flour	Bread	Rice	Flour	Bread
	- ----National-----			-----Urban-----		
250						
500	1.22	1.21	0.73	1.09	0.50	0.24
750	1.37	1.74	1.42	1.32	3.67	2.22
1000	0.97	1.29	1.62	0.74	2.12	1.26
1250	0.80	0.58	1.23	0.82	0.97	0.34
1500	1.11	-0.21	1.23	0.75	-1.11	1.62
1750	0.43	1.05	-0.30	0.57	0.64	-0.48
2000	0.06	1.18	1.95	0.55	5.98	1.03
2250	0.97	-3.65	0.44	-0.10	-5.22	0.47
2500	-0.49	7.01	0.85	0.60	8.55	0.82
2750	0.88	-1.98	0.45	1.37	-1.15	-0.43
3000	-0.38	1.13	0.77	-1.41	8.93	0.25
3500	-0.03	-0.73	0.70	0.49	-2.45	1.19
4500	0.09	1.53	0.29	-0.42	2.08	-0.15
5500	-0.30	-2.30	0.84	-0.70	-1.72	0.72
	-----Rural-----			-----Estate-----		
250						
500	1.18	0.75	1.32	1.98	0.91	14.00
750	1.36	1.62	1.22	1.56	1.72	2.67
1000	0.98	1.34	1.54	1.25	1.26	1.80
1250	0.87	0.80	1.19	0.62	1.61	2.50
1500	1.19	1.21	0.53	2.00	-1.24	0.44
1750	0.38	0.44	-0.07	0.98	2.78	1.21
2000	0.22	0.32	1.67	0.05	4.30	4.06
2250	1.14	-1.91	0.84	0.13	-3.41	-6.77
2500	-0.79	3.34	1.08	0.55	3.34	3.41
2750	1.31	-4.90	-0.85	0.00	0.00	16.75
3000	-0.22	11.00	2.14	0.00	0.00	0.00
3500	0.34	0.80	-1.20	0.00	0.00	0.00
4500	0.78	1.51	0.59	0.00	0.00	0.00
5500	-1.01	-2.80	1.45	0.00	0.00	0.00

Source: Labour Force and Socio Economic Survey, 1980/81

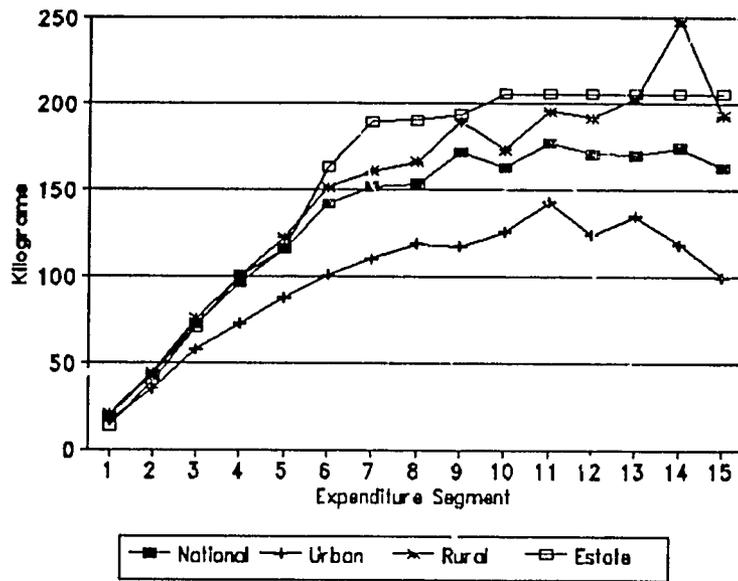


FIGURE III-1. 1980/81 Annual Per Capita Consumption By Expenditure Segment Rice.

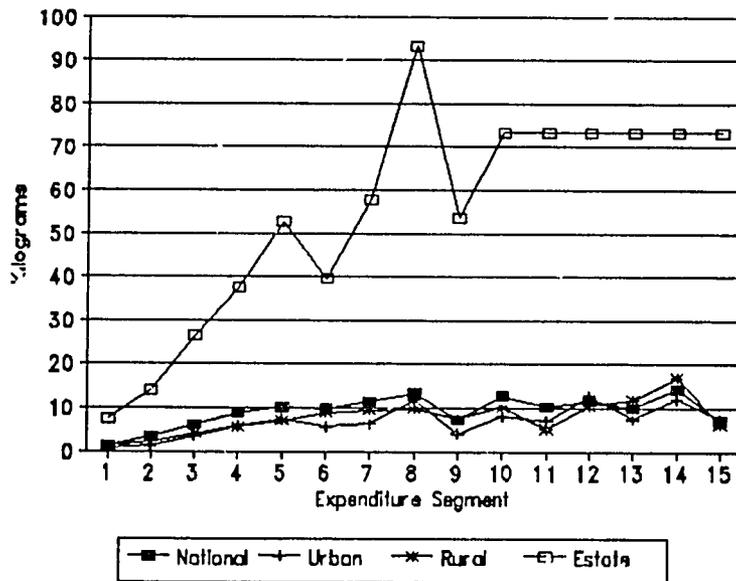


FIGURE III-2. 1980/81 Annual Per Capita Consumption By Expenditure Segment, Wheat Flour.

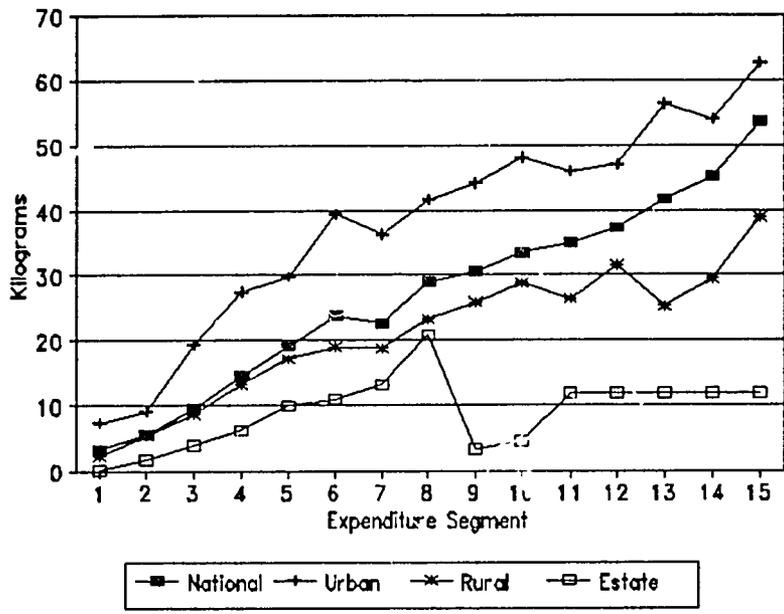


FIGURE III-3. 1980/81 Annual Per Capita Consumption By Expenditure Segment, Bread.

TABLE 10
PER CAPITA CONSUMPTION PATTERNS BY PRODUCT
(Kilograms per Year)

Product/ Sector	Survey Periods						
	69/70	73	78/79	80/81	81/82	85/86	86/87
<u>Rice</u>							
National	95.01	86.79	90.93	109.65	101.24	106.35	103.65
Urban	84.12	80.31	77.21	86.94	87.49	85.81	82.56
Rural	97.19	88.09	95.93	114.35	104.63	111.06	107.60
Estate	89.40	89.62	88.42	100.16	103.00	112.90	114.89
<u>Wheat Flour</u>							
National	15.14	17.43	16.66	8.47	10.65	9.41	8.81
Urban	8.77	17.43	8.15	6.57	5.95	6.34	5.22
Rural	14.05	12.68	10.23	6.35	6.81	6.35	5.22
Estate	63.65	65.77	90.10	36.73	67.30	56.08	50.32
<u>Bread</u>							
National	20.20	17.26	23.16	18.35	18.22	21.88	22.52
Urban	30.38	27.74	38.83	34.66	32.75	35.32	36.29
Rural	20.20	16.00	21.80	15.06	15.45	18.82	20.51
Estate	7.30	6.08	6.86	8.33	7.31	8.57	10.07
<u>Wheat</u>							
Products							
National	31.18	31.41	34.77	23.22	27.6	28.93	28.77
Urban	31.93	38.75	37.23	32.73	33.08	35.26	34.82
Rural	30.09	25.78	27.39	18.79	21.83	23.72	23.78
Estate	70.65	71.93	96.8	44.46	76.62	66.28	61.57

Source: Household Income and Expenditure Survey, 1990/91
Labour Force and Socio-Economic Survey, 1985/86
Labour Force and Socio-Economic Survey, 1980/81

TABLE 11
1973 SURVEY

Monthly Income Group Rs	Distribution of Spending Units %	Per Capita Consumption		
		Rice Kg	Wheat Flour Kg	Bread Kg
<u>National</u>				
Total	100.0	86.79	17.43	17.25
0-50	0.1	47.21	4.95	5.52
51-100	0.8	59.95	9.35	6.89
101-200	5.9	69.04	13.73	16.49
201-400	27.3	82.65	18.65	15.62
401-800	45.5	86.35	18.94	16.04
801-1600	17.0	92.18	14.26	20.50
1601-2000	1.6	97.51	15.87	24.14
2001-3000	1.2	95.83	9.84	21.30
Over 3000	0.6	99.31	10.42	27.95
<u>Urban</u>				
Total	100.0	80.31	17.43	27.74
0-50	0.2	54.45	4.95	5.44
51-100	0.4	92.94	9.35	23.23
101-200	5.7	94.19	13.73	21.91
201-400	18.2	88.97	18.65	24.02
401-800	41.7	84.83	18.94	25.71
801-1600	25.7	86.08	14.26	30.67
1601-2000	3.5	80.85	15.87	37.18
2001-3000	2.6	89.95	9.84	26.13
Over 3000	2.1	77.91	10.42	37.08
<u>Rural</u>				
Total	100.0	88.09	12.68	16.00
0-50	0.1	28.97	5.44	7.01
51-100	1.1	59.35	8.33	6.02
101-200	6.2	69.47	11.66	14.64
201-400	29.3	81.29	13.55	15.78
401-800	45.8	82.76	13.14	15.37
801-1600	14.9	95.39	10.87	18.06
1601-2000	1.3	109.49	16.63	15.96
2001-3000	0.9	100.13	7.09	17.74
Over 3000	0.5	118.15	6.68	19.91
<u>Estate</u>				
Total	100.0	89.62	65.77	6.08
0-50	0.2	76.23	0.00	0.00
51-100	0.9	41.98	20.28	3.69
101-200	3.7	92.45	59.27	3.60
201-400	31.1	84.99	68.79	5.08
401-800	49.6	92.56	69.83	5.81
801-1600	12.9	87.93	53.27	6.53
1601-2000	0.4	70.78	55.81	19.06
2001-3000	0.9	92.99	43.56	14.54
Over 3000	0.3	39.47	38.79	46.28

TABLE 11 (Cont.)

Income Elasticities by Income Segment

Income Group (Rs)	Wheat			Wheat		
	Rice	Flour	Bread	Rice	Flour	Bread
	-----National-----			-----Urban-----		
50						
100	0.27	0.89	0.25	0.71	0.89	3.27
200	0.15	0.47	1.39	0.01	0.47	-0.06
400	0.20	0.36	-0.05	-0.06	0.36	0.10
800	0.04	0.02	0.03	-0.05	0.02	0.07
1600	0.07	-0.25	0.28	0.01	-0.25	0.19
2000	0.23	0.45	0.71	-0.24	0.45	0.85
3000	-0.03	-0.76	-0.24	0.22	-0.76	-0.59
4000	0.11	0.18	0.94	-0.40	0.18	1.26
	-----Rural-----			-----Estate-----		
50						
100	1.05	0.53	-0.14	-0.45		
200	0.17	0.40	1.43	1.20	1.92	-0.02
400	0.17	0.16	0.08	-0.08	0.16	0.41
800	0.02	-0.03	-0.03	0.09	0.02	0.14
1600	0.15	-0.17	0.17	-0.05	-0.24	0.12
2000	0.59	2.12	-0.46	-0.78	0.19	7.68
3000	-0.17	-1.15	0.22	0.63	-0.44	-0.47
4000	0.54	-0.17	0.37	-1.73	-0.33	6.55

Source: Report on Consumer Finances and Socio Economic Survey, 1973

TABLE 12
1978/79 SURVEY

Monthly Income Group Rs	Distribution of Spending Units %	Per Capita Consumption		
		Rice Kg	Wheat Flour Kg	Bread Kg
<u>National</u>				
Total	100.0	90.93	16.66	23.96
0-100	0.6	82.98	10.66	20.87
101-200	1.9	80.58	15.86	25.97
201-400	12.0	83.30	18.75	23.85
401-600	21.0	84.61	18.42	22.24
601-800	19.7	89.07	17.64	22.70
801-1000	14.2	94.85	18.36	23.83
1001-1500	17.4	98.22	14.39	24.17
1501-2000	6.3	100.40	11.03	29.09
2001-2500	2.39	98.44	11.90	29.41
2500-3000	1.45	107.37	16.69	22.58
Over 3000	3.1	93.32	8.72	31.08
<u>Urban</u>				
Total	100.0	77.21	8.15	36.83
0-100	0.5	72.52	5.16	27.55
101-200	1.4	66.86	11.79	41.89
201-400	8.8	73.61	5.98	38.50
401-600	17.1	74.81	5.76	33.76
601-800	17.9	73.18	6.88	36.18
801-1000	14.4	82.98	9.79	37.21
1001-1500	18.7	79.49	8.82	35.35
1501-2000	10.2	83.09	9.46	42.99
2001-2500	3.4	81.78	14.88	37.50
2500-3000	2.3	74.16	11.87	37.70
Over 3000	5.3	73.18	8.89	38.97
<u>Rural</u>				
Total	100.0	95.93	10.23	21.80
0-100	0.7	90.60	8.73	22.10
101-200	2.2	85.15	11.85	21.98
201-400	13.2	84.72	10.80	22.41
401-600	21.5	87.55	9.89	21.71
601-800	20.0	93.76	10.16	20.82
801-1000	14.0	99.85	10.92	21.97
1001-1500	16.6	104.54	10.36	22.00
1501-2000	5.5	108.68	8.99	23.14
2001-2500	2.1	110.53	9.81	23.56
2500-3000	1.3	120.44	8.31	18.85
Over 3000	2.9	121.96	8.56	20.53
<u>Estate</u>				
Total	100.0	88.42	90.10	6.86
0-100	0.2	60.76	31.46	1.67
101-200	1.1	79.17	76.11	13.20
201-400	10.1	91.25	96.37	9.27
401-600	26.8	83.19	84.73	7.74
601-800	21.6	87.66	98.02	5.03
801-1000	15.4	84.50	99.82	6.80
1001-1500	19.7	99.96	81.46	4.53
1501-2000	1.9	109.55	78.95	5.98
2001-2500	1.6	109.66	8.10	23.04
2500-3000	1.6	106.61	126.86	
Over 3000	0.0			

TABLE 12 (Cont.)

Income Elasticities by Income Segment

Income Group (Rs)	Wheat			Wheat		
	Rice	Flour	Bread	Rice	Flour	Bread
	-----National-----			-----Urban-----		
100						
200	-0.03	0.49	0.24	-0.08	1.28	0.52
400	0.03	0.18	-0.08	0.10	-0.49	-0.08
600	0.03	-0.04	-0.13	0.03	-0.07	-0.25
800	0.16	-0.13	0.06	-0.07	0.58	0.22
1000	0.26	0.16	0.20	0.54	1.69	0.11
1500	0.07	-0.43	0.03	-0.08	-0.20	-0.10
2000	0.07	-0.70	0.61	0.14	0.22	0.65
2500	-0.08	0.32	0.04	-0.06	2.29	-0.51
3000	0.45	2.01	-1.16	-0.47	-1.01	0.03
4000	-0.39	-1.43	1.13	-0.04	-0.75	0.10
	-----Rural-----			-----Estate-----		
100						
200	-0.06	0.36	-0.01	0.30	1.42	6.92
400	-0.01	-0.09	0.02	0.15	0.27	-0.30
600	0.07	-0.17	-0.06	-0.18	-0.24	-0.33
800	0.21	0.08	-0.12	0.16	0.47	-1.05
1000	0.26	0.30	0.22	-0.14	0.07	1.40
1500	0.09	-0.10	0.00	0.37	-0.37	-0.67
2000	0.12	-0.40	0.15	0.29	-0.09	0.96
2500	0.07	0.37	0.07	0.00	-3.59	11.42
3000	0.45	-0.76	-1.00	-0.14	73.29	-5.00
4000	0.04	0.09	0.27	-3.00	-3.00	

Source: Report on Consumer Finances and Socio-Economic Survey, 1978/79

TABLE 13
1981/82 SURVEY

Monthly Income Group Rs	Distribution of Spending Units %	Per Capita Consumption		
		Rice Kq	Wheat Flour Kq	Bread Kq
<u>National</u>				
Total	100.0	101.24	10.65	18.22
0-100	0.2	77.83	16.75	26.69
101-200	0.5	80.29	5.94	10.74
201-400	2.7	81.95	9.97	13.32
401-600	8.2	80.42	10.42	13.36
601-800	12.4	87.26	12.44	15.36
801-1000	13.7	93.51	11.38	15.43
1001-1500	24.8	102.74	11.23	17.33
1501-2000	14.1	110.53	11.25	19.78
2001-3000	12.5	115.51	9.70	21.83
Over 3000	10.9	112.67	5.74	27.48
<u>Urban</u>				
Total	100.0	87.49	5.95	32.75
0-100	0.23	102.06	0.00	39.96
101-200	0.28	73.80	1.61	11.81
201-400	1.17	67.39	5.23	25.47
401-600	3.7	76.07	5.66	25.33
601-800	10.2	73.97	2.82	30.31
801-1000	8.9	81.48	4.03	28.63
1001-1500	21.8	88.56	5.71	30.66
1501-2000	17.2	90.63	7.49	33.96
2001-3000	16.5	95.04	6.61	32.78
Over 3000	20.0	95.46	6.26	39.63
<u>Rural</u>				
Total	100.0	104.63	6.81	15.45
0-100	0.2	42.50	25.13	20.05
101-200	0.6	80.06	6.46	10.81
201-400	3.1	81.08	5.84	12.48
401-600	9.5	79.67	6.36	12.58
601-800	13.2	88.46	6.72	13.81
801-1000	14.3	95.01	6.35	14.12
1001-1500	25.1	105.40	6.55	15.60
1501-2000	13.2	115.95	8.39	16.26
2001-3000	11.8	124.18	7.38	18.18
Over 3000	9.1	133.44	4.88	17.83
<u>Estate</u>				
Total	100.0	103.00	67.30	7.31
0-100	0.0	0.00	0.00	0.00
101-200	0.1	86.76	3.95	9.40
201-400	1.9	106.17	5.21	7.13
401-600	7.4	93.46	58.42	7.21
601-800	15.5	95.44	66.37	7.69
801-1000	19.7	97.55	61.50	8.29
1001-1500	29.5	106.02	72.90	6.02
1501-2000	14.1	118.57	74.81	8.54
2001-3000	8.8	110.30	77.32	5.58
Over 3000	3.1	134.32	47.88	10.82

TABLE 13 (Cont.)

Income Elasticities by Income Segment

Income Group (Rs)	Wheat			Wheat		
	Rice	Flour	Bread	Rice	Flour	Bread
	-----National-----			-----Urban-----		
100						
200	0.03	-0.65	-0.60	-0.28	0.00	-0.70
400	0.02	0.68	0.24	-0.09	2.26	1.16
600	-0.04	0.09	0.01	0.26	0.17	-0.01
800	0.26	0.58	0.45	-0.08	-1.51	0.59
1000	0.29	-0.34	0.02	0.41	1.72	-0.22
1500	0.20	-0.03	0.25	0.17	0.83	0.14
2000	0.23	0.01	0.42	0.07	0.94	0.32
3000	0.09	-0.28	0.21	0.10	-0.23	-0.07
4000	-0.07	-1.23	0.78	0.01	-0.16	0.63
	-----Rural-----			-----Estate-----		
100						
200	0.88	-0.74	-0.46	0.00	0.00	0.00
400	0.01	-0.10	0.15	0.22	0.32	-0.24
600	-0.03	0.18	0.02	-0.24	20.43	0.02
800	0.33	0.17	0.29	0.06	0.41	0.20
1000	0.30	-0.22	0.09	0.09	-0.29	0.31
1500	0.22	0.07	0.21	0.17	0.37	-0.55
2000	0.30	0.84	0.13	0.35	0.08	1.25
3000	0.14	-0.24	0.24	-0.14	0.07	-0.69
4000	0.22	-1.02	-0.06	0.65	-1.14	2.82

Source: Report on Consumer Finances and Socio-Economic Survey, 1981/82

TABLE 14
1986/87 SURVEY

Monthly Income Group Rs	Distribution of Spending Units %	Per Capita Consumption		
		Rice Kg	Wheat Flour Kg	Bread Kg
<u>National</u>				
Total	100.0	103.65	8.81	22.52
0-100	0.1	75.64	6.25	10.70
101-200	0.3	85.90	4.34	23.94
201-400	1.6	91.24	4.49	15.66
401-600	4.2	90.08	6.78	15.85
601-800	6.8	89.39	5.95	17.69
801-1000	7.4	94.10	7.28	16.37
1001-1500	20.0	100.98	9.43	18.02
1501-2000	15.9	107.46	9.95	20.83
2001-3000	18.6	110.46	9.76	23.20
Over 3000	25.2	101.34	7.34	32.36
<u>Urban</u>				
Total	100.0	82.56	5.22	36.29
0-100	0.19	67.80	21.60	23.14
101-200	0.32	65.36	2.01	29.41
201-400	1.1	72.36	1.03	34.31
401-600	2.9	73.28	2.91	33.08
601-800	3.8	67.59	4.38	32.86
801-1000	3.4	68.94	2.75	27.06
1001-1500	11.3	76.08	3.79	31.15
1501-2000	12.3	83.08	3.76	34.50
2001-3000	18.5	86.34	5.04	35.17
Over 3000	46.2	82.76	6.25	39.52
<u>Rural</u>				
Total	100.0	107.60	5.22	20.51
0-100	0.1	77.87	1.87	6.19
101-200	0.4	96.78	5.58	21.05
201-400	1.8	97.18	3.46	12.56
401-600	4.6	90.48	4.28	15.02
601-800	7.5	90.91	4.90	16.52
801-1000	8.5	95.50	4.50	15.67
1001-1500	21.7	102.23	4.90	17.68
1501-2000	16.4	110.19	5.29	19.99
2001-3000	18.3	115.14	5.17	22.26
Over 3000	20.7	113.98	6.15	28.12
<u>Estate</u>				
Total	100.0	114.89	50.32	10.07
0-100	0.0	0.00	0.00	0.00
101-200	0.0	0.00	0.00	0.00
201-400	0.7	46.39	21.96	26.52
401-600	3.6	101.77	44.23	9.44
601-800	7.3	98.78	27.16	12.82
801-1000	7.9	103.96	37.68	13.21
1001-1500	26.8	112.04	45.44	10.07
1501-2000	20.7	117.74	49.21	10.51
2001-3000	21.2	119.28	60.47	6.47
Over 3000	11.7	137.02	56.58	22.36

TABLE 14 (Cont.)

Income Elasticities by Income Segment

Income Group (Rs)	Rice	Wheat Flour	Bread	Rice	Wheat Flour	Bread
	-----National-----			-----Urban-----		
100						
200	0.14	-0.31	1.24	-0.04	0.00	0.27
400	0.06	0.03	-0.35	0.11	-0.49	0.17
600	-0.03	1.02	0.02	0.03	3.67	-0.07
800	-0.02	-0.37	0.35	-0.23	1.52	-0.02
1000	0.21	0.90	-0.30	0.08	-1.49	-0.71
1500	0.15	0.59	0.20	0.21	0.76	0.30
2000	0.19	0.16	0.47	0.28	-0.02	0.32
3000	0.06	-0.04	0.23	0.08	0.68	0.04
4000	0.25	-0.74	1.19	-0.12	0.72	0.37
	-----Rural-----			-----Estate-----		
100						
200	0.24	1.98	2.40	0.00	0.00	0.00
400	0.00	-0.38	-0.40	0.00	0.00	0.00
600	-0.14	0.48	0.39	2.39	2.03	-1.29
800	0.01	0.43	0.30	-0.09	-1.16	1.07
1000	0.20	-0.32	-0.21	0.21	1.55	0.12
1500	0.14	0.18	0.26	0.16	0.41	-0.48
2000	0.23	0.24	0.39	0.15	0.25	0.13
3000	0.09	-0.05	0.23	0.03	0.46	-0.77
4000	-0.03	0.57	0.79	0.45	-0.19	7.37

Source: Report on Consumer Finances and Socio-Economic Survey, 1986/87

APPENDIX IV

NUTRITIONAL DATA

TABLE 1

PER CAPITA ENERGY INTAKE

Year	Kilocalories per Day			As a Percentage of Total				
	Total	Rice	Wheat Flour	Other Cereals	All Cereals	Rice	Wheat Flour	Wheat Flour plus Rice
1965	2,154.43	1,060.77	216.00	26.64	60.5	49.2	10.0	59.3
1966	2,229.08	1,039.41	279.04	24.96	60.3	46.6	12.5	59.1
1967	2,184.49	908.49	383.81	35.27	60.8	41.6	17.6	59.2
1968	2,169.34	956.81	328.18	26.56	60.5	44.1	15.1	59.2
1969	2,179.15	965.67	317.04	25.16	60.0	44.3	14.5	58.9
1970	2,370.64	1,080.34	294.29	20.27	58.8	45.6	12.4	58.0
1971	2,230.53	983.52	223.48	17.25	54.9	44.1	10.0	54.1
1972	2,158.14	876.09	316.09	16.17	56.0	40.6	14.6	55.2
1973	2,169.42	853.61	326.84	24.60	55.5	39.3	15.1	54.4
1974	2,135.78	943.98	310.80	28.15	60.1	44.2	14.6	58.8
1975	2,127.10	788.18	367.73	32.87	55.9	37.1	17.3	54.3
1976	2,172.07	896.51	365.55	31.81	59.6	41.3	16.8	58.1
1977	2,343.10	1,042.22	409.98	37.06	63.6	44.5	17.5	62.0
1978	2,325.41	929.21	429.43	25.01	59.5	40.0	18.5	58.4
1979	2,316.60	878.43	361.54	21.17	54.4	37.9	15.6	53.5
1980	2,169.40	966.00	204.14	21.87	54.9	44.5	9.4	53.9
1981	2,200.12	983.41	239.70	19.35	56.5	44.7	10.9	55.6
1982	2,188.69	944.28	264.86	20.75	56.2	43.1	12.1	55.2
1983	2,361.43	1,002.75	253.51	23.46	54.2	42.5	10.7	53.2
1984	2,385.05	1,031.50	283.17	27.01	56.3	43.2	11.9	55.1
1985	2,517.48	1,050.47	303.77	16.51	54.4	41.7	12.1	53.8
1986	2,376.83	988.78	270.54	34.46	54.4	41.6	11.4	53.0
1987	2,267.40	902.90	279.27	13.69	52.7	39.8	12.3	52.1
1988	2,326.10	962.75	282.12	21.62	54.4	41.4	12.1	53.5
1989	2,248.37	878.29	323.96	14.72	54.1	39.1	14.4	53.5
1990	2,292.02	970.07	263.38	37.66	55.5	42.3	11.5	53.8
1991	2,338.91	957.45	329.87	13.89	55.6	40.9	14.1	55.0
Average	2,256.93	957.11	304.74	24.37	57.0	42.4	13.5	55.9

Source: Food and Nutrition Statistics, 1950 - 1990
Food Balance Sheet, 1991

TABLE 2
PER CAPITA PROTEIN INTAKE

Year	Grams per Day					As a Percentage of Total		
	Total	Rice	Wheat Flour	Other Cereals	All Cereals	Rice	Wheat Flour	Wheat Flour plus Rice
1970	50.43	21.36	8.81	0.70	61.2	42.4	17.5	59.8
1971	46.74	18.65	7.06	0.70	56.5	39.9	15.1	55.0
1972	46.32	16.77	9.99	0.60	59.1	36.2	21.6	57.8
1973	45.81	16.34	10.33	1.01	60.4	35.7	22.5	58.2
1974	44.94	17.90	9.91	1.81	65.9	39.8	22.1	61.9
1975	44.76	14.66	11.62	1.42	61.9	32.8	26.0	58.7
1976	46.28	16.69	12.19	1.10	64.8	36.1	26.3	62.4
1977	49.18	19.41	12.96	0.81	67.5	39.5	26.4	65.8
1978	51.11	17.31	13.57	0.83	62.0	33.9	26.6	60.4
1979	48.90	16.36	11.43	0.83	58.5	33.5	23.4	56.8
1980	45.97	17.99	6.45	0.79	54.9	39.1	14.0	53.2
1981	46.54	18.32	7.58	0.85	66.0	45.2	18.7	63.9
1982	47.94	17.58	8.37	0.90	56.0	36.7	17.5	54.1
1983	53.07	18.68	8.01	0.99	52.2	35.2	15.1	50.3
1984	55.31	19.21	8.95	0.94	52.6	34.7	16.2	50.9
1985	56.02	20.12	9.60	0.83	54.5	35.9	17.1	53.1
1986	52.10	18.42	8.56	0.68	53.1	35.4	16.4	51.8
1987	51.45	18.82	8.83	0.61	54.9	36.6	17.2	53.7
1988	52.60	17.93	8.92	0.67	52.3	34.1	17.0	51.0
1989	52.19	16.36	10.24	0.60	52.1	31.3	19.6	51.0
1990	54.32	18.07	8.33	0.60	49.7	33.3	15.3	48.6
1991	56.56	17.83	10.43	0.42	50.7	31.5	18.4	50.0
Average	49.33	17.95	9.61	0.87	57.9	36.5	19.69	56.1

Source: Food and Nutrition Statistics, 1950 - 1990
Food Balance Sheet 1991

APPENDIX V

WHEAT DATA

TABLE 1

WHEAT GRAIN IMPORTS

Year	Volume Mt	C&F Price Rs/Mt	Volume Mt	C&F Price Rs/Mt	Volume Mt	CIF Price Rs/Mt	Volume Mt	CIF Price Rs/Mt	Volume Mt	CIF Price Rs/Mt	Volume Mt	Price Rs/Mt
	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)	(5)	(5)	(6)	(6)
1965												
1966												
1967												
1968					17,391	421						
1969					25,536	395						
1970					29,743	416	55,000	N/A			29,743	416
1971					44,261	527	83,000	N/A			44,261	527
1972					102,232	435	92,000	N/A			102,230	433
1973					87,336	695	83,000	N/A			87,336	695
1974					81,047	1,440	100,000	N/A			81,045	1,440
1975					88,980	1,529	93,000	N/A			88,980	1,529
1976					90,277	1,602	130,000	N/A			90,277	1,602
1977					119,926	1,199	115,000	N/A	120,000	1,198	119,926	1,199
1978					91,459	1,673	84,000	N/A	81,000	1,673	81,458	1,600
1979					131,479	2,250	112,000	N/A	110,000	2,261	131,478	2,250
1980	163,970	3,509			197,051	2,809	227,000	N/A	197,000	2,809	197,051	2,809
1981	439,175	3,864			509,949	3,670	440,175	N/A	439,000	3,864	509,949	3,670
1982	494,737	3,612			356,509	3,697	494,737	N/A	495,000	3,611	356,509	3,696
1983	571,779	3,995			423,548	3,833	571,779	N/A	579,000	4,044	423,548	3,833
1984	571,290	3,642			371,208	4,406	571,290	N/A	571,000	4,325	641,208	2,547
1985	655,143	4,368			661,647	4,374	655,143	N/A	665,000	4,157	661,647	4,374
1986	680,945	3,683			504,898	3,969	680,944	N/A	681,000	3,481	504,898	3,969
1987	578,621	3,710			422,273	3,340	578,621	N/A	578,000	3,330	422,273	3,340
1988	612,089	4,874			681,098	4,279	612,080	N/A	612,000	4,574	681,098	4,279
1989	309,332	6,229	227,829	7,659			309,332	N/A	726,000	6,837	477,454	6,206
1990			638,632	6,921			584,226	N/A	577,000	6,575	416,850	6,646
1991			719,681	4,987					670,000	4,933	262,986	7,356
1992			706,140	6,169					709,000	6,413		

- (1) Food Commissioners Department Annual Reports.
(2) CWE Records.
(3) Annual Trade Statistics of Sri Lanka.
(4) Food and Nutrition Statistics, 1950 - 1990.
(5) Central Bank of Sri Lanka Annual Reports.
(6) Agrarian Research and Training Institute (Customs Data).

TABLE 2
WHEAT FLOUR IMPORTS

Year	Volume Mt (1)	C&F Price Rs/Mt (1)	Volume Mt (2)	C&F Price Rs/Mt (2)	Volume Mt (3)	CIF Price Rs/Mt (3)	Volume Mt (4)	CIF Price Rs/Mt (4)	Volume Mt (5)	CIF Price Rs/Mt (5)
1965	316,946	429					214,868	497	191,898	512
1966	268,295	452					239,720	471	214,113	527
1967	586,393	470					513,008	446	458,167	499
1968	366,156	598					429,228	583	383,344	653
1969	394,668	383					415,311	615	415,307	615
1970	374,547	602	374,529	602			425,277	612	425,272	612
1971	335,766	621	335,749	621			332,751	620	302,747	682
1972	329,134	657	329,118	657			306,231	630	306,208	623
1973	371,218	1,234	371,199	1,234			402,276	1,126	402,276	1,126
1974	448,907	2,207	448,885	2,207			408,204	2,098	408,200	2,098
1975	462,524	2,261	462,501	2,261			438,978	2,283	438,954	2,278
1976	385,856	2,024	385,836	2,024			330,046	2,032	330,046	2,033
1977	532,270	1,672	532,244	1,672			545,375	1,598	545,375	1,596
1978	612,620	3,405	612,590	3,405			631,783	3,469	631,783	3,469
1979	466,573	3,674	466,550	3,574			475,234	3,557	475,234	3,557
1980	360,956	5,056	360,938	5,056			370,478	4,820	370,478	4,820
1981	0	0	0	0			2,890	8,579	2,890	8,579
1982	0	0	0	0			7,189	8,161	7,189	8,181
1983	21,921	3,833	21,921	5,623			18,720	5,594	18,720	5,594
1984	10,950	2,551	10,950	7,724			3,938	6,334	13,783	1,810
1985	0	0	0	0			42,225	4,807	42,225	4,807
1986	10,353	3,969	10,353	6,346			12,338	6,847	12,837	6,847
1987	10,002	3,340	10,002	6,881			12,340	7,565	12,341	7,564
1988	35,893	4,280	35,893	8,020			36,728	8,224	36,730	8,224
1989	17,760	6,206	16,760	10,183	20,236	12,123			17,025	10,240
1990	137,486	8,456			137,003	10,039			128,736	10,774
1991					0	0			43	31,746
1992					0	0				

- (1) Food and Nutrition Statistics, 1950 - 1990
(2) Food Commissioners Annual Reports
(3) CWE Records
(4) Annual Trade Statistics of Sri Lanka
(5) Agrarian Research and Training Institute (Customs Data)

TABLE 3

1992/93 CWE WHEAT IMPORTS
(Metric Tons)

<u>Date</u>	<u>Ship</u>	<u>Shipper</u>	<u>Metric Tons</u>
<u>1993 Through June</u>			
1/10	Sea Transport	EEP	52,516.273
2/1	Chloe	EEP	52,521.843
3/4	Heliopolis	EEP	52,129.670
3/19	Trade Greece	EEP	51,498.828
4/5	Angelic Faith	EEP/G102	52,550.038
4/8	California	EEP/G102	52,449.721
4/28	Hudson Bay	EEP	50,555.057
4/28	Orion II	EEP	52,435.337
6/3	Neptune Bay	EEP	52,440.321
6/25	Bao Xing	TI	18,759.568
		TOTAL	487,856.656
		PL480	0.000
		Other	0.000
		COMM	487,856.656
<u>1992</u>			
1/5	Magdap	EEC Gift	29,922.421
2/23	Marigo.K.	Cargill	47,621.532
3/21	Kapitan Yannis	Mitsui	52,027.500
4/22	Varena	Dreyfus	49,171.432
4/29	Consensus Wave	EEC Gift	5,001.000
5/10	Marijeane	Cont Gr	51,313.425
5/30	San John Mariner	Cont Gr	48,670.507
7/4	Liberty Star	TIII	49,882.713
7/8	Despina	TI	51,630.150
7/22	Atlantic Splendor	Teopfer	52,500.000
8/28	Liberty Sea	TIII	49,830.760
9/29	Liberty Wave	TIII	56,854.584
10/11	Thoroughbred Topper	Cont Gr	31,342.500
10/31	Taeschor	TIII	31,177.863
11/5	Liberty Sun	TIII	49,991.154
11/30	Meraklis		49,202.558
		TOTAL	706,140.099
		PL480	289,367.224
		Other	34,923.421
		COMM	381,849.454

Source: CWE Records

TABLE 4

FOOD COMMISSIONERS DEPARTMENT FLOUR DISTRIBUTION
(Metric Tons)

Receipts Month	1965	1966	1967	1968	SFMC 1969	SFMC 1970	SFMC 1971	SFMC 1972	SFMC 1973	SFMC 1974	SFMC 1975	SFMC 1976
January												
February												
March												
April												
May												
June												
July												
August												
September												
October												
November												
December												
TOTAL	0	0	0	0	52,900	59,372	53,623	70,538	65,740	48,019	65,292	93,639
Imports of Flour	316,946	268,295	586,399	366,156	394,668	374,529	335,749	329,118	371,199	448,885	462,501	385,836
<u>Distribution</u>												
January	28,210	26,099	44,639	35,360	29,531	36,154	37,653	42,900	33,993	40,874	38,278	36,471
February	23,152	19,469	38,761	33,434	33,261	40,926	26,923	34,422	37,744	41,580	36,386	43,244
March	16,855	21,601	31,582	43,267	38,632	47,868	29,755	34,409	37,280	35,897	39,044	34,609
April	14,971	23,309	35,826	26,342	25,761	30,972	26,507	32,423	32,837	25,024	31,345	24,959
May	22,748	17,831	28,714	29,359	28,911	38,108	30,810	28,376	33,359	27,467	33,653	37,628
June	15,692	21,876	30,512	39,019	38,068	31,254	25,154	31,680	40,152	35,343	46,088	31,561
July	25,393	27,606	38,157	31,690	31,859	32,296	28,055	37,452	32,522	32,005	39,580	40,645
August	19,592	17,221	32,040	32,621	42,086	43,293	35,725	35,417	33,201	35,038	50,728	57,425
September	22,881	21,137	45,181	41,309	34,939	31,506	28,673	45,517	41,576	41,449	36,558	46,775
October	26,194	24,730	30,449	34,892	33,009	26,597	37,323	37,901	38,894	32,879	37,296	57,320
November	22,287	18,995	33,164	45,175	40,900	34,491	28,892	36,780	37,131	32,978	47,788	52,726
December	27,079	31,158	51,055	37,625	30,557	29,112	33,109	43,920	52,642	42,436	37,210	40,612
TOTAL	266,054	271,032	440,080	430,093	407,514	422,577	368,579	441,297	451,331	422,970	473,994	503,975
Monthly Average	22,171	22,586	36,673	35,841	33,960	35,215	30,715	36,775	37,611	35,248	39,500	41,998
Stock Position Beginning												
Receipts	316,946	268,295	586,399	366,156	447,568	433,901	389,372	399,656	436,939	496,904	527,793	479,475
Sales	266,054	271,032	440,080	430,093	407,514	422,577	368,579	441,297	451,331	422,970	473,994	503,975
Salvage												
Loss												
Ending												

Receipts Month	SFMC 1977	SFMC 1978	SFMC 1979	SFMC/ PRIMA 1980	SFMC/ PRIMA 1981	PRIMA 1982	PRIMA 1983	PRIMA 1984	PRIMA 1985	PRIMA 1986	PRIMA 1987	PRIMA 1988
January			7,721	7,854	23,494	24,022	42,693	42,622	51,393	45,395	51,090	47,192
February			6,230	7,697	23,492	29,529	40,293	36,209	39,144	19,105	43,550	35,559
March			6,178	4,672	31,343	35,734	20,912	37,607	39,931	31,127	39,532	54,428
April			3,554	1,795	14,908	30,911	30,244	38,022	45,584	37,349	30,504	46,353
May			4,983	4,256	30,685	34,534	30,124	43,097	38,312	50,767	38,047	39,513
June			5,359	6,454	24,918	25,800	25,044	42,860	44,699	38,382	26,749	38,159
July			6,095	5,325	39,136	34,041	25,214	26,517	40,887	39,084	37,190	27,897
August			5,782	4,193	38,140	32,177	53,786	34,112	38,793	52,125	38,637	40,663
September			6,406	3,363	41,241	36,831	38,742	47,894	23,022	54,068	35,296	40,614
October			2,877	34,084	34,701	27,115	41,878	44,775	45,529	47,470	14,372	43,603
November			6,015	4,993	40,036	30,109	43,204	36,208	47,863	39,136	49,479	28,254
December			10,126	22,758	38,319	44,207	38,429	40,134	51,616	45,705	59,715	45,561
TOTAL	73,848	81,788	71,326	107,444	380,413	385,010	430,563	470,057	506,773	499,713	474,161	487,796
Imports of Flour	532,244	612,590	466,550	360,938	0	0	21,921	10,950	0	10,353	10,002	35,893
<u>Distribution</u>												
January	53,536	46,203	43,474	28,619	39,312	35,972	36,255	35,715	41,715	48,208	42,301	40,600
February	51,157	46,126	47,248	35,881	44,257	33,488	30,680	34,458	42,588	36,986	38,543	50,116
March	42,044	61,155	54,205	22,265	29,341	36,117	35,110	36,980	39,310	38,983	41,802	42,181
April	43,095	34,982	42,645	20,483	29,118	29,031	26,160	29,347	34,694	34,379	34,677	35,018
May	52,922	48,893	49,845	26,922	26,987	31,178	31,380	33,228	37,833	36,548	38,167	36,875
June	39,052	57,831	48,855	26,316	35,122	36,017	34,410	32,570	35,455	37,006	36,246	41,495
July	45,320	50,614	51,925	33,161	41,664	34,685	41,436	36,006	42,016	41,335	39,930	40,863
August	51,864	58,281	51,006	28,608	41,558	37,050	35,980	40,071	41,933	39,573	43,105	46,406
September	44,426	52,554	54,708	35,751	40,656	37,460	36,244	29,287	41,004	41,513	42,560	48,738
October	63,509	26,661	58,403	36,468	34,274	33,313	37,745	34,060	41,881	45,214	41,007	44,902
November	52,943	58,551	53,874	39,933	37,842	40,098	38,636	35,151	37,440	39,183	41,306	45,908
December	46,225	34,249	43,598	44,510	40,276	47,223	40,194	37,611	42,700	43,863	46,535	49,583
TOTAL	586,093	576,100	599,786	378,917	440,407	431,632	424,230	414,484	478,569	482,791	486,179	522,685
Monthly Average	48,841	48,008	49,982	31,576	36,701	35,969	35,353	34,540	39,881	40,233	40,515	43,557
Stock Position Beginning								37,611	42,760	43,863	29,555	
Receipts	606,092	694,378	537,876	468,382	380,413	385,010	452,484	481,007	506,773	510,066	484,163	523,689
Sales	586,093	576,100	599,786	378,917	440,407	431,632	424,230	414,484	478,569	482,791	486,179	522,685
Salvage									796	228	519	335
Loss									22,259	25,944	11,773	20,428
Ending								37,611	42,760	43,863	29,555	9,796

TABLE 4 (Cont.)

Receipts Month	PRIMA 1989	PRIMA 1990	PRIMA 1991	PRIMA 1992	PRIMA 1993
January	59,571	56,275	27,564	51,800	48,000
February	34,480	47,680	39,110	25,300	46,200
March	52,040	36,924	25,151	34,100	49,300
April	37,708	33,865	35,731	37,200	45,200
May	35,430	35,856	37,168	48,000	46,900
June	40,745	21,017	39,924	48,000	
July	33,756	39,219	47,192	55,300	
August	52,475	53,441	41,786	54,600	
September	41,363	55,684	49,327	41,500	
October	59,644	31,707	56,407	54,400	
November	49,094	34,490	58,427	54,400	
December	43,998	26,724	57,602	51,800	
TOTAL	540,304	472,882	515,389	556,400	235,600
Imports of Flour	36,992	137,003	0	0	34,300
<u>Distribution</u>					
January	49,800	54,381	50,068	50,662	47,720
February	45,997	44,713	38,772	45,081	46,491
March	54,650	45,320	42,157	46,839	49,854
April	34,395	31,015	33,590	37,751	38,400
May	48,233	45,188	44,580	42,477	45,234
June	47,255	34,742	42,391	44,612	
July	42,147	35,377	46,828	51,355	
August	46,796	41,783	46,597	49,253	
September	53,157	36,368	41,926	48,451	
October	45,898	43,824	52,534	49,594	
November	51,524	43,363	46,486	50,502	
December	49,289	38,091	50,686	54,722	
TOTAL	569,141	494,165	536,615	571,299	227,699
Monthly Average	47,428	41,180	44,718	47,608	
Stock Position					
Beginning	9,796	16,653	111,165	77,900	
Receipts	577,296	609,885	515,389	556,400	
Sales	569,141	494,165	536,615	571,299	
Salvage			14	324	
Loss	1,298	21,194	11,715	0	
Ending	16,653	111,165	77,900	63,001*	

* Book Balance

Source: Food Commissioner Reports and Records
Food and Nutrition Statistics, 1950-1990

DISTRIBUTION OF WHEAT FLOUR BY DISTRICT 1989
Metric Tons

District	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Colombo	16,942	16,817	18,738	13,638	17,137	15,837	16,269	15,169	16,725	15,868	17,303	16,098
Kandy	4,539	4,165	4,761	3,105	4,412	3,003	3,109	3,700	3,397	3,899	4,391	3,509
Matale	864	820	758	514	765	916	682	724	695	552	596	580
Nuwara												
Eliya	2,453	2,509	2,862	2,191	3,079	1,762	1,340	2,589	1,148	2,576	2,449	2,253
Galle	2,616	2,315	2,575	1,401	2,366	2,280	2,068	2,070	2,744	2,434	2,931	2,483
Matara	1,807	1,216	1,541	1,012	1,573	1,633	1,320	1,012	1,584	1,405	1,645	1,444
Hambantota	809	572	671	229	633	559	564	486	572	363	455	538
Jaffna	2,936	2,098	3,786	1,813	2,201	933	7	47	1,801	1,277	3,260	2,203
Mannar	324	260	320	294	339	337	312	179	261	334	559	1,012
Vavuniya	234	186	207	68	272	263	89	89	89	120	687	218
Mulative	226	400	400	49	135	201	232	232	232	141	192	192
Kilinochchi	0	0	292	160	549	634	90	90	132	137	0	160
Batticaloa	273	589	647	333	417	760	454	585	445	138	488	490
Ampara	1,300	1,040	1,040	395	693	389	1,124	1,459	1,031	1,301	737	150
Trincomalee	444	59	42	42	42	42	42	42	42	110	80	500
Kurunegala	2,810	1,652	1,962	1,467	2,282	3,232	2,577	2,137	2,938	2,419	2,704	3,457
Puttalam	979	871	1,107	570	886	969	828	876	820	1,250	913	960
Anaradapura	739	2,371	3,276	1,671	1,325	2,289	1,665	2,086	1,160	2,715	1,567	3,170
Polonnaruwa	791	621	846	373	775	884	681	656	820	274	964	849
Badulla	2,425	2,257	2,505	1,553	2,261	2,154	1,881	1,965	1,935	1,578	1,695	2,008
Monaragala	455	460	525	258	478	462	370	348	465	413	539	505
Ratnapura	2,184	1,820	2,162	1,389	2,201	2,239	1,821	2,313	2,230	2,040	2,142	2,188
Kegalle	1,514	1,623	1,758	1,046	1,603	1,889	1,280	1,542	1,797	452	1,410	1,599
Prima Mill												
Sales	2,136	1,276	1,869	824	1,809	3,588	3,342	6,400	10,094	4,102	3,817	2,723
Total	49,800	45,997	54,650	34,395	48,233	47,255	42,147	46,796	53,157	45,898	51,524	49,289

Source: Food Commissioners Department Annual Report

Percentage
Distribution

Colombo	34.0	36.6	34.3	39.7	35.5	33.5	38.6	32.4	31.5	34.6	33.6	32.7
Primary												
Estate												
Districts	30.3	30.2	28.6	29.5	31.3	26.1	25.9	28.6	22.9	28.5	27.6	26.4
All Other	35.7	33.2	37.1	30.8	33.2	40.3	35.5	39.0	45.7	36.9	38.8	40.9

1981 Census

	<u>Percentage</u>
Population Distribution	100.0
Colombo	11.4
Estate by Primary Estate District	4.1
All Other	84.5

TABLE 6

DISTRIBUTION OF WHEAT FLOUR BY DISTRICT 1989 - 1992
(Metric Ton)

District (1)	Year												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Ratnapura	15,645	19,360	18,663	17,776	17,861	19,890	19,493	19,147	22,526	23,345	21,901	21,428	22,788
Kandy	35,151	43,506	42,671	41,633	41,608	42,779	45,010	45,825	48,426	46,780	55,247	53,283	56,184
Nuwara Eliya	25,882	25,231	27,232	24,656	24,618	22,329	23,994	25,700	26,849	26,594	25,688	27,435	29,610
Badulla	19,033	23,410	24,509	22,563	20,284	21,737	18,608	21,000	22,584	23,914	22,225	23,804	26,835
Total (2) Colombo, Gampaha, Kalutara (3)	95,721	111,507	113,075	106,628	104,371	106,635	107,105	111,672	120,385	120,633	125,061	125,950	135,417
Galle	163,534	171,972	164,351	166,992	154,496	155,475	177,996	188,955	194,726	188,052	182,394	222,071	241,767
Matara	15,718	17,822	19,702	20,582	22,258	23,132	22,250	28,380	26,763	28,409	27,194	27,748	27,462
Kegalle	6,142	11,093	11,599	12,368	12,556	13,260	14,530	15,556	14,949	16,494	15,164	19,111	19,755
Puttalam	6,778	10,670	12,743	13,229	15,849	14,175	17,277	18,085	19,638	18,843	19,571	18,775	20,847
Kurunegala	4,071	4,871	6,348	6,488	6,391	8,506	11,142	9,756	9,794	11,451	11,704	14,319	14,653
Matale	16,562	18,754	23,225	22,102	15,470	13,929	37,784	24,463	25,660	24,247	27,176	32,759	33,459
Monaregala	7,426	10,082	10,553	7,700	8,134	7,015	9,047	10,867	7,757	8,336	9,811	13,632	15,917
Jaffna	2,017	2,610	3,222	3,132	2,636	5,482	3,516	3,867	4,323	5,321	3,696	5,655	5,742
Vavuniya	21,638	31,502	29,412	26,220	32,624	39,704	32,312	17,741	26,338	23,632	12,231	0	0
Mannar	1,765	3,380	4,384	2,280	2,409	2,114	3,356	9,279	3,998	2,553	1,949	821	2,273
Anaradapura	2,205	3,019	3,428	3,227	3,077	2,317	3,151	2,476	3,215	4,553	1,212	0	0
Polonnaruwa	9,902	13,547	14,764	11,702	11,700	12,061	13,519	14,780	13,900	25,084	19,733	27,126	24,579
Trincomalee	3,281	5,107	4,944	5,311	4,066	3,361	6,764	6,857	6,709	8,927	7,714	8,665	8,984
Mullaitiva	3,944	3,403	0	58	200	438	1,845	4,627	4,440	1,555	2,015	125	0
Kilnochichi	2,497	2,437	1,476	1,076	1,034	1,687	1,521	60	2,183	2,541	856	0	0
Patticoloa	0	0	0	0	0	0	0	0	0	0	1,766	0	0
Amparai	3,451	2,958	4,129	4,180	3,855	4,028	4,520	4,554	2,895	4,795	2,373	4,369	4,181
Hambantota	3,234	3,740	5,136	5,364	5,690	5,240	5,411	6,696	9,193	10,619	6,620	6,773	7,768
Total	2,044	3,539	3,538	3,770	4,207	4,398	4,744	5,829	5,595	6,520	5,289	6,251	7,630
Grand Total	276,209	320,506	322,954	315,781	306,652	316,322	370,685	372,828	382,076	391,932	358,468	408,200	435,017
Total	371,930	432,013	436,029	422,409	411,023	422,957	477,790	484,500	502,461	512,565	483,529	534,150	570,434

(1) Major Estate Districts.

(2) All Other Districts.

(3) Data combined for these three districts.

Source: Central Bank of Sri Lanka Bulletin

Percentage Population Distribution

1981 Census	100.0
Major Estate Districts	20.8
Other	79.2

Percentage Flour Distribution

Major Estate Districts	22.2
Other	77.8

TABLE 7

WHEAT FLOUR PRICES
(Rupees per Kilogram)

Year	C&F Flour Price Cost	Average Fixed Flour Price Supply Station	Average Fixed Flour Price Whole- sale	Average Fixed Flour Price Retail	Average Flour Price Retail	Average Fixed Bread Price Retail
	(1)	(2)	(2)	(2)	(3)	(3)
1965	0.43				0.51	0.60
1966	0.45				0.55	0.60
1967	0.40				0.62	0.66
1968	0.60				0.73	0.77
1969	0.38				0.73	0.77
1970	0.58			0.73	0.73	0.77
1971	0.61			0.73	0.73	0.77
1972	0.62			0.73	0.73	0.77
1973	1.16			1.09	1.08	1.12
1974	2.10			1.91	1.90	2.05
1975	2.17			2.43	2.43	2.16
1976	1.94			2.14	2.16	1.96
1977	1.61			1.58	1.59	1.52
1978	3.25			1.84	1.85	1.74
1979	3.38			2.67	2.68	2.40
1980	4.34			4.75	4.86	4.36
1981	3.86			5.70	5.77	5.22
1982	3.61			6.53	6.53	5.88
1983	4.08			6.68	6.68	6.08
1984	3.75			7.67	7.67	6.68
1985	4.37	7.25	7.45	7.76	7.77	6.74
1986	3.74	7.25	7.45	7.90	7.88	6.83
1987	3.78	7.25	7.45	7.90	7.88	6.83
1988	5.11	7.25	7.45	7.90	7.88	6.83
1989	6.78	8.28	8.48	8.93	8.72	7.43
1990	7.62	12.80	13.14	13.59	13.48	11.09
1991	4.99	11.45	11.80	12.25	12.31	9.94
1992	6.12	11.33	11.68	12.13		9.94

Source: Table 1 and 2
Food Commissioner Report and Records, CWE Records, and
Food and Nutrition Statistics, 1970 -1990
Statistical Abstract of the Democratic Socialist Republic
of Sri Lanka

TABLE E
FOOD AID TO SRI LANKA BY DONOR COUNTRY
(Metric Tons)

	<u>Annual</u>	<u>USA</u>	<u>Australia</u>	<u>EEC</u>	<u>Canada</u>	<u>Others</u>
<u>Annual Average</u>						
Prior to 1987	320,900	202,200	16,000	41,800	28,900	32,000
1987	399,317	207,067		55,000	54,000	83,250
1988	366,888	320,889	5,000		32,333	8,666
1989	295,120	250,900				44,220
1990	248,600	240,000		8,600		
1991	324,800	319,800	5,000			
1992	349,300	314,400	5,000	29,900		
1987-1992 Average	330,700	275,500	2,500	15,600	14,400	22,700

Sources: World Food Programme
Food Commissioners Reports
USAID/Sri Lanka Records

APPENDIX VI

RICE DATA

TABLE 1
ROUGH RICE AREA AND PRODUCTION DATA

Year	Maha			Yala			Total		
	Planted Area (Acres)	Yield (Bu)	Production (1000 bu)	Planted Area (Acres)	Yield (Bu)	Production (1000 bu)	Planted Area (Acres)	Yield (Bu)	Production (1000 bu)
1965	984,576	34.11	32,100	470,773	34.11	13,200	1,455,349	34.32	45,300
1966	1,050,066	35.91	30,700	566,817	35.04	15,000	1,616,883	35.62	45,700
1967	1,053,802	40.85	34,900	585,129	42.01	20,000	1,638,931	41.27	54,900
1968	1,146,958	47.49	43,500	595,511	44.54	21,000	1,742,469	46.49	64,500
1969	1,182,001	51.23	46,960	527,151	48.24	18,900	1,709,152	50.33	65,860
1970	1,191,472	52.21	51,278	684,083	49.78	28,840	1,875,555	51.30	80,118
1971	1,147,458	44.90	42,959	646,153	47.66	26,084	1,793,611	45.90	69,043
1972	1,186,638	48.09	43,605	608,534	44.54	21,012	1,795,172	46.81	64,617
1973	1,178,969	45.54	43,558	613,132	42.78	21,488	1,792,101	44.58	65,046
1974	1,317,819	47.72	54,189	720,240	41.74	25,218	2,038,059	45.65	79,407
1975	1,095,852	46.24	35,601	623,518	40.84	21,509	1,719,370	44.04	57,110
1976	1,146,961	47.17	43,986	641,929	40.30	18,199	1,788,890	44.98	62,185
1977	1,328,749	51.56	57,697	717,442	43.98	26,267	2,046,191	47.01	83,964
1978	1,420,724	53.02	63,529	748,637	46.61	28,891	2,169,361	47.80	92,420
1979	1,428,439	54.70	66,082	643,850	49.94	25,024	2,072,289	53.30	91,106
1980	1,416,989	57.23	69,164	670,178	55.99	32,439	2,087,167	56.83	101,603
1981	1,474,456	58.29	72,333	692,028	56.90	33,884	2,166,484	57.84	106,217
1982	1,401,693	61.10	65,271	684,278	64.63	37,999	2,085,971	62.37	103,270
1983	1,440,345	70.55	85,438	596,051	69.89	33,433	2,036,396	70.36	118,871
1984	1,498,517	58.79	65,123	948,312	61.02	50,814	2,446,829	59.74	115,937
1985	1,405,393	67.84	83,765	770,840	64.83	43,473	2,176,233	67.24	127,238
1986	1,371,951	69.54	80,722	845,689	63.76	43,275	2,217,640	67.76	123,997
1987	1,254,884	71.33	66,637	675,575	65.20	35,246	1,930,459	69.10	101,883
1988	1,345,805	66.71	73,077	798,591	65.37	45,627	2,144,396	66.20	118,704
1989	1,158,541	66.50	64,343	637,799	63.60	34,573	1,796,340	65.45	98,916
1990	1,311,458	69.13	78,803	805,516	63.33	42,631	2,116,974	66.97	121,434
1991*	1,043,482	73.16	74,354	781,183	62.99	33,971	1,824,665	67.09	108,325
1992		68.01	77,990		62.99	33,971	0	66.40	111,961

* 1991 excludes North and East.

Source: Agrarian Research and Training Institute

TABLE 2

ROUGH RICE AREA AND PRODUCTION DATA
(Table 1 converted to Metric)

Year	Maha			Yala			Total		
	Planted Area Ha	Yield Kg/Ha	Production Mt	Planted Area Ha	Yield Kg/Ha	Production Mt	Planted Area Ha	Yield Kg/Ha	Production Mt
1965	398,452	1,759	669,866	190,519	1,759	275,459	588,972	1,770	945,326
1966	424,956	1,852	640,651	229,388	1,807	313,022	654,344	1,837	953,673
1967	426,468	2,106	728,297	236,798	2,166	417,362	663,266	2,128	1,145,659
1968	464,168	2,449	907,763	241,000	2,297	438,230	705,168	2,397	1,345,993
1969	478,349	2,642	979,967	213,335	2,488	394,407	691,684	2,595	1,374,374
1970	482,182	2,692	1,070,075	276,845	2,567	601,836	759,027	2,645	1,671,912
1971	464,370	2,315	896,473	261,495	2,458	544,324	725,864	2,367	1,440,797
1972	480,226	2,480	909,954	246,270	2,297	438,481	726,496	2,414	1,348,435
1973	477,122	2,348	908,973	248,131	2,206	448,414	725,253	2,299	1,357,387
1974	533,314	2,461	1,130,822	291,477	2,152	526,252	824,791	2,354	1,657,074
1975	443,485	2,384	742,926	252,334	2,106	448,852	695,820	2,271	1,191,778
1976	464,169	2,432	917,905	259,785	2,078	379,779	723,954	2,319	1,297,684
1977	537,737	2,659	1,204,028	290,345	2,268	548,143	828,082	2,424	1,752,170
1978	574,959	2,734	1,325,730	302,969	2,403	602,901	877,928	2,465	1,928,631
1979	578,081	2,821	1,379,007	260,563	2,575	522,204	838,644	2,748	1,901,210
1980	573,448	2,951	1,443,322	271,217	2,887	676,941	844,665	2,930	2,120,263
1981	596,704	3,006	1,509,453	280,060	2,934	707,095	876,764	2,983	2,216,548
1982	567,257	3,151	1,362,083	276,924	3,333	792,967	844,181	3,216	2,155,050
1983	582,900	3,638	1,782,930	241,219	3,604	697,684	824,118	3,628	2,480,614
1984	606,442	3,032	1,358,994	383,777	3,147	1,060,392	990,218	3,080	2,419,386
1985	568,755	3,498	1,748,018	311,955	3,343	907,199	880,709	3,467	2,655,217
1986	555,221	3,586	1,684,516	342,246	3,288	903,068	897,467	3,494	2,587,583
1987	507,845	3,678	1,390,588	273,401	3,362	735,518	781,246	3,563	2,126,106
1988	544,640	3,440	1,524,979	323,185	3,371	952,149	867,825	3,414	2,477,129
1989	468,855	3,429	1,342,717	258,114	3,280	721,473	726,969	3,375	2,064,190
1990	530,740	3,565	1,644,470	325,988	3,266	889,629	856,728	3,453	2,534,098
1991	422,291	3,773	1,551,628	316,140	3,248	708,911	738,432	3,460	2,260,538
1992		3,507	1,627,504		3,248	708,911	0	3,424	2,336,415

Source: Table 1

Area = Acres / 2.471 conversion factor

Yield = Bushels X 2.471 / 47.92 X 1000

TABLE 3
PLANTED AND HARVESTED AREA DATA
(Hectares)

Year	Planted Area			Harvested Area		
	Maha	Yala	Total	Maha	Yala	Total
1965						
1966		229,388				
1967	426,468	236,798	663,266			
1968	464,168	241,000	705,168			661,271
1969	478,349	213,335	691,684	436,277	186,518	622,794
1970	482,183	276,845	759,028	451,325	267,370	718,696
1971			726,022			693,646
1972	480,000	246,270	726,270	419,000	220,000	639,000
1973	477,122	248,132	725,254	439,144	232,560	671,704
1974	533,314	291,477	824,791	521,393	275,645	797,038
1975	443,481	252,335	695,816	354,229	173,000	527,229
1976	464,169	259,785	723,954	425,715	209,769	635,484
1977	538,000	290,000	828,000	506,000	277,000	783,000
1978	575,000	301,000	876,000	553,000	287,000	840,000
1979	578,069	260,557	838,626	550,803	231,511	782,314
1980	573,436	271,211	844,647	554,410	261,230	815,640
1981	596,691	280,054	876,745	564,970	271,684	836,654
1982	567,246	276,918	844,164	478,217	267,298	745,515
1983	582,887	241,214	824,101	557,540	219,498	777,038
1984	606,441	383,758	990,199	508,933	376,874	885,807
1985	568,743	311,948	880,691	559,235	305,442	864,677
1986	555,209	340,110	895,319	526,920	309,897	836,817
1987	507,830	273,396	781,226	432,694	246,053	678,747
1988	544,628	323,182	867,810	498,553	217,008	715,561
1989	468,850	258,108	726,958	439,787	249,966	689,753
1990	530,726	325,981	856,707	519,290	308,956	828,246
1991	500,508	290,446	790,954	482,749	247,446	730,195
1992	548,190	255,050	803,240	522,786	243,320	766,106

Sources: Statistical Abstract of the Democratic Socialist Republic of Sri Lanka
Central Bank of Sri Lanka Annual Report, 1992
Economic and Social Statistics of Sri Lanka

TABLE 4

YIELD AND PRODUCTION DATA

Year	Yield			Production		
	Maha	Yala	Average	Maha	Yala	Total
1965				669,866	275,459	945,326
1966				640,651	313,022	953,673
1967				728,297	417,362	1,145,659
1968				907,763	440,317	1,348,080
1969	2,642	2,488	2,597	979,873	394,311	1,374,184
1970	2,692	2,567	2,647	1,032,662	583,288	1,615,950
1971			2,200	867,159	528,621	1,395,780
1972	2,478	2,296	2,418	883,163	429,281	1,312,444
1973	2,348	2,206	2,301	876,423	436,000	1,312,423
1974	2,461	2,152	2,364	1,098,116	504,208	1,602,324
1975	2,384	2,106	2,279	718,974	435,186	1,154,160
1976	2,432	2,078	2,328	882,140	370,483	1,252,623
1977	2,657	2,267	2,533	1,144,103	533,190	1,677,293
1978	2,732	2,402	2,626	1,285,841	604,652	1,890,493
1979	2,820	2,575	2,753	1,393,046	524,176	1,917,222
1980	2,951	2,887	2,931	1,453,324	679,872	2,133,196
1981	3,005	2,934	2,982	1,522,348	706,998	2,229,346
1982	3,150	3,332	3,217	1,362,771	792,058	2,154,829
1983	3,638	3,604	3,628	1,785,924	697,507	2,483,431
1984	3,031	3,146	3,082	1,353,354	1,060,234	2,413,588
1985	3,498	3,343	3,445	1,751,029	910,182	2,661,211
1986	3,585	3,287	3,481	1,688,138	906,966	2,595,104
1987	3,678	3,362	3,569	1,392,468	735,364	2,127,832
1988	3,440	3,370	3,413	1,524,661	951,952	2,476,613
1989	3,429	3,279	3,377	1,342,437	721,357	2,063,794
1990	3,564	3,266	3,459	1,647,000	891,000	2,538,000
1991	3,620	3,048	3,420	1,554,000	835,000	2,389,000
1992	3,512	3,252	3,433	1,630,000	709,700	2,339,700

Sources: Statistical Abstract of the Democratic Socialist Republic of Sri Lanka
Central Bank of Sri Lanka Annual Report, 1992
Economic and Social Statistics of Sri Lanka

TABLE 5

PRODUCTION AND AVAILABILITY DATA

Year	Production (1000 Bu)	Converted to Mt	Rice Mt	Conversion Factor
1965	36,300	757,513	515,039	0.68
1966	45,700	953,673	648,410	0.68
1967	54,900	1,145,659	778,944	0.68
1968	64,500	1,345,993	915,153	0.68
1969	65,860	1,374,374	934,449	0.68
1970	77,447	1,616,173	1,098,850	0.68
1971	66,895	1,395,972	949,134	0.68
1972	62,901	1,312,625	892,465	0.68
1973	62,900	1,312,604	892,451	0.68
1974	76,794	1,602,546	1,089,585	0.68
1975	55,315	1,154,320	784,832	0.68
1976	60,034	1,252,796	851,787	0.68
1977	80,377	1,677,316	1,140,422	0.68
1978	90,605	1,890,755	1,286,541	0.68
1979	91,886	1,917,487	1,303,716	0.68
1980	102,237	2,133,493	1,450,681	0.68
1981	106,876	2,230,301	1,516,400	0.68
1982	103,330	2,156,302	1,466,088	0.68
1983	119,050	2,484,349	1,689,130	0.68
1984	115,647	2,413,335	1,640,847	0.68
1985	127,293	2,656,365	1,806,085	0.68
1986	124,034	2,588,356	1,759,845	0.68
1987	101,988	2,128,297	1,447,046	0.68
1988	118,714	2,477,337	1,684,363	0.68
1989	98,878	2,063,397	1,402,922	0.68
1990	121,638	2,538,356	1,725,880	0.68

Source: Food and Nutrition Statistics, 1950 -1990

TABLE 6
ROUGH RICE PRODUCTION BY DISTRICT
(Metric Tons)

District	1986			1987		
	Maha	Yala	Total	Maha	Yala	Total
Colombo	16,232	13,645	29,877	18,256	7,386	25,642
Kalutara	45,546	34,425	79,971	48,863	26,768	75,631
Gampaha	38,431	23,513	61,944	41,957	28,625	70,582
Kandy	59,754	36,762	96,516	46,777	30,774	77,551
Matale	59,775	15,272	75,047	50,031	7,094	57,125
Nuwara Eliya	13,895	6,676	20,571	13,332	8,471	21,803
Galle	37,513	32,923	70,436	41,894	21,135	63,029
Matara	37,304	37,743	75,047	48,759	28,729	77,488
Hambantota	71,458	52,806	124,264	67,077	29,877	96,954
Jaffna	13,374	0	13,374	13,770	0	13,770
Mannar	54,809	981	55,790	15,377	167	15,544
Vavuniya	19,591	5,153	24,744	3,213	250	3,463
Mullaitivu	19,257	7,824	27,081	5,695	876	6,571
Kilinochchi	24,285	26,205	50,490	48,654	647	49,301
Batticaloa	61,694	44,982	106,676	77,467	43,043	120,510
Trincomalee	51,095	18,068	69,163	28,604	11,684	40,288
Amparai	135,009	171,062	306,071	163,822	187,607	351,429
Kurunegala	266,305	62,800	329,105	66,305	60,672	126,977
Puttalam	28,375	8,512	36,887	14,250	2,316	16,566
Anuradhapura	158,731	36,532	195,263	73,044	7,407	80,451
Polonnaruwa	142,520	100,125	242,645	155,977	86,230	242,207
Badulla	64,970	24,202	89,172	76,361	31,817	108,178
Moneragala	42,145	14,396	56,541	39,585	7,970	47,555
Ratnapura	38,327	35,907	74,234	40,038	28,708	68,746
Kegalle	36,929	26,747	63,676	33,716	28,771	62,487
Udawalawe	49,489	40,538	90,027	58,210	41,122	99,332
Mahaweli "H"	97,350	18,151	115,501	109,264	7,219	116,483
Total	1,684,163	825,950	2,580,113	1,400,298	735,365	2,135,663

TABLE 6 (Cont.)

District	1988			1989		
	Maha	Yala	Total	Maha	Yala	Total
Colombo	17,985	12,706	30,691	16,627	6,776	23,403
Kalutara	41,623	30,795	72,418	38,348	35,632	73,980
Gampaha	34,363	27,373	61,736	38,243	15,836	54,079
Kandy	50,928	37,430	88,358	50,657	38,049	88,706
Matale	37,930	15,856	53,786	38,202	11,359	49,561
Nuwara Eliya	13,248	7,344	20,592	12,727	7,254	19,981
Galle	43,271	35,907	79,178	45,024	27,901	72,925
Matara	42,291	40,789	83,080	46,297	34,470	80,767
Hambantota	95,389	52,243	147,632	83,914	57,836	141,750
Jaffna	15,898	0	15,898	10,453	0	10,453
Mannar	42,395	2,441	44,836	6,468	29	6,497
Vavuniya	15,856	1,064	16,920	6,635	0	6,635
Mullaitivu	12,977	1,607	14,584	4,527	701	5,228
Kilinochchi	44,899	7,323	52,222	38,348	245	38,593
Batticaloa	17,108	25,579	42,687	61,652	41,423	103,075
Trincomalee	30,670	26,518	57,188	20,259	9,508	29,767
Amparai	170,144	164,678	334,822	165,512	1,074,934	1,240,446
Kurunegala	216,441	158,857	375,298	193,178	66,751	259,929
Puttalam	19,195	12,205	31,400	28,959	5,994	34,953
Anuradhapura	113,353	18,318	131,671	14,646	3,056	17,702
Polonnaruwa	146,797	111,037	257,834	139,996	111,509	251,505
Badulla	64,219	37,075	101,294	61,360	35,593	96,953
Moneragala	32,381	9,597	41,978	28,546	5,524	34,170
Ratnapura	41,498	33,027	74,525	41,122	25,252	66,374
Kegalle	32,005	29,877	61,882	36,073	24,931	61,004
Udawalawe	44,753	40,956	85,709	46,067	46,317	92,384
Mahaweli "H"	87,044	11,350	98,394	69,497	1,454	70,951
Total	1,524,661	951,952	2,476,613	1,343,437	1,688,334	3,031,771

TABLE 6 (Cont.)

District	1990			1991		
	Maha	Yala	Total	Maha	Yala	Total
Colombo	18,000	10,000	28,000	16,000	8,000	24,000
Kalutara	43,000	36,000	79,000	45,000	30,000	75,000
Gampaha	41,000	25,000	66,000	31,000	20,000	51,000
Kandy	49,000	41,000	90,000	51,000	34,000	85,000
Matale	54,000	16,000	70,000	58,000	12,000	70,000
Nuwara Eliya	13,000	5,000	18,000	14,000	7,000	21,000
Galle	41,000	36,000	77,000	40,000	26,000	66,000
Matara	49,000	44,000	93,000	39,000	27,000	66,000
Hambantota	65,000	55,000	120,000	67,000	42,000	109,000
Jaffna	23,000	0	23,000	0	0	0
Mannar	33,000	0	33,000	0	0	0
Vavuniya	7,000	0	7,000	0	2,000	2,000
Mullaitivu	20,000	1,000	21,000	159,000	9,000	168,000
Kilinochchi	42,000	1,000	43,000	0	16,000	16,000
Batticaloa	94,000	42,000	136,000	0	19,000	19,000
Trincomalee	34,000	10,000	44,000	134,000	127,000	261,000
Amparai	177,000	125,000	302,000	0	18,000	18,000
Kurunegala	225,000	98,000	323,000	249,000	118,000	367,000
Puttalam	16,000	10,000	26,000	29,000	10,000	39,000
Anuradhapura	88,000	37,000	125,000	98,000	23,000	121,000
Polonnaruwa	166,000	125,000	291,000	170,000	134,000	304,000
Badulla	64,000	34,000	98,000	69,000	31,000	100,000
Moneragala	33,000	14,000	47,000	48,000	15,000	63,000
Ratnapura	53,000	34,000	87,000	37,000	28,000	65,000
Kegalle	37,000	27,000	64,000	36,000	26,000	62,000
Udawalawe	53,000	44,000	97,000	46,000	37,000	83,000
Mahaweli "H"	109,000	18,000	127,000	118,000	17,000	135,000
Total	1,647,000	888,000	2,535,000	1,554,000	836,000	2,390,000

Source: Statistical Abstract of the Democratic Socialist Republic of Sri Lanka

TABLE 7

PLANTED AREA BY WATER SOURCE
(Hectares)

Year	Maha				Yala			
	Major Irrigated	Minor Irrigated	Rainfed	Total	Major Irrigated	Minor Irrigated	Rainfed	Total
1965								
1966								
1967	126,328	118,549	181,591	426,468	89,042	60,168	67,354	216,564
1968	139,828	129,029	195,311	464,168	96,054	66,957	77,989	241,000
1969	145,558	132,971	199,820	478,349	76,801	48,021	43,021	172,844
1970	147,096	135,799	199,287	482,183	116,288	65,641	65,641	247,571
1971								
1972								
1973	158,847	124,161	194,115	477,122	86,997	57,013	104,122	248,132
1974	167,581	133,879	231,862	533,322	106,028	69,538	115,911	291,477
1975	134,327	100,624	208,530	443,481	78,740	56,292	117,302	252,335
1976	146,894	110,754	210,568	468,216	93,834	54,656	107,248	255,738
1977								
1978								
1979	204,683	150,968	222,418	578,069	123,611	43,469	93,277	260,357
1980	207,662	147,317	218,457	573,436	122,672	47,271	101,268	271,211
1981	221,612	150,948	224,131	596,691	127,478	48,056	104,520	280,054
1982	229,305	120,838	217,103	567,246	117,691	51,346	108,831	277,918
1983	234,598	127,011	221,278	582,887	138,325	38,369	64,520	241,214
1984	241,405	145,149	219,887	606,441	185,038	86,767	111,963	383,768
1985	236,984	133,681	198,078	568,743	155,840	56,569	99,539	311,948
1986	238,238	132,656	184,315	555,209	172,362	66,018	103,859	342,239
1987	229,123	107,010	171,697	507,830	141,464	46,510	85,422	273,396
1988	243,342	127,081	174,205	544,628	156,611	65,226	101,345	323,182
1989	215,139	95,632	158,079	468,850	140,534	41,912	75,662	258,108
1990	240,758	114,640	175,328	530,726	111,419	53,637	94,601	259,657
1991	191,212	107,111	123,960	422,283	143,720	54,163	92,565	290,448

TABLE 7 (Cont.)

Year	Total			Total
	Major Irrigated	Minor Irrigated	Rainfed	
1965				
1966				
1967	215,371	178,717	248,945	643,033
1968	235,883	195,986	273,300	705,169
1969	222,359	180,993	247,842	651,193
1970	263,384	201,441	264,929	729,754
1971				
1972				
1973	245,844	181,174	298,236	725,254
1974	273,608	203,417	347,773	824,799
1975	213,068	156,916	325,832	695,816
1976	240,728	165,411	317,816	723,954
1977				
1978				
1979	328,294	194,437	315,695	838,426
1980	330,334	194,588	319,725	844,647
1981	349,090	199,004	328,651	876,745
1982	346,996	172,184	325,984	845,164
1983	372,923	165,380	285,798	824,101
1984	426,443	231,916	331,850	990,209
1985	392,824	190,250	297,617	880,691
1986	410,600	198,674	288,174	897,448
1987	370,587	153,520	257,119	781,226
1988	399,953	192,307	275,550	867,810
1989	355,673	137,544	233,741	726,958
1990	352,177	168,277	269,929	790,383
1991	334,932	161,274	216,525	712,731

Source: Statistical Abstract of the Democratic Socialist Republic of Sri Lanka

TABLE 8

PLANTED AREA BY WATER SOURCE
(Acres)

Year	Maha				Yala			
	Major Irrigated	Minor Irrigated	Rainfed	Total	Major Irrigated	Minor Irrigated	Rainfed	Total
1965	288,331	253,718	442,527	984,576	175,387	126,439	168,947	470,773
1966	314,732	283,798	451,536	1,050,066	243,906	140,215	182,696	566,817
1967	312,157	290,607	451,038	1,053,802	220,024	140,031	225,074	585,129
1968	345,516	313,217	488,225	1,146,958	237,550	124,069	234,092	595,711
1969	359,673	326,572	403,756	1,090,001	189,776	118,661	218,714	527,151
1970	363,474	335,560	492,439	1,191,473	287,348	162,200	234,536	684,084
1971	362,753	306,962	477,743	1,147,458	266,464	149,128	230,561	646,153
1972	382,871	309,158	494,009	1,186,038	224,665	146,306	237,573	608,544
1973	392,511	306,801	479,657	1,178,969	214,969	140,879	257,285	613,133
1974	414,092	330,816	572,911	1,317,819	261,994	171,828	286,417	720,239
1975	331,923	248,642	501,704	1,082,269	194,564	139,095	287,948	621,607
1976	352,968	273,668	503,573	1,130,208	231,283	135,628	274,728	641,640
1977	447,098	340,524	534,603	1,322,225	253,265	162,607	298,596	714,467
1978	479,137	388,229	543,398	1,410,763	317,007	145,925	285,714	748,646
1979	505,782	373,049	549,608	1,428,439	305,450	107,861	230,539	643,850
1980	513,144	364,027	539,818	1,416,989	303,130	116,808	250,240	670,178
1981	547,616	373,001	553,839	1,474,456	315,005	118,749	258,274	692,028
1982	566,624	298,596	536,473	1,401,693	290,821	126,878	266,579	684,278
1983	579,706	313,849	546,790	1,440,345	341,808	94,812	159,431	596,051
1984	596,513	358,663	543,341	1,498,517	457,239	214,406	276,667	948,312
1985	585,600	330,333	485,146	1,405,079	385,089	130,785	245,967	770,841
1986	588,698	327,301	455,452	1,371,451	425,915	163,134	256,640	845,689
1987	566,176	264,427	424,271	1,254,874	349,563	114,929	211,083	675,575
1988	601,312	314,024	430,469	1,345,805	386,993	161,173	250,425	798,591
1989	531,621	236,303	390,617	1,158,541	347,268	103,569	186,962	637,799
1990	594,927	283,284	433,247	1,311,458	275,322	132,540	233,764	641,626
1991	472,494	264,677	306,311	1,043,482	355,136	133,836	228,736	717,708
1992	219,260	120,817	146,782	486,859	130,503	49,823	74,656	254,982

TABLE 8 (Cont.)

Year	Total			Total
	Major Irrigated	Minor Irrigated	Rainfed	
1965	463,718	380,157	611,474	1,455,349
1966	558,638	424,013	634,232	1,615,883
1967	532,181	430,638	676,112	1,638,931
1968	583,066	437,286	722,317	1,742,669
1969	549,449	445,233	622,470	1,617,152
1970	650,822	497,760	726,975	1,875,557
1971	629,217	456,090	708,304	1,793,611
1972	607,536	455,464	731,582	1,794,582
1973	607,480	447,680	736,942	1,792,102
1974	676,086	502,644	859,328	2,038,058
1975	526,487	387,737	789,652	1,703,876
1976	584,251	409,296	778,301	1,771,848
1977	700,363	503,130	833,199	2,036,692
1978	796,144	534,154	829,112	2,159,409
1979	811,232	480,910	780,147	2,072,289
1980	816,274	480,835	790,058	2,087,167
1981	862,621	491,750	812,113	2,166,484
1982	857,445	425,474	803,052	2,085,971
1982	921,514	408,661	706,221	2,036,396
1984	1,053,752	573,069	820,008	2,446,829
1985	970,689	470,118	735,113	2,175,920
1986	1,014,613	490,435	712,092	2,217,140
1987	915,739	379,356	635,354	1,930,449
1988	988,305	475,197	680,894	2,144,396
1989	878,889	339,872	577,579	1,796,340
1990	870,249	415,824	667,011	1,953,084
1991	821,630	398,513	535,047	1,761,190
1992	349,763	170,640	221,438	741,841

1991 includes estimator for North and East.
 1992 excludes North and East.

Source: Agrarian Research and Training Center

TABLE 9

PLANTED AREA BY WATER SOURCE
(Hectares)

Year	Maha				Yala			
	Major Irrigated	Minor Irrigated	Rainfed	Total	Major Irrigated	Minor Irrigated	Rainfed	Total
1965	116,686	102,678	179,088	398,452	70,978	51,169	68,372	190,519
1966	127,370	114,851	182,734	424,956	98,707	56,744	73,936	229,388
1967	126,328	117,607	182,533	426,468	89,042	56,670	91,086	236,798
1968	139,828	126,757	197,582	464,168	96,135	50,210	94,736	241,081
1969	145,558	132,162	163,398	441,117	76,801	48,021	88,512	213,335
1970	147,096	135,799	199,287	482,183	116,288	65,641	94,915	276,845
1971	146,804	124,226	193,340	464,370	107,837	60,351	93,307	261,495
1972	154,946	125,115	199,923	479,983	90,921	59,209	96,144	246,274
1973	158,847	124,161	194,115	477,122	86,997	57,013	104,122	248,132
1974	167,581	133,879	231,854	533,314	106,028	69,538	115,911	291,477
1975	134,327	100,624	203,037	437,988	78,739	56,291	116,531	251,561
1976	142,844	110,752	203,737	457,389	93,599	54,888	111,181	259,668
1977	180,938	137,808	216,351	535,097	102,495	65,806	120,840	289,141
1978	193,904	157,114	219,910	570,928	128,291	59,055	115,627	302,973
1979	204,687	150,971	222,423	578,081	123,614	43,651	93,298	260,563
1980	207,667	147,320	218,461	573,448	122,675	47,272	101,271	271,217
1981	221,617	150,951	224,136	596,704	127,481	48,057	104,522	280,060
1982	229,310	120,840	217,108	567,257	117,694	51,347	107,883	276,924
1983	234,604	127,013	221,213	582,900	138,328	38,370	64,521	241,219
1984	241,406	145,149	219,887	606,442	185,042	86,769	111,966	383,777
1985	236,989	133,684	197,955	568,628	155,843	56,570	99,541	311,955
1986	238,243	132,457	184,319	555,019	172,565	66,019	103,861	342,246
1987	229,128	107,012	171,700	507,841	141,466	46,511	85,424	273,401
1988	243,348	127,084	174,208	544,640	156,614	65,226	101,346	323,185
1989	215,144	95,631	158,081	468,855	140,537	41,914	75,662	258,114
1990	240,764	114,643	175,333	530,740	111,421	53,638	94,603	259,662
1991	191,216	107,113	123,962	422,291	143,722	54,163	92,568	290,452
1992	88,733	48,894	59,402	197,029	52,814	20,163	30,213	103,190

TABLE 9 (Cont.)

Year	Total			Total
	Major Irrigated	Minor Irrigated	Rainfed	
1965	187,664	153,847	247,460	588,972
1966	226,078	171,596	256,670	654,344
1967	215,371	174,277	273,619	663,266
1968	235,964	176,967	292,318	705,248
1969	222,359	180,183	251,910	654,452
1970	263,334	201,441	294,203	759,028
1971	254,641	184,577	286,647	725,864
1972	245,366	184,324	296,067	726,257
1973	245,644	181,174	298,236	725,254
1974	273,608	203,417	347,765	824,791
1975	213,066	156,915	319,568	689,549
1976	236,443	165,640	314,974	717,057
1977	283,433	203,614	337,191	824,238
1978	322,195	216,169	335,537	873,901
1979	328,301	194,622	315,721	838,644
1980	330,342	194,591	319,732	844,665
1981	349,098	199,008	328,658	876,764
1982	347,003	172,187	324,991	844,181
1983	372,932	165,383	285,804	824,118
1984	426,448	231,918	331,853	990,218
1985	392,832	190,254	297,496	880,583
1986	410,608	198,476	288,180	897,264
1987	370,594	153,523	257,124	781,242
1988	399,962	192,310	275,554	867,825
1989	355,682	137,544	233,743	726,969
1990	352,185	168,282	269,936	790,402
1991	334,937	161,276	216,531	712,744
1992	141,547	69,057	89,615	300,219

Source: Table 5 / 2.471

TABLE 10
ASWEDDUMIZED LAND BY SOURCE OF WATER
(Hectares)

<u>Year</u>	<u>Major Irrigated</u>	<u>Minor Irrigated</u>	<u>Rainfed</u>	<u>Total</u>
1965				515,176
1966				535,411
1967				538,648
1968				545,933
1969				560,907
1970				570,214
1971				574,261
1972				585,998
1973				582,760
1974				606,232
1975				620,801
1976				630,919
1977				
1978				
1979	228,378	165,880	258,910	653,168
1980	238,531	167,352	253,081	658,964
1981	244,014	171,066	253,078	668,158
1982	259,177	172,259	255,274	686,710
1983	265,836	175,045	257,730	698,611
1984	268,784	176,235	257,343	702,362
1985	276,376	175,414	254,092	705,882
1986	288,032	176,423	252,730	717,185
1987	292,255	180,997	251,351	724,603
1988	297,762	181,534	248,115	727,411
1989	302,469	180,638	247,515	730,622
1990	310,522	179,311	243,562	733,395
1991	310,479	179,190	242,940	732,609

Source: Statistical Abstract of the Democratic Socialist Republic of Sri Lanka

TABLE 11

ASWEDDUMIZED LAND BY SOURCE OF WATER
(Acres)

<u>Year</u>	<u>Major Irrigated</u>	<u>Minor Irrigated</u>	<u>Rainfed</u>	<u>Total</u>
1965				
1966	402,331	388,583	532,403	1,323,317
1967	401,626	365,393	544,033	1,311,052
1968	413,795	380,237	555,025	1,349,057
1969	429,971	394,967	569,771	1,394,709
1970	441,255	401,105	566,562	1,408,922
1971	447,564	403,424	568,207	1,419,195
1972	454,808	411,835	581,763	1,448,406
1973	465,561	407,612	566,701	1,439,874
1974	485,353	416,804	596,330	1,498,487
1975	501,542	428,074	603,952	1,533,568
1976	504,146	438,676	611,632	1,554,454
1977	514,896	447,197	626,450	1,588,543
1978	536,102	458,220	631,152	1,625,474
1979	564,334	423,205	626,473	1,614,012
1980	589,423	413,535	625,376	1,628,334
1981	602,970	422,714	625,368	1,651,052
1982	640,441	425,751	630,794	1,696,986
1983	656,895	432,546	636,863	1,726,304
1984	664,170	435,486	635,909	1,735,565
1985	682,940	433,458	627,874	1,744,272
1986	711,742	435,950	624,513	1,772,205
1987	722,180	447,256	621,102	1,790,538
1988	735,792	448,577	613,106	1,797,475
1989	747,425	446,370	611,610	1,805,405
1990	767,316	443,087	601,854	1,812,257
1991	767,209	442,788	600,317	1,810,314
1992	783,847	440,554	596,774	1,821,175

Source: Agrarian Research and Training Center

TABLE 12

ASWEDDUMIZED LAND BY SOURCE OF WATER
(Table 6 Converted to Hectares)

Year	Major Irrigated	Minor Irrigated	Rainfed	Total
1965				
1966	162,821	157,257	215,461	535,539
1967	162,536	147,873	220,167	530,575
1968	167,461	153,880	224,616	545,956
1969	174,007	159,841	230,583	564,431
1970	178,573	162,325	229,285	570,183
1971	181,127	163,263	229,950	574,340
1972	184,058	166,667	235,436	586,162
1973	188,410	164,958	229,341	582,709
1974	196,420	168,678	241,331	606,429
1975	202,971	173,239	244,416	620,626
1976	204,025	177,530	247,524	629,079
1977	208,376	180,978	253,521	642,875
1978	216,958	185,439	255,424	657,820
1979	228,383	171,269	253,530	653,182
1980	238,536	167,355	253,086	658,978
1981	244,019	171,070	253,083	668,172
1982	259,183	172,299	255,279	686,761
1983	265,842	175,049	257,735	698,626
1984	268,786	176,239	257,349	702,374
1985	276,382	175,418	254,097	705,897
1986	288,038	176,427	252,737	717,202
1987	292,262	181,002	251,357	724,621
1988	297,771	181,537	248,121	727,428
1989	302,479	180,643	247,515	730,637
1990	310,529	179,315	243,567	733,410
1991	310,485	179,194	242,945	732,624
1992	317,219	178,290	241,511	737,019

Source: Table 6 / 2.471 conversion factor

TABLE 13

LAND USAGE RATIOS

Year	Ratio of Asweddumized Land to Planted Area				Land Utilization Total Planted / Total Asweddumized			
	Maha Major	Maha Minor	Rainfed	Total	Total Major	Total Minor	Rainfed	Total
	Irrigated	Irrigated			Irrigated	Irrigated		
1965								
1966	1.3	1.4	1.2	1.3	1.4	1.1	1.2	1.2
1967	1.3	1.3	1.2	1.2	1.3	1.2	1.2	1.3
1968	1.2	1.2	1.1	1.2	1.4	1.2	1.3	1.3
1969	1.2	1.2	1.4	1.3	1.3	1.1	1.1	1.2
1970	1.2	1.2	1.2	1.2	1.5	1.2	1.3	1.3
1971	1.2	1.3	1.2	1.2	1.4	1.1	1.2	1.3
1972	1.2	1.3	1.2	1.2	1.3	1.1	1.3	1.2
1973	1.2	1.3	1.2	1.2	1.3	1.1	1.3	1.2
1974	1.2	1.3	1.0	1.1	1.4	1.2	1.4	1.4
1975	1.5	1.7	1.2	1.4	1.0	0.9	1.3	1.1
1976	1.4	1.6	1.2	1.4	1.2	0.9	1.3	1.1
1977	1.2	1.3	1.2	1.2	1.4	1.1	1.3	1.3
1978	1.1	1.2	1.2	1.2	1.5	1.2	1.3	1.3
1979	1.1	1.1	1.1	1.1	1.4	1.1	1.2	1.3
1980	1.1	1.1	1.2	1.1	1.4	1.2	1.3	1.3
1981	1.1	1.1	1.1	1.1	1.4	1.2	1.3	1.3
1982	1.1	1.4	1.2	1.2	1.3	1.0	1.3	1.2
1983	1.1	1.4	1.2	1.2	1.4	0.9	1.1	1.2
1984	1.1	1.2	1.2	1.2	1.6	1.3	1.3	1.4
1985	1.2	1.3	1.3	1.2	1.4	1.1	1.2	1.2
1986	1.2	1.3	1.4	1.3	1.4	1.1	1.1	1.3
1987	1.3	1.7	1.5	1.4	1.3	0.8	1.0	1.1
1988	1.2	1.4	1.4	1.3	1.3	1.1	1.1	1.2
1989	1.4	1.9	1.6	1.6	1.2	0.8	0.9	1.0
1990	1.3	1.6	1.4	1.4	1.1	0.9	1.1	1.1
1991	1.6	1.7	2.0	1.7	1.1	0.9	0.9	1.0

TABLE 14

CULTIVATION RATIO
(Total Cultivated Area/Maha
Cultivated Area)

<u>Year</u>	<u>Major Irrigated</u>	<u>Minor Irrigated</u>	<u>Rainfed</u>	<u>Total</u>
1965	1.6	1.5	1.4	1.5
1966	1.8	1.5	1.4	1.5
1967	1.7	1.5	1.5	1.6
1968	1.7	1.4	1.5	1.5
1969	1.5	1.4	1.5	1.5
1970	1.8	1.5	1.5	1.6
1971	1.7	1.5	1.5	1.6
1972	1.6	1.5	1.5	1.5
1973	1.5	1.5	1.5	1.5
1974	1.6	1.5	1.5	1.5
1975	1.6	1.6	1.6	1.6
1976	1.7	1.5	1.5	1.6
1977	1.6	1.5	1.6	1.5
1978	1.7	1.4	1.5	1.5
1979	1.6	1.3	1.4	1.5
1980	1.6	1.3	1.5	1.5
1981	1.6	1.3	1.5	1.5
1982	1.5	1.4	1.5	1.5
1983	1.6	1.3	1.3	1.4
1984	1.8	1.6	1.5	1.6
1985	1.7	1.4	1.5	1.5
1986	1.7	1.5	1.6	1.6
1987	1.6	1.4	1.5	1.5
1988	1.6	1.5	1.6	1.6
1989	1.7	1.4	1.5	1.6
1990	1.5	1.5	1.5	1.5
1991	1.8	1.5	1.7	1.7

TABLE 15

PROJECTIONS
(Land Area)

Year	Total Planted Area 1000 Ha	Planted Area Linear Trend	Planted Area Curvi- Linear Trend	Planted Area	
				Curvi- linear Upper Bound	Curvi- linear Lower Bound
1965	589.0	685.9	605.8		
1966	654.3	693.3	647.9		
1967	663.2	700.7	676.0		
1968	705.2	708.1	695.6		
1969	691.7	715.6	712.4		
1970	759.0	723.0	726.4		
1971	725.9	730.4	740.5		
1972	726.3	737.8	751.7		
1973	725.3	745.2	760.1		
1974	824.8	752.7	768.5		
1975	695.8	760.1	779.7		
1976	724.0	767.5	785.4		
1977	828.0	774.9	793.8		
1978	876.0	782.3	802.2		
1979	838.6	789.7	807.8		
1980	844.6	797.2	813.4		
1981	876.7	804.6	819.0		
1982	844.2	812.0	824.6		
1983	824.1	819.4	830.2		
1984	990.2	826.8	835.8		
1985	880.7	834.2	844.3		
1986	895.3	841.7	847.1		
1987	781.2	849.1	849.9		
1988	867.8	856.5	852.7		
1989	727.0	863.9	855.5		
1990	856.7	871.3	858.3		
1991	791.0	878.7	861.1		
1992	803.2	886.2	863.9		
1993		893.6	866.7	910.0	823.4
1994		901.0	869.5	912.8	826.2
1995		908.4	872.3	915.6	829.0
1996		915.8	875.1	918.4	831.8
1997		923.2	877.9	921.2	834.6
1998		930.7	880.7	924.0	837.4
1999		938.1	883.5	926.8	840.2
2000		945.5	886.3	929.6	843.0

Linear Regression Output:

Constant	-13889.2
Std Err of Y Est	67.50227
R Squared	0.459006
No. of Observations	28
Degrees of Freedom	26
X Coefficient(s)	7.417351
Std Err of Coef.	1.579244

Curvilinear Regression 0.2

Constant	325.3246
X Coefficient	280.5069
R Squared	0.598315

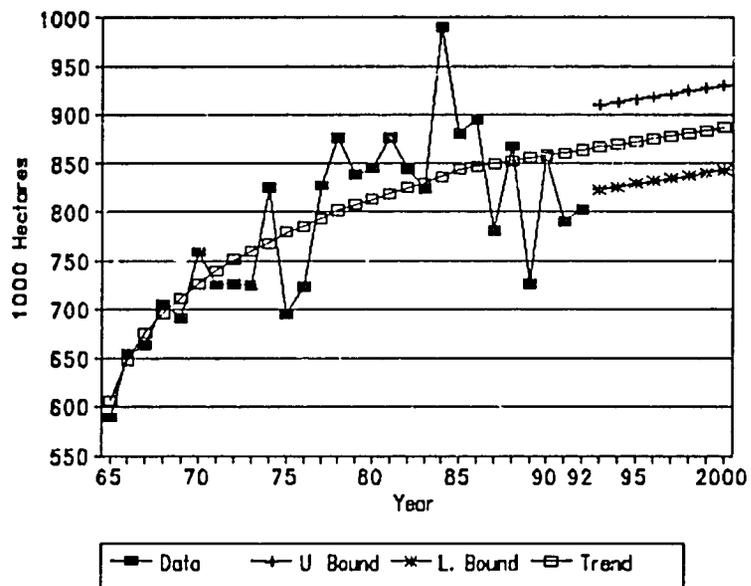


FIGURE VI-1. Cultivated Rough Rice Area With Curvi-Linear Trend With Bounds.

TABLE 15 (Cont.)

Year	Yield		
	Annual Average Yield Kg/Ha	S-Curve Trend Quad. Kg/Ha	Linear Trend Kg/Ha
1965	1,759	2,200	1,954
1966	1,837	2,218	2,017
1967	2,128	2,236	2,080
1968	2,397	2,254	2,143
1969	2,595	2,272	2,206
1970	2,645	2,290	2,269
1971	2,367	2,308	2,332
1972	2,414	2,326	2,395
1973	2,299	2,344	2,458
1974	2,354	2,362	2,521
1975	2,271	2,388	2,584
1976	2,319	2,442	2,647
1977	2,424	2,492	2,710
1978	2,465	2,531	2,773
1979	2,748	2,674	2,836
1980	2,930	2,817	2,899
1981	2,983	2,960	2,962
1982	3,218	3,103	3,025
1983	3,628	3,246	3,088
1984	3,080	3,400	3,151
1985	3,467	3,427	3,214
1986	3,494	3,454	3,277
1987	3,563	3,481	3,340
1988	3,414	3,508	3,402
1989	3,375	3,521	3,465
1990	3,453	3,534	3,528
1991	3,460	3,547	3,591
1992	3,424	3,560	3,654
1993		3,573	3,717
1994		3,586	3,780
1995		3,599	3,843
1996		3,612	3,906
1997		3,625	3,969
1998		3,638	4,032
1999		3,651	4,095
2000		3,664	4,158

Linear Regression Output:

Constant	-121792
Std Err of Y Est	236.6211
R Squared	0.832701
No. of Observations	28
Degrees of Freedom	26
X Coefficient(s)	62.9751
Std Err of Coef.	5.535848

S-Curve Quadratic

R Squared 0.932138

TABLE 15 (Cont.)

Year	Production		
	Total Pro- duction	Total Pro- duction Trend	Production as a Function of Yield and Land
	1000 Mt	1000 Mt	1000 Mt
1965	945	1,030	682.5
1966	954	1,089	888.4
1967	1,146	1,149	1,101.9
1968	1,348	1,209	1,379.1
1969	1,374	1,269	1,478.1
1970	1,616	1,329	1,670.3
1971	1,396	1,389	1,408.2
1972	1,312	1,449	1,440.2
1973	1,312	1,509	1,361.8
1974	1,602	1,569	1,633.4
1975	1,154	1,629	1,273.6
1976	1,253	1,689	1,372.0
1977	1,677	1,749	1,687.3
1978	1,891	1,809	1,827.9
1979	1,917	1,869	1,926.6
1980	2,133	1,929	2,061.1
1981	2,229	1,989	2,172.1
1982	2,155	2,049	2,250.6
1983	2,483	2,109	2,474.2
1984	2,414	2,169	2,504.6
1985	2,661	2,229	2,501.6
1986	2,595	2,289	2,554.0
1987	2,128	2,349	2,329.8
1988	2,477	2,409	2,436.0
1989	2,064	2,468	2,077.4
1990	2,538	2,528	2,435.6
1991	2,389	2,588	2,284.9
1992	2,340	2,648	2,289.9
1993		2,708	2,602.2
1994		2,768	2,628.3
1995		2,828	2,654.4
1996		2,888	2,680.5
1997		2,948	2,701.8
1998		3,008	2,717.0
1999		3,068	2,732.3
2000		3,128	2,747.5

Linear Regression Output:

Constant	-116784
Std Err of Y Est	245.8204
R Squared	0.806956
No. of Observations	28
Degrees of Freedom	26
X Coefficient(s)	59.95599
Std Err of Coef.	5.751071

Production Function Regression Output:

Constant	-1873.27
Std Err of Y Est	102.3899
R Squared	0.967797
No. of Observations	28
Degrees of Freedom	25
X Coefficient(s)	2.364283 0.661275
Std Err of Coef.	0.291143 0.046187

TABLE 16

GOVERNMENT PROCUREMENT OF ROUGH RICE

Year	Domestic Production (1000Mt)	Government Procurement (1000MT)	Government Procurement %
1965	945.3	448.2	47.4
1966	953.7	526.3	55.2
1967	1,145.7	295.8	25.8
1968	1,348.1	311.4	23.1
1969	1,374.2	286.2	20.8
1970	1,616.0	545.8	33.8
1971	1,395.8	681.4	48.8
1972	1,312.4	550.0	41.9
1973	1,312.4	478.2	36.4
1974	1,602.3	436.6	27.3
1975	1,154.2	241.6	20.9
1976	1,252.6	268.7	21.4
1977	1,677.3	512.5	30.6
1978	1,890.5	675.1	35.7
1979	1,917.2	541.3	28.2
1980	2,133.2	211.4	9.9
1981	2,229.3	127.6	5.7
1982	2,154.8	83.8	3.9
1983	2,483.4	323.8	13.0
1984	2,413.6	168.7	7.0
1985	2,661.2	98.2	3.7
1986	2,595.1	144.9	5.6
1987	2,127.8	52.9	2.5
1988	2,476.6	105.0	4.2
1989	2,063.8	5.0	0.2
1990	2,538.0	31.1	1.2
1991	2,389.0	44.4	1.9
1992	2,339.7	6.5	0.3

Source: Food and Nutrition Statistics, 1950 - 1990, Central Bank of Sri Lanka Bulletins

TABLE 17

RICE IMPORTS

Year	CIF Rs/Mt	Volume Mt	C&F Rs/Mt	Volume Mt	C&F Rs/Mt	Volume Mt	CIF Rs/Mt	Volume Mt	CIF Rs/Mt	Volume Mt
	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)	(5)	(5)
1965	621	550,512					516	200,419	577	250,195
1966	531	492,353					529	693,193	593	619,090
1967	630	380,722					593	354,706	665	316,787
1968	988	349,347					922	369,913	1,032	330,369
1969	800	264,363					855	300,739	933	275,735
1970	661	534,042	661	534,016			662	400,011	741	428,698
1971	554	339,198	554	339,181			663	294,173	743	262,726
1972	536	265,781	536	265,768			539	298,406	593	271,115
1973	938	343,130	938	343,113			795	339,960	895	301,836
1974	2,611	301,825	2,611	301,810			2,422	297,415	2,712	265,622
1975	2,133	459,320	2,133	459,297			2,282	465,361	2,556	415,614
1976	1,703	425,064	1,703	425,044			1,583	377,900	1,698	377,900
1977	1,742	542,475	1,743	542,448			1,701	538,750	1,701	538,450
1978	3,750	169,202	3,750	169,193			3,690	186,045	3,690	186,854
1979	4,211	211,527	4,211	211,518			4,177	211,597	4,177	211,619
1980	4,653	189,460	4,653	189,450			4,489	168,275	4,493	168,315
1981	5,769	156,664	5,953	157,032			5,796	154,579	5,769	154,577
1982	5,277	160,867	5,779	160,931			5,277	111,659	5,271	111,634
1983	5,200	123,168	5,022	119,491			5,200	176,808	5,193	176,746
1984	7,599	26,479	4,876	26,494			7,562	20,339	7,516	20,225
1985	5,220	182,301	5,095	182,375			5,220	176,873	5,213	176,844
1986	4,628	220,098	4,573	220,184			4,628	210,906	4,527	210,877
1987	6,095	102,416	5,877	102,416			6,096	79,749	6,503	74,749
1988	8,625	35,893	8,455	188,659			8,625	194,477	8,624	194,457
1989	10,502	42,865	9,727	130,710					10,502	139,444
1990	11,092	171,962							11,092	116,798
1991					11,947	133,000			11,950	132,961
1992					12,034	237,000				

- (1) Food and Nutrition Statistics, 1950 - 1990.
(2) Food Commissioner Annual Reports.
(3) Central Bank of Sri Lanka 1992 Annual Report.
(4) Annual Trade Statistics of Sri Lanka.
(5) Agrarian Research and Training Institute (Customs Data).

TABLE 18

PRODUCER PRICES FOR ROUGH RICE

Year	GPS Price		Average Producer Price Market		Average Producer Price Market		Average Producer Price Market	Weighted	Average Producer Price Market	
	Rs/Bu	Rs/Mt	Rs/Bu	Rs/Mt	Rs/Bu	Rs/Mt			Rs/Mt	Rs/Mt
	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)	(5)	(5)
1965	12.00	575	11.25	539						
1966	12.00	575	11.05	530			529		11.25	539
1967	12.50	599	13.66	655			654		11.05	530
1968	14.00	671	15.32	734			734		13.61	652
1969	14.00	671	15.21	729			729		16.86	808
1970	14.00	671	14.80	709			709		15.22	729
1971	14.00	671	14.45	692					14.80	709
1972	14.25	683	14.81	710			710		14.45	692
1973	19.25	922	26.22	1,256			1,279		14.83	711
1974	29.67	1,422	45.06	2,159			2,136		24.24	1,162
1975	33.00	1,581	43.64	2,091			2,005		41.21	1,975
1976	33.00	1,581	37.45	1,795			1,791		41.54	1,991
1977	34.17	1,637	35.16	1,685			1,687		37.37	1,791
1978	40.00	1,917	40.61	1,946	41.04	1,967	1,952		35.22	1,688
1979	40.00	1,917	41.72	1,999	41.93	2,009	2,015		40.74	1,952
1980	41.67	1,997	52.80	2,530	51.95	2,489	2,455		42.03	2,014
1981	52.71	2,526	69.27	3,319	68.65	3,290	3,216		55.60	2,664
1982	57.50	2,755	72.02	3,451	72.61	3,479	3,413		67.14	3,217
1983	61.67	2,955	75.16	3,602	76.57	3,669	3,573		71.41	3,422
1984	62.50	2,995	78.27	3,751	78.46	3,760	3,542		73.50	3,522
1985	63.75	3,055	80.75	3,870	82.42	3,950	3,807		73.27	3,511
1986	70.00	3,354	83.63	4,008	83.88	4,020	3,876	3,722	79.90	3,829
1987	70.00	3,354			88.88	4,259	4,078	3,786	81.45	3,903
1988	74.17	3,554			92.22	4,419	4,255	4,024	86.53	4,147
1989	80.00	3,834			124.77	5,979	5,675	5,641	88.75	4,253
1990	105.00	5,032			169.87	8,140	7,448	5,641	117.89	5,649
1991	130.83	6,270			176.35	8,451	7,223	7,290	155.86	7,469
1992	135.00	6,469			178.53	8,555			151.06	7,239
									169.17	8,107

Source: Food and Nutrition Statistics, 1950 - 1990
Food Importation and Distribution Study
Economic and Social Statistics of Sri Lanka
Table 19
Agrarian Research and Training Institute

TABLE 17

RICE IMPORTS

Year	CIF Rs/Mt (1)	Volume Mt (1)	C&F Rs/Mt (2)	Volume Mt (2)	C&F Rs/Mt (3)	Volume Mt (3)	CIF Rs/Mt (4)	Volume Mt (4)	CIF Rs/Mt (5)	Volume Mt (5)
1965	621	550,512					516	200,419	577	250,195
1966	531	492,353					529	693,193	593	619,090
1967	630	380,722					593	354,706	665	316,787
1968	988	349,347					922	369,913	1,032	330,369
1969	800	264,363					855	300,739	933	275,735
1970	661	534,042	661	534,016			662	400,011	741	428,698
1971	554	339,198	554	339,181			663	294,173	743	262,726
1972	536	265,781	536	265,768			539	298,406	593	271,115
1973	938	343,130	938	343,113			795	339,960	895	301,836
1974	2,611	301,825	2,611	301,810			2,422	297,415	2,712	265,622
1975	2,133	459,320	2,133	459,297			2,282	465,361	2,556	415,614
1976	1,703	425,064	1,703	425,044			1,583	377,900	1,698	377,900
1977	1,742	542,475	1,743	542,448			1,701	538,750	1,701	538,450
1978	3,750	169,202	3,750	169,193			3,690	186,045	3,690	186,854
1979	4,211	211,527	4,211	211,518			4,177	211,597	4,177	211,619
1980	4,653	189,460	4,653	189,450			4,489	168,275	4,493	168,315
1981	5,769	156,964	5,953	157,032			5,796	154,579	5,769	154,577
1982	5,277	160,867	5,779	160,931			5,277	111,659	5,271	111,634
1983	5,200	123,168	5,022	119,491			5,200	176,808	5,193	176,746
1984	7,599	26,479	4,876	26,494			7,562	20,339	7,516	20,225
1985	5,220	182,301	5,095	182,375			5,220	176,873	5,218	176,844
1986	4,628	220,098	4,573	220,184			4,628	210,906	4,627	210,877
1987	6,095	102,416	5,877	102,416			6,096	79,749	6,503	74,749
1988	8,625	35,893	8,455	188,659			8,625	194,477	8,624	194,457
1989	10,502	42,865	9,727	130,710					10,502	139,444
1990	11,092	171,962							11,092	116,798
1991					11,947	133,000			11,950	132,961
1992					12,034	237,000				

- (1) Food and Nutrition Statistics, 1950 -1990.
- (2) Food Commissioner Annual Reports.
- (3) Central Bank of Sri Lanka 1992 Annual Report.
- (4) Annual Trade Statistics of Sri Lanka.
- (5) Agrarian Research and Training Institute (Customs Data).

TABLE 18

PRODUCER PRICES FOR ROUGH RICE

Year	GPS Price		Average Producer Price Market		Average Producer Price Market		Average Producer Price Market	Weighted Rs/Mt	Average Producer Price Market	
	Rs/Bu	Rs/Mt	Rs/Bu	Rs/Mt	Rs/Bu	Rs/Mt			Rs/Bu	Rs/Mt
	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)	(5)	(5)
1965	12.00	575	11.25	539					11.25	539
1966	12.00	575	11.05	530			529		11.05	530
1967	12.50	599	13.66	655			654		13.61	652
1968	14.00	671	15.32	734			734		16.86	808
1969	14.00	671	15.21	729			729		15.22	729
1970	14.00	671	14.80	709			709		14.80	709
1971	14.00	671	14.45	692					14.45	692
1972	14.25	683	14.91	710			710		14.83	711
1973	19.25	922	26.22	1,256			1,279		24.24	1,162
1974	29.67	1,422	45.06	2,159			2,136		41.21	1,975
1975	33.00	1,581	43.64	2,091			2,005		41.54	1,991
1976	33.00	1,581	37.45	1,795			1,791		37.37	1,791
1977	34.17	1,637	35.16	1,685			1,687		35.22	1,688
1978	40.00	1,917	40.61	1,946	41.04	1,967	1,952		40.74	1,952
1979	40.00	1,917	41.72	1,999	41.93	2,009	2,015		42.03	2,014
1980	41.67	1,997	52.80	2,530	51.95	2,489	2,455		55.60	2,664
1981	52.71	2,526	69.27	3,319	68.65	3,290	3,216		67.14	3,217
1982	57.50	2,755	72.02	3,451	72.61	3,479	3,413		71.41	3,422
1983	51.67	2,955	75.16	3,602	76.57	3,669	3,573		73.50	3,522
1984	62.50	2,995	78.27	3,751	78.46	3,760	3,542		73.27	3,511
1985	63.75	3,055	80.75	3,870	82.42	3,950	3,807		79.90	3,829
1986	70.00	3,354	83.63	4,008	83.88	4,020	3,876	3,722	81.45	3,903
1987	70.00	3,354			88.88	4,259	4,078	3,786	86.53	4,147
1988	74.17	3,554			92.22	4,419	4,255	4,024	88.75	4,253
1989	80.00	3,834			124.77	5,979	5,675	5,641	117.89	5,649
1990	105.00	5,032			169.87	8,140	7,448	5,641	155.86	7,469
1991	130.83	6,270			176.35	8,451	7,223	7,290	151.06	7,239
1992	135.00	6,469			178.53	8,555			169.17	8,107

Source: Food and Nutrition Statistics, 1950 - 1990
Food Importation and Distribution Study
Economic and Social Statistics of Sri Lanka
Table 19
Agrarian Research and Training Institute

TABLE 19

PRODUCER PRICES FOR ROUGH RICE BY DISTRICT
(Rupees per Metric Ton)

District	Year												
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Colombo	520	746	794	793	788	--	805	1,216	2,125	2,187	1,940	1,733	1,999
Kalutara	453	634	734	761	676	--	702	1,253	2,168	2,195	1,886	1,810	2,102
Gampaha	--	--	--	--	--	--	--	--	--	--	--	--	--
Kandy	555	628	889	673	684	--	675	1,136	1,856	1,880	1,737	1,700	1,881
Matale	482	617	753	705	655	--	671	1,005	1,990	2,121	1,753	1,659	1,843
Nuwara Eliya	484	653	736	728	703	--	703	1,044	2,352	1,818	1,744	1,655	1,783
Galle	516	660	740	750	765	--	762	1,941	2,420	2,076	1,853	1,781	2,023
Matara	532	654	732	732	710	--	679	2,474	2,696	1,893	1,791	1,637	1,909
Hambantota	545	645	727	731	708	--	0	1,501	1,711	1,662	1,841	1,785	1,968
Jaffna	698	797	815	908	916	--	868	902	3,450	0	1,766	1,684	2,091
Mannar	575	588	701	726	707	--	664	1,286	1,965	0	1,438	1,584	1,900
Vavuniya	533	626	768	742	699	--	679	1,097	1,474	2,049	1,812	1,718	1,902
Mullaitivu	--	--	--	--	--	--	--	--	--	--	--	--	--
Kilinochchi	--	--	--	--	--	--	--	--	--	--	--	--	--
Batticaloa	489	728	714	783	691	--	684	1,374	0	1,677	1,740	1,569	1,988
Trincomalee	554	630	707	681	685	--	710	0	2,028	0	0	1,632	1,961
Ampara	558	628	707	712	713	--	733	1,204	1,801	1,866	1,716	1,697	2,049
Kurunegala	497	635	723	726	661	--	683	1,208	2,085	2,246	1,850	1,617	1,879
Puttalam	602	754	668	726	700	--	724	1,112	1,894	2,662	1,842	1,629	1,973
Anuradhapura	491	650	712	732	666	--	724	1,085	1,759	2,068	1,796	1,663	1,843
Polonnaruwa	471	582	721	710	701	--	675	1,292	1,809	1,978	1,810	1,644	1,885
Badulla	507	612	698	678	680	--	703	1,407	2,037	1,949	1,783	1,728	1,986
Moneragala	575	610	674	688	688	--	681	955	0	1,789	1,798	1,758	2,004
Ratnapura	490	644	663	655	697	--	689	991	2,396	1,947	1,873	1,728	2,018
Kegalle	515	678	780	696	699	--	696	1,380	2,696	2,032	1,848	1,711	1,964
Average Weighted Average*	529	654	734	729	709	0	710	1,279	2,136	2,005	1,791	1,687	1,952

TABLE 19 (Cont.)

District	Year												
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Colombo	1,977	2,297	3,125	3,843	3,868	3,833	3,876	3,790	3,690	4,170	6,000	7,290	7,060
Kalutara	2,130	2,419	3,143	3,449	3,517	3,676	3,895	4,050	4,140	4,290	5,190	8,810	7,230
Gampaha	2,104	2,577	3,360	0	0	3,294	3,953	3,850	3,680	4,070	5,620	6,840	5,970
Kandy	1,985	2,311	3,048	3,155	3,221	3,184	3,292	2,690	3,710	4,030	5,280	6,520	6,920
Matale	1,876	2,345	3,027	3,274	3,332	3,313	3,403	3,940	3,690	3,850	4,970	6,650	6,880
Nuwara Eliya	1,972	2,429	3,019	0	0	3,654	3,602	3,650	3,890	3,890	4,800	6,810	7,560
Galle	2,297	2,857	3,350	3,452	3,759	4,288	3,963	3,820	4,340	4,770	5,680	7,520	8,310
Matara	1,928	2,285	3,105	3,272	3,276	3,424	3,563	3,630	3,820	4,010	5,390	7,260	7,960
Hambantota	2,017	2,562	3,295	3,285	3,404	3,244	3,909	3,730	3,570	3,880	5,630	7,100	7,670
Jaffna	2,076	2,687	3,449	3,839	3,952	4,586	4,652	4,680	5,240	0	5,980	8,510	0
Mannar	1,900	2,508	0	3,756	3,928	3,147	4,414	4,770	5,670	5,380	7,460	8,300	0
Vavuniya	1,935	2,769	3,560	3,652	3,701	4,057	3,843	4,370	4,560	4,240	4,380	7,350	0
Mullaitivu	2,055	2,753	3,356	3,689	0	3,756	4,112	4,460	4,410	4,590	6,400	8,200	0
Kilinochchi	--	--	--	--	--	--	--	--	--	6,100	7,830	8,540	0
Batticaloa	2,079	2,496	3,215	3,413	3,543	3,373	3,739	3,740	3,630	4,340	5,330	7,260	7,250
Trincomalee	1,975	2,416	3,167	3,439	3,732	3,525	3,642	3,520	4,330	0	0	7,350	0
Ampara	1,957	2,303	3,057	3,184	3,276	3,281	3,601	3,810	3,900	4,410	5,820	7,550	7,430
Kurunegala	2,046	2,443	3,250	3,377	3,992	3,227	3,718	3,980	4,020	3,970	5,780	7,080	7,070
Puttalam	2,072	2,582	3,365	3,336	3,724	4,230	4,376	3,910	4,590	4,270	6,010	8,860	7,080
Anuradhapura	1,935	2,391	3,119	3,274	3,380	3,275	3,590	3,690	3,651	3,900	6,000	6,800	6,800
Polonnaruwa	1,954	2,479	3,277	3,245	3,369	3,240	3,578	3,750	3,780	3,850	5,980	7,150	6,850
Badulla	2,102	2,348	3,399	3,356	3,579	3,421	3,551	3,780	3,850	3,990	4,880	6,650	6,950
Moneragala	2,012	2,365	3,115	3,340	3,706	3,323	3,660	3,720	3,680	3,730	5,120	6,530	7,110
Ratnapura	2,049	2,339	3,029	3,296	3,463	3,475	3,768	3,850	4,050	4,250	5,470	7,840	7,660
Kegalle	1,915	2,366	3,138	3,163	3,301	3,185	3,662	3,840	3,980	3,890	5,190	7,420	7,660
Average	2,015	2,455	3,216	3,413	3,573	3,542	3,807	3,876	4,078	4,255	5,675	7,448	7,233
Weighted													
Average*								3,722	3,786	4,024	5,641	7,290	N/A

* Weighed by production

Source: Statistical Abstract of the Democratic Socialist Republic of Sri Lanka

TABLE 20
COST OF MILLED RICE

Year	Average Producer Price	Average Price Milled	Import Price	Domestic Production	Rice Imports	Weighted Base Cost of Rice	Weighted Base Cost of Rice
	Rs/Mt	Rs/Mt	Rs/Mt	Mt	Mt	Rs/Mt	Rs/Kq
	(1)					(2)	
1965	575	846	621	945.3	550.5	763	0.76
1966	575	846	521	953.7	492.4	735	0.74
1967	654	962	630	1,145.7	380.7	879	0.88
1968	734	1,079	955	1,348.1	349.3	1,054	1.05
1969	729	1,072	600	1,374.2	264.4	996	1.00
1970	709	1,043	661	1,616.0	534.0	948	0.95
1971	692	1,018	554	1,395.8	339.2	927	0.93
1972	710	1,044	536	1,312.4	265.8	959	0.96
1973	1,279	1,881	936	1,312.4	343.1	1,685	1.69
1974	2,136	3,141	2,611	1,602.3	301.8	3,057	3.06
1975	2,005	2,949	2,133	1,154.2	459.3	2,716	2.72
1976	1,791	2,634	1,703	1,252.6	425.0	2,398	2.40
1977	1,687	2,481	1,743	1,677.3	542.4	2,301	2.30
1978	1,952	2,871	3,750	1,890.5	169.2	2,943	2.94
1979	2,015	2,963	4,211	1,917.2	211.5	3,087	3.09
1980	2,466	3,626	4,653	2,133.2	189.5	3,710	3.71
1981	3,216	4,729	5,953	2,229.3	157.0	4,810	4.81
1982	3,413	5,019	5,778	2,154.8	160.9	5,072	5.07
1983	3,573	5,254	5,022	2,483.4	119.5	5,244	5.24
1984	3,542	5,209	4,678	2,413.6	26.5	5,203	5.20
1985	3,807	5,599	5,095	2,661.2	182.4	5,566	5.57
1986	3,876	5,700	4,573	2,595.1	220.2	5,612	5.61
1987	4,078	5,997	5,877	2,127.8	102.4	5,992	5.99
1988	4,255	6,257	8,455	2,476.6	188.7	6,413	6.41
1989	5,675	8,346	9,727	2,063.8	130.7	8,428	8.43
1990	7,448	10,953	11,092	2,538.0	172.0	10,962	10.96
1991	7,223	10,622	11,947	2,389.0	133.0	10,692	10.69
1992	8,107	11,922	12,054	2,339.7	237.0	11,934	11.93

(1) Milling rate of 68%.

(2) Weighted by production and import quantities.

Source: Tables 2, 17, 18

TABLE 21
PRICES FOR MILLED RICE
(Rupees per Kilogram)

Year	Average Wholesale Price Colombo				Average Retail Price Colombo	
	Raw	Samba	Parboiled	Raw	Parboiled	Raw
	(1)	(2)	(2)	(1)	(3)	(3)
1965					0.97	0.91
1966					0.94	0.87
1967					1.25	1.20
1968					1.34	1.29
1969					1.36	1.31
1970				1.33	1.30	
1971				1.31	1.27	
1972				1.55	1.45	
1973				2.98	2.96	
1974				5.25	5.01	
1975				3.68	3.60	
1976				3.37	3.31	
1977				3.15	3.18	
1978		3.74	3.20		3.48	3.52
1979		4.21	3.59		3.68	3.84
1980		5.20	4.43		4.58	4.78
1981		6.91	5.87		6.19	6.35
1982		7.40	6.02		6.69	6.80
1983		8.07	6.20		6.94	7.28
1984	6.15	9.84	6.50	7.23	7.98	8.21
1985	6.52	10.05	7.18	7.70	8.02	8.42
1986	6.72	9.94	7.25	8.00	8.08	8.32
1987	6.95	10.83	7.56	8.26	8.30	8.43
1988	7.60	11.58	7.97	8.93	9.04	9.12
1989	10.42	14.14	11.22	11.86	12.53	12.82
1990	13.07	18.72	13.93	15.11	16.03	15.28
1991	13.25	20.26	14.89	15.20	16.99	15.49
1992	14.20		16.35			

(1) Tables 22 and 23.

(2) Economic and Social Statistics of Sri Lanka.

(3) Statistical Abstract of the Democratic Socialist Republic of Sri Lanka.

TABLE 22

MONTHLY AVERAGE RETAIL PRICES (COLOMBO)

Rice Samba Grade I		Rs/Kg									
	84	85	86	87	88	89	90	91	92	93	Ave
Jan		15.44	11.92	12.70	13.59	16.41	23.05	26.24	22.89	24.55	18.48
Feb	11.37	14.80	11.33	12.21	13.73	14.70	24.18	23.23	21.98	24.90	17.24
Mar	11.60	10.63	11.05	12.88	11.74	14.10	20.66	20.80	22.34	22.39	15.82
Apr	11.25	9.08	9.91	11.80	11.82	13.94	19.76	18.00	20.83	21.38	14.78
May	10.88	9.13	10.11	11.94	12.13	13.47	18.39	17.97	22.22	22.97	14.92
Jun	11.52	9.32	9.83	11.67	12.01	14.27	18.86	18.04	21.49	23.01	15.00
Jul	11.26	9.21	9.41	11.21	11.88	15.15	19.47	18.46	20.56	22.39	14.90
Aug	11.29	9.19	9.72	11.42	12.38	16.02	18.93	18.55	19.80		14.14
Sep	11.03	9.89	10.16	11.73	13.25	16.06	21.09	19.24	22.20		14.96
Oct	11.85	10.54	10.97	12.18	13.57	17.51	22.09	22.31	22.85		15.99
Nov	12.46	12.00	12.17	13.79	15.31	20.27	25.89	24.04	23.26		17.69
Dec	16.06	12.42	12.38	13.73	18.28	22.44	25.84	25.53	24.50		19.02
Ave	10.88	10.97	10.75	12.23	13.31	16.20	21.52	21.03	22.08	23.08	

Rice Samba Grade 2		Rs/Kg									
	84	85	86	87	88	89	90	91	92	93	Ave
Jan	9.74	13.30	10.06	10.92	12.70	15.02	21.71	24.35	21.49	23.66	16.30
Feb	9.93	12.58	9.83	10.99	12.70	13.41	22.45	21.22	20.88	23.36	15.74
Mar	10.21	8.99	9.38	10.98	10.67	12.93	19.16	18.74	21.11	20.98	14.32
Apr	9.76	7.89	8.80	10.68	10.82	12.82	18.30	16.00	19.61	20.23	13.49
May	9.54	7.80	8.99	10.73	10.99	12.40	17.20	16.01	21.06	22.03	13.68
Jun	10.00	7.99	8.93	10.60	10.93	13.17	17.72	16.04	20.29	22.04	13.77
Jul	9.83	8.25	8.47	10.36	10.82	14.00	18.11	16.48	19.40	21.39	13.71
Aug	9.84	7.94	8.88	10.48	11.43	14.66	17.71	16.56	18.75		12.92
Sep	9.68	8.13	9.20	10.88	12.27	14.86	19.47	17.24	21.17		13.66
Oct	10.32	8.92	9.79	11.29	12.57	16.42	20.28	20.40	21.76		14.64
Nov	11.06	10.39	10.89	12.78	14.17	18.85	24.02	22.60	22.13		16.32
Dec	13.61	11.25	11.18	12.72	16.83	21.07	23.95	22.29	23.29		17.36
Ave	10.29	9.45	9.53	11.12	12.24	14.97	20.01	18.99	20.91	21.96	

Rice Kora Grade 1		Rs/Kg									
	84	85	86	87	88	89	90	91	92	93	Ave
Jan	8.12	9.93	8.88	9.21	9.10	13.77	17.32	17.96	18.20	18.34	13.08
Feb	8.21	10.07	8.72	9.20	9.04	12.24	17.73	17.40	18.20	18.04	12.89
Mar	8.09	7.92	8.25	8.69	8.60	11.53	16.06	16.06	15.92	16.74	11.79
Apr	7.80	7.37	7.83	8.38	8.50	11.37	15.83	14.66	16.05	16.39	11.42
May	7.38	7.37	7.89	8.37	8.70	11.28	15.43	14.98	17.90	17.05	11.64
Jun	7.62	7.58	7.96	8.47	8.62	12.09	15.51	14.67	17.37	17.11	11.70
Jul	7.66	7.66	8.07	8.32	8.75	12.74	15.79	15.25	16.73	15.81	11.78
Aug	7.56	7.64	8.29	8.41	9.29	13.18	15.67	15.18	16.28		11.28
Sep	8.22	7.55	8.17	8.46	9.79	13.27	15.60	15.10	17.08		11.47
Oct	7.43	8.01	8.41	8.64	9.84	13.97	15.47	17.33	17.69		11.87
Nov	8.03	8.75	8.86	9.20	12.49	15.41	17.04	18.66	18.35		12.98
Dec	9.47	8.34	9.15	9.19	15.66	15.66	17.44	18.54	18.99		13.72
Ave	7.97	8.18	8.37	8.71	9.87	13.13	16.24	16.32	17.40	17.21	

TABLE 22 (Cont.)

Rice Kora	Grade 2		Rs/Kg								
	84	85	86	87	88	89	90	91	92	93	Ave
Jan				8.59	8.46	12.41	15.57	16.10	16.90	17.37	13.63
Feb				8.52	8.50	11.13	16.31	15.55	17.08	17.08	13.45
Mar				8.10	7.97	10.45	14.92	14.19	14.90	15.67	12.31
Apr				7.80	7.94	10.40	14.75	12.88	14.92	15.26	11.99
May			7.25	7.84	8.04	10.25	14.23	13.16	16.67	16.03	11.68
Jun			7.45	7.98	8.02	11.04	14.48	13.13	16.17	16.13	11.80
Jul			7.44	7.80	8.07	11.76	14.54	13.51	15.61	15.81	11.82
Aug			7.72	7.95	8.49	12.15	14.45	13.84	15.27		11.41
Sep			7.69	8.00	9.05	12.29	14.19	13.49	16.03		11.53
Oct			7.95	8.23	9.09	12.84	13.81	15.40	16.67		12.00
Nov			8.40	8.47	11.51	13.82	15.16	16.81	17.27		13.06
Dec			8.61	8.72	14.89	14.99	15.68	17.11	17.81		13.97
Ave	0.00	0.00	7.81	8.17	9.17	11.96	14.84	14.60	16.67	16.19	

Rice Nadu	Grade 1		Rs/Kg								
	84	85	86	87	88	89	90	91	92	93	Ave
Jan	6.94	8.44	8.05	8.33	8.52	12.94	16.72	17.89	18.00	18.29	12.41
Feb	7.18	8.58	8.86	8.23	8.35	11.60	17.55	17.21	18.02	17.56	12.31
Mar	6.59	7.04	7.31	7.72	8.01	10.83	15.77	15.50	15.79	16.21	11.08
Apr	6.20	6.46	6.77	7.49	7.74	11.16	15.74	14.06	15.42	15.73	10.68
May	6.60	6.53	6.88	7.93	7.84	10.90	15.15	14.29	17.53	16.74	11.04
Jun	6.60	6.97	6.97	7.95	7.98	11.77	15.17	14.13	16.87	16.77	11.12
Jul	6.65	7.09	7.10	7.84	7.98	12.61	15.48	14.64	16.18	16.36	11.19
Aug	6.58	6.88	7.36	7.87	8.52	12.84	15.39	14.81	15.66		10.66
Sep	6.23	6.64	7.36	8.04	9.45	13.01	15.43	14.62	17.02		10.87
Oct	6.43	7.57	7.53	7.89	9.35	13.65	15.31	16.64	17.69		11.34
Nov	7.11	7.85	8.18	8.35	11.98	14.87	16.75	18.26	18.08		12.38
Dec	7.86	7.66	8.18	8.53	14.51	16.06	17.32	17.97	18.87		13.00
Ave	6.75	7.31	7.55	8.01	9.19	12.69	15.98	15.84	17.09	16.81	

Rice Nadu	Grade 2		Rs/Kg								
	84	85	86	87	88	89	90	91	92	93	Ave
Jan				7.87	7.94	11.63	15.16	16.10	16.72	17.07	13.21
Feb				7.72	7.76	10.07	16.17	15.43	16.84	16.44	12.92
Mar				7.21	7.31	9.73	14.67	13.66	14.61	15.05	11.75
Apr				6.96	7.11	10.07	14.56	12.50	14.24	14.55	11.43
May			6.39	7.37	7.11	9.75	13.99	12.79	16.35	15.68	11.18
Jun			6.47	7.25	7.32	10.57	14.04	12.78	15.65	15.80	11.24
Jul			6.58	7.23	7.26	11.75	14.22	13.12	15.05	15.37	11.32
Aug			6.89	7.34	7.76	11.87	14.04	13.56	14.65		10.87
Sep			6.92	7.41	8.68	11.94	13.90	13.19	15.97		11.14
Oct			7.21	7.58	8.49	12.60	13.56	14.79	16.67		11.56
Nov			7.74	7.92	10.83	13.48	14.98	16.55	17.35		12.69
Dec			7.66	8.02	12.95	14.61	15.57	16.53	17.63		13.28
Ave	0.00	0.00	6.98	7.49	8.38	11.51	14.57	14.25	15.98	15.71	

TABLE 22 (Cont.)

Rice											
Red Raw	Rs/Kg										
	84	85	86	87	88	89	90	91	92	93	Ave
Jan	8.05	9.64	9.06	8.90	9.16	13.34	17.20	18.22	19.83	21.34	13.47
Feb	8.06	10.25	9.89	9.18	9.05	12.33	17.09	17.95	18.85	20.03	13.27
Mar	8.32	8.47	8.51	8.81	8.41	11.31	15.48	16.56	15.72	16.78	11.84
Apr	7.98	7.84	8.03	8.46	8.36	10.74	15.06	14.70	16.47	16.06	11.37
May	7.90	7.72	7.96	8.35	8.35	10.77	14.87	14.86	18.52	16.58	11.59
Jun	7.82	8.04	8.20	8.29	8.32	11.86	15.05	14.73	17.87	16.63	11.68
Jul	7.80	8.22	8.13	8.21	8.63	12.52	15.52	15.39	17.51	16.55	11.86
Aug	7.82	8.10	8.16	8.38	9.06	13.28	15.47	15.31	17.26		11.43
Sep	7.56	7.73	8.13	9.43	9.51	13.19	15.83	15.20	19.38		11.66
Oct	7.55	8.04	8.09	8.61	9.66	13.48	15.32	17.24	18.96		11.88
Nov	8.15	8.77	8.53	9.24	11.61	15.41	16.95	18.88	19.80		13.04
Dec	9.34	8.82	8.73	9.31	13.59	16.12	17.75	18.84	20.84		13.70
Ave	8.03	8.47	8.45	8.69	12.86	15.97	15.97	16.49	18.42	17.71	

Rice											
Raw White	Rs/Kg										
	84	85	86	87	88	89	90	91	92	93	Ave
Jan	7.07	8.83	8.24	8.44	8.50	10.54	16.20	15.81	16.93	17.43	11.80
Feb	7.20	9.37	8.02	8.45	8.48	10.35	16.15	15.56	16.26	16.92	11.68
Mar	7.30	7.38	7.71	8.16	8.24	10.47	15.06	15.10	14.80	15.66	10.99
Apr	7.03	7.06	7.57	8.13	8.40	10.60	14.96	13.88	15.51	15.03	10.82
May	7.13	6.94	7.73	8.12	8.37	10.85	14.98	14.05	16.54	15.91	11.06
Jun	7.02	7.30	7.96	8.17	8.45	11.52	14.77	14.06	16.13	15.97	11.14
Jul	7.19	7.39	7.96	8.03	8.66	12.02	14.87	14.80	15.80	15.81	11.25
Aug	7.23	7.23	8.04	8.07	8.89	12.38	14.52	14.79	15.82		10.77
Sep	6.93	7.23	7.97	8.10	9.21	12.42	14.31	14.50	17.20		10.87
Oct	6.91	7.66	8.07	8.33	8.38	12.76	14.31	16.11	16.64		11.02
Nov	7.46	8.03	8.29	8.55	10.59	13.63	15.44	16.95	16.90		11.76
Dec	8.28	8.02	8.39	8.51	10.97	14.80	15.75	16.73	17.64		12.12
Ave	7.23	7.70	8.00	8.26	8.93	11.86	15.11	15.20	16.35	16.10	

Source: Agrarian Research and Training Institute

TABLE 23

MONTHLY AVERAGE WHOLESALE PRICES (COLOMBO)

Rice Samba Grade I	Rs/65kg									
	84	85	86	87	88	89	90	91	92	93
Jan	661		642	699	780	882	1,269	1,458	1,255	1,510
Feb	683	771	593	693	769	814	1,357	1,168	1,239	1,502
Mar	667	555	619	659	609	769	1,114	1,168	1,205	1,255
Apr	598	475	515	667	634	748	992	1,017	1,159	1,252
May	628	507	550	666	606	730	976	1,000	1,209	1,331
Jun	636	517	531	633	650	817	1,026	1,063	1,173	1,321
Jul	628	520	530	610	659	869	1,052	1,072	1,153	1,272
Aug	624	534	562	654	725	835	1,078	1,081	1,146	
Sep	604	541	601	674	756	941	1,220	1,154	1,293	
Oct	698	622	654	704	768	1,046	1,259	1,304	1,320	
Nov	700	706	724	805	922	1,231	1,494	1,384	1,394	
Dec	905	687	707	889	955	1,294	1,465	1,334	1,540	
Ave Rs/Kg	10.3	8.3	9.3	10.7	11.3	14.2	18.3	18.2	19.3	

Rice Samba Grade 2	Rs/65kg									
	84	85	86	87	88	89	90	91	92	93
Jan	589	772	554	640	720	813	1,179	1,340	1,153	1,404
Feb	616	685	524	650	709	736	1,214	1,080	1,140	1,368
Mar	617	503	513	599	564	703	1,015	1,057	1,093	1,115
Apr	553	414	453	594	592	692	932	938	1,059	1,148
May	556	433	473	573	584	691	915	926	1,117	1,230
Jun	569	456	468	565	599	779	941	984	1,092	1,221
Jul	544	464	466	560	595	825	947	1,000	1,068	1,172
Aug	557	473	505	609	662	887	975	996	1,062	
Sep	518	462	538	628	695	873	1,098	1,056	1,212	
Oct	618	537	587	649	714	976	1,162	1,188	1,241	
Nov	614	645	652	744	858	1,189	1,372	1,257	1,312	
Dec	785	598	639	734	870	1,126	1,341	1,230	1,424	
Ave Rs/Kg	9.1	8.3	8.2	9.7	10.5	13.2	16.8	16.7	17.9	

Rice Samaba Grade 3	Rs/65kg									
	84	85	86	87	88	89	90	91	92	93
Jan	502	631	511	528	640	754	1,100	1,151	1,033	1,291
Feb	546	571	480	585	631	661	1,145	936	1,031	1,249
Mar	530	432	470	523	518	634	946	949	983	1,010
Apr	457	364	396	523	536	632	840	854	963	1,045
May	470	384	414	497	518	642	849	838	1,015	1,128
Jun	483	412	400	500	534	742	859	896	987	1,121
Jul	477	411	421	505	533	773	841	907	961	1,071
Aug	456	434	448	563	587	802	874	904	970	
Sep	463	450	486	595	639	813	1,003	956	1,127	
Oct	524	485	525	626	649	917	1,062	1,079	1,167	
Nov	513	562	563	682	770	1,055	1,202	1,157	1,232	
Dec	630	548	534	649	802	1,112	1,175	1,115	1,323	
Ave Rs/Kg	7.8	7.3	7.2	8.7	9.4	12.2	15.3	15.1	16.4	

TABLE 23 (Cont.)

Rice											
Kora	Grade 1		Rs/65kg								
	84	85	86	87	88	89	90	91	92	93	
Jan	411	480	482	545	540	693	1,028	1,019	1,104		
Feb	414	495	469	497	499	642	978	919	1,023		
Mar	359	387	402	467	452	577	895	838	856		
Apr	347	340	424	458	464	611	859	838	924		
May	346	353	441	453	463	618	879	0	0		
Jun	362	411	446	458	478	703	886	0	0		
Jul	376	392	459	454	492	732	880	0	0		
Aug	369	398	466	484	541	754	845	0	0		
Sep	344	387	443	482	552	764	834	0	0		
Oct	376	423	484	525	564	848	865	0	0		
Nov	423	476	512	541	767	1,064	1,000	0	0		
Dec	448	488	542	547	844	1,023	990	0	0		
Ave.											
Rs/Kg	5.9	6.4	7.1	7.6	8.5	11.6	14.0	13.9	15.0		

Rice											
Kora	Grade 2		Rs/65kg								
	84	85	86	87	88	89	90	91	92	93	
Jan	382	440	452	512	508	643	988	949	1,018	1,028	
Feb	381	460	430	460	469	604	930	858	950	983	
Mar	322	355	370	431	420	538	849	777	814	860	
Apr	310	308	375	404	422	578	808	774	855	857	
May	312	345	400	416	427	588	826	777	969	887	
Jun	330	388	410	422	448	667	825	785	940	919	
Jul	347	367	420	423	457	703	818	811	906	882	
Aug	332	377	434	445	508	724	776	804	882		
Sep	314	367	419	443	521	733	776	772	937		
Oct	350	393	446	481	534	807	800	922	993		
Nov	338	450	478	506	718	886	924	999	1,018		
Dec	398	456	510	509	792	963	929	981	1,061		
Ave											
Rs/Kg	5.3	6.0	6.6	7.0	8.0	10.8	13.1	13.1	14.5		

Rice											
Nadu	Grade 1		Rs/65kg								
	84	85	86	87	88	89	90	91	92	93	
Jan	477	575	533	486	497	674	1,000	1,002	1,078	1,063	
Feb	489	616	502	449	484	623	943	901	1,002	1,015	
Mar	452	464	445	423	425	562	887	800	822	891	
Apr	443	415	389	416	428	604	834	793	887	887	
May	417	446	381	410	431	605	834	788	982	928	
Jun	450	476	392	430	456	700	824	830	972	958	
Jul	452	463	414	431	465	732	833	841	937	911	
Aug	441	463	422	456	514	754	814	833	922		
Sep	380	452	418	464	533	756	812	807	988		
Oct	444	477	456	481	544	825	847	984	1,017		
Nov	463	532	473	517	722	910	993	1,062	1,055		
Dec	529	516	488	521	786	968	982	1,053	1,125		
Ave.											
Rs/Kg	7.0	7.6	6.8	7.0	8.1	11.2	13.6	13.7	15.1		

TABLE 23 (Cont.)

Rice Nadu	Grade 2		Rs/65kg							
	84	85	86	87	88	89	90	91	92	93
Jan	416	518	491	454	452	622	953	934	994	990
Feb	438	557	483	416	445	595	905	836	930	945
Mar	386	423	431	397	387	527	874	736	759	826
Apr	373	378	348	382	388	565	763	711	818	822
May	371	405	340	376	387	575	780	709	914	862
Jun	396	443	360	395	417	668	777	767	907	859
Jul	411	424	376	397	428	701	777	773	881	845
Aug	394	431	386	422	476	720	759	769	858	
Sep	342	416	392	425	500	722	786	745	944	
Oct	401	443	422	446	502	780	778	904	957	
Nov	415	496	449	472	863	863	921	966	993	
Dec	473	474	448	467	734	908	917	974	1,049	
Ave. Rs/Kg	6.2	6.9	6.3	6.5	7.7	10.6	12.8	12.6	14.1	

Rice Red Raw	Rs/65kg									
	84	85	86	87	88	89	90	91	92	93
Jan	456	543	543	523	518	740	995	1,031	1,151	1,223
Feb	468	565	533	514	487	596	910	966	981	1,103
Mar	467	439	441	465	431	550	840	895	870	931
Apr	445	405	442	459	440	554	846	803	1,010	923
May	440	428	448	454	440	607	836	806	1,070	934
Jun	438	456	458	456	456	684	852	834	1,037	947
Jul	449	469	455	458	461	729	880	866	1,005	934
Aug	439	444	445	476	500	762	864	837	1,011	
Sep	411	416	443	479	520	751	835	835	1,112	
Oct	416	452	461	493	547	786	850	1,037	1,095	
Nov	464	514	494	531	694	911	986	1,065	1,156	
Dec	541	512	512	526	734	934	990	1,106	1,233	
Ave. Rs/Kg	7.0	7.2	7.3	7.5	8.0	11.0	13.7	14.2	16.3	

Rice Raw White	Rs/65kg									
	84	85	86	87	88	89	90	91	92	93
Jan	417	490	471	509	499	621	957	934	1,027	1,022
Feb	406	503	440	470	449	560	875	874	879	935
Mar	403	374	420	424	416	524	826	821	814	832
Apr	399	366	402	434	419	526	822	768	883	830
May	389	378	416	420	423	588	832	772	947	859
Jun	393	427	421	423	449	649	828	797	935	921
Jul	402	401	428	423	459	689	815	844	901	867
Aug	391	393	418	430	504	708	803	800	880	
Sep	354	398	413	437	508	730	787	783	947	
Oct	378	418	452	468	536	777	808	985	940	
Nov	418	465	471	492	629	859	933	953	992	
Dec	444	475	488	488	636	899	912	1,006	930	
Ave. Rs/Kg	6.15	6.52	6.72	6.95	7.60	10.42	13.07	13.25	14.20	

Source: Agrarian Research and Training Institute

TABLE 24

COST OF PRODUCTION SAMPLES

	<u>Maha 1972/73</u>		
	<u>Rs Cost</u> <u>Per Ha</u>	<u>Yield</u> <u>Kgs</u>	<u>Cost Mt</u>
Hambantota	1,578.75	1,571	1,004.70
Polonnaruwa	1,891.97	1,807	1,046.92
Elahera	1,814.01	1,772	1,023.88
Kurunegala	1,611.78	1,181	1,364.61
Kandy	1,768.96	1,356	1,304.13
Colombo	1,609.63	902	1,785.50
<u>Sample Average</u>		<u>National Average</u>	
Cost Mt	1,254.95	744.90	
Cost Ha	1,712.52	N/A	

Source: Cost of Production of Paddy, Maha, 1972-73

	<u>Maha 1974/75</u>		
	<u>Rs Cost</u> <u>Per Ha</u>	<u>Yield</u> <u>Kgs</u>	<u>Cost Mt</u>
Polonnaruwa	3,325.35	1,461	2,276.44
Amparai	3,669.44	1,106	3,317.72
Kurunegala	3,138.17	876	3,580.50
Kegalle	2,394.40	1,106	2,164.90
<u>Sample Average</u>		<u>National Average</u>	
Cost Mt	2,834.89	1379.06	
Cost Ha	3,131.84	N/A	

Source: Some Aspects of Paddy and Rice Marketing in Sri Lanka

TABLE 25
COST OF PRODUCTION ESTIMATES

Year	Data				Calculated	
	Per Hectare		Per Mt		Per Ha	Per Mt
	Maha Rs	Yala Rs	Maha Rs	Yala Rs	National Average Rs	National Average Rs
1965					1,562.18	888.11
1966					1,559.41	848.89
1967					1,594.12	749.12
1968					1,687.16	703.86
1969					1,812.13	698.32
1970					1,919.06	725.54
1971					1,970.44	832.46
1972					2,095.41	868.02
1973	1,712.52		1,254.96		2,296.76	999.03
1974					2,580.04	1,096.02
1975	3,131.84		2,834.89		2,753.61	1,212.51
1976					2,786.94	1,201.78
1977					2,821.65	1,164.05
1978					3,163.25	1,283.27
1979	3,617.54	3,250.35	1,124.20	1,128.52	3,503.46	1,274.91
1980	4,644.49	4,903.95	1,190.33		4,727.80	1,613.58
1981	6,536.78	6,640.81	1,626.40	1,629.76	6,570.01	2,202.49
1982	7,366.30	6,930.41	1,948.43	1,831.98	7,223.31	2,244.66
1983	7,944.27	7,982.07	1,847.32	2,142.50	7,955.33	2,192.76
1984	8,109.82	8,703.36	2,386.90	2,398.88	8,339.85	2,707.74
1985	8,398.93	9,002.35	2,060.08	2,216.30	8,612.66	2,484.18
1986	9,707.32	9,369.29	2,469.80	2,434.82	9,578.91	2,741.53
1987	9,967.77	9,814.81	2,420.92	2,615.47	9,914.24	2,782.55
1988					11,300.84	3,310.15
1989					12,608.46	3,735.84
1990					15,317.87	4,436.10
1991	17,236.71	16,137.61	4,204.98	4,487.23	16,833.11	4,865.06
1992					18,750.73	5,476.26

Source: Table 24
Cost of Cultivation of Agricultural Crops

TABLE 26

PRODUCTION AND PRICE RELATIONSHIPS

Year	Average Producer Price Rs/Mt	Margin Price Less Cost of Pro- duction Rs/Mt	Pro- duction Mt	Area Ha	Price Rs/Mt	Yearly Increase/Decrease	
						Production Mt	Area Ha
1965	575	(313)	945,326	508,971	0		
1966	575	(274)	953,673	654,344	0	8,347	145,373
1967	654	(95)	1,145,659	663,266	79	191,986	8,922
1968	734	30	1,348,080	705,168	80	202,421	41,902
1969	729	31	1,474,184	691,684	(5)	126,104	(13,484)
1970	709	(17)	1,615,960	759,028	(20)	141,776	67,344
1971	692	(140)	1,396,780	725,865	(17)	(219,180)	(33,163)
1972	710	(158)	1,312,444	726,270	18	(84,336)	405
1973	1,279	280	1,312,423	725,254	569	(21)	(1,016)
1974	2,136	1,040	1,602,324	824,791	857	289,901	99,537
1975	2,005	792	1,154,160	695,816	(131)	(448,164)	(128,975)
1976	1,791	590	1,252,623	723,954	(214)	98,463	28,138
1977	1,687	523	1,677,293	828,000	(104)	424,670	104,046
1978	1,952	669	1,890,493	876,000	265	213,200	48,000
1979	2,015	740	1,917,222	838,626	63	26,729	(37,374)
1980	2,466	852	2,133,196	844,647	451	215,974	6,021
1981	3,216	1,014	2,229,346	876,745	750	96,150	32,098
1982	3,413	1,168	2,154,829	844,164	197	(74,517)	(32,581)
1983	3,573	1,380	2,483,431	824,101	160	328,602	(20,063)
1984	3,542	834	2,413,588	990,199	(31)	(69,843)	166,098
1985	3,807	1,323	2,661,211	880,691	265	247,623	(109,508)
1986	3,876	1,134	2,595,104	895,319	69	(66,107)	14,628
1987	4,078	1,295	2,127,832	781,226	202	(467,272)	(114,093)
1988	4,255	945	2,476,613	867,810	177	348,781	86,584
1989	5,675	1,939	2,063,794	726,958	1,420	(412,819)	(140,852)
1990	7,448	3,012	2,538,000	856,707	1,773	474,206	129,749
1991	7,223	2,358	2,389,000	790,954	(225)	(149,000)	(65,753)
1992	8,107	2,631	2,339,700	803,240	884	(49,300)	12,286

Source: Tables 2, 18, 19

<u>Relationships</u>	<u>Equation</u>	<u>Std Err</u>	<u>R2</u>
Ch Price/Ch Cultivated Area	$Y = 32232.227 + 69.583626X$	102.1541	0.018221
Ch Price t-1/Ch Cult Area	$Y = 61678.95 + -40.75775X$	105.5785	0.005926
Price/Cult Area	$Y = 723694.7 + 21.1138237X$	7.724469	0.223215
Price t-1/Cult Area	$Y = 743498 + 19.0126375X$	7.573788	0.201322
Price t-1/Ch Cult Area	$Y = 29649.66 + -7.149218X$	8.175713	0.029678
Ch Price/Ch Production	$Y = 32232.23 + 69.583626X$	102.1541	0.018221
Ch Price t-1/Ch Prod	$Y = 64340.93 + -43.146402X$	108.2475	0.006576
Price/Prod*	$Y = 1295093 + 194.3903462X$	30.92954	0.603056
Price t-1/Prod*	$Y = 1332696 + 207.246541X$	34.3921	0.592253
Price t-1/Ch Prod	$Y = 94700.39 + -16.416531X$	25.28676	0.01658
Margin/Ch Cultivated Area	$Y = 25277.02 + -16.245843X$	18.70486	0.02929
Margin t-1/Ch Cult Area	$Y = 21600.9 + -13.791301X$	19.83959	0.018962
Margin/Ch Production	$Y = 56307.15 + -5.2694467X$	58.31693	0.000326
Ch Cult Area/Ch Prod	$Y = 30850.26 + 1.90783606X$	0.481616	0.38563
<u>The Yala Equation</u>			
Margin/Ch Yala Cult	$Y = 10325.53 + -8.96628X$	10.97958	0.025982
Ch Price/Yala Cult	$Y = 2192.35 + 0.708651$	19.66412	5.19E-05

* Intercorrelated, therefore spurious

TABLE 27

RICE AVAILABILITY TRENDS

Per Capita TrendsLong-Term Linear Trend
Regression Output:

Constant	-484.347
Std Err of Y Est	10.26915
R Squared	0.054786

No. of Observations	28
Degrees of Freedom	26
X Coefficient(s)	0.294932
Std Err of Coef.	0.240251

Short-Term Linear Trend 1
Regression Output:

Constant	1,779.341
Std Err of Y Est	9.195507
R Squared	0.122317

No. of Observations	13
Degrees of Freedom	11
X Coefficient(s)	-0.84394
Std Err of Coef.	0.681616

Short-Term Linear Trend 2
Regression Output:

Constant	5,050.848
Std Err of Y Est	10.93993
R Squared	0.265895

No. of Observations	8
Degrees of Freedom	6

TABLE 27 (Cont.)

Import Trends

<u>Year</u>	<u>Linear Import Trend</u>	<u>Curvi- Linear Import Trend</u>		
1965	450.70	405.48	Linear Regression Output:	
1966	437.55	389.95	Constant	26,292.22
1967	424.40	375.90	Stdd Err of Y Est	101.1054
1968	411.25	362.89	R Squared	0.543139
1969	398.10	350.51	No. of Observations	28
1970	384.95	338.55	Degrees of Freedom	26
1971	371.80	327.01	X Coefficient(s) - 13.1509	
1972	358.65	315.69	Std Err of Coef. 2.365403	
1973	345.49	304.78		
1974	332.34	294.08		
1975	319.19	283.59		
1976	306.04	273.31	Curvi-Linear Regression	
1977	292.89	263.24	Exponential	0.8
1978	279.74	253.17	Constant	426.46
1979	266.59	243.30	X Coefficient(s)	-20.98
1980	253.44	233.44	R Squared	0.71038
1981	240.29	223.79		
1982	227.14	214.14		
1983	213.99	204.70		
1984	200.83	195.47		
1985	187.68	186.45		
1986	174.53	177.64		
1987	161.38	169.04		
1988	148.23	160.64		
1989	135.08	152.46		
1990	121.93	145.12		
1991	108.78	138.82		
1992	95.63	132.53		
1993	82.48	126.24		
1994	69.33	119.94		
1995	56.17	113.65		
1996	43.02	107.35		
1997	29.87	101.06		
1998	16.72	94.77		
1999	3.57	88.47		
2000	-9.58	82.16		

TABLE 27 (Cont.)

Total Availability

<u>Year</u>	<u>Total Avail-ability Trend</u>
1965	1,064.28
1966	1,091.27
1967	1,118.26
1968	1,145.25
1969	1,172.24
1970	1,199.22
1971	1,226.21
1972	1,253.20
1973	1,280.19
1974	1,307.18
1975	1,334.16
1976	1,361.15
1977	1,388.14
1978	1,415.13
1979	1,442.11
1980	1,469.10
1981	1,496.09
1982	1,523.08
1983	1,550.07
1984	1,577.05
1985	1,604.04
1986	1,631.03
1987	1,658.02
1988	1,685.01
1989	1,711.99
1990	1,738.98
1991	1,765.97
1992	1,792.96

Total Availability Trend

Regression Output:

Constant	-51966.9
Std Err of Y Est	149.574
R Squared	0.695832
No. of Observations	28
Degrees of Freedom	26

X Coefficient(s) 26.98788

Std Err of Coef. 3.499347

Table 27 (Cont.)

Import Function

<u>Year</u>	<u>Domestic Production Kg</u>	<u>Imports Kg</u>	<u>Relation- ship</u>	<u>Relationship of Imports to Domestic Milled Rice</u>	
1965	51.82	49.31	36.72	Regression Output:	
1966	51.02	43.05	37.20	Constant	68.10311
1967	59.91	32.53	31.82	Std Err of Y Est	8.080941
1968	68.80	29.13	26.43	R Squared	0.62566
1969	68.64	21.58	26.53	No. of Observations	28
1970	79.02	42.67	20.24	Degrees of Freedom	26
1971	67.75	26.90	27.07		
1972	62.45	20.67	30.28	X Coefficient(s)	-0.60566
1973	61.35	26.21	30.94	Std Err of Coef.	0.091878
1974	73.82	22.72	23.39		
1975	52.34	34.03	36.40		
1976	55.89	30.98	34.26		
1977	73.63	38.90	23.51		
1978	81.54	11.92	18.72		
1979	81.08	14.62	19.00		
1980	92.52	12.86	12.07		
1981	94.93	10.46	10.61		
1982	90.64	10.59	13.20		
1983	102.96	7.75	5.74		
1984	98.88	1.70	8.22		
1985	107.38	11.51	3.07		
1986	102.92	13.66	5.77		
1987	83.13	6.26	17.75		
1988	95.44	11.38	10.30		
1989	78.49	7.78	20.56		
1990	95.47	10.12	10.28		
1991	88.54	7.71	14.48		
1992	85.93	13.62	16.06		
1993	94.53		10.85		
1994	94.44		10.90		
1995	94.33		10.97		
1996	94.22		11.04		
1997	93.94		11.21		
1998	93.44		11.51		
1999	92.95		11.81		
2000	92.45		12.11		

APPENDIX VII

ELASTICITIES AND CONSUMPTION REGRESSIONS

TABLE 1

INCOME ELASTICITIES
(Central Bank Surveys)

Food Item	1973 Survey	1978/79 Survey	1981/82 Survey
Food	0.53	0.44	0.48
Rice	0.19	0.18	0.26
Wheat Flour	0.51	-1.69	-0.38
Bread	0.52	0.12	0.47
Meat	1.89	1.92	1.72
Fish	0.86	0.71	0.92
Eggs	1.70	N/A	1.52
Milk	1.41	1.00	N/A
Sugar	0.46	0.53	0.56

Source: Report on Consumer Finances and Socio Economic Survey, 1973
 Report on Consumer Finances and Socio Economic Survey, 1978/79
 Report on Consumer Finances and Socio Economic Survey, 1981/82

TABLE 2

PRICE ELASTICITIES

	Rice	Wheat	Roots	Grains	Coconut	Sugar
Rice	-0.57	0.16	-0.05	****	****	****
Wheat*	0.73	-0.35	-0.08	0.04	0.51	-0.56
Roots**	0.60	1.09	-0.62	-0.04	-0.79	1.16
Grains***	0.54	0.48	-0.43	-1.23	0.44	-0.75
Coconut	0.08	-0.05	****	-0.02	-0.36	0.08
Sugar	-0.17	0.40	****	-0.03	0.16	-0.53

* Includes flour and bread.

** Primarily cassava and sweet potato.

*** Course grains such as maize, finger millet, and sorghum.

**** Not given, stated that coefficients were not significant.

Source: Impact of Wheat Imports, Prices and Consumption on Staple Food Production in Sri Lanka: A Brief Assessment

TABLE 3
 INCOME ELASTICITIES
 (Calculated From Department of Census
 and Statistics Surveys)

<u>National</u>		
	<u>1980-1985</u>	<u>1985-1990</u>
Rice	-0.01	0.03
Wheat Flour	0.10	-0.48
Bread	0.14	0.14
Flour P	0.68	0.64
 <u>Urban</u>		
	<u>1980-1985</u>	<u>1985-1990</u>
Rice	0.00	0.04
Wheat Flour	0.00	-0.26
Bread	0.00	0.18
Flour P	0.91	0.18
 <u>Rural</u>		
	<u>1980-1985</u>	<u>1985-1990</u>
Rice	-0.01	0.06
Wheat Flour	0.00	-0.51
Bread	0.16	0.08
Flour P	1.36	0.86
 <u>Estate</u>		
	<u>1980-1985</u>	<u>1985-1990</u>
Rice	0.09	0.08
Wheat Flour	0.35	-0.33
Bread	0.00	1.10
Flour P	2.05	1.28

TABLE 4

PRICE ELASTICITIES
(Calculated From Department of Census
and Statistics Surveys)

National

	<u>1980-1985</u>				<u>1985-1990</u>				
	Wheat				Wheat				
	Rice	Flour	Bread	Flour P	Rice	Flour	Bread	Flour P	
Rice	-0.09	0.59	0.83	4.13	Rice	0.02	-0.37	0.11	0.50
Wheat Flour	-0.05	0.35	0.49	2.43	Wheat Flour	0.02	-0.36	0.11	0.48
Bread	-0.05	0.34	0.47	2.35	Bread	0.03	-0.57	0.17	0.76
Flour P	-0.04	0.25	0.35	1.77	Flour P	0.02	-0.37	0.11	0.50

Urban

	<u>1980-1985</u>				<u>1985-1990</u>				
	Wheat				Wheat				
	Rice	Flour	Bread	Flour P	Rice	Flour	Bread	Flour P	
Rice	0.00	0.00	0.00	5.60	Rice	0.03	-0.20	0.14	0.14
Wheat Flour	0.00	0.00	0.00	3.36	Wheat Flour	0.06	-0.40	0.27	0.28
Bread	0.00	0.00	0.00	2.83	Bread	-0.28	2.04	-1.41	-1.46
Flour P	0.00	0.00	0.00	2.62	Flour P	-0.31	2.22	-1.53	-1.58

Rural

<u>Price</u>	<u>1980-1985</u>				<u>1985-1990</u>				
	Wheat				Wheat				
	Rice	Flour	Bread	Flour P	Rice	Flour	Bread	Flour P	
	<u>Consumption Price</u>				<u>Consumption</u>				
Rice	-0.09	0.00	1.00	8.67	Rice	0.04	-0.41	0.06	0.68
Wheat Flour	-0.04	0.00	0.44	3.83	Wheat Flour	0.05	-0.48	0.08	0.80
Bread	-0.05	0.00	0.50	4.31	Bread	0.06	-0.56	0.09	0.93
Flour P	-0.04	0.00	0.39	3.35	Flour P	0.04	-0.37	0.06	0.62

Estate

	<u>1980-1985</u>				<u>1985-1990</u>				
	Wheat				Wheat				
	Rice	Flour	Bread	Flour P	Rice	Flour	Bread	Flour P	
Rice	0.53	2.06	0.00	15.95	Rice	0.06	-0.26	0.86	1.00
Wheat Flour	0.29	1.12	0.00	8.65	Wheat Flour	0.07	-0.30	1.00	1.17
Bread	0.26	1.02	0.00	7.90	Bread	0.09	-0.35	1.18	1.37
Flour P	0.60	2.35	0.00	18.18	Flour P	0.05	-0.22	0.72	0.84

TABLE 5
CONSUMPTION TO PRICE REGRESSIONS

All Wheat Flour Consumption to Retail Rice/Retail Flour Index
Regression Output:

Constant	25.90021
Std Err of Y Est	3.237406
R Squared	0.196047
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	2.526733
Std Err of Coef.	2.088906

Rice Consumption to Retail Rice/Retail Flour Index
Regression Output:

Constant	117.5553
Std Err of Y Est	5.407397
R Squared	0.66575
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-12.0616
Std Err of Coef.	3.489072

All Wheat Flour Consumption to Rice and Wheat Flour Price, Real
Regression Output:

Constant	36.16762
Std Err of Y Est	3.093701
R Squared	0.388197
No. of Observations	8
Degrees of Freedom	5
X Coefficient(s)	0.00725
Std Err of Coef.	4.724561
	-5.63386
	3.297097

All Wheat Flour Consumption to Current Rice and Wheat Flour Price
Regression Output:

Constant	28.58018
Std Err of Y Est	3.245529
R Squared	0.326673
No. of Observations	8
Degrees of Freedom	5
X Coefficient(s)	-2.90189
Std Err of Coef.	2.07624
	2.640249
	2.048469

Rice Consumption to Wheat Flour Price, Rice Price, Wheat Flour Consumption
Regression Output:

Constant	125.9288
Std Err of Y Est	3.214973
R Squared	0.92123
No. of Observations	8
Degrees of Freedom	4
X Coefficient(s)	3.916358
Std Err of Coef.	2.425409
	-2.50701
	2.342145
	-1.06181
	0.443003

TABLE 5 (Cont.)

Rice Consumption to Wheat Flour Price, Rice Price
Regression Output:

Constant		95.58205
Std Err of Y Est		4.488282
R Squared		0.8081
No. of Observations		8
Degrees of Freedom		5
X Coefficient(s)	6.997608	-5.31046
Std Err of Coef.	2.871257	2.832853

Rice Consumption to Wheat Price
Regression Output:

Constant		90.84592
Std Err of Y Est		5.346556
R Squared		0.673229
No. of Observations		8
Degrees of Freedom		6
X Coefficient(s)	1.667135	
Std Err of Coef.	0.474172	

Rice Consumption to Wheat Flour Price (real), Rice Price (real), Wheat Flour
Consumption

Regression Output:

Constant		130.1951	
Std Err of Y Est		4.915068	
R Squared		0.815896	
No. of Observations		8	
Degrees of Freedom		4	
X Coefficient(s)	-12.5134	15.16606	-0.97154
Std Err of Coef.	7.506071	6.592563	0.710503

Wheat Consumption to Wheat Flour Price, Rice Price, Rice Consumption
Regression Output:

Constant		81.64829	
Std Err of Y Est		2.324785	
R Squared		0.723618	
No. of Observations		8	
Degrees of Freedom		4	
X Coefficient(s)	0.983255	-0.30817	-0.55521
Std Err of Coef.	2.199834	1.914747	0.231642

All Wheat Flour Consumption to Wheat Flour Price
Regression Output:

Constant		30.93489
Std Err of Y Est		3.419694
R Squared		0.102962
No. of Observations		8
Degrees of Freedom		6
X Coefficient(s)	-0.25169	
Std Err of Coef.	0.303283	

TABLE 5 (Cont.)

All Wheat Flour Consumption to Wheat Flour Price, Rice Price
Regression Output:

Constant		28.58018
Std Err of Y Est		3.245529
R Squared		0.326673
No. of Observations		8
Degrees of Freedom		5
X Coefficient(s)	-2.90189	2.640249
Std Err of Coef.	2.07624	2.048469

Rice Consumption to Rice Price
Regression Output:

Constant		90.25692
Std Err of Y Est		6.060446
R Squared		0.58014
No. of Observations		8
Degrees of Freedom		6
X Coefficient(s)	1.52689	
Std Err of Coef.	0.530296	

Wheat Flour Consumption to Rice Price
Regression Output:

Constant		30.7885
Std Err of Y Est		3.4939
R Squared		0.063609
No. of Observations		8
Degrees of Freedom		6
X Coefficient(s)	-0.19518	
Std Err of Coef.	0.30572	

APPENDIX VIII

POPULATION DATA

TABLE 1

ESTIMATED MID-YEAR POPULATION

<u>Year</u>	<u>Total</u>
1965	11,164,000
1966	11,439,000
1967	11,703,000
1968	11,992,000
1969	12,252,000
1970	12,516,000
1971	12,608,000
1972	12,861,000
1973	13,091,000
1974	13,284,000
1975	13,496,000
1976	13,717,000
1977	13,942,000
1978	14,190,000
1979	14,471,000
1980	14,738,000
1981	15,011,000
1982	15,195,000
1983	15,417,000
1984	15,603,000
1985	15,842,000
1986	16,117,000
1987	16,361,000
1988	16,586,000
1989	16,806,000
1990	16,993,000
1991	17,247,000
1992	17,405,000

Sources: Food and Nutrition Statistics
 Statistical Abstract of the Democratic Socialist Republic of Sri Lanka

APPENDIX IX
ECONOMIC DATA

TABLE 1
PRICE INDEXES

Year	Colombo CPI Total 1952=100	Adjusted to 1965=100	Colombo CPI Food 1952=100	Adjusted to 1965=100
1965	112.5	100.0	107.3	100.0
1966	112.3	99.8	109.1	101.7
1967	114.8	102.0	112.7	105.0
1968	121.5	108.0	121.2	113.0
1969	130.5	116.0	127.9	119.2
1970	138.2	122.8	136.6	127.3
1971	141.9	126.1	139.1	129.6
1972	150.9	134.1	147.5	137.5
1973	165.4	147.0	166.2	154.9
1974	185.8	165.2	189.7	176.8
1975	198.3	176.3	204.3	190.4
1976	200.7	178.4	202.1	188.4
1977	203.2	180.6	203.3	189.5
1978	227.8	202.5	237.5	221.3
1979	252.3	224.3	263.3	245.4
1980	318.2	282.8	339.7	316.6
1981	375.4	333.7	399.6	372.4
1982	416.1	369.9	450.4	419.8
1983	474.2	421.5	506.3	471.9
1984	553.1	491.6	598.0	557.3
1985	561.2	498.8	598.4	557.7
1986	606.0	538.7	641.4	597.8
1987	652.8	580.3	697.0	649.6
1988	744.1	661.4	802.0	747.4
1989	830.2	738.0	884.6	824.4
1990	1,008.6	896.5	1,090.9	1,016.7
1991	1,131.5	1,005.8	1,220.3	1,137.3
1992	1,260.4	1,120.4	1,366.0	1,273.1

Sources: Statistical Abstract of the Democratic Socialist Republic of Sri Lanka
Central Bank of Sri Lanka Annual Report

TABLE 2
EXCHANGE RATES

<u>Year</u>	Exchange Rate End Year U.S.\$	Exchange Rate Mid-Year U.S.\$
	(1)	(2)
1965	5.95	5.95
1966	5.95	5.95
1967	5.95	5.95
1968	5.95	5.95
1969	5.95	5.95
1970	5.95	5.95
1971	5.95	5.95
1972	6.40	6.15
1973	6.75	6.38
1974	6.69	6.67
1975	7.71	7.10
1976	8.86	8.43
1977	15.56	8.90
1978	15.51	15.60
1979	15.45	15.58
1980	18.00	16.53
1981	20.55	19.67
1982	21.32	20.80
1983	25.00	23.52
1984	26.28	25.43
1985	27.41	27.21
1986	28.52	28.04
1987	30.76	29.48
1988	33.03	31.80
1989	40.00	36.07
1990	40.24	40.00
1991	42.58	41.41
1992	46.00	44.29

Sources: Central Bank of Sri Lanka Annual Reports
Statistics Division of Department of Commerce

APPENDIX X

CONVERSION FACTORS

1 Measure	=	2 pounds
1 Hectare	=	2.471 Acres
1 Metric Ton	=	2,204 Pounds
1 Kilogram	=	2.204 Pounds
1 Bushel Rough Rice (46 Pounds)	=	20.87 Kilograms
1 Metric Ton Rough Rice	=	47.92 Bushels Rough Rice
100 Grams Rice	=	349 Calories
100 Grams Rice	=	6.5 Grams Protein
100 Grams Wheat Flour	=	348 Calories
100 Grams Wheat Flour	=	11.0 Grams Protein
100 Grams Bread	=	245 Calories
100 Grams Bread	=	7.8 Grams Protein