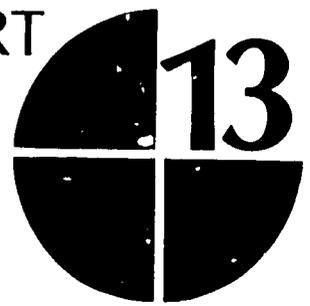


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RESEARCH REPORT



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The Impact of Public Foodgrain Distribution on Food Consumption and Welfare in Sri Lanka

by
James D. Gavan
Indrani Sri Chandrasekera



December 1979

The International Food Policy Research Institute was established to identify and analyze alternative national and international strategies and policies for meeting food needs in the world, with particular emphasis on low-income countries and on the poorer groups in those countries. While the research effort is geared to the precise objective of contributing to the reduction of hunger and malnutrition, the factors involved are many and wide-ranging, requiring analysis of underlying processes and extending beyond a narrowly defined food sector. The Institute's research program reflects worldwide interaction with policymakers, administrators, and others concerned with increasing food production and with improving the equity of its distribution. Research results are published and distributed to officials and others concerned with national and international food and agricultural policy.

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FOREWORD

This is the fourth IFPRI Research Report on foodgrain subsidy programs in South Asia. The previous reports presented an analysis of a small sample of low-income families in the state of Kerala in India to provide a detailed comparative analysis of the impact of food subsidies on the nutritional status of infants (Research Report No. 5), a broad analysis of costs and returns to the food subsidy program in Kerala (Research Report No. 7), and a broad analysis of food subsidies in Bangladesh that included a comparison of the relative efficiency of food and fertilizer subsidies for reaching particular objectives (Research Report No. 8).

The food subsidy system in Sri Lanka has a number of features in common with the system in Kerala. However, this analysis has the advantage of concentrating on a small country with a substantial, clearly delineable trade sector. The four studies together offer a broad insight into food subsidy questions and will be the basis of a comprehensive statement on the subject to be published at a later date.

During the past decade mounting concern about basic human needs, recognition that increased food consumption is essential to these needs, and evidence that narrowly targeted programs often miss the poorer elements in the society has drawn interest to the food subsidy programs. It is ironic that just as the efficacy of broad subsidy schemes in meeting needs of the poor is being documented, these schemes have been criticized in the international

community because they also benefit high-income people. Concurrently, Sri Lanka, which has the most publicized program meeting basic human needs, drastically modified and cut back its scheme in 1978 and in September 1979 replaced it with a food stamp program. These changes were made presumably because of the high costs of the program and were supported by the International Monetary Fund, which analyzed the fiscal policy effects.

Many countries are concerned about the implications of food subsidies for food policy. This study sheds light on not only the overall scheme, but also on component parts and relationships that can assist in constructing modified programs. It also substantially contributes to the knowledge needed for setting priorities at the international level and for understanding the relationships involved and how these affect foreign assistance, long-term growth, and short-term welfare.

IFPRI is developing an overview analysis of its work on food subsidies in South Asia as well as a new set of in-depth analyses focusing on the nutritional impact of food policy and technological change in a diverse set of countries.

John W. Mellor

Washington, D. C.
December 1979

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1

SUMMARY

Sri Lanka has achieved remarkable social progress for a country with a very modest economic base and relatively low per capita income. This progress is manifest in, among other things, high rates of literacy, long life expectancy, and low infant mortality.

This progress appears to be at least in part the result of a series of social policies that have been followed in the country since and in some cases prior to independence. Among these are the food distribution programs. A comprehensive public rice distribution system has operated since World War II. The system involves the distribution of rice at subsidized prices through an extensive network of cooperatives and an active government program of price supports and procurement of agricultural commodities, particularly rice, to supply the public distribution system. This study explores the operation of the public food distribution system, how it affects the price and availability of foods, and its impact on the food intake levels and nutrition of different income groups in the society.

A comparison of food intake in Sri Lanka with nutritional requirements and intake levels in other poor countries of Asia indicates that average consumption in Sri Lanka is not high and that protein intake is unsatisfactory. On the other hand, survey data indicate that the distribution of available food among different income groups is remarkably even compared to that in other poor countries. This evenness is a result of relatively modest intake at the higher end of the income scale as well as relatively satisfactory food intake levels at the lower end of the income scale.

Sri Lanka is a food-deficit economy that traditionally has relied on imports of rice and wheat, which are paid for by the export of plantation crops. The most important Sri Lankan food staples are rice and coconut. No wheat is grown in the country. The government has pursued a policy of maintaining rice prices through the Guaranteed Price Scheme and encouraging production mainly through irrigation, land settlement, and the subsidization of inputs. Rice production grew very rapidly between the 1940s

and the early 1970s, and the cereal self-sufficiency ratio almost doubled in 20 years.

The Sri Lankan government, through the Food Commissioner's Department, has a monopoly on the international trading of food commodities. The Food Commissioner's Department imports rice and wheat for the public food distribution system. Rice is distributed at subsidized prices through the ration system. Generally, wheat is available in unrestricted quantities at prices that are sometimes taxed and sometimes subsidized. Wheat also is made available to bakeries. Rice and sugar are distributed through a network of authorized distributorships at a fixed mark-up, whereas wheat is normally available through all retail outlets in the country. Rice is procured from farmers at a guaranteed purchase price by the Paddy Marketing Board, which, during certain periods, has controlled all movement of rice within the country. The Board purchases all the rice offered by the farmer.

Prior to 1966 the distribution system expanded rapidly helped by cheap rice imports. During this period domestic production and procurement were also expanding rapidly. Per capita wheat imports and consumption declined. Between 1966 and 1970 the size of the ration quota was cut in half and the entire quota was available free of charge. Prices rose in the open market, procurement declined, and wheat consumption grew considerably. This was also a period of high domestic production, and overall food consumption increased rather than decreased as a result. In 1970 an additional paid ration quota was reintroduced at a significantly higher price. For the first time the paid portion of the rice ration cost more than wheat flour. A series of poor harvests and high world prices forced cuts in the system and drastic price increases beginning in late 1973, and for a time wheat was also distributed through the ration system. Food intake levels declined between 1972 and 1975/76, and there is some evidence of a decline in nutrition standards. In 1978 the newly elected government changed the system by removing the eligibility for rice

distribution of approximately half of the population by the use of a means test.

The costs of operating the food subsidy scheme grew almost continuously with increases in population and domestic procurement. For a number of years, almost half the cost of the system was covered by the sale of sugar and wheat flour at above official import prices. Low world prices for sugar and cereals during much of the 1950s and 1960s allowed the general and comprehensive system to operate at a sustainable cost of approximately Rs 300 million per year in the late 1960s, or approximately 14 percent of public expenditures. The offsetting revenue declined sharply after 1972 as a result of higher sugar and wheat prices and the situation was further compounded in 1974 by the high world rice prices. The burden on the budget rose rapidly to intolerable levels. Between 1970 and 1975 the net cost of the subsidy more than tripled, rising to 18 percent of total current account expenditures.

Both rice producers and consumers have received benefits from the food subsidy. Using the official exchange rate, the producers were the primary beneficiaries of the subsidy. At the premium Foreign-Exchange-Entitlement-Certificates-Scheme rate, the system benefited consumers. With an exchange rate somewhere between these two values, farmers benefited from the scheme in all but the very high world price years of 1968 and 1973 through 1975. Consumers appeared to be the major beneficiaries in most years. The overvalued exchange rate also meant that a substantial hidden cost burden fell on exporters.

Demand equations for rice and cereals were estimated using time-series data. The study indicated that a change in the availability of rationed rice had a sharp impact on the demand for open-market rice and on the consumption of wheat. Thus the overall impact of an increase in the ration on rice consumption was much less than the amount distributed through the system, and the impact on cereal consumption was even less.

The time-series analysis also indicated the importance of domestic rice production as a determinant of rice and cereal consumption and raised some questions concerning the possible indirect links between the public distribution program and food consumption. Consumer survey data used

to examine utilization of the ration by different economic groups in rural, urban, and estate areas and to estimate the net contribution of the ration to calorie consumption indicated that use of the ration was virtually universal and that all segments of the community received some benefit from it. A high proportion of total cereals consumed was obtained through the public distribution system by all income groups. When converted into its cash equivalent, the value of the rice ration subsidy was equivalent to 16 percent of total income for the tenth percentile of the population. This increment in income enabled them to increase consumption of a range of food products in the categories of animal products and oils and fats and to spend more for housing and clothing. Inclusion of food subsidy income along with other income reduced the Gini coefficient of income inequality substantially.

The 1969-70 socioeconomic survey data suggested that, on the average, one rupee of additional income resulted in an increased intake of 155 rice calories, 179 cereal calories, and 323 total calories. At the prevailing ration quantity and price, this translated into an increased calorie intake of only 63 calories per capita per day as a result of the ration for the average recipient. The impact was larger at the lower end of the income distribution, where the marginal propensity to spend on calories is higher. For individuals in the tenth percentile of the income distribution, the effect of the ration in 1969-70 was to raise calorie intake by 115 calories per day and protein intake by three grams. The method used may not provide a very accurate measure of the impact of the system on the lowest 7 to 8 percent of the population, where incomes without the ration would fall outside the range observed in the data. It is possible, therefore, that the very poorest of the poor might have benefited significantly more nutritionally than the results reported above indicate.

Thus in 1969-70 only a fraction of the rice calories put through the ration system had an impact on reducing the calorie gap. The rest went to substitute for market purchases or to raise the consumption levels of people already receiving their required levels of intake. As a result, the cost per calorie effectively delivered was very high—on the order of Rs 4.10 per thousand calories or Rs 2.00 after deductions for the flour and sugar tax income.

The estimates obtained from the 1969-

70 socioeconomic survey data tend to understate the contribution of the ration. The survey years were notable for the high level of rice production and cereal consumption that may have led to unusually low income elasticities of demand for rice and cereals. At the lower per capita consumption levels prevailing before and after that time, the impact of the ration was probably somewhat larger. The time-series analyses, which indicated a significantly larger ration impact on the average, confirm this. They suggest that the cost per calorie effectively delivered would be considerably less, perhaps one-half to one-third of the figures indicated above. Nevertheless, "leakage" in normal years was still very high, indicating that the bulk of what was distributed through the ration tended to substitute for calories from other sources or to go to those already receiving adequate intake levels.

In the 1970s cereal consumption was less stable and more closely tied to domestic production. Bad harvests in 1972, 1973, and 1975 were instrumental in leading to low consumption levels that appear to have caused some deterioration in nutrition and health standards in the country. Thus, cut-backs in the ration subsidy system beginning in 1967 seem to have left consumers more vulnerable to instability.

Apart from its effects on food consumption, the system has been an important vehicle for increasing the purchasing power of the poor and thereby contributing to social welfare.

The data also suggest other less direct benefits. The intervention of the public sector in food distribution in Sri Lanka appears to have helped bring about the rapid growth in rice production. During much of the independence period, the growth of rice production was an important contributor to overall growth. Through its production and distribution policies, the public

sector helped create a favorable climate for the expansion of rice production. Growth in the paddy sector was responsible for a significant part of overall employment growth, and the increased expenditures resulting from higher real incomes as a result of the ration also contributed to income generation in rural areas. These factors help to explain the relatively even income distribution and satisfactory "physical quality of life" attained in Sri Lanka.

The benefits of the ration program were attained at a high cost to fiscal resources. It is arguable that the cost was sustainable during the 1950s and the first part of the 1960s, when it was possible to take advantage of favorable conditions in world markets, including the low prices for flour and sugar that helped offset some of the burden. This was especially true in the earlier period when the terms of trade for Ceylon's exports were more favorable, when foreign exchange was relatively plentiful, and when domestic paddy production was still at a low level.

Under the more difficult conditions prevailing in the 1970s, the increased costs of the system and the heavy burden it placed on the national economy made continuance of the full system much more difficult to justify. To maintain the entire system as a stabilization device to protect consumers in poor harvest years would be a very expensive proposition. The attempt since 1978 to lower overall costs by restricting ration coverage to the lower half of the population was an important step toward improving the efficiency of the system. The fact that it was apparently possible to accomplish this is an exciting development that few would have considered possible a short time ago. It is also a commentary on Sri Lanka's administrative sophistication, itself in no small measure a reflection of the successful levels of social development achieved.

2

INTRODUCTION

Sri Lanka is often singled out as a poor country that has successfully followed a human needs development strategy. The Overseas Development Council's Physical Quality of Life Index (PQLI), which combines literacy, infant mortality, and life expectancy rates, ranks Sri Lanka first among 42 low-income countries. Sri Lanka ranks only thirty-first for per capita income among these same countries. Some sample values of the indicators for Sri Lanka and its neighbors appear in Table 1.

This rather unique situation is generally attributed to a series of progressive government social policies, which include food distribution policies. The government has intervened actively in the local sector to provide incentive prices to farmers, and the population has had almost universal access to a rice distribution (ration) scheme which operated between the early 1940s and 1978.

when access of the wealthier half of the population to the scheme was eliminated.

Budget subsidies on rice distribution began in the late 1940s. During 1971 and 1972, 67 percent of the island's rice consumption was channeled through the distribution scheme, and the cost of operating the program was a significant component of the national budget. Soon after, adverse developments in Sri Lanka's foreign trade sector and failure of domestic rice harvests led to reductions in the benefits accruing through the scheme.

This study attempts to review comprehensively the operation of the public rice distribution scheme from its inception until the changes introduced in 1978. Chapter 3 surveys the available evidence on food consumption and nutrition status. Chapter 4 traces the development of the rice ration and procurement schemes in the postwar

Table 1 — Per capita income and social development in low-income countries in Asia

Country	1970-75 Average GNP Per Capita	Literacy Age 15 and Over	Infant Mortality Per 1,000	Life Expectancy At Age One	Physical Quality of Life Index
	(\$U.S.)	(percent)		(years)	
Bangladesh	92	22	132	53	35
India	133	34	122	60	43
Pakistan	155	16	121	57	38
Sri Lanka	179	81	45	70	82
Indonesia	203	60	137	55	48
Thailand	318	79	89	63	68
Philippines	342	83	74	62	71
Malaysia	692	53	75	67	66
Taiwan	847	85	26	70	86
Brazil ^a	912	66	82	65	68
Average ^b	329	57	72	61	60

Source: Morris D. Morris, *Measuring the Condition of World's Poor: The Physical Quality of Life Index*, Permagon Policy Series 42 (New York: Overseas Development Council, 1979), Appendix A.

^aBrazil is included as a contrasting case of a higher income country with a lower ranking on the Physical Quality of Life Index.

^bExcluding Brazil.

period and their impact on the rice economy. Chapter 5 examines time-series data from 1950 to 1976 and household data from the 1969-70 socioeconomic survey in order to determine the impact of the rice distribution scheme on food consumption, calorie and protein intake in the aggregate, and each

income group. Chapter 6 examines some of the fiscal and social costs of operating the system and the distribution of aggregate benefits under different assumptions regarding the foreign exchange rates and touches on some of the wider implications of the operation of the scheme.

3

FOOD INTAKE AND NUTRITIONAL STATUS

In Sri Lanka three staple commodity groups—cereals, coconuts, and root crops—provide 77 percent of total calorie intake. Rice accounts for 42 percent and wheat for one-fifth to one-sixth of calorie consumption. Coconuts are an important element in the diet, supplying approximately a fifth of the calories consumed. Overall protein consumption is low, and animal-protein consumption levels for Sri Lanka are the same as in neighboring countries.¹ Green leafy vegetables and yellow fruits and vegetables are consumed by all income groups in Sri Lanka and may account for the existing low prevalence of Vitamin A deficiency. Fats, mainly from coconut products, also are commonly consumed.²

CALORIE AND PROTEIN INTAKE

The Medical Research Institute of Sri Lanka set 2,200 calories and 48 grams of protein as the minimum per capita daily

requirements.³ During the period 1970-76, aggregate food availability in Sri Lanka was barely adequate to satisfy these requirements. National food balance sheets indicate that during this time per capita availability was 2,195 calories and 46.4 grams of protein.⁴ Estimates of the Food and Agriculture Organization of the United Nations (FAO) were 2,071 calories and 42 grams of protein for 1972-77.⁵ These levels put Sri Lanka in the middle of the range of values observed in neighboring South and Southeast Asian countries for calories consumed and at or below comparable levels of protein intake (see Table 2).

The Department of Census and Statistics undertook a comprehensive socioeconomic survey in 1969-70 and the Central Bank undertook consumer expenditure surveys in 1953, 1963, and 1973. As Table 3 indicates, the 1969-70 socioeconomic survey data approximate the FAO calorie estimates but indicate a somewhat higher level of protein intake;⁶ per capita consumption was 2,264

¹ According to the Food and Agriculture Organization of the United Nations, *Provisional Food Balance Sheets, 1972-74 Average* (Rome: FAO, 1977), animal protein consumption was 6.6 grams per day per capita for 1972-74 compared with 6.7 for Bangladesh, 5.3 for India, 12.7 for Pakistan, and 16.9 for the Philippines. Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Special Report on Food and Nutrition Levels in Sri Lanka* (Colombo: Government of Sri Lanka, October 1972) has a somewhat higher estimate, 10.2 grams, but the Central Bank of Ceylon, *Survey of Sri Lanka's Consumer Finances, 1973* (Colombo: Swadeshi Printers, 1973) shows 6.8 grams. Also see Table 3.

² See Davidson R. Gwatkin, "Nutritional Planning and Well-Being in Kerala and Sri Lanka," Overseas Development Council, Washington, D.C., January 1978. (Mimeographed.) Gwatkin argues that greater variety in the Sri Lankan diet may be a factor in explaining lower mortality rates. He also points to the relatively high fat content in the diet. An interesting hypothesis that merits further study is that higher caloric density resulting from high fat content as well as greater variety results in more nutrient ingestion among children. For a discussion of growth retardation associated with low caloric density and palatability in a different setting, see Stanley N. Gershoff et al., "Nutritional Studies in Thailand; Paper 2: Effects of Fortification of Rice with Lysine, Threonine, Thiamin, Riboflavin, Vitamin A and Iron on Preschool Children," *American Journal of Clinical Nutrition* 30 (July 1977): 1185-97.

³ Thomas T. Poleman, "Income and Food Consumption: Report to the Government of Sri Lanka," Cornell Agricultural Economics Staff Paper No. 73-19, Cornell University, Department of Agricultural Economics, Ithaca, N.Y., October 1973, p. 4.

⁴ Sri Lanka, Department of Census and Statistics, "Food Balance Sheets," Colombo, 1970-76. (Mimeographed.)

⁵ Food and Agriculture Organization of the United Nations, *FAO Production Yearbook 1978*, vol. 32 (Rome: FAO, 1979).

⁶ Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Special Report on Food and Nutrition Levels in Sri Lanka* (Colombo: Department of Government Printing, 1972). See Table 3.

Table 2—Per capita daily calorie and protein intake in low-income countries in Asia, 1966-71 and 1972-77

Country	Calories		Protein	
	1966-71	1972-77	1966-71	1972-77
	71	77	71	77
	(grams)			
Bangladesh	1,974	1,932	43	42
India	1,958	1,964	49	49
Pakistan	2,136	2,230	59	61
Sri Lanka	2,306	2,071	46	42
Indonesia	1,895	2,080	40	43
Thailand	2,286	2,232	49	50
Philippines	2,062	2,139	49	51
Malaysia	2,454	2,559	51	54
Average	2,134	2,151	48	49

Source: Food and Agriculture Organization of the United Nations, *FAO Production Yearbook 1978*, vol. 32 (Rome: FAO, 1979), pp. 247-251.

calories and 54 grams of protein. This reported calorie consumption was within 3 percent of the FAO food balance sheet estimates based on disappearance. The 1973 Central Bank survey, which was conducted for two months of the year, indicated that only 1,936 calories and 47 grams of protein were consumed.⁷ This calorie consumption figure is 8 percent less than the FAO food balance sheet figure and 12 percent less than the national food balance sheet figure.

Part of the difference between the results of the two surveys may be explained by the timing of the 1973 Central Bank survey, which was undertaken during the lean grain harvest months, and by the exclusion of some minor commodities from it. Because of the large discrepancy between this survey and the food balance sheets, it is not emphasized in this analysis. In general, emphasis is placed on the 1969-70 socio-economic survey.

Food balance sheet data show a decline

Table 3—Per capita daily calorie and protein intake by food item, 1969-70 and 1973

Commodity	Calories				Protein			
	1969-70		1973		1969-70		1973	
	Calories	Percent	Calories	Percent	Grams	Percent	Grams	Percent
Cereals	1,221	54	1,194	62	27.2	51	27.2	58
Rice	917	40	835	43	17.8	33	16.2	35
Wheat and products	284	13	286	15	9.0	17	9.1	19
Subsidiary cereals	20	1	73	4	0.4	1	1.9	4
Pulses	52	2	33	2	3.8	7	2.4	5
Sugar¹	200	9	123	6
Oil and oil bearing nuts	501	22	443	23	4.0	7	3.5	7
Fish and products	39	2	26	1	7.0	13	5.0	11
Meat and products	44	2	30	2	3.2	6	1.8	4
Others	207	9	87	5	8.5	16	6.8	15
Total	2,264	100	1,936	100	53.8	100	46.7	100

Sources: Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Special Report on Food and Nutrition Levels in Sri Lanka* (Colombo: Department of Government Printing, 1972), Table 2; and IFPRI estimates based on Central Bank of Ceylon, *Survey of Sri Lanka's Consumer Finances, 1973* (Colombo: Swadeshi Printers, 1973).

¹Protein from sugar is included in the "others" category.

⁷ Central Bank of Ceylon, *Survey of Consumer Finances, 1973*.

in calorie and protein intake between the late 1960s and the 1970s. According to the national data, calorie and protein consumption declined 8 percent between 1970 and 1976. This sharp decline was a result of poor harvests, high prices, and ration cuts.

FOOD CONSUMPTION AND INCOME GROUPS

The 1969-70 socioeconomic survey's food consumption data were broken down by income group. In Tables 4 and 5, food consumption is given in total calories and grams of protein per capita for each household income category. In Figures 1 and 2, calorie consumption data are related to the cumulative percent of the population arranged from lower to higher income—the diagram popularized by Reutlinger and Selowsky.⁸ What immediately stands out is the relative evenness of the distribution.

As a measure of this evenness, the coefficient of variation around the mean was calculated. This coefficient has a value of 8 percent for the 1969-70 data and of 7 percent for the 1973 data. By comparison, analysis of survey data in other countries reveals a comparable value of 12 percent for Pakistan in 1970/71 and 41 percent for Bangladesh in 1973/74.⁹ This evenness of distribution in Sri Lanka, which has been noted by a number of investigators, leads to the hypothesis that it is attributable to the operation of the food ration/subsidy scheme.¹⁰ This proposition is addressed in the present study.

The data also show that approximately 30 percent of the island's population consumed

too few calories in 1969-70.¹¹ There are significant variations among the urban, rural, and estate sectors.¹² Forty percent of the urban population and 12 percent of the rural population received less than 2,200 calories in 1969-70. All of the income groups surveyed in the estate sector received more than 2,200 calories. Given the relative evenness of the distribution, however, 90 to 95 percent of the population in the urban and rural sectors was within 10 percent of the standard. On the other hand, the 1973 Central Bank survey shows that almost 95 percent of the island's population consumed fewer than 2,200 calories and 75 percent consumed less than 90 percent of that standard. It also shows that the rural areas consumed fewer calories, on the average, than urban areas—an apparent reversal of the situation in 1969-70 (Table 6). Both 1972 and 1973 were poor crop years, which tends to confirm the overriding importance of domestic production as a determinant of consumption in rural areas. This point will be discussed in the analysis of time-series data.

Both surveys show that calorie and protein intake were significantly greater in the estate sector. This is surprising in view of suggestions that the sector, with its largely ethnic Tamil population,¹³ is discriminated against. Also, this higher intake cost less per capita than lower intakes in the other sectors. Because the relative prices faced by consumers in the estate and urban sectors presumably were similar and the results hold for comparable income groups, the difference appears to be attributable to differences in tastes.

The first extensive survey of nutrition status was not made until 1975, hence it is

⁸ Shlomo Reutlinger, and Marcelo Selowsky, *Malnutrition and Poverty: Magnitude and Policy Options*, World Bank Staff Occasional Paper No. 23 (Baltimore: Johns Hopkins Press, 1976).

⁹ Estimates based on Pakistan, Ministry of Finance, Statistical Division, Planning and Provincial Coordinator, *Household Income and Expenditure Survey of 1970/71* (Islamabad: Ministry of Finance, 1975); and Bangladesh, Bureau of Statistics, *Statistical Yearbook of Bangladesh* (Dacca: Bureau of Statistics, 1975), p. 281, Table 13.22. Average monthly consumption per household on all major food items in all areas of Bangladesh, 1973/74 by expenditure groups.

¹⁰ Davidson Gwatkin, "Nutritional Planning and Well-Being"; and Paul Isenman, "The Relationship of Basic Needs to Growth, Income Distribution and Employment: The Case of Sri Lanka," International Bank for Reconstruction and Development, Washington, D.C., March 1978. (Mimeographed.)

¹¹ The figure was determined by applying a statistical smoothing procedure to the grouped data presented in the survey under the assumption that consumption within each income group is evenly distributed.

¹² See Poleman, "Income and Food Consumption," Appendix 3. The estate sector is comprised of tea and rubber plantations.

¹³ The Tamils are a largely Hindu ethnic minority. The majority of Sri Lanka's population is Sinhalese.

Table 4—Per capita food and nonfood expenditures, calorie intake, and protein intake, by income group, 1969-70

Household Income Group	Monthly Food Expenditure ^a	Monthly Expenditure for All Goods ^a	Ratio of Expenditures on Food and All Goods	Population	Calories ^b	Protein ^b
(Rs)	(Rs)	(Rs)	(percent)			(grams)
0-99	19.44	n.a. ^c	n.a. ^c	5.4	1,941	40.2
100-149	23.05	n.a. ^c	n.a. ^c	13.6	2,103	45.0
150-199	25.12	37.15 ^c	62 ^c	16.5	2,157	47.1
200-399	29.79	51.79	58	40.0	2,272	54.0
400-599	37.09	71.59	52	14.6	2,437	58.6
600-799	41.84	92.25	45	5.3	2,512	60.8
800-999	48.36	123.83	39	2.1	2,540	62.2
Above 1000	59.46	177.93	33	2.6	2,641	66.0
Average	30.34	56.35	54	100.0	2,264	53.8

Sources: Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Statistical Tables*, vol. 2 (Colombo: Department of Government Printing, 1973), Tables 20.0 and 22.0; Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey, 1969-70: Special Report on Food and Nutrition Levels in Sri Lanka* (Colombo: Department of Government Printing, 1972); and Thomas T. Poleman, "Income and Food Consumption: Report to the Government of Sri Lanka," Cornell Agricultural Economics Staff Paper No. 73-19, Cornell University, Department of Agricultural Economics, Ithaca, New York, October 1973, Appendix 3.

^aExcludes liquor and tobacco expenditures.

^bThe provisional data for income groups 0-199 are not entirely consistent with Poleman's data. Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey, 1969-70, Special Report*, Table 2 and Supplementary Table 17.

^cThe expenditures of the first three household groups are not available separately. The figure for the third group is the average for all three.

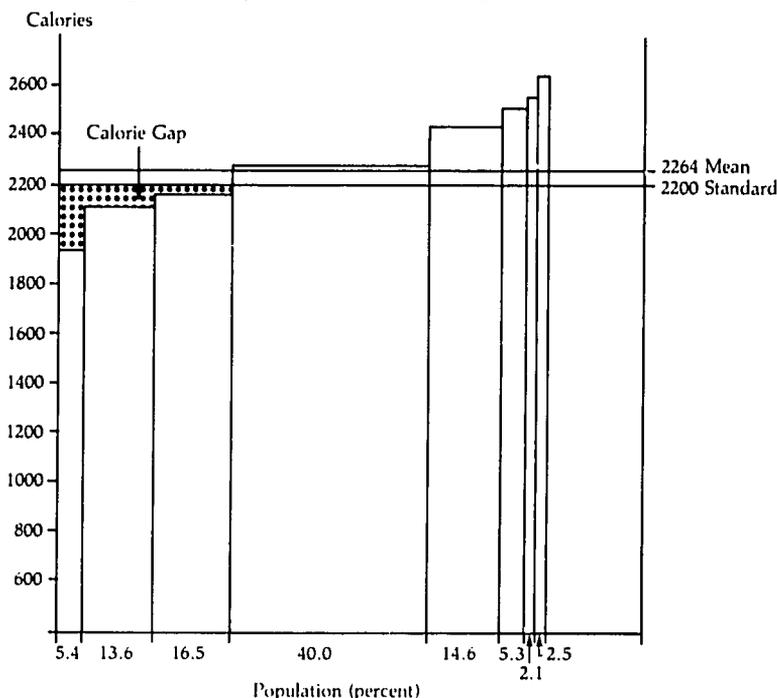
Table 5—Per capita food and nonfood expenditures, calorie intake, and protein intake, by income group, 1973

Household Income Group	Monthly Food Expenditure ^a	Monthly Expenditure for All Goods ^a	Ratio of Expenditures on Food and All Goods	Population	Calories	Protein
(Rs)	(Rs)	(Rs)	(percent)			(grams)
0-25	27.49	43.71	63	0.04	1,157	31.8
26-50	19.93	30.52	65	0.29	1,622	31.3
51-100	22.66	37.46	61	2.47	1,752	38.8
101-200	22.37	37.69	59	21.75	1,900	42.1
201-400	26.63	46.03	58	49.46	1,879	43.3
401-800	34.68	67.99	51	21.38	2,049	48.3
801-1,000	49.30	124.37	40	2.05	2,334	62.1
1,001-1,500	53.06	209.21	26	1.54	2,110	53.5
Above 1,500	70.17	237.10	30	1.02	2,276	57.9
Average	28.65	54.87	52	100.00	1,936	44.2

Source: Central Bank of Ceylon, *Survey of Sri Lanka's Consumer Finances, 1973* (Colombo: Swadeshi Printers, 1973), Part 2, p. 609; and IFPRI estimates.

^aExcludes liquor and tobacco expenditures. The imputed value of the free rice ration has also been deducted from expenditures on food and all goods.

Figure 1—Per capita daily calorie consumption, 1969-70



Source: Compiled by IFPRI based on Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Statistical Tables*, vol. 2 (Colombo: Department of Government Printing, 1973).

not possible to make detailed comparisons of nutrition status and food intake. Fragmentary evidence for earlier periods, based on very small samples, indicates widespread mild undernutrition. A 1968-73 study of a community health project in a semiurban district near Colombo showed that almost two-thirds of the children surveyed suffered from some degree of undernutrition. Of these, 16.5 percent suffered from second-degree and 1.7 percent from third-degree malnutrition.¹⁴ Another survey in 1970 of 90 children in Hirigallagama, a dry-zone, rural

community in the north, showed that 83 percent were undernourished. Using the Gomez scale, 26 percent of these had second-degree and 1.5 percent had third-degree malnutrition.¹⁵

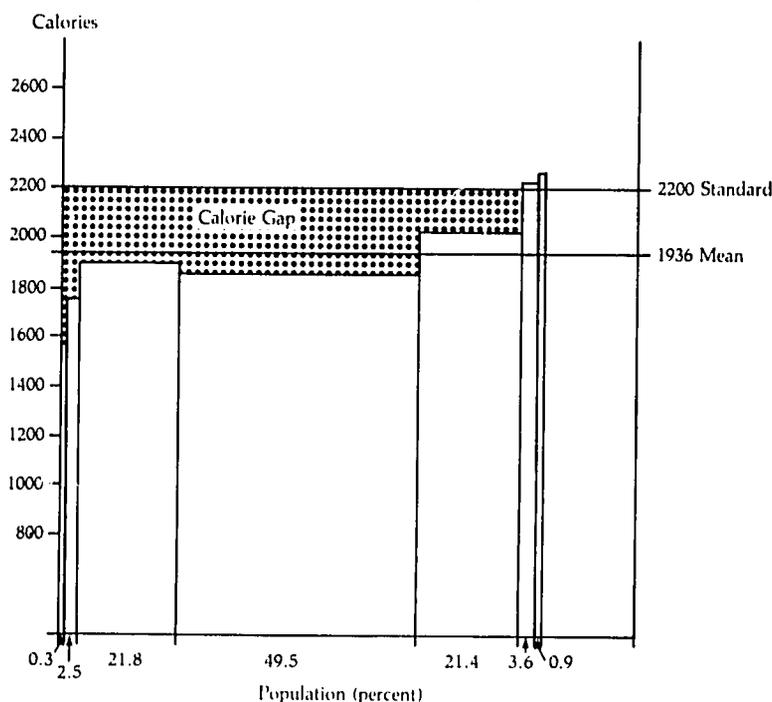
In 1975 the Ministry of Health conducted a country-wide survey of the growth status of 13,450 rural Sri Lankan 6- to 72-month-old children.¹⁶ For the overall sample, 91 percent showed some level of undernutrition. Using the Gomez scale, 38 percent had second-degree and 3.9 percent had third-degree malnutrition. These high figures indi-

¹⁴ Ruth Ellman, "The Kotte Community Health Project," *Ceylon Medical Journal*: 22 (June 1976): 110-118.

¹⁵ Beatrice de Mel and Kamalike Abeyaratne, "Diet and Health in an Isolated Community in the Dry Zone," *Ceylon Medical Journal* 21 (March 1976): 29-38.

¹⁶ United States, Agency for International Development, Office of Nutrition, *Sri Lanka Nutrition Status Survey, 1976* (Washington, D.C.: U.S. Department of Agriculture, 1976).

Figure 2—Per capita daily calorie consumption, 1973



Source: Compiled by IFPRI on the basis of Central Band of Ceylon, *Survey of Sri Lanka's Consumer Finances, 1973* (Colombo: Swadeshi Printers, 1973).

cate an unsatisfactory protein/calorie nutrition situation.¹⁷ To some extent the poor nutrition status may reflect the generally poor harvests and the accompanying high import prices that prevailed between 1972 and 1975 and hence may not provide a true picture of the situation as it was when the full ration/subsidy scheme was in operation.¹⁸ Certainly, the comparison of the 1975 Ministry of Health survey with the earlier figures would indicate a worsening of the nutrition situation; however, much weight cannot be placed on the earlier data because of the very small samples involved.

Table 7, which is taken from the 1975 nutrition survey, compares nutrition status in the rural, village, and estate sectors using the Waterlow classification.¹⁹ It should be noted that the sample was not drawn explicitly to compare the estate sector with rural areas. Unfortunately, large urban areas were not included. The survey indicates that 31.4 percent of the rural preschool children were stunted, 3.3 percent were wasted, and 3.4 percent were stunted and wasted. The high incidence of nutritional deficiency among children in the estate sector is striking considering that both consumer surveys showed

¹⁷ J. M. Bengoa and Gonzalo Danoso, "Prevalence of Protein Calorie Malnutrition 1963 to 1973," *Protein Advisory Group Bulletin*, March 1974, pp. 24-35. The authors present some figures for other areas of the world and a few fragmentary numbers for South and Southeast Asia. The means for Southeast Asia are 18 percent moderate and 1.6 percent severe malnutrition. For rural India the range of values is very large, but one study of 15,000 cases in rural areas in 1969 shows 17 to 19 percent moderate and 1.4 to 2.9 percent severe malnutrition. Unfortunately, the precise measures used in each survey are not known. Presumably, "moderate" coincides approximately with second-degree malnutrition on the Gomez scale.

¹⁸ The ration allotment was partially curtailed and ration prices increased in late 1973 and 1974. See Chapter 4.

¹⁹ United States, Agency for International Development, *Nutrition Status Survey 1976*, Table 76.

Table 6—Calorie and protein consumption and the ratio of expenditures on food and all goods by sector, 1969-70 and 1973

Sector/Year	Total Calories	Calories from Cereals	Total Protein	Protein from Animal Sources	Ratio of Expenditures on Food and All Goods ^d
			(grams)		(percent)
Urban					
1969-70	2,161	1,122	52.2	25.3	48.2
1973	1,951	1,184	45.1	n.a.	45.1
Rural					
1969-70	2,268	1,217	51.2	19.7	55.4
1973	1,837	1,206	43.0	n.a.	54.5
Estate					
1969-70	2,459	1,386	61.6	15.3	57.5
1973	2,345	1,580	57.5	n.a.	56.7

Sources: L. N. Perera et al., "The Effect of Income on Food Habits in Ceylon," Cornell International Agricultural Development Reprint 55, Cornell University, Department of Agricultural Economics, Ithaca, N.Y., November 1972, Appendix; Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Special Report on Food and Nutrition Levels in Sri Lanka* (Colombo: Department of Government Printing, 1972), Tables 3, 4, and 5; IFPRI estimates of calorie and protein consumption, based on Central Bank of Ceylon, *Survey of Sri Lanka's Consumer Finances, 1973* (Colombo: Swadeshi Printers, 1973), Tables S-581, S-582, S-583, S-590, S-591, S-592, S-594, S-595, S-596.

^aExcludes liquor and tobacco expenditures.

Table 7—Summary of the nutritional status of Sri Lanka rural preschool children by sector, 1975

Population	Sample Size	Normal	Stunting ^d	Wasting ^b	Wasting and Stunting
			(percent)		
Rural	13,450	62.0	31.4	3.3	3.4
Village	12,301	65.8	27.8	3.4	3.0
Estate	1,130	35.0	56.3	2.6	6.1
Special age group (48-71 months) ^c	438	95.2	2.2	2.6	0
Reference population ^d	4,957	98.7	0.4	0.8	0

Source: U.S. Agency for International Development, Office of Nutrition, *Sri Lanka Nutrition Status Survey, 1976* (Washington, D.C.: U.S. Department of Agriculture, 1976), Table 26.

^aStunting means height for age less than 90 percent of the reference median of the National Academy of Sciences.

^bWasting means falling below 80 percent of the reference median of weight for height.

^cNumber of children in other age groups sampled were too small for data to be useful.

^dOf the National Academy of Sciences.

significantly higher average calorie and protein consumption in estate areas than in rural areas.

To summarize, available data indicate that aggregate calorie intake levels were about what would be expected in countries with similar income levels. If anything, the consumption levels of animal and vegetable proteins are low. Although aggregate food availability is not high, it is remarkably evenly distributed among income groups, something that distinguishes Sri Lanka from

its neighbors. The available evidence on nutrition status does not overlap in time with that on food intake. It indicates the presence of widespread nutritional inadequacy as reflected in the standard weight and height measures in 1975. To the extent that the results are valid for the whole estate population, it also indicates that nutrition status was particularly bad in the estate sector, despite its comparatively high levels of calorie and protein intake.

4

MAJOR CHARACTERISTICS OF FOOD PRODUCTION, PROCUREMENT, AND DISTRIBUTION

This chapter examines some of the salient characteristics of the food production sector and the role of various public institutions involved in rice paddy procurement and the operation of the rice subsidy/ration program.

PRODUCTION AND AVAILABILITY OF MAJOR FOOD STAPLES

The two main food commodities grown in Sri Lanka are rice and coconuts. Rice is the only major cereal crop. Other cereals, among them maize, millet, and sorghum, provide only 2 percent of total food energy produced. In 1970, 1,081,000 tons of rice were produced, making it the best year for rice production prior to 1976.

All coconuts and coconut products consumed in the island are grown locally. During the last 20 years, they have contributed about 20 percent to total calorie intake. There are no firm statistics on coconut production and it is normally estimated to be roughly twice the yearly export volume.

All manioc, or cassava, another staple food crop, is grown and consumed on the island. Reliable production statistics are not available. However, the 1970 food balance sheet estimated that root and tuber production, mainly cassava, was 450,300 tons. The consumption estimate from the 1969-70 socio-economic survey for the same period was one-third of this estimate, or 143,000 tons.²⁰

Wheat is the second most important cereal consumed, even though it is more expensive than subsidiary cereals. All of the wheat in Sri Lanka is imported. Between 1970 and 1974 wheat and wheat products contributed about one-third as much to total calorie intake as rice, and the proportion increased to about half by 1975/76.

RICE PRODUCTION

In 1970 rice was grown on 28 percent of cultivated acreage, a larger share than any other crop. Paddy cultivation also provided 44 percent of agricultural sector employment, more employment than any other crop.²¹ The agricultural sector itself employs 50 percent of the work force.²² In 1976 rice production contributed 22 percent of the gross national product (GNP) at current factor costs.²³

During much of the colonial period, agricultural policy was focused on the plantation sector, which was responsible for a large part of export earnings and value added in agriculture. Food needs were met, in large part, by cheap rice imports from Burma. The government placed more emphasis on food production in the 1930s. Since World War II, agricultural policy has overwhelmingly emphasized increasing rice production.

Government interest in developing the rice sector is reflected by a number of policies established during the last 30 years.²⁴

²⁰ Department of Census and Statistics, *Socio-Economic Survey, 1969-70: Statistical Tables*, vol. 2 (Colombo: Department of Government Printing, 1972) and Sri Lanka, Department of Census and Statistics, "Food Balance Sheet," Colombo, 1970. (Mimeographed.)

²¹ Throughout this report the term paddy refers to unmilled rice.

²² Sri Lanka, Department of Census and Statistics, *Population Census 1971: General Report* (Colombo: Department of Government Printing, 1978), Table 9.16, p. 138.

²³ Central Bank of Ceylon, personal communication.

²⁴ See S. M. Hussein, "Sectoral Analysis of Paddy Production, Marketing and Processing in Sri Lanka," Ministry of Planning, Colombo, June 1977, pp. 47-55. (Mimeographed.) From the evidence available it would seem that because of defects in the enforcement of legislation on the conditions of tenure and the rent of paddy land cultivated under leasehold, prior to the 1970s, that only a small part of the incentive to increase paddy production can be attributed to "progressive" social reform.

The most important have been the allotment of government land, particularly land under irrigation schemes, to landless peasants for rice cultivation; providing irrigation at a price that is almost "costless" to the peasant;²⁵ breeding and disseminating high-yielding varieties of rice seed throughout the country by means of an official extension network; supplying fertilizers at highly subsidized prices; extending cultivation loans by government-owned banks, a large proportion of which are never repaid because they have come to be partially viewed as grants; and guaranteeing the paddy price through the government procurement scheme.

In 1970 an International Labor Organization (ILO) mission to Sri Lanka assessed the value of subsidies on irrigation (including the cost of settling peasants on newly irrigated land), seed breeding and dissemination, and fertilizer subsidies to the rice sector for two years in the late 1960s.²⁶ Adding to their estimates the value of unrecovered loans given out for paddy cultivation in the same crop years, the subsidies were worth approximately 25 percent of the value of paddy production at farm gate, not including the subsidy element in procurement.

As a result, the growth of paddy production has been very rapid during much of the postwar period. Between 1952/53 and 1970/71, paddy production tripled, representing what may have been the most spectacular record of any rice-growing country. The increase was due in almost equal measure to increased acreage and increased yield per hectare. In 1975/76 it was assessed that high-yielding varieties were grown on 77 percent of the paddy area.²⁷

The growth rate of paddy production in the 1970s has been disappointing, declining between 1970 and 1976. Hussein attributed the poor performance from 1972 to 1976 mainly to crop losses associated with drought, shortages of fertilizer, and large decreases in the paddy/fertilizer price ratio in 1975

and 1976. The cumulative loss in paddy output between 1972 and 1976 caused by inadequate rainfall has been estimated at 630,000 tons. The loss because of the unfavorable paddy/fertilizer price ratio during 1975 and 1976 was estimated at 180,000 tons.²⁸ The insurgency in the island in 1971 also disrupted government services, such as extension programs, and production at the farm level.

The rapid growth of paddy output resulted in a large increase in Sri Lanka's food self-sufficiency ratio from World War II until the 1970s (Table 8). Rice imports in the early 1970s were considerably below those of the 1950s, in spite of population growth. On the other hand, wheat imports increased. A major portion of the Sri Lankan food supply is still met from imports. Between 1970 and 1976, 30 percent of the island's rice consumption, 100 percent of its wheat consumption, and 87 percent of its sugar consumption were supplied by imports.²⁹

Burma and the People's Republic of China are the principal suppliers of rice to Sri Lanka. Imports from China are governed by a bilateral agreement under which rice is made available at a favorable price. Rice from Burma is also obtained on a government-to-government basis at low prices. Between 1967 and 1972, more than half of wheat imports were made on concessionary terms, but this proportion fell off considerably in the crisis years of 1973 and 1974.

PROCUREMENT

A large part of the paddy marketed in Sri Lanka has been handled through public sector procurement and ration operations. Paddy procurement began during World War II when the country was faced with a disruption of supplies from overseas. A levy on paddy was imposed on farmers in order to distribute the available rice supply more

²⁵ By the mid-1970s, 60 percent of Sri Lanka's rice area was under irrigation according to N. D. Abdul Hameed et al., "Rice Revolution in Sri Lanka" U.N. Research Institute for Social Development, Geneva, 1977, p. 66. (Mimeographed.)

²⁶ International Labor Organization, *Matching Employment Opportunities and Expectations: The Case of Sri Lanka*, vol. 2 (Geneva: ILO, 1971), p. 111.

²⁷ Hussein, "Sectoral Analysis," p. 22

²⁸ *Ibid.*

²⁹ Central Bank of Ceylon, *Annual Report, 1976* (Colombo: Central Bank of Ceylon, 1976), Table 2-9, p. 208 and Sri Lanka, Department of Census and Statistics, "Food Balance Sheets," Colombo, 1970-76. (Mimeographed.)

Table 8—Production and imports of major food staples, 1950 to 1976

Year	Production						Imports				Availability		Self-Sufficiency Ratio			
	Rice	Other Cereals	Pulses	Root Crops ^a	Coconuts ^b	Sum ^c	Rice	Wheat and Flour	Sugar	Sum ^c	Aggregate ^{c,d}	Per Capita	Cereals	Starchy Foods		
	(1,000 long tons)														(pounds/year)	
1950-54	352						426	214	127	744			0.36			
1955-59	466						501	218	143	835			0.39			
1960-64	653						528	198	178	872			0.47			
1965	507					1,037	642	311	218	1,131			0.35			
1966	638	27	96	301	811	1,193	485	264	233	982	2,175	426	0.47	0.55		
1967	767	34	76	351	871	1,350	348	517	226	1,046	2,395	444	0.48	0.55		
1968	901	23	67	378	895	1,483	334	359	220	872	2,355	426	0.57	0.63		
1969	920	33	83	355	906	1,525	260	388	309	901	2,426	430	0.60	0.63		
1970	1,081	26	75	329	908	1,666	526	369	240	1,090	2,756	478	0.55	0.60		
1971	934	26	56	332	970	1,529	331	331	243	894	2,423	414	0.59	0.63		
1972	878	26	100	291	802	1,429	262	324	214	760	2,188	367	0.61	0.65		
1973	878	36	35	525	585	1,479	338	365	191	857	2,336	386	0.57	0.63		
1974	1,072	49	39	643	904	1,745	304	435	42	767	2,512	407	0.61	0.69		
1975	772						452	463	73	969						
1976	838						418	386	55	844						

Sources: The data for imports and rice production are from Sri Lanka, Food Commissioner's Department, Personal communications. The data for the production of pulses, root crops, coconuts, and other cereals are derived from Food and Agriculture Organization of the United Nations, *Provisional Food Balance Sheets, 1972-74 Average* (Rome: FAO, 1977).

^aThe root crop estimates are particularly unreliable. See text.

^bRefers to consumption.

^cRice equivalents.

^dAvailability is calculated as production plus imports, in rice equivalents. No adjustment is made for feed, seed, and wastage or for stock changes.

equitably throughout the country. Distribution of rationed rice in Sri Lanka began in 1942.

Since the end of the war, paddy has been procured voluntarily under the Guaranteed Price Scheme (GPS). Under this scheme the government stipulates each year the price at which it will purchase paddy from the farmers. There is no restriction on the amount of paddy that a farmer can sell to the procuring agents.

The GPS is administered by the Paddy Marketing Board,³⁰ which is in charge of handling supplies of rice. The procurement operations of the agents of the Paddy Marketing Board are financed by the branches of the People's Bank, a government corporation. The procuring agents of the Paddy Marketing Board are the branch societies of the multi-purpose cooperative societies located in village areas. In 1978 there were approximately 3,100 branch cooperative societies that handle procurement.³¹ They also distribute goods, mainly rice, to the public.³² Before 1978 the main criterion for opening a paddy purchasing center was the distance the farmer had to transport paddy to the center, which was set at three miles or less. For the most part, paddy purchasing centers are located within three miles of all farms. In 1978 procuring agents were paid a commission of Rs 35.84 per ton of paddy.³³ They are also reimbursed for the cost of transportation and handling by the Board.

Once the Paddy Marketing Board receives the paddy, it makes arrangements to have it milled and transported to the district warehouses of the Food Commissioner's Department. The Paddy Marketing Board has its own milling network, but most milling for the

distribution system is in private hands. The Paddy Marketing Board has a milling capacity of 180,000 tons of paddy per year and the effective milling capacity of authorized private and cooperative millers ("quota" millers) was 340,000 tons in 1977.³⁴

In early 1978 when the procurement price was Rs 0.87 per pound of paddy, the transfer price, which includes the costs of storage, transportation, milling, commissions, profit, and the fixed costs of the Paddy Marketing Board was Rs 1.45 for parboiled rice and Rs 1.41 for raw rice.³⁵ At that time the rice ration cost for consumers was Rs 1.00 per pound.

The procurement price has been kept constant for long periods of time. There has been a tendency for it to be raised during periods of rising world rice prices and to be maintained in periods of lower world prices. Thus it was raised in 1952 and 1953 in response to high import prices during the Korean War, not again until 1967, and then in 1974 and 1975.

DISTRIBUTION OF RICE THROUGH THE RATION SYSTEM

Until recently, almost the entire population of Sri Lanka received an allotment of rice at a subsidized price through a system of authorized distributorships since rationing began. In 1967 a portion of the allotment was made available free of charge. In the 1970s sugar, and at times wheat, was also distributed through the ration. Details of ration allotments and prices are presented in Table 9.

The Food Commissioner's Department is in charge of administering the main (univer-

³⁰ Before its establishment in 1966, the Agrarian Services Department, under the auspices of the Ministry of Agriculture and Lands, was in charge of procuring local rice for distribution. Later, the total quantity of rice procured increased to such a magnitude that it was thought desirable to put up a separate government corporation, which would not be hampered by the normal financial procedures of a government department, to handle rice procurement in the country.

³¹ Sri Lanka, Paddy Marketing Board, "Paddy Storage and Processing: Project Review and Update," Colombo, March 1978, p. 4. (Mimeographed.)

³² T. Pathmanathan, "Country Report: Sri Lanka," in *Economics of Food Grain Distribution: The Asian Scene* (Tokyo: Asian Productivity Organization, 1976), p. 213.

³³ Sri Lanka, Paddy Marketing Board, "Paddy Storage and Processing," p. 4.

³⁴ *Ibid.*, p. 6.

³⁵ *Ibid.*, Appendixes 1 and 2.

Table 9—Changes in the allotment and prices of free and paid ration rice and paid ration wheat, 1952 to 1977

Date of Change	Rice			Wheat	Prices	
	Free	Paid	Total	Paid	Ration Rice	Ration Wheat
	(pounds/person/week)				(cents/pound)	
September 1952	0	2.0	2.0	0	12.5 ^d	...
July 1953	0	2.5	2.5	0	35.0 ^d	...
October 1953	0	2.5	2.5	0	27.5 ^d	...
November 1954	0	4.0	4.0	0	27.5	...
May 1955	0	4.0	4.0	0	25.0	...
October 1955	0	4.0	4.0	0	12.5	...
May 1956	0	4.0	4.0	0	20.0	...
June 1958	0	4.0	4.0	0	17.5	...
June 1959	0	4.0	4.0	0	12.5, 22.5 ^b	...
April 1960	0	4.0	4.0	0	12.5	...
December 1966	2.0	0	2.0	0	0	...
September 1970	2.0	2.0	4.0	0	37.5	...
February 1973	2.0	2.0	4.0	0	50.0	...
October 1973 ^c	1.0	2.0	3.0	1.0	100.0	70
April 1974	1.0	1.0 ^d	2.0	0.5	115.0	70
August 1974	1.0	1.0	2.0	0.5 ^e	110.0	110
December 1974	1.0	1.0	2.0	1.0	110.0	110
March 1975	1.0	1.0	2.0	0	110.0	...
November 1975	1.0	1.0	2.0	0	100.0	...
1977	1.0	3.0	4.0	0	100.0	...

Sources: Sri Lanka, Food Commissioner's Department. Personal communication; and Vidya Sagar, "Cereal Consumption in Ceylon—Pattern and Demand Estimates," Sri Lanka, Ministry of Planning and Employment and Ministry of Agriculture and Lands, Colombo, March 1971. (Mimeographed.)

^dInfants and children received less, workers more.

^bThe price for the first two pounds was 12.5 cents and for the next 2 pounds 22.5 cents.

^cIncome-tax payers were no longer eligible for free ration rice.

^dIn the urban areas of rice-deficit districts, two pounds of paid ration rice were issued.

^eThe estate sector received a larger wheat flour ration of one and a half pounds and the ration in Colombo and some other urban areas was increased to one pound of ration wheat.

sally available) food distribution schemes.³⁶ Its main functions are to obtain food for the distribution system through imports and procurement of domestic supplies and to issue rationed commodities (and some important nonrationed items, such as wheat

flour) to the different types of wholesalers and retailers.

Only authorized distributors are allowed to distribute rationed goods. In mid-1978 there were about 7,400 retail cooperatives distributing rationed commodities.³⁷ In 1976

³⁶ Two other important subsidized food distribution schemes in the island are targeted and do not come under the purview of the Food Commissioner's Department; these are the "Thripasha" program, and the "school-feeding" (biscuit distribution) program. The Thripasha program was begun in 1973 under the auspices of the Ministry of Health, and the present school-feeding program was begun in 1974 under the auspices of the Ministry of Education. The school program is a revival of one abandoned in the 1960s. Both were being continued at the end of 1977.

³⁷ Sri Lanka, Department of Cooperatives, personal communication. As of early 1978, the margins given to authorized distributors for rationed rice, flour, and sugar in the country were 10, 7, and 20 cents per pound, respectively, within a radius of 50 miles from the Food Commissioner's warehouses. If the pickup were made from further afield than 50 miles, additional transportation costs would be paid at the rate of about Rs 1.00 per ton-mile in low-country areas and about Rs 1.18 per ton-mile in the up-country (hilly) areas.

they were responsible for 80 percent of the volume of rice and sugar distributed.³⁸

Apart from the cooperative network, there are private authorized distributors who are licensed by the Food Commissioner's Department to distribute rationed items at stipulated prices. Since 1977 their numbers have expanded greatly—to about 3,900 in mid-1978, or 2.8 for every 10,000 people in Sri Lanka. In addition, there were 5.4 branch cooperatives for every 10,000 people, making a total of 8.2 outlets for distributing rice and sugar for every 10,000 people in Sri Lanka. Flour is distributed by authorized distributors as well as by ordinary retail outlets. The Department of Cooperatives assesses that in 1977 about 75 percent of the income (not profit) of the cooperatives was derived from the distribution of rationed rice.³⁹

The branch cooperative societies receive their supplies of rice and flour from the multipurpose cooperative societies which, in turn, obtain their supplies from the 66 warehouses of the Food Commissioner's Department located in the districts or at such ports as Colombo and Galle.⁴⁰ Until early in 1978 the private authorized distributors also received their supplies from the multipurpose cooperative societies, which also handled flour wholesaling. In early 1978 the 20-year wholesaling monopoly of rice and flour by these societies was eliminated and private distributors allowed to take part.⁴¹

The Price Controller's Department in the Ministry of Trade polices the authorized distributors to see that rations are made available as stipulated. If evidence of malpractice is found, authorized distributors or other dealers are prosecuted and licenses for the distribution of rationed or price-

controlled commodities are sometimes suspended.

Rice, flour, and sugar imports have been a government monopoly under the Food Commissioner's Department since the early 1940s. Until the sharp price rises in 1973, 1974, and 1975 both wheat and sugar were sold at a profit, thereby helping to defray a significant part of the cost of the rice distribution program. All rice imports since at least the mid-1950s have been channeled through the rice distribution scheme.⁴² The planned quantity of rice imports is the difference between ration offtake and expected domestic procurement.

OPERATION OF THE RICE SECTOR

The combination of policy tools discussed provides the government with a great deal of control over the rice sector. The way in which these policy tools have been used and their impact on the rice economy can best be appreciated by distinguishing four periods: the years before 1966; 1966 to 1970; 1970 to 1973; and 1973 to 1978. There are a number of salient characteristics of each period.

Before 1966

When the scheme began in 1942, rice rationing was introduced only to the rice-deficit areas. By 1943 the rice rationing scheme was extended to the rice surplus areas.⁴³ Everyone three years old and older was entitled to an allotment. Substantial budget subsidies on rationed rice began in the late 1940s. By the early 1950s the age requirement for receiving rationed rice was reduced to one year.⁴⁴

³⁸ Pathmanathan, "Country Reports," p. 218.

³⁹ Sri Lanka, Department of Cooperatives, personal communication.

⁴⁰ Sri Lanka, Cooperative Management Services Center, *Rational Distribution through Co-op Region Warehouses* (Colombo: Department of Government Printing, 1976), p. 8.

⁴¹ Sri Lanka, Food Commissioner's Department, personal communication.

⁴² In the early 1950s the government did engage in sales of imported rice in the open market to reduce the price consumers had to pay for "country rice." However, the practice seems to have been discontinued since 1953. See Central Bank of Ceylon, *Annual Report 1952* (Colombo: Central Bank of Ceylon, 1952), p. 9, and Central Bank of Ceylon, *Annual Report, 1953* (Colombo: Central Bank of Ceylon, 1953), p. 8.

⁴³ Neville Edirisinghe and Thomas T. Poleman, "Implication of Government Intervention in the Rice Economy of Sri Lanka," Cornell International Agriculture Monograph No. 38, Cornell University, Department of Agricultural Economics, Ithaca, N.Y., January 1976, p. 58.

⁴⁴ Pathmanathan, "Country Report," p. 213.

The high import cost of rice during the Korean War led to attempts to reduce the burden by lowering the ration quota and raising prices. As a result, in 1953/54 the subsidy expenditure on rice was half of what it had been in 1952/53.⁴⁵ The decrease in the rice subsidy, together with increases in public transportation fares and other costs, resulted in food riots and led to the resignation of the prime minister.⁴⁶ The experiment was short-lived, and by November 1954 ration quantities were increased for all groups of the population to four pounds per adult person per week (see Table 9 for these and subsequent changes). The increase was officially attributed to consistently declining rice prices in world markets.⁴⁷

From the period following the Korean War until 1966, the ration quota was four pounds per capita per week. Between 1954 and 1960 the price of ration rice was cut several times to levels well below the market level. In 1960, for example, the ration price was 12.5 cents a pound, whereas the market price was 37 cents (see Tables 9 and 10). At the same time the prices of wheat and sugar were kept above their import prices. As a result of declining price and expanded coverage, the quantity of rice distributed increased steadily. By 1965 more than 75 percent of all rice consumed passed through the public system (see Table 11). Consumer purchases of rice from the open market and of wheat and wheat flour declined, but not enough to offset the increase in ration rice. Total cereal consumption rose significantly.

The 1954-66 period was one of remarkable price stability. The GPS price of paddy was constant from 1952 to 1966. Because the level had been fixed during the temporary high-price period of the Korean War, it contained a large subsidy element to domestic producers when world prices subsequently fell. For example, the average import

price of rice in the 1956-60 period was 22 cents a pound, whereas the GPS price was 38.4 cents.⁴⁸ During this period of high and stable rice prices, rice production more than doubled. This increase, together with the increase in ration offtake with which it coincided, resulted in a dramatic increase in the volume procured. By 1966, 62 percent of domestic production was sold to procurement centers (see Table 10).

From 1953 to 1966 the GPS procurement price was an effective floor price and the market price remained close to it. There was, however, a tendency for the market price to fall somewhat below the procurement price in 1963, 1964, and 1965, following a period of good harvests and high procurement volumes.⁴⁹

The combined growth of ration and procurement during the period resulted in a sharp increase in the cost of the subsidy. According to Pathmanathan, the gross cost of the rice subsidy almost tripled between 1950-54 and 1960-64.⁵⁰

1966 to 1970

The 1966-70 period brought significant changes. In November 1966 the ration was reduced by half to two pounds per person per week under the pressure of the rapidly growing cost of supporting the scheme. However, the quota was issued free of charge.

The proportion of rice consumption channeled through the ration declined to 46 percent. Demand for open-market rice rose sharply and the market price of rice rose above the guaranteed price. Between 1965/66 and 1968/69 the market price increased by 37 percent. Rice consumption decreased by 125,000 tons between 1966 and 1967, much less than the 410,000-ton drop in the ration.

⁴⁵ Central Bank of Sri Lanka, personal communication. The rice subsidy was Rs 116 million for 1952/53 and Rs 76 million for 1953/54.

⁴⁶ Howard Wriggins, *Ceylon: The Dilemmas of a New Nation* (Princeton: Princeton University Press, 1960), p. 348.

⁴⁷ Central Bank of Ceylon, *Annual Report, 1955* (Colombo: Central Bank of Ceylon, 1955), p. 8.

⁴⁸ Import price estimates based on Pathmanathan, "Country Report," p. 207; for GPS price see Table 9.

⁴⁹ Apart from these years and 1977, when a bumper harvest coincided with large import arrivals to create some storage problems, the procurement system appears to have done an effective job of maintaining the GPS price. There are, however, periodic reports of prices falling below the guaranteed level in the period just following the peak harvest month.

⁵⁰ T. Pathmanathan, "Country Report," p. 213; see also Chapter 5.

Table 10—Rice production, procurement, and ration distribution, 1950 to 1976

Year	Production	Procurement	Ratio of Procurement to Production	Ration	Market Price ^d	Guaranteed Minimum Price
	(1,000 long tons)		(percent)	(1,000 long tons)	(Rs/pound)	
1950-54	352	18	5	386	0.40	0.34
1955-59	466	192	41	664	0.37	0.38
1960-64	653	359	55	845	0.36	0.38
1965	507	300	59	961	0.36	0.38
1966	638	394	62	926	0.35	0.38
1967	767	185	24	517	0.44	0.45
1968	901	210	23	511	0.49	0.45
1969	920	193	21	530	0.49	0.45
1970	1,081	369	34	630	0.47	0.45
1971	934	455	49	867	0.46	0.45
1972	878	355	40	780	0.47	0.45
1973	878	321	37	675	0.53	0.58
1974	1,072	293	27	550	1.46	1.01
1975	772	159	21	606	1.33	1.06
1976	838	180	21	602	1.19	1.06

Sources: IFPRI estimates based on Sri Lanka, Food Commissioner's Department, Personal communication; and Sri Lanka, Department of Census and Statistics, "Food Balance Sheets," Colombo, 1950-76. (Mimeographed.)

^dAt the farm level.

Wheat consumption rose by 57,000 tons. Sales to the government under the procurement scheme dropped by 209,000 tons. Imports of rice dropped drastically, given the reduced demand for supplying the ration system, but wheat imports rose. The results of the ration cut were to some extent masked by unusually good harvests between 1967 and 1971. By 1969-70 the combination of increased wheat imports and increased domestic rice supply had brought the real market price of rice back down almost to its 1965 level.⁵¹

The changes did not produce the desired result of decreasing the cost of the subsidy. Most of the savings from the reduction in the quantity distributed were offset by the loss of revenues resulting from free distribution. The cost of the food subsidy continued to rise under the impact of higher import and procurement prices. It is of interest to note that this period appears to have been

one of unusual economic buoyancy for Sri Lanka.⁵²

1970 to 1973

In late 1970, after a change of political leadership in the island, the rice ration was increased to its old level of four pounds per person per week. Two pounds continued to be issued free, but the additional two pounds were charged for. The price of the paid portion was triple what it had been prior to 1966 and, for the first time, was also higher than the comparable price for wheat flour.

The situation returned to something similar to what it had been prior to 1966. The proportion of rationed rice in total rice consumption increased to 67 percent in 1971/72. The paid portion was not used fully, however, and ration distribution did not regain former per capita levels (Table

⁵¹ See Table 10. Price deflated using Colombo cost of living index.

⁵² Janice Jiggins, "Dismantling Welfarism in Sri Lanka," *Overseas Development Institute Review* (No. 2, 1976): 84-104.

Table 11—Per capita cereal and rice demand, ration, and GNP, 1950 to 1976

Year	Cereal Con- sumption	Rice Con- sumption	Ration	Gross National Product
		(pounds)		(Rs)
1950-54	245.1	186.6	106.8	558
1955-59	265.2	217.6	161.7	598
1960-64	288.6	244.2	182.1	638
1965	290.3	237.8	192.8	670
1966	286.9	232.8	181.3	673
1967	286.5	203.7	99.0	706
1968	293.5	214.4	95.5	824
1969	289.8	216.5	96.9	875
1970	316.6	242.2	112.8	924
1971	291.6	227.6	152.9	928
1972	278.5	203.6	134.9	974
1973	275.7	198.9	115.2	1,155
1974	287.8	218.3	92.0	1,470
1975	258.5	181.6	99.8	1,613
1976	286.3	205.9	97.6	1,743

Sources: IFPRI estimates based on Sri Lanka, Food Commissioner's Department, Personal communication; Sri Lanka, Department of Census and Statistics, "Food Balance Sheets," Colombo, 1958-76; and Central Bank of Ceylon, *Annual Report, 1950-76* (Colombo: Central Bank of Ceylon, 1950-76).

12). Wheat consumption declined, but not to its former level. In 1970 and 1971 total rice consumption was comparable with 1966 levels and total cereal consumption was slightly more than that of 1965 and 1966. As already noted, the volume of procurement again increased. The costs of operating the system were kept down by the low import prices of rice, wheat, and sugar at the time. During this period, starting in late 1971, part of sugar consumption was also brought

within the ration scheme to permit consumers to meet some of their needs at below the high (taxed) market price.⁵³

1973 to 1978

In 1973 important changes took place. The price of rationed rice increased rapidly from the early part of the year and the quantities allotted to the ration were reduced in October. Income-tax payers were also made ineligible to receive any free rice. They represent only a small fraction of the population. The changes were brought about by a combination of factors. Poor harvests in 1972 and 1973 coincided with world scarcities and rising import prices for foods, including cereals and sugar, and other necessary imports, such as fertilizer and petroleum products, and produced a crisis in the balance of payments.

By early 1973 the price of the portion of rationed rice paid for by consumers was Rs 0.50 a pound. In October it increased to Rs 1.00 a pound, and the free portion of the rationed rice allotment was reduced by one pound, bringing the total ration to three pounds per person per week. To substitute for the one pound reduction in the rice ration, one pound of wheat flour was offered on the general ration at Rs 0.70, slightly less than the price for rationed rice. As the government undertook to regulate the quantity issued to bakeries for bread, bread was no longer freely available.⁵⁴ The bakeries in turn informally rationed bread to their customers. Further reductions in the quota and price rises followed.⁵⁵ In March 1975 the flour ration was abolished and flour again became available in the open market.

An attempt was also made in this period to restrict the trade of rice to the public sector. The monopoly procurement system was vigorously enforced between July 1973

⁵³ The sugar ration, which at its inception was three pounds per person per month, was reduced to two pounds in March 1972, one pound in May 1973, and 0.75 pounds in October 1973. It was increased to one pound per person per month between March and October 1973 and later in November 1976.

⁵⁴ Pathmanathan, "Country Report," p. 214.

⁵⁵ Beginning in April 1974, the paid portion of the rice ration was reduced by one pound. The ration was then one pound free and one pound paid for in rice surplus districts and one pound free and two pounds paid for at the stipulated price in urban areas of rice-deficit districts. The price on the paid portion of the rice ration was raised still further to between Rs 1.15 and 1.25 a pound during April to August 1974, but was reduced to Rs 1.10 a pound in August. In 1975 and 1976 the rice ration allotment was the same as it was in 1974, although the price of rationed rice was reduced to Rs 1.00 a pound from November 1975. See Table 9.

Table 12—Actual and possible offtakes from the rice distribution system, 1971 to 1976

Year	Free Quota	Free Quota Utilized	Paid Quota	Paid Quota Utilized	Price for Paid Portion of Quota ^a	Open Market Rice Price ^b	Wheat Flour Price
		(1,000 long tons)				(Rs/pound)	
1971	590	585	590	282	0.375	0.62	0.33
1972	601	583	601	198	0.375	0.64	0.33
1973	533	488	610	187	0.560	0.72	0.49
1974	311	304	389	246	1.090	1.97	0.87
1975	316	301	316	305	1.080	1.81	1.10
1976	321	306	321	296	1.000	1.61	0.97

Sources: Sri Lanka, Food Commissioner's Department, Personal communications; Central Bank of Ceylon, *Annual Report 1971-76* (Colombo: Central Bank of Ceylon, 1971-76).

^aAverage for the entire year.

^bTaking the market price at the farm level as a base and adding wholesale and retail margin. The margin as assessed in Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Statistical Tables*, vol. 2 (Colombo: Department of Government Printing, 1973). Table 24 has been used here. Between 1973 and 1975, this margin may underestimate the difference due to rapid escalation in the open-market price with the initiation of a new system of domestic rice procurement.

and October 1975 by banning the transport of paddy by private persons except in very small quantities. During this period of time, paddy prices in "rice-deficit" areas (13 out of the 22 districts) rose rapidly. As a result, the legislation pertaining to the transport of paddy by private persons was annulled in 1975. Despite these changes, the proportion of production entering the public system declined drastically from 1971 through 1976. The market price dropped slightly between 1974 and 1976, but remained far higher in real terms than it had been formerly.

Total cereal consumption,⁵⁶ however, did not appear to respond closely to changes in the ration during this period, but instead seemed to be more closely related to domestic production, which was low in the bad harvest years of 1972, 1973, and 1975. The open-market price of rice remained surprisingly stable in 1972 and 1973 despite the bad harvest and generally low availability.

This may reflect either that quotations were unreliable because of the illegality attached to transactions while the procurement monopoly was enforced or that the liquidation of private stocks accumulated during the good harvests from 1967 to 1971 meant that consumption could have been higher than indicated. The availability of an additional two pounds of rice through the ration may also have acted as a buffer against price speculation. The higher open-market price in 1974, despite a relatively good harvest, indicates the greater volatility of prices in the absence of a large commitment of supplies through the ration. It seems likely that private stocks were accumulated and consumption was not as high as indicated. The subsequent small decline in the free-market prices in 1975 suggest that internal rice prices were affected by expectations about the world situation in 1974.

⁵⁶ This is for wheat and rice only.

5

IMPACT OF THE RATION ON FOOD CONSUMPTION

To determine the impact of the ration on food consumption, it is not enough only to look at ration offtake: substitution of ration purchases for commercial purchases and the effect on open-market prices must also be considered. First, quantities used from the ration may be substituted for food purchases that would be made anyway. Second, the operation of the ration system may affect open-market prices, producing a secondary effect. Some of these relations are quantified using time-series and cross-section data below.

RICE SECTOR MODEL

A simple model of the rice sector is presented in Figure 3 to serve as a theoretical framework for the time-series analysis that follows. DD is the demand curve for rice. It includes demand for home consumption by farmers, but not government procurement for the ration system. Q_a is total rice available to the public. It equals domestic production (q) plus the quantity supplied through the ration (r). (Domestic production is a function of the previous year's price. However, because annual data were used and there are two harvests in the year, it may be somewhat responsive to current price.) It should be noted that imports do not enter into the picture because rice imports come through the public sector and are made available to the general public only as a component of the ration.

The supply curve (SS) is equal to Q_a less Q_p , the amount sold to the government at the guaranteed minimum price (P_g). Thus SS is equal to the rice offered nonfarmers plus the amount farmers consumed from their own production. The amount procured by the government (Q_p) is a function of the difference between the open-market price and the price offered by the government under the GPS. The lower the market price, the larger the quantity procured. At price p_g SS becomes infinitely elastic. At any price below p_g all would be sold to the procurement system.

The equilibrium price (p) is determined by the intersection of SS and DD. At that price the quantity consumed is given by q_r and the quantity procured q_p is the difference between q_r and q_a^t . An increase in domestic production or an increase in the quantity distributed through the ration would cause SS to shift to the right, the equilibrium price to decline, and the quantity of rice consumed to increase. The demand curve would also shift upward as a result of increased incomes. If the demand curve intersects the supply curve along its flat portion, there will be no change in price.

ANALYSIS OF TIME-SERIES DATA

The kink in the supply curve poses a problem for statistical estimation. In effect there are two different regimes. When the demand curve intersects the supply curve along the latter's horizontal section (regime 1), price is determined by the guaranteed minimum price. Since the latter is a policy variable, it can be treated as exogenous and the demand curve can be estimated directly, treating consumption as the dependent variable. When the intersection occurs on the rising portion of the supply curve (regime 2), price and consumption both become endogenous and a different specification is needed.

The following procedure was adopted to handle this problem. First, demand equations were fitted for the entire period 1950-76 using ordinary least squares. Because regime 2 prevailed part of the time, the parameter estimates are biased. Another set of estimates was prepared for the two periods 1953-66 and 1970-73. Because the first regime prevailed in these periods so that the market price was determined by the guaranteed price, the coefficients are unbiased and can be used as a check on the first set. There were not enough data points to make independent estimates for the second regime.

Demand equations were estimated for rice and cereals. All quantities were entered in per capita terms and all prices and values deflated by the Colombo cost of living

Table 13—Estimated coefficients of rice demand equations, 1950-76 and 1953-66, 1970-73

Equation	Intercept	Rice Price (p)	GNP Per Capita (y)	Value of Ration (v)	Quantity of Ration (r)	Production (q)	R ²
1950-76							
1	173	-159 (3.51)	+0.10 (1.53)	+1.31 (3.20)			0.45
2	84	-54 (0.35)	+0.13 (2.53)		+0.50 (4.96)		0.62
3	86	-12 (0.36)	+0.02 (0.35)		+0.51 (6.31)	+0.41 (13.83)	0.77
4	89				+0.51 (7.93)	+0.43 (5.19)	0.77
1953-66, 1970-73							
5	286	-221 (-0.83)	-0.05 (-0.32)	+1.27 (2.63)			0.43
6	-19	+93 (0.59)	+0.14 (1.53)		+0.78 (7.27)		0.83
7	28	+142 (1.01)	-0.02 (-0.17)		+0.69 (6.79)	+0.37 (2.20)	0.88
8	79				+0.68 (8.39)	+0.28 (2.66)	0.87

Sources: IFPRI estimates based on data from Sri Lanka, Food Commissioner's Department, Personal communications; Central Bank of Ceylon, *Annual Report, 1950-76* (Colombo: Central Bank of Ceylon, 1950-76); and Sri Lanka, Department of Census and Statistics, "Food Balance Sheets," Colombo, 1958-76. (Mimeographed.)

Notes: The units of measurement used in the equations were, for the dependent variable, pounds/capita; for p, Rs/pound; for y, Rs/capita; for v, Rs/capita; for r, pounds/capita; and for q, pounds/capita. The numbers in parentheses are t-values.

The "unbiased" estimates obtained by reestimating the relationship for the years falling under regime 1, that is 1953-66 and 1971-73, provide general support for the results obtained for the entire period. The price variable is no longer significant, reflecting both the reduced degrees of freedom and the much lower variance of prices during regime 1.

Equations (2) and (3) include the quantity distributed through the ration (r) in place of the value of the ration subsidy (v). This significantly improves the fit obtained. The effect is more dramatic for rice and, in fact, the fit is slightly poorer for cereals for the first set of estimates. Where v and r were

included in the same equation (not shown), the latter usually dominated, which was unexpected. According to the standard ration theory, when the ration is effective it should affect consumption only by raising income.⁵⁸ The survey data discussed in the next section indicate that all income groups also consumed significant quantities of market rice, which would indicate that the ration was effective.

A number of factors may explain why r explains more than v. To some extent, v simply may not adequately measure the value of the ration. Another factor may be that although on the average all income groups consume market rice, many people

⁵⁸ Maximizing the Lagrangian function within a simple two commodity consumer choice framework, the ration price disappears from the first order ratio conditions and appears only in the value of the budget constraint. For a treatment of classical ration theory, see James Tobin, "A Survey of the Theory of Rationing," *Econometrica* 20 (October 1952): 521-53.

Table 14—Estimated coefficients of cereal demand equations, 1950-76 and 1953-66, 1970-73

Equation	Intercept	Rice Price (p)	GNP Per Capita (y)	Value of Ration (v)	Quantity of Ration (r)	Production (q)	R ²
1950-76							
1'	168	-162 (4.70)	+0.22 (4.64)	+0.94 (3.02)			0.59
2'	138	-109 (2.77)	+0.24 (4.65)		+0.21 (2.11)		0.53
3'	140	-62 (2.11)	+0.11 (2.46)		+0.21 (3.03)	+0.45 (4.85)	0.77
4'	167				+0.23 (3.52)	+0.58 (7.10)	0.70
1953-66, 1970-73							
5'	283	-288 (1.54)	+0.11 (1.01)	+0.70 (2.08)			0.50
6'	105	-105 (0.73)	+0.22 (2.63)		+0.45 (4.56)		0.74
7'	134	-75 (0.53)	+0.13 (1.14)		+0.39 (3.82)	+0.22 (1.29)	0.78
8'	168				+0.35 (4.14)	+0.41 (3.76)	0.74

Sources: IFPRI estimates based on data from Sri Lanka, Food Commissioner's Department, Personal communication; Central Bank of Ceylon, *Annual Report* 1950-76 (Colombo: Central Bank of Ceylon, 1950-76); and Sri Lanka, Department of Census and Statistics, "Food Balance Sheets," Colombo, 1958-76. (Mimeographed)

Notes: The units of measurement used in the equations were, for the dependent variable, pounds/capita; for p, Rs/pound; for y, Rs/capita; for v, Rs/capita; for r, pounds/capita; and for q, pounds/capita. The numbers in the parentheses are t-values.

in each income group do not. It seems unlikely that either of these two factors offers a sufficient explanation. A third interesting hypothesis is that because of quality differences, consumers regard ration rice as a slightly different commodity. As the quantity of rice made available through the ration increases and replaces market rice, the marginal utility of market rice rises and consumers begin to substitute ration rice for other foods (principally wheat) rather than for open-market rice purchases. This hypothesis helps explain the continued purchase of market rice by all income groups and why incorporating the size of the ration into the demand equation gives a better fit and implies a larger impact of the ration on the demand for rice. It does not explain why the fit was significantly improved for cereals when equation (6') was used in place of equation (5') (Table 14) except insofar as ration rice may also have

substituted for foods other than wheat.

Equations (3) and (7) incorporate domestic rice production (q) directly into the function as a demand shifter. The effect is to substantially improve the fit for rice and cereals for the 1950-76 estimates. Comparing these equations to equations (2) and (6) indicates that the production variable picks up much of the impact of price and income changes. Nevertheless, the fact that it appears to explain more than those two variables seems to indicate that rice production changes have a greater impact on rice consumption than is explained by the indirect impact through price and income. This is as might be expected in Sri Lanka, where rice is an important crop and much of the rice is consumed on the farm.

The estimates for regime I are again generally supportive, though the independence of the production effect from the general income effect is less clear.

The value of the ration variable implies that one additional rupee of subsidy income resulted in additional rice consumption of about 1.2 pounds. This would mean, on the average, that an increase of one pound of rice distributed through the free ration resulted in increased rice consumption of approximately 0.45 pounds. The coefficient on the r variable implies that the impact could have been as high as 0.6 to 0.7 pounds per pound of free ration.

The impact on cereal consumption of a pound of free rice distributed through the ration appears to have been approximately half the impact on rice consumption, that is, cereal consumption increased only 0.2 to 0.3 pounds. There is little discrepancy between the assessments of the impact using the value of the ration subsidy and the assessments using quantity. This result, contrasted with the result for rice, suggests that the substitution between cereals and other commodities is relatively unimportant.

The absence of time-series data on non-cereal calories made it impossible to expand the analysis to total calories.

ANALYSIS OF SURVEY DATA

The time-series data indicate the aggregate relationships involved, but do not indicate the distributional effects among different groups in the society. This section uses the 1969-70 socioeconomic survey data to determine what can be inferred about the distribution of ration consumption among income groups.

Use of the Ration

The 1969-70 data show widespread use of ration rice in all groups (Table 15). All but the upper quartile of the population made full use of their rice ration allotment of eight pounds per person per week.⁵⁹ The same pattern emerges when the urban, rural, and estate sectors are examined separately. The degree of coverage achieved is quite remarkable with rural areas actually showing slightly higher ration consumption than the

urban areas. All income groups also consumed some open-market rice,⁶⁰ and in all but the bottom income group, open-market rice was at least as important as ration rice.

In 1973 an additional eight pounds of rice a month was available on a paid basis. The amount of free ration consumed by any income group did not reach the eight pounds allotted, however. This was presumably due to supply shortages at the time of the survey. The data show ration use increasing with income up to the middle-income groups and decreasing at higher incomes (Table 16). This is mainly, but not entirely, because the lower-income groups made less use of the paid ration.

The data also indicate less use of the free ration among the lowest income groups. To some extent this reflects the very poor selling their ration cards. All income groups, including the poorest—even in urban areas—continued to consume some open-market rice at a higher price while not using all of their paid ration. This may reflect the fact that free-market rice was regarded as a different (higher quality) commodity with marginal utility becoming quite high at low consumption levels.

Impact of the Ration on Consumption— Cross Section

A measure of the net increase in consumption as a result of the ration subsidy was obtained by estimating the proportion of increased incomes used to purchase calories at different income levels and applying these proportions to the cash value of the ration subsidy income received. Engel curves relating per capita food consumption to per capita incomes were fitted to the grouped 1969-70 socioeconomic survey data. The double log inverse curve was found to give a good fit. The monetary value of the ration, at market prices, was included as income and was also added to food expenditure. The estimated equations are given in Table 17, and the income elasticities and consumption propensities for different income groups are given in Table 18.

⁵⁹ The survey indicates how much is taken from the ration. There is no evidence of how much is sold by poor consumers, though undoubtedly some appreciable amount is disposed of this way.

⁶⁰ A substantial portion of this is consumption of home-produced rice.

Table 15—Per capita consumption of rationed and unrationed rice by sector and household income group, 1969-70

Household Income Group	National					Urban Sector				Rural Sector				Estate Sector			
	Rationed Rice	Rationed Rice Calories	Percent of Total Calories	Open-Market Rice	Open-Market Rice Calories	Rationed Rice Calories	Percent of Total Calories	Open-Market Rice Calories	Percent of Population	Rationed Rice Calories	Percent of Total Calories	Open-Market Rice Calories	Percent of Population	Rationed Rice Calories	Percent of Total Calories	Open-Market Rice Calories	Percent of Population
(Rs/month)	(pounds/month)			(pounds/month)													
0-100 ^a	8.3	435	23	5.8	308	376	22	254	7	437	22	303	6	445	20	368	6
100-150 ^a	8.2	430	20	7.8	411	400	21	338	5	430	20	426	15	438	19	367	21
150-199 ^a	8.2	429	19	8.6	455	419	21	353	10	428	19	480	17	439	19	376	24
200-399	8.1	424	19	9.8	516	419	20	397	40	422	18	559	40	446	18	418	42
400-599	7.7	403	17	11.1	591	412	18	428	20	398	16	652	15	438	18	493	6
600-799	7.5	393	16	11.2	593	398	17	474	9	390	15	650	5	386	12	584	1
800-999	6.9	368	14	11.7	593	402	16	490	6	317	12	742	1	413	13	383	...
1,000 and over	6.2	323	12	11.3	598	304	12	483	9	360	12	801	1	261	7	568	...
All groups	8.0	417	18	9.5	500	402	19	414	100	418	18	536	100	441	18	401	100

Sources: Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Statistical Tables*, vol. 2 (Colombo: Department of Government Printing, 1973), Tables 22.0 and 24.0; and Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Special Report on Food and Nutrition Levels in Sri Lanka* (Colombo: Department of Government Printing, 1972), Tables 2-5 and 17-20.

^aProvisional data.

Table 16—Monthly average ration rice consumption by household income group, 1973

Household Income Group	Share of Population	Total Ration	Free Ration	Paid Ration	Free Ration	Paid Ration	Open-Market
(Rs/capita)	(percent)		(pounds/capita)		(percent)		(pounds)
0-25	0.04	5.94	2.09	3.85	26.1	48.1	2.7
26-50	0.29	8.48	6.20	2.28	77.5	28.5	2.5
51-100	2.47	10.23	6.65	3.58	83.1	44.7	2.4
101-200	21.75	12.28	7.32	4.96	91.5	62.0	2.9
201-400	49.46	12.26	7.49	4.77	93.6	59.6	3.6
401-800	21.38	12.01	6.96	5.05	87.0	63.1	4.9
801-1,000	2.05	9.29	4.77	4.52	59.6	56.5	7.0
1,001-1,500	1.54	8.11	3.16	4.95	39.5	61.9	7.0
More than 1,500	1.02	6.06	2.29	3.77	28.6	47.1	12.0
Average	...	11.96	7.14	4.82	89.2	60.2	4.0

Source: Central Bank of Ceylon, *Survey of Sri Lanka's Consumer Finances, 1973* (Colombo: Swadeshi Printers, 1973), Table S-589.

Table 17—Estimated consumption functions^a

Dependent Variable	α	δ	γ	R ²
Expenditure on food, Rs/month	2.8918 (5.31) ^b	-22.219 (-3.20)	0.23740 (2.36)	.991
Calories/day	8.1338 (32.65)	-13.083 (4.12)	-0.037409 (-0.81)	.976
Protein grams/day	4.2656 (37.83)	-13.715 (-8.80)	-0.0037168 (-0.18)	.997
Cereal calories/day ^c	8.6170 (133.28)	-24.141 (-27.73)	-0.26184 (-21.86)	.998
Rice calories/day ^c	8.7923 (49.32)	-29.727 (-12.39)	-0.34643 (-10.49)	.985

Sources: Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Statistical Tables*, vol. 2 (Colombo: Department of Government Printing, 1973); Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70: Special Report on Food and Nutrition Levels in Sri Lanka* (Colombo: Department of Government Printing, 1972); Thomas T. Poleman, "Income and Food Consumption: Report to the Government of Sri Lanka," Cornell Agricultural Economics Staff Paper No. 73-19, Cornell University, Department of Agricultural Economics, Ithaca, New York, October 1973.

^aA double log inverse function of the form $\ln x = \alpha + \frac{\delta}{y} + \gamma \ln y$ is used where y is per capita income including the value of the ration.

^bThe numbers in parentheses are t-values.

^cExpenditure is used in lieu of income.

Table 18—Estimates of the per capita contribution of the rice ration to consumption by income percentile, 1969-70

Income Percentile	Income	Food Expenditure	Average Propensity to Spend on Food	Marginal Propensity to Spend on Food	Ration Value	Ration Value as Share of Income	Sugar and Flour Tax	Calories Consumed Per Day		Food Expenditure	Elasticities				Marginal Consumption			Ration Contribution	
								Cereals	Total		Rice	Calories		Rice	Cereals	Total			
												Protein	Protein						
	(Rs. month)	(Rs. month)			(Rs. month)	(percent)	(Rs. month)												(cal/day)
10	33.08	21.13	0.64	0.58	5.29	16.0	0.97	1.096	2.013	0.91	0.44	0.37	0.36	0.41	333	374	662	115	
20	35.64	22.57	0.63	0.55	5.29	14.8	0.97	1.125	2.065	0.86	0.39	0.33	0.33	0.38	283	319	581	101	
30	38.52	24.09	0.63	0.51	5.29	13.7	0.97	1.153	2.123	0.81	0.34	0.29	0.30	0.35	236	267	506	88	
40	42.01	25.80	0.61	0.47	5.25	12.5	1.07	1.181	2.170	0.77	0.29	0.25	0.27	0.32	191	217	430	74	
50	46.45	27.79	0.60	0.43	5.21	11.2	1.19	1.209	2.227	0.72	0.24	0.21	0.24	0.29	146	168	356	61	
60	51.88	29.99	0.58	0.39	5.21	10.0	1.19	1.234	2.284	0.67	0.19	0.17	0.21	0.26	106	124	288	49	
70	59.28	32.66	0.55	0.34	5.21	8.8	1.19	1.259	2.346	0.61	0.14	0.13	0.18	0.23	67	82	220	38	
80	69.60	35.87	0.52	0.29	5.08	7.3	1.39	1.208	2.409	0.56	0.08	0.08	0.15	0.19	34	46	159	26	
90	88.58	40.67	0.46	0.22	4.95	5.6	1.47	1.297	2.486	0.49	0.01	0.03	0.11	0.15	3	11	99	16	
Average	51.67	28.95	0.56	0.39	5.20	10.1	1.16	1.196	2.236	0.67	0.24	0.21	0.24	0.29	155	179	323	63	

Sources: The figures for monthly income and food expenditures are based on data from Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey of Sri Lanka, 1969-70. Special Report on Food and Nutrition Levels in Sri Lanka* (Colombo: Department of Government Printing, 1972). The calorie and protein figures are computed from data in Thomas T. Poleman, "Income and Food Consumption: Report to the Government of Sri Lanka," Cornell University, Department of Agricultural Economics, Ithaca, New York, October 1973.

The results indicated that food expenditure elasticities were 0.90 or more for the lowest decile of the population in 1969-70, and declined to less than 0.49 for the top decile (see Table 18). The marginal propensity to spend additional income on food was 0.58 for the tenth percentile and 0.43 for the fiftieth. The income elasticity for rice calories for the lowest groups was 0.44. However, the cereal and total calorie elasticities were smaller: 0.37 and 0.36, respectively, for the lowest decile. The protein elasticities were only slightly more than the calorie elasticities.

The value of the ration subsidy for each income group as a percentage of monthly income is given in column 6 of Table 18. The ration is valued at the open-market price, which is probably a high estimate given the lower quality of the ration product. For the tenth percentile of the population, the ration subsidy provided the equivalent of 16 percent of money income. Because of the relatively even distribution of income in the survey, the value of the ration was still equivalent to 10 percent of income at the sixtieth percentile.

Multiplying the value of the ration by the propensity to purchase calories results in an estimate of the net increase of caloric consumption resulting from the ration. For the tenth percentile of the population, the estimated impact of the ration was to raise total calorie consumption by 115 calories per person per day, or approximately 5 percent of total requirements. By the fiftieth percentile the contribution was approximately 60 calories.

Again, looking at the tenth percentile, the ration income appears to have increased rice consumption by 70 calories and cereal consumption by 80 calories, implying an increase in other cereals, mostly wheat, of 10 calories. Since total calories increased by 115, it is implied that noncereal calories rose by 35 calories per day.

Thus the estimates imply that the bulk of the ration supplied substituted for commercial food purchases. For the population as a whole, they imply that one rupee of subsidy income resulted in additional rice consumption of about 0.10 pounds, additional cereal consumption of 0.12 pounds, and additional total consumption of about 0.21 pounds of rice equivalent. Per one pound of rice distributed through the free ration the comparable figures were rice,

0.06 pounds; cereals, 0.07 pounds; and total (rice equivalent), 0.13 pounds.

To the extent that the ration/subsidy program was conceived of as a means of raising calorie and protein intake levels, the reduction in commercial purchases as a result of the ration is a form of leakage. Another form of leakage arises from the large portion of the ration, approximately two-thirds in 1969-70, that went to those already consuming the recommended daily allowance of calories and protein (see Figure 1).

Combining the data of Table 18 with those of Table 4, the aggregate reduction, caused by the ration, in the calorie gap of the population falling below the requirement standards in 1969-70 can be estimated. This reduction was approximately 140 billion kilocalories per year. In other words, for each calorie that went to increase the consumption of nutritionally deficient groups from the ration in 1969-70, another 13 went either to nondeficient population groups or to substitute for commercial purchases. This rather high "leakage" resulted in a very high cost per calorie effectively delivered, in the sense in which it is used here. To the extent that no attempt was made to target the ration to any particular group in 1969-70, "leakage" is an artificial construct. Taking the total cost of the program for the same years (Table 19) results in a cost of Rs 4.10 for each 1,000 calorie reduction in the deficit for 1969-70, or Rs 2.00 if the value of the tax on flour and sugar is deducted.

The implication is that the rice subsidy had only a small impact on calorie intake in Sri Lanka in 1969-70. Before proceeding to compare the cross-section and time-series results, a number of possible objections to the methodology used in the cross-section analysis are considered.

First, the method explicitly excludes substitution effects from the lower price of rationed rice. This follows from classical ration theory that suggests that if the ration is fully used and more of the same commodity is purchased on the open market, then there should be no substitution effect. This is because the consumer still makes his marginal purchase decisions on the basis of open-market prices. Because no decision is made involving the ration price, it is irrelevant. The ration is only relevant insofar as it releases income to purchase more

Table 19—Gross and net fiscal food subsidies, 1967 to 1975

Year	Gross National Product	Rice Subsidy	Distribution Charge	Total Rice Subsidy	Other Food Subsidies	Sugar and Flour Profit	Net Food Subsidy With Distribution Charges
				(million Rs)			
1967	8,264	424.6	34.6 ^a	459.2	3.6	260.6	202.2
1968	9,876	530.2	37.6 ^a	567.8	10.9	280.5	298.2
1969	10,725	545.3	51.8 ^a	597.1	14.0	288.5	322.6
1970	11,562	505.6	48.5 ^a	554.1	14.5	313.5	226.5
1971	11,786	474.8	47.1 ^b	521.9	4.2	286.8	239.3
1972	12,616	468.7	36.7 ^b	505.4	21.6	224.8	302.2
1973	15,168	498.7	41.8 ^b	540.5	25.9	201.8	364.6
1974	19,694	635.6	66.0 ^b	701.6	34.6	22.6	713.7
1975	21,935	718.8	41.5 ^b	760.3	11.9	-164.0	936.2

Sources: For gross national product, International Monetary Fund, *International Financial Statistics Yearbook 1979* (Washington, D.C.: IMF, 1979). The other columns are IFPRI estimates. Inter-agency transactions within the public sector have been subtracted from them.

^aImputed.

^bEstimates from the Central Bank of Ceylon, *Annual Report, 1967-75* (Colombo: Central Bank of Ceylon, 1967-75).

goods on the open market. It is worth noting that this interpretation does not require any resale by ration recipients, only that purchases are switched from the open market to the ration.

In 1969-70 all of the ration quota was used and all income groups obtained significant quantities from the open market, even in urban areas. A similar situation seems to have existed during most of the period considered. Hence, the conditions of the theory appear to have been met and the zero substitution effect to be a valid assumption.

The results of the time-series analysis contradict this premise, however. They indicate the presence of important substitution effects for rice. At the same time, however, they do not indicate an important substitution effect for cereals as a whole. Thus the estimation of the increase in rice calories resulting from the ration probably understates the true impact, but there is no evidence to indicate that this is true for cereals as a whole.

Second, the analysis makes the standard assumption that all sources of income are equivalent to the consumer. There is some suggestion that the propensity to buy food with food-subsidy income is higher than for other forms of income, in which case the impact of the ration is underestimated. The time-series analysis suggested that a rupee of ration subsidy has a greater effect on food energy intake than a rupee of general income. There is, in fact, some evidence that this phenomenon may be quite general. IFPRI analyzed household survey data for the state of Kerala in India to determine how food consumption, nutritional status, and income from different sources interact. The analysis indicated that food consumption responded more to subsidy income than to other forms of income.⁶¹ Similar results have been obtained in studies of U. S. food subsidies.⁶²

At this stage one can only speculate about possible causes, assuming that the result is sustained with further testing. One hypothesis is that increased incomes re-

⁶¹ See Shubh K. Kumar, *Impact of Subsidized Rice on Food Consumption and Nutrition in Kerala*, Research Report 5 (Washington, D.C.: International Food Policy Research Institute, 1979).

⁶² See J. Benus, J. Kmenta, and H. Shapiro, "The Dynamics of Household and Budget Allocation to Food Expenditures," *Review of Economics and Statistics* 58 (May 1976): 129-138; and R. B. Rees, J. G. Feaster, and Q. B. Perkins, *Bonus Food Stamps and Cash Income Supplements—Their Effectiveness in Expanding Demand for Food*, Marketing Research Report No. 1034 (Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, 1974).

quire more time spent working away from home, hence scarcity of time dictates that foods be bought that require less preparation. Because food subsidies do not require additional work, the proceeds can be spent on more traditional low-cost foods. Hence, each additional rupee of income from the subsidy provides more calories. There is no direct evidence of this in Sri Lanka and the argument is weakened by the observation that one of the principal time-savers is bread, which is cheaper per calorie than rice. Yet another hypothesis is that the subsidy income accrues to a different decisionmaker, the wife, and hence may be spent differently. In this case the phenomenon might be expected to be largely transitory.

Even if true, the quantitative significance of this factor would not appear to be great. In spite of the low propensity to purchase calories, the marginal propensity to spend on food is quite high in Sri Lanka. It was 0.58 for the tenth percentile and 0.34 for the seventieth percentile. Low- and middle-income people do, in fact, already spend a large portion of increases in their general income on food but much of the increased expenditure goes for more expensive foods, including rice. In the tenth percentile, for example, only 1,140 calories and 32 grams of protein were obtained per additional rupee spent on food compared to a possible 5,000 calories and 140 grams of protein if all were spent on a cheaper source such as wheat.

Even a higher propensity to spend from subsidy income, if used in the same way that marginal income is currently spent, would only mean a modest increase in calories consumed. If the true marginal propensity to consume from the subsidy income were 0.85,⁶³ given current food expenditure patterns, the estimated impact of the ration would only rise from 115 calories to 170 calories for the tenth percentile.

Third, as they fail to allow for the impact of the ration on the open-market price of rice, it might be argued that the cross-section analyses underestimate. During most of the period studied, the size of the ration was sufficiently large to have had an important impact on prices. The problem that arises is what alternative set of policies

to use as a comparison. A cutback in the ration could be replaced by open-market sales, or unrestricted imports of rice, for example. It is not easy to determine what the level of the rice price might have been under an alternative regime. It can be argued that trade restrictions plus the operation of the GPS have, on balance, tended to keep the market price high, hence the net impact on the price has been positive rather than negative. This question is discussed at greater length in Chapter 6. There appears to be no adequate basis on which to incorporate this factor.⁶⁴

Fourth, the socioeconomic survey data only permit observation of the situation with the ration already in place. The "before" situation is not observed, of course. Thus caution must be used when interpreting the response of the bottom 8 to 10 percent of the population. The real income of this group without the ration falls outside the range of incomes reported in the sample data available. Hence there is little confidence in what the response to lowered incomes might be. For the remainder of the population, this objection does not appear to be valid.

Fifth, on the other side of the ledger, the cross-section estimates do not adjust for general equilibrium impacts of the scheme. A subsidy on the principal wage good can be expected to act in the same way as a wage subsidy to lower money wages in the economy. To the extent this is true, the above estimates overstate the full impact of the ration on real income and food consumption.

DISCUSSION

The two sets of estimates differ importantly in their assessment of the impact of the ration on aggregate consumption of rice and cereals. The time-series analysis implies a substantially larger impact per pound of rice delivered through the ration. The discrepancy is less for cereals than for rice but is still disturbingly large, that is between 0.30 and 0.07.

Although this difference is large, even the higher figure of 0.30 pounds increase in cereal consumption per pound of rice

⁶³ It seems unreasonable to suppose a value of unity.

⁶⁴ Any effects on the price are captured in the time-series analysis.

distributed still implies a very large leakage factor. Seventy percent appears to have replaced commercial purchases and only 30 percent contributed to increased cereal consumption. Even of this amount, much went to higher-income families who were not in need. The situation would probably look a little more favorable if noncereal calories could be included. The cross-section analysis indicates that the income elasticity of demand for noncereals exceeds that for cereals, but it is not clear how much can be inferred from the data for 1969-70.

From the discussion of the previous section, it appears that there is no ready explanation for the discrepancy. The presence of substitution effects was probably a factor for rice but would not seem to explain the discrepancy for other cereals. It is also possible that specification procedures in the regression analysis may have resulted in some overstatement of the impact in the time-series analysis. The most plausible explanation of the discrepancy, however, stems from the fact that the socioeconomic survey years of 1969 and 1970 were high food consumption years. They were the highest in the entire postwar period for cereal consumption. In the period 1955-59, for example, total cereal consumption per capita was 12.5 percent less than in 1969-70.⁶⁵

The 1969-70 survey results therefore may have given uncharacteristically low income elasticities and hence unduly low estimates of the impact of the ration.⁶⁶ In periods of lower production and lower food intake, the propensities to purchase more calories with increased incomes may be more consonant with those given by the time-series results. In an average year, the degree of substitution of ration for market purchases is likely to have been smaller. Also, the proportion of the population falling below the estimated requirement level would be larger in an average year. In very bad years such as 1972, 1973, and 1975

as much as 75 percent of the population may have consumed fewer calories than required.⁶⁷ Hence the contribution toward lowering the calorie gap in such years may be much more substantial. The time-series data imply that the proportion of ration calories going to meet the effective nutrition deficit could have been as high as one out of every two or three in such years. If this were the case, obviously this would imply a much lower cost per calorie delivered than the figures given previously.

The relatively high consumption in 1969-70 seems to have resulted from a combination of high domestic production, high per capita income, and low wheat prices. It was not due to the ration because the ration quota (though not the value of the ration) was cut in half in 1967. The evidence suggests that production is an important determinant. The period since the mid-1960s has been marked by an increased dependency of cereal consumption on domestic production, high consumption coinciding with years of good production. With the growth of domestic production, a strong interaction between the size of the harvest and the impact of the ration subsidy seems to have developed. In bumper years the ration subsidy may contribute little to calorie intake levels, whereas in years of scarcity it may contribute much. Unfortunately, statistical estimation problems make it impossible to sort out these effects with any degree of precision.

With a reduced ration quota and increased reliance on domestic production, prices and consumption in the early 1970s were more variable, and cereal consumption was especially low in the poor harvest years 1972, 1973, and 1975.

There are some reasons to believe that nutrition levels also suffered. We have already referred to the results of the 1975 rural nutrition status survey. They document an unsatisfactory nutritional situation that year. The same data on a regional basis

⁶⁵ FAO, *Provisional Food Balance Sheets, 1972-74 Average*, indicate that since 1961, 1968, 1969, and 1970 were the best years for total calorie consumption.

⁶⁶ It must also be pointed out that the Central Bank of Ceylon, *Survey of Consumer Finances, 1973*, which was conducted in an unfavorable year, also shows a very low calorie elasticity. As argued above, there seem to be problems with the data that prevent use of them.

⁶⁷ This figure was derived from the Central Bank of Ceylon, *Survey of Consumer Finances, 1973*. (See Table 5.) Even if we allow for an underestimation of 10 percent, 75 percent seems to have fallen below 2,200 calories in that year.

show a significant relationship between mortality rates (overall, maternal, and infant) and the indicators of malnutrition. The infant mortality rate related more closely to wasting, whereas malnutrition was positively correlated with per capita rice production, that is, wasting was more significant in the rice producing areas. This points to the impact of the poor harvest. Also in the same year, malnutrition was negatively correlated with per capita ration consumption, though the relationship disappeared once literacy was introduced as a second independent variable. Unfortunately, the data do not permit a comparison over time. The observed increase in the mortality rate from 7.7 to 8.9 percent between 1973 and 1974,⁶⁸ as well as limited evidence on the increased incidence of symptoms of malnutrition among admissions to the university unit of the Children's Hospital in Colombo,⁶⁹ tend to support the notion of deteriorating nutrition in this period.

In sorting out the importance of the ration cuts in this period, a complication arises. It is that prices of other foods, particularly wheat, also rose dramatically in the same time span and wheat availability

was severely restricted during 1973 and 1974. Isenman points out that a disproportionate share of the increased mortality appears to have occurred among the Tamil population.⁷⁰ He points out that the Tamils were particularly dependent on the rice ration because they are not rice growers. It is also true, however, that they traditionally have been the heaviest wheat consumers and were probably hit hardest by the restriction on wheat.

In conclusion, the ration has had a significant impact on cereal consumption, particularly in poor harvest years. Ration cuts after 1973 were instrumental in leading to a greater variability of consumption in the mid-1970s. Although there is less certainty about this, the combined impact of the ration cuts and high wheat prices seems also to have increased malnutrition in this period.

Although the data suggest that the ration significantly determines calorie consumption, the calorie impact per rupee of subsidy still indicates that in most years the largest part of the increased income from the subsidy is spent on items which do little to raise calorie consumption.

⁶⁸ Isenman, "The Relationship of Basic Needs," p. 10.

⁶⁹ Dr. P. Soysa, personal communication.

⁷⁰ Isenman, "The Relationship of Basic Needs," p. 17.

6

COSTS AND AGGREGATE BENEFITS

This chapter examines some of the wider implications of the operation of the food distribution system. In particular, it considers the costs of operating the system, focusing primarily on the large income transfers involved. A focus on the transfers leads naturally to a consideration of the consequences of the system for income distribution. Finally, it discusses some of the possible long-run impacts through savings and growth.

GOVERNMENT COST

The most visible "cost" involved—the outlay incurred by the government—is not a true economic cost at all; it is a transfer. It is the loss the government takes on the distribution of subsidized commodities plus the operating costs of the agencies involved. In the case of the domestically procured grain, the government distribution loss is (proportional to) the difference between the procurement price paid to the farmer and the price at which grain is sold to the consumer. For imported commodities, it is (proportional to) the difference between the import price converted at the official exchange rate and the ration price. Where the procurement price is above the world price (at the going exchange rate), the fiscal cost rises in good crop years and falls in bad ones.

The gross and net costs to the government of operating the food subsidy schemes in Sri Lanka appear in Table 19. Before commenting on the results, a few methodological notes are necessary.

The official accounts are not adjusted for interagency transfers. The figures in the

table are adjusted for profits and losses of public corporations supplying the Food Commissioner's Department and for duty, customs, and foreign exchange surcharges levied on food items. An important component of the latter is the Foreign-Exchange-Entitlement-Certificates-Scheme (FEECS) charges levied on imported sugar. The FEECS charge is a surcharge on the exchange rate for imports. Payment of this amount is clearly a transfer among government accounts and should be netted out. As a result of the changes, subsidy figures tend to be lower and tax figures higher than recorded in the published food commissioner's accounts.⁷¹

An important qualification is necessary. During the 1970s a significant proportion of food imports, particularly flour, was donated to Sri Lanka.⁷² According to some estimates in recent years, outlays for flour imports from the United States have been only one-third of the nominal cost.⁷³ It appears that the accounting system of the Food Commissioner's Department did not adjust for these concessions. To that extent, the net subsidy cost estimates in Table 19 overestimate actual cash outlays in those years. The estimates of the cost of the rice subsidy are not significantly affected, however.

During much of the history of the operation, income from the sale of sugar and wheat flour, particularly sugar, was enough to offset a major part of the cost of the rice subsidy. In 1969-70, for example, gains on the sale of sugar and wheat flour (Rs 285 million) were equivalent to almost 53 percent of the rice subsidy cost.

Up to 1973 the net cost of the subsidy remained relatively stable. In 1973, how-

⁷¹ The reevaluation figure of government stocks of rice, flour, and sugar has been maintained intact.

⁷² The amount of PL-480 wheat varied greatly from year to year. In 1972 for example, 229 thousand tons, 72 percent of wheat imports, was PL-480 wheat but in 1975 only 20 thousand tons, or 5 percent, was. Between 1971 and 1976 approximately 30 percent of all wheat imports entered under PL-480.

⁷³ U.S. Department of Agriculture, *Food for Peace, Fiscal Year 1975* (Washington, D.C.: U.S. Department of Agriculture, February 1977), Appendix and U.S. Department of Agriculture, Economic Research Service, personal communication.

ever, the gain from wheat flour turned into a large operating loss as import prices rose. In 1974 the gross rice subsidy rose sharply with higher rice import prices, and the sugar offset dropped drastically as world sugar prices mounted. The combined result was that the net subsidy cost tripled between 1973 and 1975. The largest contribution to this increase was higher sugar prices.

It is difficult to evaluate the overall economic impact of outlays of this magnitude. The net subsidy during most of the period considered amounted to slightly more than 3 percent of the gross domestic product. However, the cost burden appears much worse when the restricted financial means of the government are taken into account. In the five-year period 1964/65 to 1968/69, the net subsidy averaged 14 percent of total current account expenditures. In the three-year period 1969/70 to 1971/72, this figure dropped to 10 percent but jumped to 18 percent in 1975 in spite of the major cutbacks. Pathmanathan estimated that the subsidy was equivalent to 36 percent of public sector capital expenditures in the 1965-70 period and in some years exceeded 50 percent.⁷⁴

Thus a very large portion of the government's disposable resources had been absorbed by the subsidies. This comparison may be too unfavorable, however. Excluding the exceedingly high cost years after 1974, the net rice subsidy in the years 1967 to 1973 was 12.5 percent of gross domestic capital formation.

OTHER COSTS

The above cost estimates understate the real burden, however. In the early 1960s exchange controls were introduced into Sri Lanka and have continued ever since with only a brief respite in the late 1960s. Food imports, including rice for the distribution system, have received favored treatment in foreign exchange budgeting procedures. In May 1968 a dual exchange rate was introduced. A significant portion of nonfood imports was made at the FEECS rate at a premium of 44 percent above the official exchange rate, while food imports con-

tinued to be made at the old rate. By 1972 the premium increased to 65 percent. By 1978, 60 percent of the current payments were being routed through the scheme, although imports of rice, flour, and sugar never were invoiced at the FEECS rate. This means of financing the system held down the direct burden on the budget by transferring it to other segments of the economy, particularly the export sector.

In Table 20 the FEECS exchange rate was used to obtain an alternative estimate of the subsidy with rice valued at its import price converted at the FEECS rate. The subsidy to the consumer is the difference between what he would have had to pay for rice he consumed at the opportunity cost (FEECS rate) and what he actually paid.⁷⁵ To the producer the resulting total subsidy is much larger than what it would be if the official rate were applied because of the induced transfers involved.

By subtracting the total subsidy at the official rate from the hypothetical subsidy, an estimate of the "hidden tax cum private subsidy" involved with the operation of the program was obtained. In 1971, for example, this amounted to about Rs 130 million. In the crisis years of 1974 and 1975, the hidden tax involved was very large, and the amounts give a better indication than the cash subsidies of the degree to which consumers were protected by the distribution system during those years. The burden of the hidden tax was borne by exporters and consumers of import substitutes.

DISTRIBUTION OF BENEFITS

Table 20 shows the distribution of gross benefits from the rice subsidy among rice producers and consumers. The value of rice used is its import price converted at the official exchange rate and at the FEECS rate. Using the official exchange rate, producers received a large proportion of the benefits in some years and 60 percent of all benefits during the 1965-76 period. This is because the domestic procurement price was kept above the import price (at the official exchange rate) during much of the period. In 1972, when the import price was low, the

⁷⁴ Pathmanathan, "Country Report," p. 214.

⁷⁵ This is an overestimate since it assumes a perfectly inelastic demand. The discrepancy is likely to be slight, however.

Table 20—Distribution of the aggregate rice subsidy between rice producers and consumers, 1965 to 1976

Year/Average	Official Exchange Rate			FEECS Exchange Rate ^a			
	Producer Subsidy	Consumer Subsidy	Total Subsidy	Producer Subsidy	Consumer Subsidy	Total Subsidy	Private Net Transfer ^b
	(million Rs)						
1965	154	195	349	28	479	507	158
1966	185	187	373	26	476	502	129
1967	241	163	404	29	470	499	96
1968	41	479	520	-341	997	655	136
1969	205	268	473	-142	754	611	98
1970	389	88	478	-22	598	576	131
1971	387	58	445	108	468	576	132
1972	360	11	371	127	377	503	237
1973	159	304	463	-384	1,084	700	449
1974	276	438	714	-1,555	2,718	1,163	622
1975	461	135	595	-452	1,670	1,218	474
1976	744	252	492	-209	1,176	967	139
1965-73 average	236	184	431	-63	634	506	174
1965-76 average	300	165	473	-232	858	658	234

Source: IFPRI estimates.

Note: The FEECS is the Foreign Exchange Entitlement Certificate Scheme.

^aFor years before 1968, the premium of 44 percent was used.

^bPrivate net transfer is equal to the total rice subsidy at the FEECS exchange rate less the total subsidy at the official exchange rate. The latter is an estimate of fiscal subsidy.

consumer subsidy component was only Rs 11 million, whereas the producer subsidy was Rs 360 million. This raises serious doubt about whether the public distribution system was primarily a consumer-oriented system at all. At the FEECS rate the system appears biased toward consumers. Farmers were net beneficiaries in only 5 out of 12 years in which world prices were very low.

Which of the two estimates is more realistic? Because the general foreign exchange situation in Sri Lanka was not as serious before 1965, particularly in the 1950s, a large foreign exchange premium was not appropriate. As a result, paddy farmers as well as consumers appear to have received a substantial subsidy from the scheme.

In the very high world price years of 1974-76, the system was heavily biased against farmers and toward consumers. In the interim period, from 1965 to 1973, it seems reasonable to assume that the true exchange rate was somewhere between the

two values. This implies that the scheme was approximately neutral or slightly favorable to rice farmers and represented a large net subsidy to consumers. The net food subsidy to consumers was lower than that shown in Table 20 by the amount of their share in financing the scheme through general revenues.

Because consumers use slightly more of the rationed commodities, the consumer subsidy favored the lower end of the income scale slightly more than the upper end. The effect was small, but would have been somewhat more pronounced if the costs of the flour and sugar tax had been subtracted (see Table 19). However, the subsidy as a proportion of income in the low-income groups and its impact on the relative distribution of real incomes were more significant. As we have already seen, the lower-income deciles received as much as 16 percent of their real incomes from the rice ration. Including the value of the ration subsidy in income lowers the Gini co-

efficient for individual income from 0.29 to 0.22.⁷⁶

The income redistribution effects are especially significant if the extreme administrative and political difficulties of extending aid to low-income groups are considered. (Higher real incomes for low-income groups may also have played a role in enabling them to take advantage of other social services including education. This mechanism would be one of financial synergism.) It can also be argued that the income distribution effect of the food distribution system was larger than these estimates might indicate because of indirect effects on employment and returns to labor.

The system as a whole has had an important effect on the rice economy. The high guaranteed prices for rice helped to stimulate production, while the operation of the ration system played an important role in expanding the demand for rice. The rice paddy sector has been responsible for a large proportion of employment growth. According to Jiggins, "About 30 percent of the total increase in employment between 1946 and 1960 was provided by rice/paddy production."⁷⁷ Because much of the increase in purchasing power from the ration is spent on other foodstuffs and rural products, the total employment impact in rural areas was still larger. For the bottom 30 percent of the population, 41 cents of every additional rupee of income goes to non-cereal foods, particularly meat, fish, milk, eggs, sugar, oil, nuts, and other foods that are traditionally labor-intensive activities. Corea points to the importance agricultural development had for growth in the 1960s.⁷⁸ Agriculture was responsible for 33 percent of employment growth between 1963 and 1972.⁷⁹ Another 8 cents of the rupee of increased expenditure went to housing, and 10 cents to clothing, much of which was

probably labor intensive and local. The comparatively small rural and urban income differentials in Sri Lanka, no doubt, are in part a reflection of these developments. The relatively even food consumption pattern may be at least partially due to the support given to rural areas.⁸⁰ The observed linkage between domestic production and rice and cereal consumption lends support to the importance of this mechanism.

It is not clear what role can be ascribed to the ration in this process and to what extent the same results could have been achieved by price supports without the ration or by other means. There seems to be little doubt that the ration played an important practical role. The need to supply the ration system provided a strong incentive to maintain the procurement system which was the basis for providing high prices for farmers. The ration helped small farmers to participate in the expansion process by permitting them to dispose of a larger quota of rice at the procurement price and get cash to purchase inputs. It is arguable whether the price policy would have been politically feasible at all without the ration. The reaction to attempts to cut back the system in the 1950s seems to indicate that the ration was a practical necessity at that time. Moreover, there is some question whether without the ration domestic demand for rice would have been able to absorb the amount of rice produced domestically in the 1960s, especially toward the end of the decade. At a higher rice price, imported wheat would undoubtedly have occupied a more important place in the diet.

DISCUSSION

The real measure of the cost of the public food distribution system should be

⁷⁶ The calculation does not consider the flour and sugar tax. Because it falls more heavily on higher-income groups, the effect on the Gini coefficient would be still larger. To the extent that money wages may have been adjusted downward (or have increased less rapidly through time) in response to the subsidy on the wage good, the effect of the subsidy is overestimated. This calculation does not consider the flour and sugar tax. Since it falls more heavily on higher-income groups, the effect on the Gini coefficient would be still larger.

⁷⁷ Jiggins, "Dismantling Welfarism," p. 89.

⁷⁸ Gamani Corea, "Ceylon in the Sixties," *Marga Quarterly Journal* 1 (No. 2, 1971): pp. 1-29.

⁷⁹ Calculated from International Labor Organization, *Yearbook of Labor Statistics 1973* (Geneva: ILO, 1973).

⁸⁰ To an unknown extent, the income differences are probably understated in the data due to underreporting of incomes in urban areas.

the impact on long-term growth. Efficiency losses due to price distortions result in lower real incomes and reduced savings. Probably more important, the drain on public resources lowers government investment in directly productive assets while financing the budget competes for private investment resources. The measures presented earlier, such as subsidy outlay as a proportion of domestic capital formation, suggest that this impact may have been substantial. The possible impact on growth via the balance of payments constraint is difficult to assess because of the offsetting influences of the disincentive to export of the overvalued exchange rate and the contribution of increased rice production to foreign exchange saving.

A full appraisal should also take into account the positive relationship between operation of the system and economic growth. The welfare programs in general, and the rice subsidy programs in particular, should have contributed to increased productivity of investment in Sri Lanka by augmenting human capital. As we have already argued, there is also reason to believe that raising the real incomes of the poor has been instrumental in stimulating rural development and mobilizing local resources that would otherwise have been underutilized.

Unfortunately, there seems to be no objective basis, at present, for quantifying these various effects. It is useful to point out though, as Isenman does, that the long-term growth of per capita income, although not comparable with that of the most rapidly growing Asian economies, was nevertheless respectable. During the 1960s, GDP grew 4.6 percent per year. As he also points out, Sri Lanka's growth performance during the period 1950-75 was above average for countries with a per capita income of less than \$250.⁸¹ Nevertheless, in the postwar period Sri Lanka has not grown rapidly enough to prevent levels of unemployment from rising rapidly, especially among the younger age groups.⁸²

There seems to be little doubt that the rising cost of operating the food distribution system in the 1970s contributed to poor economic performance. From 1974 to 1977 gross domestic product was stagnant. This was a very unusual period, however, and it seems that some form of food subsidization was inevitable during the crisis years. The consequences of passing on the full rise in costs to consumers would have been socially and politically unacceptable, and a good case can be made that having the public system in place was instrumental in avoiding still more widespread hardship.

⁸¹ Isenman, "The Relationship of Basic Needs." He cites a study by Morawetz.

⁸² In Sri Lanka, Department of Census and Statistics, *Socio-Economic Survey, 1969-70: Statistical Tables*, the rate of unemployment is 14.0 percent of the workforce. In the Central Bank of Ceylon, *Survey of Consumer Finances, 1973*, the rate of unemployment is 24.0 percent of the workforce. Also see the Central Bank of Ceylon, *Annual Reports*.

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