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Recommended Support for

Grain Policy Development and Implementation in Sri Lanka

KSU
KANSAS STATE UNIVERSITY

FOOD & FEED GRAIN INSTITUTE
MANHATTAN, KANSAS 66506

REPORT SUMMARY

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Agricultural policy formulation in Sri Lanka is handicapped by inadequate data and inadequate analytical capabilities. These two basic deficiencies have adversely affected the ability of GSL to plan for the rational development of the agricultural sector. Manifestations of the deficiency include the lack of a central focus in Government marketing operations, internal management problems in operating agencies such as PMB and poorly-defined policies toward development of the dryland crops sector.

Data collection, dissemination and analysis must be upgraded substantially. Responsibilities for each of these basic functions must be centralized and clearly identified. An interface such as the proposed Food Policy Committee, must be established between upgraded analytical agency and top-level Government policy makers.

Rationalization of marketing organizational structures should be a first priority for the upgraded policy-making apparatus. The role of PMB, in particular, should be clarified. Internal management capabilities of PMB should be reinforced. In the long term, as need for the ration system diminishes, attention should be given to the price-stabilization potential of reserve stock management. At the same time, refinements in PMB's pricing system will be needed. In the short run, consideration should be given to a modest increase in paddy prices. Continued importation of wheat or wheat products is both necessary and desirable.

The demand potential for dryland crops and the capability of the marketing system to absorb added production of these crops should be analyzed intensively. Rational plans for development of the dryland sector can then be formulated. In the short run, attention should be directed to a rationalization of certain relative and absolute price relationships.

Donor support should be focused on technical assistance and training aimed at upgrading data collection, dissemination and analytical capabilities. Specific assistance is recommended for upgraded policy formulation, for improved PMB management capabilities, private sector development, and for evaluation of dryland crops sector needs.

RECOMMENDED SUPPORT FOR GRAIN POLICY DEVELOPMENT AND IMPLEMENTATION IN SRI LANKA

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Prepared for the

AGENCY FOR INTERNATIONAL DEVELOPMENT
UNITED STATES DEPARTMENT OF STATE

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Technical Assistance in Grain Storage, Processing, and Marketing
and Agribusiness Development

At the

FOOD AND FEED GRAIN INSTITUTE
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EXECUTIVE SUMMARY

The summary which follows is divided into three sections. The first section is addressed toward basic problems and needs in the current environment for agricultural policy development and implementation. The needs in this area are particularly pressing, but they can be addressed effectively only through massive support efforts phased over a period of 10 to 15 years and costing perhaps $15 to $20 million. Major enabling actions must be taken by GSL if support is to be used effectively.

The second and third sections are addressed toward the problems and needs of the Paddy Marketing Board (PMB) and of the dryland agricultural sector. Both are areas of present or proposed USAID support. Both are areas in which further support is needed and in which it can for the most part be utilized effectively within the existing institutional setting. Outlined in the summary tables are specific recommendations for USAID-supported technical assistance and training. Page references in "Summary Tables" 1, 2 and 3 (at end of present section) and in "Support" sections of the "Summary" indicate where more detailed recommendations can be found.

Although each of the donor support recommendations addresses an important need, some needs are more important than others, some can be met more expeditiously than others. On a project basis, the study team believes the order of priority to be: #1--the PMB recommendations, #2--dryland recommendations, and #3--policy development recommendations.

I. Marketing Policy Development

A. Current Situation

Current agricultural marketing policies and policy-making activities are tilted toward political rationalization rather than economic rationalization.

The results of such policies and procedures are mixed. One result is a proliferation of government marketing agencies causing duplication of marketing functions, lack of coordination between agencies, no clearly defined role for the private sector in the agricultural marketing system, and lack of a well defined food reserve policy. On the other hand, price policies aimed at increasing paddy production have had some apparent positive impact, but the size of that impact is unclear, leaving uncertainty as to how future policies should relate to past results.

The primary basis for policy failures lies in the fact that decision makers have had to make judgements based upon limited and sometimes unreliable data and upon limited and often hastily-produced marketing studies which fail to define the problem clearly or to spell out viable alternatives.

B. Needs

Major marketing policy development needs are:

1. Collection and analysis of statistical data on a timely basis for dissemination to government institutions and private enterprises.
2. Development of an institutional capability to perform agricultural marketing analysis in support of formulation of marketing policies and programs.
3. Establishment of an interfacing unit between analytical capability and policy decision-makers. The new Food Policy Committee may be the logical focus for this most important activity.
4. Rationalization of agricultural marketing organizational structures and improvement of coordination among marketing agencies.

C. Recommended Donor Support

Donor support recommendations are predicted upon the GSL:

(1) identifying the specific agencies responsible for data collection,

analysis and dissemination;

(2) defining the role and responsibility of the proposed Food Policy Committee; and

(3) acknowledging the necessity for providing the Food Policy Committee with analytical support. Subsequent donor support can follow two lines:

1. A reinforcement project aimed at upgrading capabilities of the agency responsible for agricultural data collection, analysis and dissemination (p. 97); and

2. An assistance project aimed at developing a new agricultural marketing analysis unit (pp. 97-8).

II. PMB Operations

A. Current Situation

The role of PMB is not clearly defined; the specific purpose for its grain storage activities needs clarification by cabinet-level policy makers. PMB is one of several government agencies having paddy and rice marketing responsibilities. Serious problems exist in coordinating the activities of these various agencies; no formalized mechanism exists for effecting such coordination. The internal organizational structure of PMB lacks an echelon of upper management, leading to poor control over its operation.

Capabilities for collection and anlaysis of data needed for day-to-day control of the organization and for long-term planning are seriously inadequate. The staff lacks technical training in basic management skills. Although severly handicapped by inadequate and incomplete data and analytical capabilities, the more recent pricing policies administered by PMB appear generally to have been sound.

B. Needs

1. Specific objectives for PMB should be clarified. The role of PMB relative to that of the private sector should be more clearly defined. Performance of the agency should be monitored and evaluated against the background of these objectives.

2. PMB staff capabilities should be upgraded substantially. Management training is a particularly pressing need. Research capabilities of an independent RPDC should be bolstered.

3. With diminishing need for a ration system, consideration should be given to managing reserve stocks so as to buffer price movements. Imports should be programed to complement the reserve system and to minimize its needed size. Imports of wheat will be required to meet long-term shortfalls in domestic cereals production.

4. Consideration should be given to refinements in PMB's pricing system. As capability for administering such improvements is developed, prices should be structured to more nearly reflect differences in time, location and product quality. RPDC should take the lead in establishing the appropriate price refinements.

5. Rising costs of production will soon precipitate the need for an increase in GPS paddy prices to about Rs 45 per bushel.

C. Recommended Donor Support

1. Long-term training at M.S. level for agricultural economists and marketing specialists to fill PMB staffing needs and later to meet GSL policy analysis requirements (pp. 98-9).

2. Short-term training. a) Training in agribusiness management, marketing management and quantitative analysis is needed for PMB staff. b) Three or four warehouse storage specialists from PMB, RPDC and FC should attend the summer KSU short course in grain storage

handling and marketing. Graduates of the short course, assisted by donor-supported technical assistance, should organize annual training sessions for all PMB and FC facility managers (pp.99-100).

3. Technical assistance for management audit to support development of an effective organizational structure and a management information system. (p. 100).
4. Technical assistance for development of a centralized system for inventory control and traffic management (p. 100).
5. Technical assistance in support of location analysis for FC facilities (p. 101).
6. Technical assistance to RPDC in support of private sector development efforts (pp.101-2).

III. Dryland Crops Production

A. Situation

Production resources sufficient to greatly expand the production of dryland crops appear to be available. Very little is known, however, of costs of production and differences in comparative advantage of the various crops or of their market potential. Little is known of the capability of existing market institutions (private or public) to absorb the added load of increased dryland crop production. Based on what is known about consumer needs and preferences for these crops, their domestic market potential is extremely limited and the potential for overproduction quite great. Export markets for most, but not all, appear to be out of reach. Government price policies have moved in rational directions in the past year, but some minor adjustments are in order.

B. Needs

1. The economic analysis agency of GSL, creation of which was recommended previously, should make an intensive study of cropping and market alternatives. Results of the study will form the basis for a rational program of development for the dryland sector.

2. Consideration should be given to modest increases in coarse grain prices to allow for price inflation and to keep prices in correspondence with increased paddy prices (recommended above). Since coarse grains appear to be poor substitutes for rice and wheat flour in the minds of consumers, care must be taken to assure that prices are not set at levels which will result in overproduction.

3. Price relationships suggest export potential for sesame, and possibly for finger millet. Special attention should be directed toward assessing prospects for expanded production of these crops.

4. Too many government agencies are involved in procurement and sale of dryland crops. A consolidation of these activities is recommended. The extent to which government intervention is needed cannot be established in the absence of rigorous analysis of the performance of markets in the private sector.

C. Recommended Donor Support

1. Initiate a short-term economic feasibility study for expansion of soybean production (p. 102).

2. If results of item 1 are positive, initiate a pilot program to develop the production and marketing of soybeans (pp. 102-3).

3. Employ a full-time marketing economist at the INTSOY project to conduct market feasibility analyses of soya products being developed (p. 103).

4. Initiate a joint program with GSL to develop an analysis of the economic feasibility of the major dryland crops. Production and marketing programs should be initiated for those crops deemed feasible (pp. 103-4).

Summary Table 1
Summary of Recommended USAID Technical Assistance
for PMB Post-Production Development Project

Personnel	Calendar Period for Completion: 1st 6 Mo.	6-18 Mo.	Beyond 18 Mo.	Major Functions	Estimated Cost[a]
1. Grain Marketing Specialist(p. 100)	1 mm			Assist with Development of a series of annual training courses for facility managers, selected employees, and other groups.	$ 6,000
2. Grain Storage Engineer(p. 100)	1 mm				6,000
3. Stored Grain Entomologist(p. 100)	1 mm				6,000
4. Grain Marketing Specialist(p. 100)	1 mm	2 mm		Management Audit	18,000
5. Management Systems Specialist(p. 100)	2 mm	2 mm		Management Audit	24,000
6. Management Economist(p. 100)	1 mm	2 mm		Management Audit	18,000
7. Management Information Specialist(p. 100)	1 mm	2 mm		Information System Development	18,000
8. Marketing Economists(p. 100)	2 mm	2 mm		Development of centralized system for Inventory Control and Traffic Management	24,000
9. Grain Storage Engineer(p. 101)	1 mm	1 mm		FC Warehouse Analysis	12,000
10. Grain Marketing Economist(p. 101)	2 mm	3 mm		FC Warehouse Analysis	30,000
11. Grain Marketing Economist(p. 102)	1 mm	2 mm	1 mm	RPDC Private Rice Industry Development Programs	24,000
12. Grain Storage Engineer (p. 102)	1 mm	2 mm	1 mm		24,000
13. Grain Storage Entomologist(p. 102)	1 mm	2 mm	1 mm		24,000
				TOTAL COST	$234,000

[a]Manpower costs only at standard USAID rate. Costs of travel and other support not included.

Summary Table 2
Summary of Recommended USAID Technical Assistance
for Dryland Sector Development Support

Personnel	Calendar Period for Completion: 1st 6 Mo.	6-18 Mo.	Beyond 18 Mo.	Major Functions	Estimated Cost[a]
1. Production Economist(p. 102)	2 mm			Soybean Economic Feasibility Study	$ 12,000
2. Marketing Economist(p. 102)	2 mm				12,000
3. Production Agronomist(p. 102)	2 mm				12,000
4. Production Economist(p. 103)	6 mm	12 mm	6 mm	Soybean Pilot Production Program	150,000
5. Marketing Economist(p. 103)	6 mm	12 mm	6 mm	Soybean Marketing	150,000
6. Analytical Economist(p. 104)	6 mm	12 mm	18 mm	Dryland Crop Cost of Product and Marketing Assistance	225,000
7. TDY Personnel(p. 104)	8 mm	16 mm	24 mm		288,000
				TOTAL COST	$849,000

[a]Manpower costs at standard USAID rate. Costs of travel and other support not included.

Summary Table 3
Summary of Recommended USAID Training Support
for PMB Post-Production Development Project

Personnel	Calendar Period for Completion				Activity	Estimated Cost
	Year 1	Year 2	Year 3	Year 3		
Out-Country						
Short-Term						
1 RPDC Staff(pp. 99-100)	1.5 mm				KSU Summer Short Course, Grain Storage, Handling and Marketing	$ 30,000[b]
2 PMB Staff(pp. 99-100)	3 mm					
1 FC Staff(pp. 99-100)	1.5 mm					
Long-Term						
5 PMB Staff(pp. 98-9).		10 my	10 my	10 my/yr., yrs. 3-6	M.S. - Agri. Economics and Marketing	750,000[b]
In-Country						
Short-Term[a]						
25 Agribusiness Management(p.99)	5.5 mm	5.5 mm			Agribusiness Management	78,000[c]
25 Marketing Management(p. 99)	3 mm	3 mm			Marketing Management	49,500[c]
25 Quantitative Analysis(p. 99)	3 mm	3 mm			Quantitative Analysis	39,000[c]
					TOTAL COST	$946,500

[a]Borsdorf, Roe and Cornelius Hugo, Suggested Training Procedures, Contents, and Structure for Proposed Phase II Project, a working paper prepared for USAID/Colombo, August, 1978, Food and Feed Grain Institute, Kansas State University, Manhattan, Kansas. Recommended numbers of participants are maximums.

[b]Manpower costs at standard USAID rate. Costs of travel and other support not included.

[c]Includes all costs except participant costs.

PART ONE

INTRODUCTION

A. Scope of Work

B. The Policy-Making Apparatus

A. Scope of Work

The scope of work as outlined in the USAID request has been reordered into four major issues as outlined below. All items covered in the original cable request are included. It was verbally agreed during the initial briefing of the team by USAID/Colombo officials that primary attention would be directed toward items #1, 3 and 4. While assessment of the role of the private sector is not specifically requested in the scope of work outline, it was included in the review and assessment process as a result of discussions following the briefing.

1. Evaluation of Price Policies, Paddy

   a. Review the management and operation of the GPS in relationship to national paddy production objectives.
   b. Investigate the potential role of seasonal changes in procurement pricing to encourage on-farm storage.

2. Evaluation of Food Grain Reserve (Paddy and Rice) Questions for Policy Action

   a. Review operation of the National Food Distribution System (ration system) and its integration and relationship to the GPS and establishment of buffer stock program.
   b. Review merits of establishing and managing a reserve buffer stock program, including an analysis of the financial and economic implications of such a program. Price stabilization and maintaining emergency food stock reserves are important considerations.

3. Organizational Structure and Policies Impacting Upon Organizational Systems

   a. Investigate potential for integration and coordination of domestic and offshore procurement of food grains including crop forecasting.
   b. Evaluate the organization, operation and management of the Paddy Marketing Board and Food Commissioner's operations.
   c. Evaluate quality control procedures and alternatives and programs to improve quality control of paddy procurement and rice distribution.
   d. Determine staffing, organization, and training requirements.
   e. Determine requirements for, functions of, and supporting requirements for national food policy committee.

4. Government Non-Rice Food Policies

   a. Review and assess current and projected supply and demand for non-rice food grains for both human and livestock feed.
   b. Review government policies impacting upon non-rice food grains, particularly price, procurement and import policies.
   c. Review government's capability to support specific policy objectives through market interventions.
   d. Review and assess private sector involvement in non-rice food grain marketing. Identify government policy options to support and finance dryland agricultural development through private as well as government marketing mechanisms.
   e. Identify administrative and institutional support requirements for both government and private sector that would be necessary to complement increased production of non-rice food crops.
   f. Identify and estimate requirements for assistance including training, physical infrastructure, and required complementary project support from the GSL.

B. The Policy-Making Apparatus

Major policy decisions affecting the food and agricultural sector are made at Cabinet level in the GSL. Policy decision making seems to be highly centralized with all but minor decisions made at this level.

Ministers of the 30 ministries of Government comprise the Cabinet. Five of the thirty ministries are directly involved either in matters relating to agricultural production or agricultural product marketing. The span of departments and actions controlled by these five ministries is illustrated in Figure 1. Not included in Figure 1 are the Ministry of Plantation Industries which is involved in plantation crops of tea, rubber, coconut; the Ministry of Lands and Land Development; nor the Ministry of Mahaweli Development which supervises irrigation development.

The complexity of agricultural policy formulation is compounded by the diffusion and duplication of responsibilities among several ministries. The report, "A Review of Functions of State Organizations in the Agricultural Sectors and Evaluation of Their Use of Resources" (17), attempted to address this problem and to determine the extent to which the upper level of bureaucracy

Figure 1.
COMPOSITION OF MINISTRIES DIRECTLY INVOLVED IN AGRICULTURAL PRODUCTION OR AGRICULTURAL MARKETING, SRI LANKA, 1979

within "agricultural" ministries had input into the policy-making process. An incomplete answer to the latter question suggests that any impact is minimal. The team's observations support this conclusion. The role of sub-ministerial agencies is not carefully spelled out and, as a consequence, it appears that few policy decisions are made at this level. The decision-making process is largely centered at the Ministerial level.

PART TWO

PRESENT SITUATION

A. Marketing Organizational Structures

B. Paddy and Rice Marketing

C. Coarse Grains, Oilseeds and Pulses

A. Marketing Organizational Structures

The following description of the current status of organizational structure parallels closely the scope of work reproduced in the introduction to the report. Also taken into consideration are the two proposed USAID projects--Paddy Post-Production Development and Dryland Agricultural Production.

1. Food Grain Market Channels

Domestic and offshore procurement of food grains can be characterized as a highly fragmented system. Paddy and rice marketing channels, illustrated in Figure 2, are highly complex and, more importantly, are controlled to a large extent by diverse government agencies and ministries. The diagram also reveals duplication of functions, such as that of rice retailing.

The case of rice has been previously documented rather extensively (1, 3, 7, 10, 32). However, detailed descriptive analyses of how the market system operates, especially the private sector, are lacking. Even more lacking are descriptive analyses of coarse grains, pulses, and oilseeds.

Figures 3 through 5 illustrate the marketing channels for the non-rice commodities. As in the case of rice, only governmental institutions can be more than partially identified at this time. Accurately identifying relative shares of commodity flows awaits the results of descriptive marketing studies which have never been undertaken. Owing to the lack of data with which to evaluate information collected in verbal and narrative form, the accompanying diagram should be regarded as a best estimate of the actual marketing channels.

The identifiable issue is the complexity caused by the large number of governmental agencies involved in purchasing agricultural commodities. The key organizations and the ministries of which they are a part are as follows:

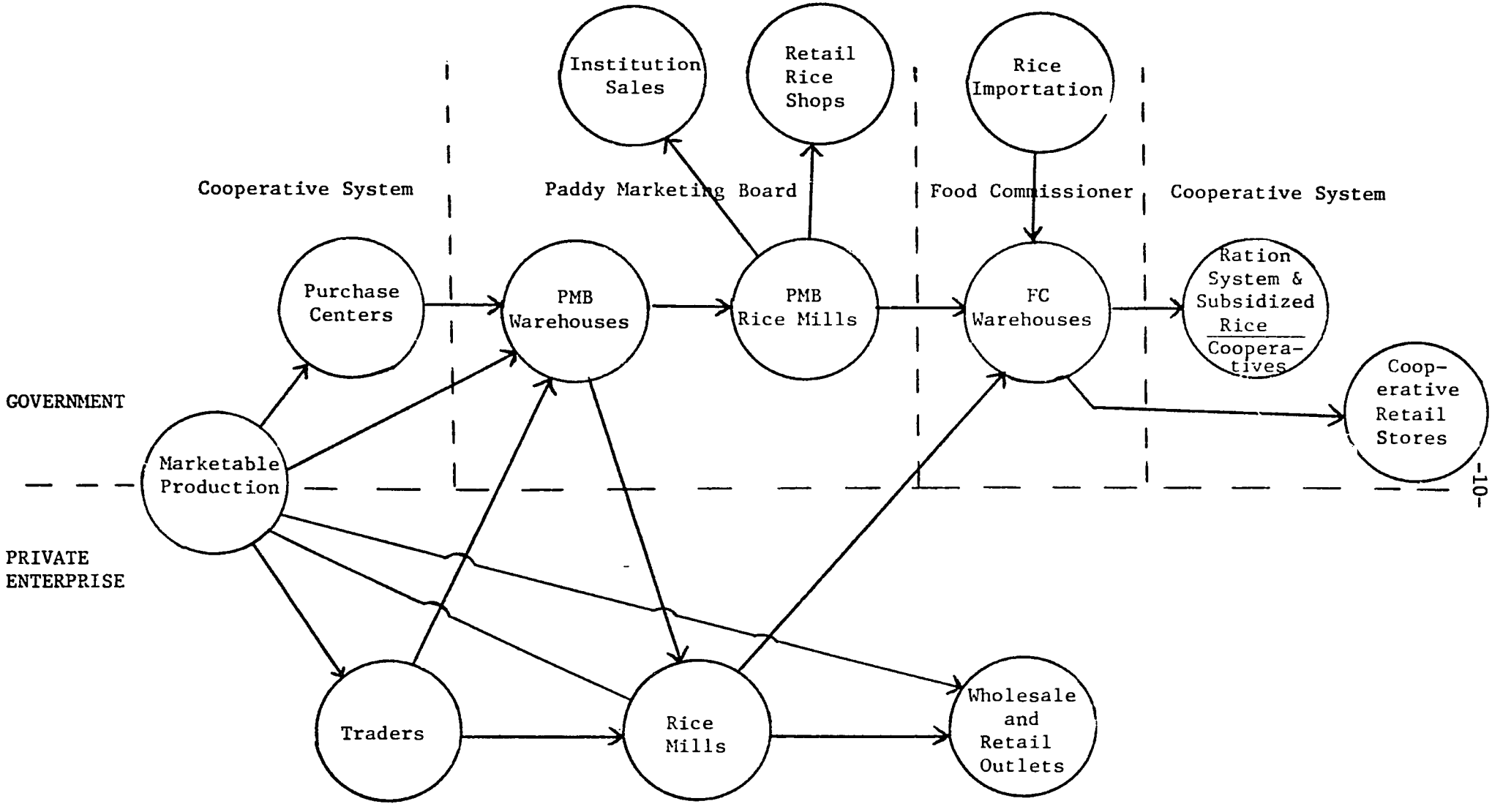

Figure 2. MARKETING CHANNELS FOR PADDY AND RICE

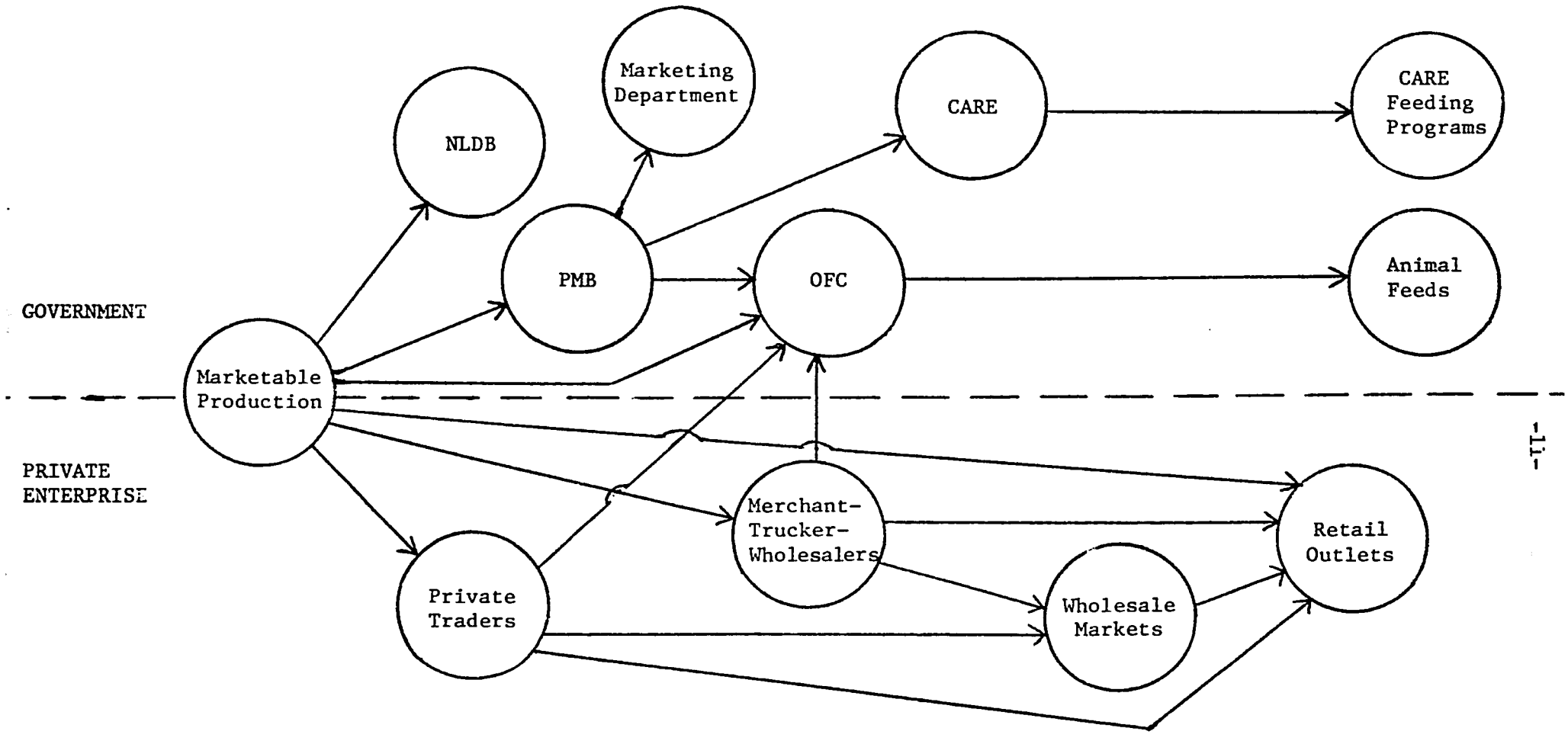

Figure 3. MARKETING CHANNELS FOR COARSE GRAINS

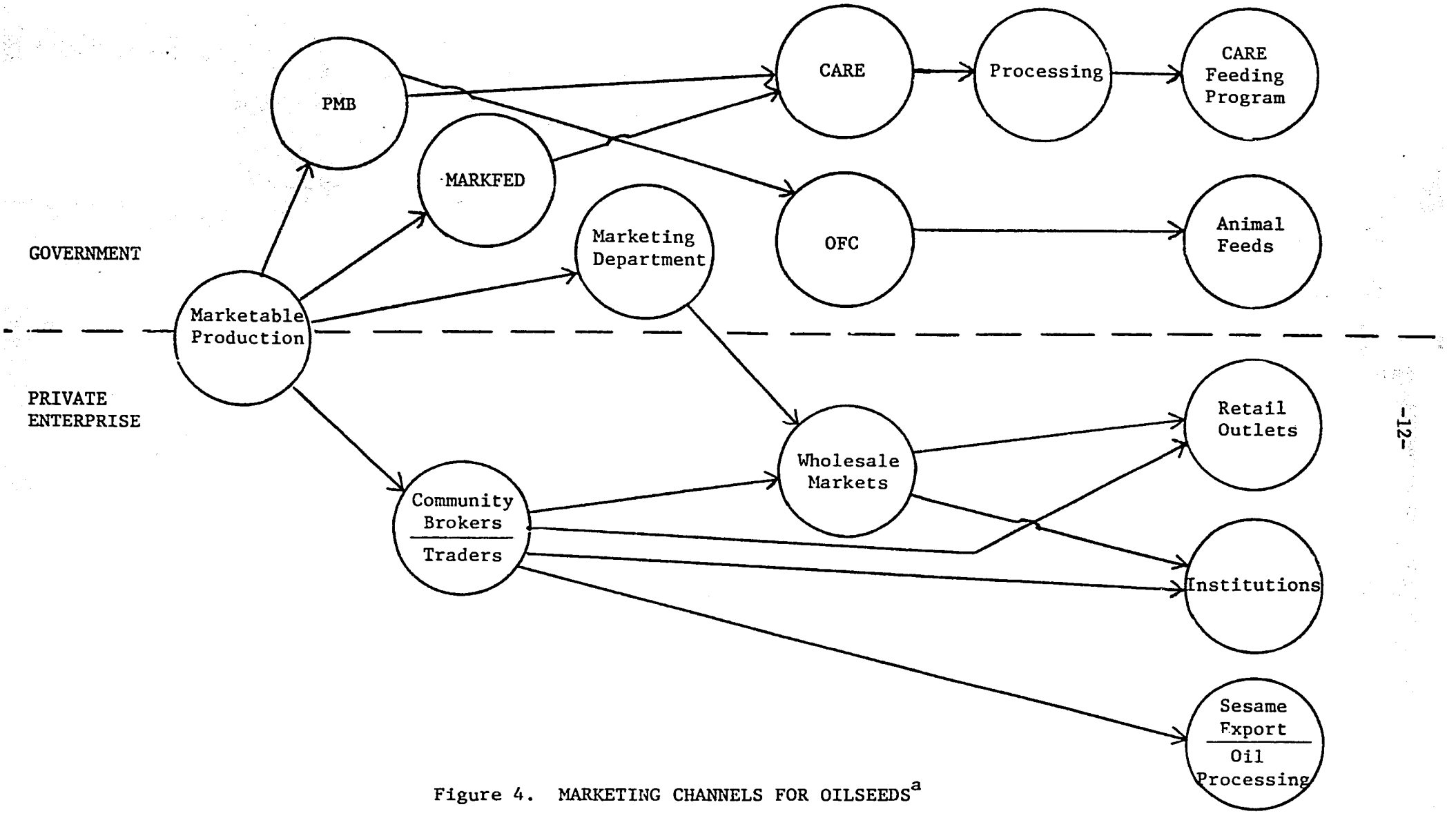

Figure 4. MARKETING CHANNELS FOR OILSEEDS[a]

[a]Soybeans and Sesame.

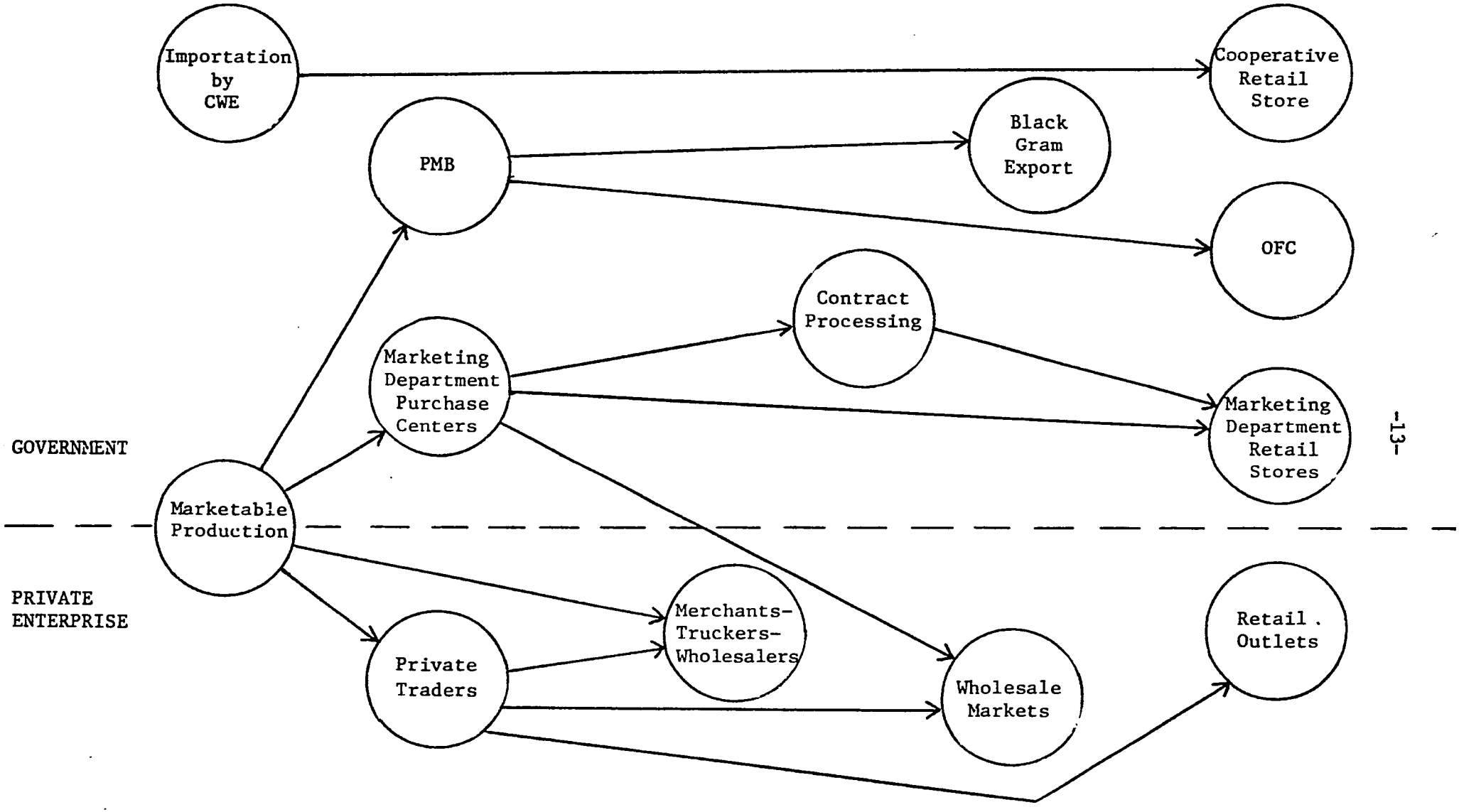

Figure 5. MARKETING CHANNELS FOR PULSES

Paddy Marketing Board	Ministry of Agricultural Development and Research
Department of Marketing Development	Ministry of Trade and Shipping
Cooperative Wholesale Establishment	Ministry of Trade and Shipping
National Livestock Development Board	Ministry of Rural Industries
Oils and Fats Corporation	Ministry of Rural Industries
MarkFed	Ministry of Food Cooperatives and Small Industries

Consideration is presently being given to creating a new purchasing agency for agricultural crop commodities. The agency would be known as the Agricultural Produce Marketing Board and would be located within the Ministry of Agricultural Development and Research.

While domestic procurement of commodities spans many agencies, the Food Commissioner alone is responsible for importing rice and the Cooperative Wholesale Establishment is responsible for importing pulses and other products.

2. Status of Data Collection and Marketing Analysis

Forecasts of production of paddy are set forth in the five-year agricultural plan. However, no forecasts of production are constructed for coarse grains, pulses, or oilseeds. Nor is any attention given to description or analysis of marketing activities except that certain marketing responsibilities have been assigned to some of the agencies previously listed.

Annual targets are established and formalized into a working paper (17). Adjustments in targets apparently are made only on a year-to-year basis since the working document is produced only once each year. The working document for 1978/1979 was not available to compare with the 1977/1978 document as it had not yet been printed by March, 1979.

Publication of crop statistics is similarly deficient with bound volumes being several years in arrears. Data describing the 1978 Yala paddy production were being released in March, 1979. These delays in dissemination of statistical data pose serious problems for those who need data for planning marketing policies and programs.

Neither is there a statistical sampling procedure for estimating the size of upcoming paddy harvests, information vital to the various marketing agencies.[1] In the case of coarse grains, pulses, and oilseeds, field observations are converted into quantitative estimates and used to generate final land areas and production statistics. Multiple sets of data (usually conflicting) exist as a result of multiple agency collection efforts. Part of the duplication of effort stems from lack of confidence in data collected by means which are clearly deficient.

The known agricultural data collection agencies are as follows:

Department of Census and Statistics	Ministry of Plan Implementation
Department of Marketing Development	Ministry of Trade and Shipping
Department of Agriculture	Ministry of Agricultural Development and Research
Agrarian Research and Training Institute	Ministry of Agricultural Development and Research
Agricultural Development Authority	Ministry of Agricultural Development and Research
Central Bank of Ceylon	Ministry of Finance and Planning
	Ministry of Lands and Land Development
	Ministry of Mahaweli Development

[1]For example, three separate "estimates" of the upcoming paddy harvest are made; undoubtedly, all are based on different methods of casual observation.

3. Paddy Marketing Board Organizational Structure

While the operation of the Paddy Marketing Board is discussed in a later section (Part Two, B., 1., c), its organization is described here because of the impact of the current organizational structure upon the Board's effectiveness (3, 7). The current organizational structure of the Paddy Marketing Board is outlined in Figure 6.

There have been continued criticisms of the Board's past performance in terms of coordination with purchasing centers, quality control, effectiveness in reaching the farmer, lack of planning, low utilization rates, high operating costs of PMB mills, etc. While only part of these problems originate internally, the ability to solve the problems is certainly not enhanced by the organizational structure.

There are approximately 25 officers of various grades, including division heads, who report directly to the Chairman and General Manager. Such a structure places immense burdens on general management since decision-making is apparently based at General Manager and Chairman level. There is no doubt that this impedes the continuity of operations. Furthermore, such an organizational structure requires highly effective middle management, a requirement which appears not to be met.

The Paddy Marketing Board's general objectives as set forth under the Paddy Marketing Board Act of 1971 are as follows (19):

a. "To carry on the business of purchasing, selling, supplying and distributing paddy and rice;

b. to carry on the business of milling, hulling, and necessary processing of paddy and rice;

c. to carry on any such other business as may be incidental or conducive to the attainment of the objectives referred to in paragraphs 'a' and 'b'; and

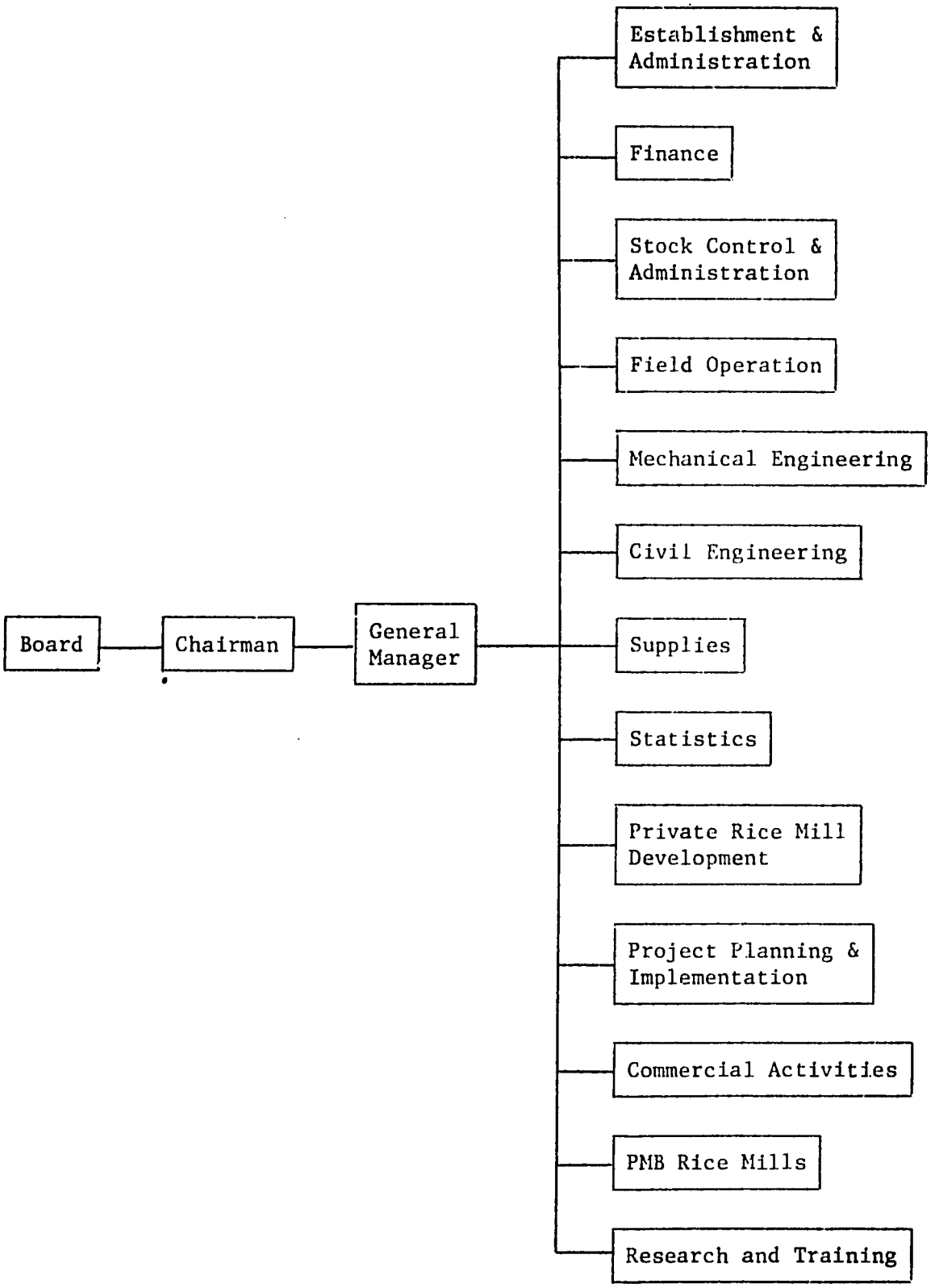

Figure 6. PMB ORGANIZATIONAL STRUCTURE

d. to do all other things which, in the opinion of the Board, are necessary to facilitate the carrying out of business."

As an apparent result of these ill-defined objectives, the Paddy Marketing Board is entrusted with a research and planning activity which is centered in the RPDC and has assumed a primary role in the development of the private sector of the rice industry.

4. Role of the Private Sector

The current role of the private sector can be adequately described in neither rice nor non-rice crops due to the lack of descriptive marketing studies. At best, only generalized statements can be made concerning the importance of this sector in agricultural commodities marketing.

In the case of rice, the private sector is estimated to handle two-thirds of the nation's production. However, the exact quantity is unknown since no known on-farm consumption data exist. Based on assumed levels of on-farm consumption, the percentage of production marketed through private channels should range from 35 to 65 percent or approximately 50 to 65 percent of marketable production. In any case, a large portion of paddy flows through the private marketing sector.

The importance of the private sector is not in doubt; previous attempts by Government to eliminate its role proved disastrous. The private sector, inefficient though it may be, does provide the basic structure needed for marketing of agricultural commodities.

Of more importance for the future is the implied public policy of strengthening the role of the private sector in the paddy and rice industry. While not yet manifested in action programs, this policy is evident from general statements emanating from ministerial levels of government and by the government's concurrence in the modest program to be undertaken within the

current USAID-funded PMB post-harvest project. While tentative criteria have been established for guiding the latter action program, there is no overall plan for development of the private sector either in paddy and rice or in non-rice food crops.

5. Proposed National Food Policy Committee

A position paper believed to be before the Cabinet would establish a "national food policy committee." It is not known whether the proposal is an outgrowth of suggestions by the recent FAO team which undertook a country report on strengthening national food security in Sri Lanka. Details of the proposed committee's structure and charge were not available at the time of this team's visit. One of the tentative understandings is that if a committee is established, a market analysis unit would be formed within the Ministry of Agricultural Development and Research to serve as an analytical support unit for the committee.

B. Paddy and Rice Marketing

1. Food Grain Reserves

a. Purpose of Reserves. The required rate of food consumption is always more uniform than the rate of food production. Since it is never possible to mesh the rate of food production precisely with required rates of food consumption, storage or imports are necessary to meet consumption needs during periods of reduced production. Three major types of reserves can be distinguished:

(1) Working stocks. Stocks are required to keep the day-to-day pipelines from field to consumer supplied. Allowances must be made for transport delays, holidays and other interruptions in the flow of food from farmer to consumer.

(2) Buffer Stocks. Buffer stocks are accumulated and released so as to smooth seasonal and cyclical price movements. Stocks are accumulated when production levels exceed consumer requirements and released when they fail to meet requirements. Producers are thereby given the proper price signals to assure adequate but not excessive production. Consumers are afforded prices which are just sufficient to call forth the required production. Seasonal price rises are kept at a level which just covers costs of storage.

The price effects of changes in available supplies of food are a measure of the hardship imposed upon consumers by short supplies and upon producers by excessive supplies. Elasticity of demand measures the responsiveness of quantity to a small adjustment in product price, the percentage change in quantity associated with a percentage change in price--$\%\Delta Q/\%\Delta P$. The demand for food, and particularly the demand for basic storable foods such as cereal grains, tends to be inelastic with respect to price. An inelastic demand indicates that a given change in price will result in a relatively small change in quantity purchased. Price elasticity of demand for all food in Sri Lanka has been estimated at 0.217 (13, p. 109). The implication is that a 1.0 percent change in food price will result in a quantity change of only 0.217 percent. The implied sign is negative since an increase in quantity results in a decrease in price and vice versa. Being dietary mainstays, the demand for basic cereal grains should be even more inelastic, probably 0.2 or less.

In the absence of stocks large enough to smooth the month-to-month and season-to-season availability of basic foods, small changes in quantities available would result in wide swings in prices to the detriment of producers and consumers alike. Prices would drop precipitously at harvest time and

rise to prohibitive levels before the next harvest season. Given adequate reserves to meet ongoing needs and to buffer the price effects of interseasonal variations in food production, seasonal prices should reflect only the costs of product storage from one harvest until the next.

(3) Emergency reserves. Reserves are needed not only to buffer the price effects of anticipated production variability but to protect against the possibility of disasters of one sort or another. Severe crop shortages occasioned by adverse weather conditions or other calamities might occur from time to time. The probability of shortages occurring simultaneously across wide geographic areas being much less than that of shortfall in a narrower area, imports from surplus to deficit areas may be relied upon to meet most contingencies. Stocks above and beyond those needed as price buffers should be set aside to meet these and other more serious emergencies. Major emergency needs may have to be met from imports, but stocks sufficient to meet lesser emergency needs and to keep pipelines filled until imports can arrive are required.

b. Importance of Cereal Grain in Sri Lanka. Paddy is the major grain grown in Sri Lanka and the predominant food item in the average citizen's diet. Rice (local production plus imports), on a weight basis, accounted for almost 36 percent of estimated total food consumption in the country during 1977. Total rice plus imported wheat and wheat flour together accounted for nearly 50 percent of the total, and were even more important in meeting basic calorie and protein needs of the country (see Part Two, C., 2., below). Locally grown paddy and imported rice, along with imported wheat and flour, are the central focus of the reserve program operated by GSL.

Major progress has been made in expanding both yields and total acreage of paddy. Output has increased more than 190 percent from the 452,703 tons

produced in 1952 to 1,313,820 tons in 1977 (Table 1). Requirements have also increased. Population of the Island has risen more than 80 percent from just over 8 million in 1952 to nearly 14.5 million in 1977. Thus, while relatively more locally-produced rice was available on a per capita basis by the end of the period, the deficit between production and requirements has increased in an absolute sense. Imports of milled rice rose nearly 30 percent, from 412,327 tons in 1952 to 534,000 tons in 1977 (Table 1). The flour-equivalent amount of wheat and wheat flour imports expanded even more rapidly; the total was 214,897 tons in 1952, 586,686 tons in 1977, an increase of nearly 173 percent.

The rate of population growth has slowed markedly in recent years, declining from 2.8 percent per year in 1953 to an estimated 1.7 percent by 1979 (27, p. 2). There is cause for optimism that the oft-sounded goal of self-sufficiency in rice may one day be achieved. In any case, there is reason to suppose that domestically-grown paddy, supplemented by imports of wheat and possibly rice, will form the mainstay of any future GSL reserve operations. That wheat (in place of wheat flour) imports are officially expected to continue over the long term is clear from the flour mill construction program now under way. The mill, located at Trincomalee, is to have a weekly capacity of 10,000 metric tons of wheat flour.

c. The GSL Reserve Program. The Paddy Marketing Board (PMB) was organized in 1971 and began operations in 1972 as successor to the Ministry of Agriculture and Land, Department of Agrarian Services in government grain marketing intervention activities. As outlined in more detail above in the section on organization of GSL marketing agencies (Part Two, A, 3), PMB is primarily a paddy procurement agency. PMB buys on average about one-third of the nation's paddy output. Relative purchases by PMB or its predecessor

Table 1
Total Annual Available Wheat, Wheat Flour and Rice, Sri Lanka, 1952-1977

Year	(1) Net Paddy Production[a]	(2) Milled Rice[b]	(3) Rice Imports[c]	(4) Total Available Rice[d]	(5) Wheat Imports[e]	(6) Flour Imports[c]	(7) Total Flour Equivalent Imports[f]	(8) Population[g]	(9) Total Per Capita Availability of Flour and Rice[h] (pounds)
	- - - - - -	- - - - - -	- - - - - -	- Long Tons -	- - - - -	- - - - - -	- - - - -		
1952	452,703	307,838	412,327	720,165	203	214,751	214,897	8,005,617	261.63
1953	325,075	221,051	416,799	637,850		296,363	296,363	8,185,702	255.65
1954	468,256	318,414	408,871	727,285	102	206,316	206,389	8,398,609	249.02
1955	556,223	378,232	371,064	749,296	305	222,476	222,696	8,617,054	252.59
1956	421,279	286,470	499,427	785,897	102	188,530	188,603	8,841,181	246.89
1957	492,804	335,107	531,441	866,548		197,779	197,779	9,071,137	262.82
1958	555,508	377,745	562,236	939,981		230,302	230,302	9,307,074	281.66
1959	555,859	377,984	593,031	971,015		262,824	262,824	9,549,147	289.43
1960	676,610	460,095	536,726	996,821		170,744	170,744	9,797,518	266.94
1961	687,024	467,176	476,661	943,837	305	176,131	176,351	10,052,348	249.62
1962	771,287	524,475	417,307	941,782	102	178,265	178,338	10,313,806	243.27
1963	789,906	537,136	409,481	946,617		142,083	142,083	10,582,064	230.46
1964	809,611	550,535	668,748	1,219,283	305	326,341	326,561	10,832,744	319.65
1965	563,067	382,886	538,657	921,543	102	144,422	144,495	11,089,363	215.28
1966	727,643	494,797	704,523	1,199,320	305	366,831	367,051	11,352,060	309.08
1967	880,154	598,505	360,494	958,999	305	210,512	210,732	11,620,901	225.47
1968	1,043,899	709,851	375,948	1,085,799	17,684	346,073	358,805	11,896,272	272.01
1969	1,083,395	736,709	313,777	1,050,486	25,917	332,931	351,591	12,178,084	257.89
1970	1,271,847	864,856	553,502	1,418,358	30,229	369,000	390,765	12,466,574	325.06
1971	1,078,538	733,406	344,748	1,078,154	44,982	333,000	365,387	12,761,896	253.37
1972	1,019,186	693,046	270,751	963,797	71,143	324,000	375,223	13,022,191	230.20
1973	1,007,703	685,238	349,111	1,034,349	88,761	365,000	428,908	13,308,210	246.29
1974	1,253,625	852,465	302,268	1,154,733	82,368	442,000	501,305	13,590,076	272.96
1975	885,424	602,088	472,954	1,075,042	90,431	455,000	520,110	13,877,911	257.47
1976	959,207	652,261	419,000	1,071,261	87,187	380,000	442,775	14,171,843	239.30
1977	1,313,820	893,398	534,000	1,427,398	87,187	523,861	586,636	14,443,940	322.34

Source: Adapted from (1, pp. 242-3).

[a]Total paddy production minus seed requirements for next season minus 14.2 percent post-maturity losses.
[b]Column 1 times 0.68 milling factor.
[c]1952-1963 - FAO data series; 1964-1977 - FC data series.
[d]Column 2 + column 3.
[e]FAO data series.
[f]Column 6 + 0.72 (Column 5).
[g]Midyear population.
[h]Column 4 + Column 7/Column 8.

agency have ranged from a high of 52 percent of production in 1963 to lows of 21 percent in 1969, 1975 and 1976. Total purchases have varied from 238 thousand tons in 1975 to 658 thousand tons in 1971. Some 504 thousand tons, 30 percent of total production, were procured in 1977. Larger relative and absolute purchases have tended to occur during years of larger harvests, owing to the tendency for official PMB procurement prices to exceed open market prices in years of larger supply. The reverse price relationship has prevailed in years of short supplies, with resulting contraction of PMB purchases. That PMB purchased as much as it did during certain lean years prior to 1975 may be largely attributed to the fact that sales of paddy through private sources were illegal. Enforcement of the ban was facilitated, prior to October 1975, by a prohibition against shipments of more than two measures (four pounds).

The offical purpose of PMB's market intervention appears to be two-fold (see also Part Two, A., 3):

1) To provide a price support for paddy producers. The apparent aim is to secure equity for producers and "self-sufficiency" for the nation.

2) To supply the rice ration system and thereby cushion the effects of market prices on consumers.

A procurement price is established each year prior to planting the Maha crop.[2] The price is invariable through the course of the marketing year. Present support price is Rs 40 ($2.63) per bushel of paddy delivered to procurement centers. As might be expected, most purchases are made during a relatively short period immediately following harvest.

[2]Two paddy crops per year are grown in irrigated areas. The spring or "Maha" crop is harvested in March, April and May, the fall or "Yala" crop in September and October.

About one-half of the population is presently eligible for a weekly ration of one pound of free rice and three pounds of rice costing Rs 1 ($0.066) per pound. About 55,000 tons per month (some 46 percent of average monthly consumption during 1977) are distributed through the ration system.

Overall, considering the many handicaps faced by PMB--limited professional staff, an unwieldy organizational structure, inadequate office facilities and equipment, frequent and unexpected changes in paddy procurement policies, ration system provisions and related policy matters--the system appears to have functioned reasonably well in meeting its apparently limited goals. PMB has never bought less than 21 percent of total annual paddy production. Producer prices have been high enough to encourage a steady and relatively rapid expansion in paddy output. Low-income consumers have been afforded a ration of rice at low or zero price.

Physical facilities have recently been enlarged and upgraded and additional improvements are either planned or underway. Storage and handling facilities are generally very good. Assuming adequate maintenance, the physical aspects of the storage situation should present no major problems.

There is much talk of establishing "reserves" or "buffer stocks." What is implied seems to vary depending on where and when the discussion is encountered. The present reserves held by PMB are employed in a price-supporting role. Almost all of the grain released from storage goes into the ration system. Releases have not necessarily been scheduled so as to have a maximum buffering effect on open-market prices.

Comparisons of historical annual cereal supply and requirements provide insight into the nature of the supply variability problem and of the extent to which buffer stocks might have been required to bring price stability to cereals markets. The series reproduced in Table 2 identifies annual variations

Table 2
Cereal Grain Supply / Requirements Balance Sheet, Sri Lanka, 1952-1977 (long tons)

Year	(1) Domestic Milled Rice[a]	(2) IMPORTS Rice[b]	(3) IMPORTS Flour[c]	(4) Total Imports[d]	(5) Total Supply[e]	(6) Cereal Requirements[f]	(7) Deviation
1952	307,838	412,327	214,897	627,224	935,062	939,731	-4,669
1953	221,051	416,799	296,363	713,162	934,213	960,870	-26,657
1954	318,414	408,871	206,389	615,260	933,674	985,861	-52,187
1955	378,232	371,064	222,696	593,760	971,992	1,011,503	-39,511
1956	286,470	499,427	188,603	688,030	974,500	1,037,781	-63,281
1957	335,107	531,441	197,779	729,220	1,064,327	1,064,805	-478
1958	377,745	562,236	230,302	792,538	1,170,283	1,092,501	+77,782
1959	377,984	593,031	262,824	855,855	1,233,839	1,120,916	+112,923
1960	460,095	536,726	170,744	707,470	1,167,565	1,150,071	+17,494
1961	467,176	476,661	176,351	653,012	1,120,188	1,179,984	-59,796
1962	524,475	417,307	178,338	595,645	1,120,120	1,210,675	-90,555
1963	537,136	409,481	142,083	551,564	1,088,700	1,242,164	-153,464
1964	550,535	668,748	326,561	995,309	1,545,844	1,271,590	+274,254
1965	382,886	538,657	144,495	683,152	1,066,038	1,301,713	-235,675
1966	494,797	704,523	367,051	1,071,574	1,566,371	1,332,549	+233,822
1967	598,505	360,494	210,732	571,226	1,169,731	1,364,107	-194,376
1968	709,851	375,948	358,805	734,753	1,444,604	1,396,431	+48,173
1969	736,709	313,777	351,591	665,368	1,402,077	1,429,511	-27,434
1970	864,856	553,502	390,765	944,267	1,809,123	1,463,375	+345,748
1971	733,406	344,748	365,387	710,135	1,443.531	1,498,141	-54,510
1972	693,046	270,751	375,223	645,974	1,339,020	1,528,596	-189,576
1973	685,238	349,111	428,908	778,019	1,463,257	1,562,170	-98,913
1974	852,465	302,268	501,305	803,573	1,656,038	1,595,256	-30,218
1975	602,088	472,954	520,110	993,064	1,595,152	1,629,043	-33,891
1976	652,261	419,000	442,775	861,775	1,514,036	1,663,546	-149,510
1977	893,398	534,000	586,636	1,120,636	2,014,034	1,695,486	+318,548

Source: Adapted from (1).

[a]Column 2, Table 1.
[b]Column 3, Table 1.
[c]Column 6, Table 1.
[d]Column 2 + Column 3.
[e]Column 1 + Column 4.
[f]Based on average availability per capita (262.94 lbs.) and estimated population, 1952-1977 (average actual per capita amount available during the period multiplied by population for each year).

in domestic paddy production (in net rice equivalents); rice, wheat flour and wheat imports (in wheat-flour equivalents); and cereal consumption requirements (263 pounds per capita based on average annual per capita cereals availability)[3] over the period 1952-1977. Annual deviations from implied total annual requirements are identified in column 7 of Table 2.

There has been considerable variability in year-to-year production. For example, paddy production declined 29 percent between 1974 and 1975, but increased 37 percent between 1976 and 1977. Deviations in supplies available to meet annual cereals requirements ranged from a maximum surplus of almost 346 thousand tons in 1970 to a maximum deficit of nearly 236 thousand tons in 1965. Moreover, surplus and deficit years are sometimes clustered, resulting in large cumulative surpluses or deficits. For example, a deficit of nearly 557 thousand tons had accumulated by the end of 1976. Imports, for whatever reason, were far too small to overcome the effects of drought-reduced harvests in that and the five preceding years. Reserve stocks large enough to meet such needs completely would be extremely costly. Moreover, required stocks will be larger in the future given anticipated growth in production, population and consumer incomes.

2. Storage and Milling Facilities

PMB has storage facilities, located throughout the producing areas, for 280,363 tons of paddy. Nearly 31,000 tons of space were planned for

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[3]While there is no evidence of widespread malnutrition during the period, the amount of cereal available was marginal at best. Results of a socio-economic survey (cited in 9, p. 34) indicate caloric intake per consumer unit per day in 1969-1970 ranged from 2,450 to 2,950 depending on location and income. Based on the estimated nutritional content of the typical per capita diet as found in Table 5, average caloric intake is about 2,400 per day. Minimum per capita calorie requirement for Sri Lanka is about 2,220. Per capita availability of rice and wheat flour averaged 291 pounds in 1969-70. Lack of reliable data on availability of root crops and other sources of calories renders a rigorous assessment of the nutritional implications of the cereals situation impossible.

construction in 1978 and an additional 21,700 tons of new storage are planned for 1979. These additional facilities will bring the total to 332,793 tons by 1980.[4] PMB presently has an additional 70,000 tons of temporary storage.

In 1978 PMB operated 28 of its own rice mills. It also moved paddy to some 400 private quota millers who operate under contract with PMB. The total milling capacity of mills owned by PMB was 15,000 tons per month in 1978.[5] Planned new construction of 12,000 tons per month of milling capacity is planned for 1979. This will bring total mill capacity for the 1980 processing year to 27,000 tons per month or an annual capacity of 324,000 tons. PMB is capable of milling 11 percent (after allowance of 12 percent for seed and losses) of a crop the size of the one in 1977 (a record crop); by 1980 it will have capacity sufficient to mill 17 percent of projected 1980 domestic paddy output.

3. The Price Support Role of PMB

The Paddy Marketing Board was created in March 1971 to administer government price intervention policies. PMB buys paddy from farmers, stores paddy and delivers milled rice to FC stores to meet food ration requirements. The purchase of paddy is accomplished through a commission arrangement with the approximately 3,000 cooperative stores scattered throughout the country.

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[4]As far as is known, the construction program is proceeding as scheduled (31).

[5]Total milling capacity of the quota millers is not known; it is believed that considerable excess capacity exists, although equipment is almost uniformly outdated and in a poor state of repair. According to a 1976 survey, the 313 quota millers registered at that time had total paddy storage capacity of 19,740 tons (63 tons each on average). The quota mills reportedly operated at only 61 percent of capacity in 1977. There are believed to be 1,500 private (non-quota) millers. The latter are for the most part small and old; their capacities are not known (32).

The purchase price set for paddy is held constant throughout the marketing year. Over the past several years, the GPS price for paddy has been increased substantially in an effort to increase paddy production. The GPS price for paddy was Rs 14 ($0.92) in 1972 and increased gradually to Rs 40 ($2.63) per bushel at present (Table 3). Prices have not been deflated to correct for inflation. The rate of price inflation experienced by farmers over the period is not known since there is apparently no official index of producer prices. Consumer prices reportedly increased only 2.6 percent in 1975 and 2.8 percent in 1976. These data appear questionable, however, when compared with results of two surveys of paddy production costs (22, 33). Extrapolating estimates from the cost studies to cover the period 1972-78 suggests that paddy production costs increased on average nearly 128 percent per year.

The response to paddy prices which apparently more than cover production costs has apparently been significant as both yields and total acreage of paddy have increased substantially. Paddy production increased more than 190 percent from 452,730 tons produced in 1952 to 1,313,820 tons in 1977. Output per capita rose 61 percent, from 127 pounds in 1952 to 204 pounds in 1977. Weather conditions are an important factor in rice production. Production data since 1970 underscore the variability of production in Sri Lanka; output ranged from a high of 1,313,820 tons (204 pounds per capita) to a low of 852,420 tons (138 pounds per capita) in 1975.

The extent to which prices to producers varied in response to large historical swings in cereals production and availability cannot be established with any degree of precision. Comparison of the production series in Table 2 with the GPS series (Table 3) suggests that producers have responded to increasing guaranteed prices by expanding production (see also, Appendix

Table 3
Relationship of PMB Guaranteed Paddy Prices
to Open-Market Farm Prices, Sri Lanka, 1972-1978[a]

Year	GPS Price (Rs/bu)	GPS Price ($/bu)	Open-Market Price (Rs/bu)	Open-Market Price ($/bu)	Market Price Minus GPS (Rs/bu)
1972 - (Jan.-Oct.)	14.00	0.92	14.81	0.97	+0.81
1972 - (Nov.-Dec.)	15.00	0.99	14.81	0.97	-0.19
1973 - (Jan.-Feb.)	15.00	0.99	14.81	0.97	-0.19
1973 - (Mar.-Sept.)	18.00	1.18	26.22	1.73	+8.22
1973 - (Oct.-Dec.)	25.00	1.64	26.22	1.73	+1.22
1974 - (Jan.-Mar.)	25.00	1.64	26.22	1.73	+1.22
1974 - (Apr.-June)	30.00	1.97	46.06	3.03	+16.06
1974 - (July-Dec.)	33.00	2.17	45.06	2.96	+12.06
1975	33.00	2.17	43.64	2.87	+10.64
1976	33.00	2.17	37.45	2.46	+4.45
1977 - (Jan.-Nov.)	33.00	2.17	35.16	2.31	+2.16
1977 - (Dec.)	40.00	2.63	N/A	--	--
1978	40.00	2.63	N/A	--	--

Source: Department of Census and Statistics, Paddy Marketing Board and (33).

[a]Prices have not been deflated to correct for inflation since no index of producer prices is available. Market prices are average prices paid to farmers.

Table 1. Comparison of the production series with open market paddy prices suggests that open market rice prices are responsive to changes in availability of cereal grains. There are additional variables, however, which affect price, variables such as the rate of price inflation, prices of substitute foods, quality, income levels, and government ration system policies. Some of these variables cannot be quantified given present data limitations, making it impossible to test price responsiveness to quantity changes in a rigorous way.

Trends in guaranteed paddy prices since 1972 suggest that costs of paddy production and costs of imported rice were important considerations when the GPS prices were set.

Figure 7 compares changes in the GPS paddy price with open market prices and with a trend line developed from cost-of-production studies (22, 33). These are the only two relatively sound cost studies that have been undertaken. The studies were limited, however, to specific districts (different districts in each study). Only ad hoc and expedient cost-of-production studies have been made specifically for price-setting purposes. This deficiency in production-cost analysis underlies comments made repeatedly in this report as to the critical need for development of anlaytical capability as a prerequisite for rational policy formulation.

Extrapolation of a linear trend in production costs from data reported in the two limited studies suggests that costs have been increasing rapidly (nearly 128 percent per year). Unfortunately, no cost or price indexes are available against which these results can be compared. However, known sharp price rises in fertilizer tend to support the view that costs have increased rapidly. GPS paddy prices increased only 31 percent per year over the same period. According to the cost studies, GPS prices have been well above costs,

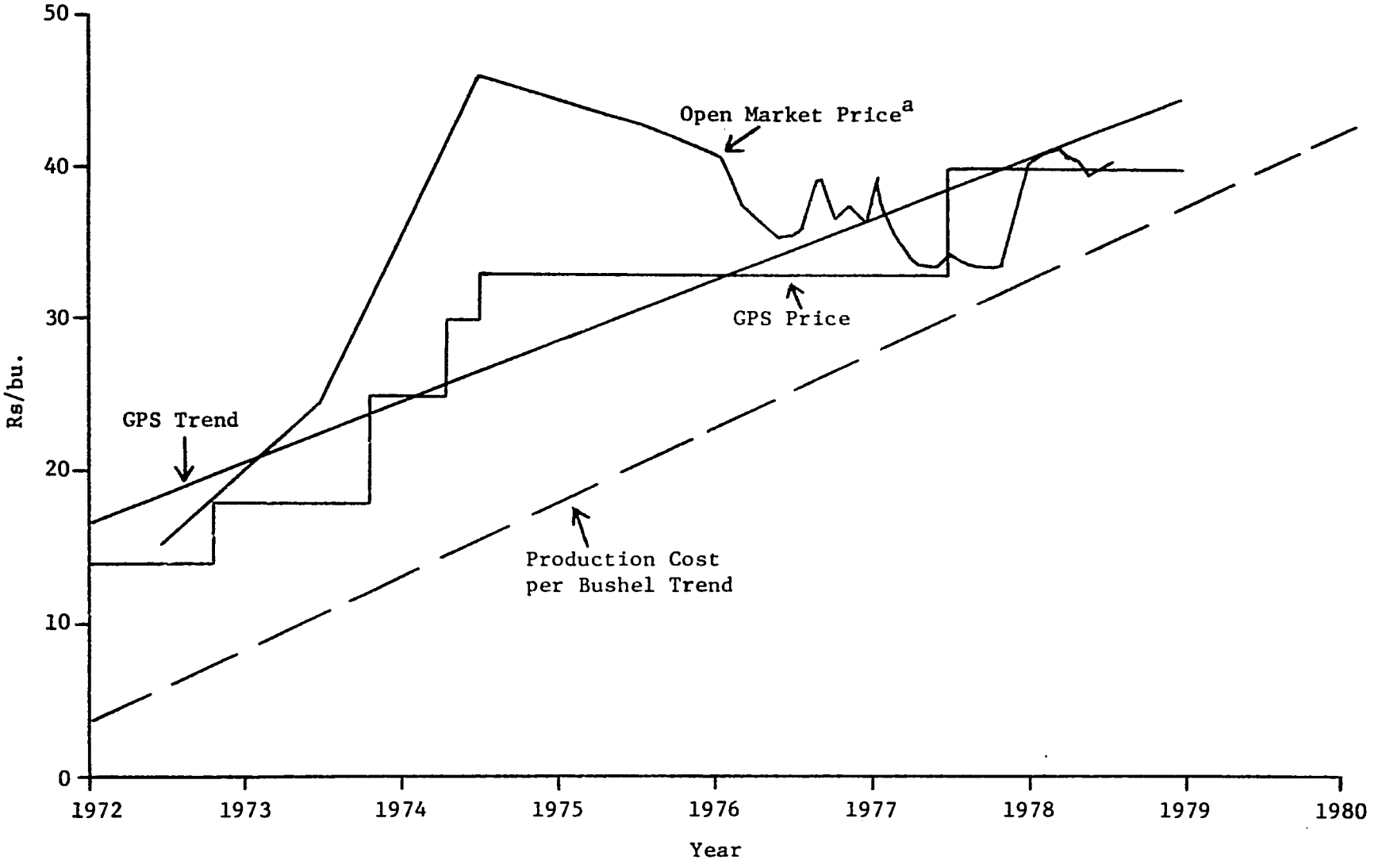

Figure 7. GPS AND OPEN MARKET PADDY PRICES IN RELATIONSHIP TO COST OF PRODUCTION, 1972-1978

Sources: Appendix Tables 1 and 2, and Cost of Production Studies (22, 33).

[a]Pre-1976 observations annual: post-January observations monthly.

however, and the trend has been toward a convergence of prices and costs at what may presently be a fairly realistic relationship (see Figure 7 for a graphic representation).

Figure 7 suggests that the GPS paddy price acts as a floor for open market paddy prices. Free market prices were above GPS prices in all but a short period in 1972-73 when the two prices were about equal. The free market was at one time as much as Rs 16.06 ($1.06) per bushel higher than the GPS price; however, the two prices have moved closer together in recent years. PMB purchased only 21 percent of the paddy production in 1975, when the spread between market and GPS prices was Rs 10.64 ($0.70) per bushel. By 1977 PMB purchases had increased to 30 percent of paddy production and the price spread had narrowed to Rs 2.16 ($0.14). While market prices between 1972 and 1976 were influenced by drought conditions and resulting paddy shortages, the 1976-78 prices appear to have been supported by the GPS paddy price. Even in the face of a substantial harvest during Maha 1978, the open market price remained above GPS paddy prices. It appears that an intervention level of something approaching 30 percent of the total production may be needed to support prices at present levels.

The trend line for GPS paddy prices and that for production costs in Figure 7 are converging. While the present GPS price may be realistic (perhaps more realistic than in some earlier years), the price will need to be increased soon if production cost trends continue. Figure 8 also suggests the need for a price increase. While there has been a decline in the price of lower grade milled rice during the early part of 1979, the current price is only slightly below the rice-equivalent value of the GPS paddy price.

The grading system for paddy purchases from farmers is oversimplified and inadequate. One result is the movement of very low quality products

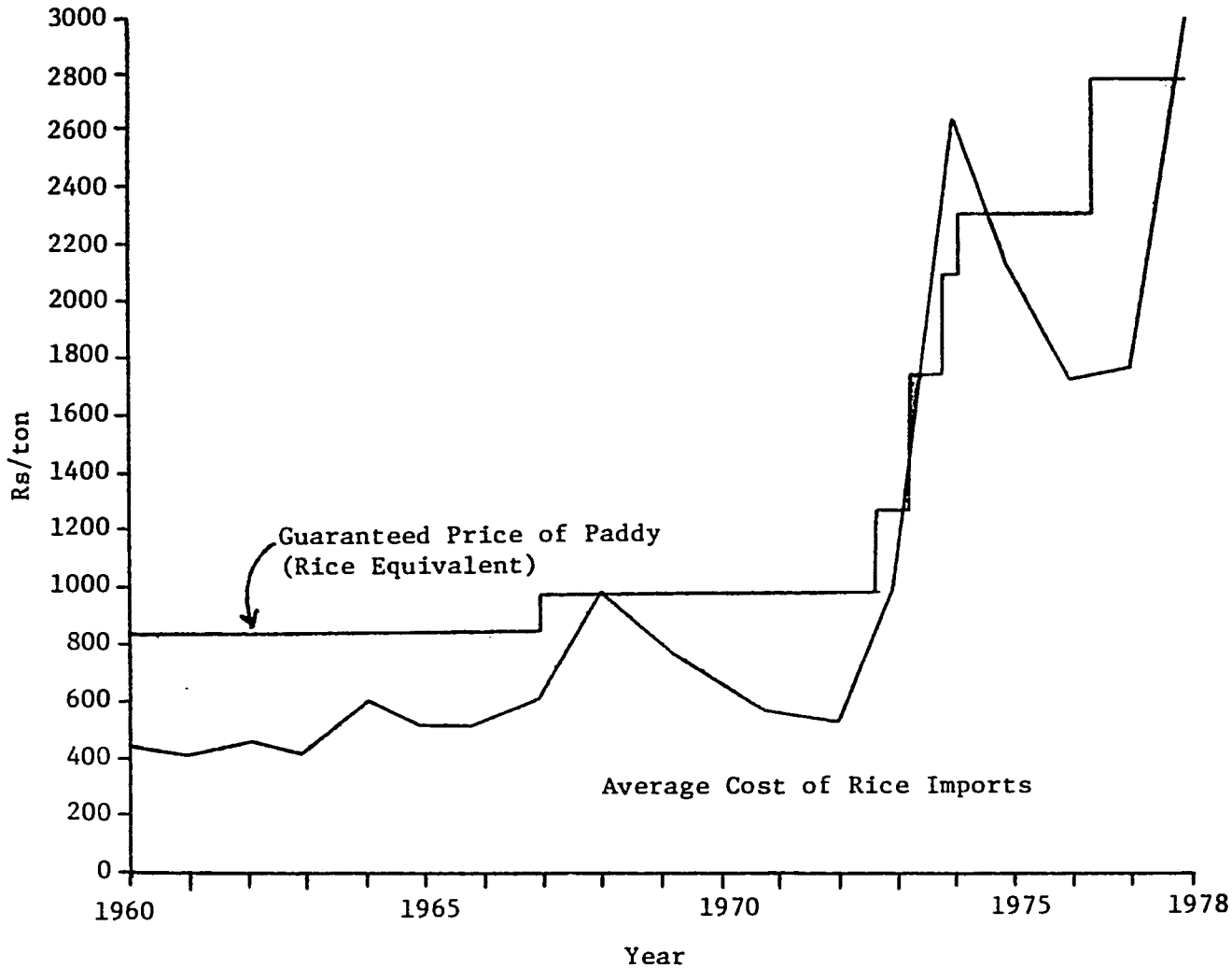

Figure 8. GUARANTEED PRODUCER PRICE FOR PADDY AND AVERAGE COST OF RICE IMPORTS

Source: Victoria Project, Feasibility Report, MDB, 1978.

through the PMB system. PMB has attempted to improve this situation via a set of new specifications for paddy purchases. Current specifications are shown in Table 4. The specifications do not establish a range of discounts sufficient to communicate to farmers the need to maintain grain quality. Farmers cannot be expected to be quality conscious when the pricing system does not reward them for quality. It appears that rice moving in private trade is of higher quality than can be found in PMB marketing channels. Private trades usually involve face-to-face transactions where buyer and seller negotiate a mutually acceptable price.

PMB is currently making an effort to differentiate prices according to quality for its sales of milled rice to FC stores and private retailers. The present sales price schedule is Rs 1.45 ($0.10) per pound for the lowest grade rice, Rs 1.55 ($0.10) for intermediate grades and Rs 1.75 ($0.12) for imported rice. The basic problem with this pricing system is that quality factors are not clearly specified; consequently, adequate price differences cannot be established.

Paddy and rice prices relative to prices of other domestic crops are examined in Part Two, C, 6. Domestic rice prices relative to imported rice, wheat and wheat flour are discussed in Section 4, below.

4. Imported Wheat and Flour/Milled Rice Price Relationships

Cereal imports are likely to be needed for the foreseeable future. The recent study by Borsdorf and Hugo (1) indicates that replacement of the proportion of imports presently accounted for by rice with expanded domestic rice production may not be possible until the mid 1980's. Effective post-maturity loss abatement programs may be required to achieve that goal. Replacing the wheat flour imports will take much longer.

Table 4
Grades and Standards for PMB Paddy Purchases,
Sri Lanka, 1979

Minimum Specifications for Paddy	
1. Unmixed Ordinary Grade	
Refraction	9%
Mixture of other varieties - less than	10%
2. Mixed Ordinary Grade	
Refraction	9%
Mixture of other varieties exceeding (discount).	10%

Common Features for All Grades
1) Well dried and matured. Moisture not exceeding 15%.
2) Extraneous matter not exceeding 1% by weight; free of dirt and mud.
3) Refraction not exceeding 9%.
4) Free of insect and pest damaged grain.

Source: Mr. W. Mediwaka - Manager Field Operations, PMB.

In the meantime, the deficit will have to be covered by cereal grain imports. Whether the imported cereals should be wheat flour (or wheat) or rice or, as is the present case, some combination of both is in large measure a question of costs. Nutritionally, the two cereals are comparable, a pound of milled rice has about 99 percent as many calories as a pound of wheat flour and approximately one-half as much crude protein. Cost relationships between imported rice, domestic rice and imported wheat flour over the period 1970-78 are set forth in Table 5.

In seven out of the eight years, rice imports cost less on a calorie basis than domestically-produced rice (based on GPS price). In every year wheat flour imports were less costly than domestic rice. In four out of the nine years, wheat flour was a more economical purchase than rice, while in two years there were only minor cost differences (7½ percent or less) between the two. In only three years could major savings (9.5 to 10.5 percent) have been effected by switching from imported flour to imported rice. A large proportion (44 percent in 1978) of the wheat flour is imported under concessional terms, resulting in an average cost well below world market price.

It is doubtful whether the potential savings from substituting rice imports for flour imports in any given year would offset the costs of the disruptions to the marketing system which such a substitution would occasion. Moreover, rice and wheat flour are not perfect substitutes in the minds of consumers. Finally, the higher protein content of the flour makes it a valuable source of that important nutrient.

Some porportion of flour products will continue to be required to meet consumer preferences. Until a thorough survey of preferences has been completed, the extent and implications of the potential trade-off will not

Table 5
Comparative Costs of Domestic Rice, Imported Rice and Imported Wheat Flour, Sri Lanka, 1970-1978

Year	Imported Rice	Domestic[b] Rice	Wheat[c] Flour
	- - - - -	- -(Rs/lb)- -	- - - - -
1970	0.30	0.45	0.27
1971	0.25	0.45	0.28
1972	0.24	0.45	0.28
1973	0.48	0.62	0.55
1974	1.18	0.97	0.98
1975	0.94	1.05	1.03
1976	0.77	1.05	0.90
1977	0.79	1.07	0.79
1978	1.35[a]	1.28	1.12[a]

Source: Based on data from Department of Census and Statistics and Paddy Marketing Board.

[a]Estimate.

[b]Based upon GPS price; no milling or logistical costs included.

[c]One pound of wheat flour is nearly identical in caloric value to one pound of rice. No adjustment has been made for the slight difference.

be known. In any case, the die has already been cast with the decision to build the flour mill at Trincomalee. Wheat rather than wheat flour will be imported. Wheat costs would have to be very high relative to imported rice costs before it would pay to "write off" the high fixed costs of the new, modern mill.

C. Coarse Grains, Oilseeds and Pulses

A major policy of the Government of Sri Lanka has been that of seeking increased self-sufficiency in agricultural products. It is particularly evident that there has been a strong desire to reach a higher degree of self-sufficiency in food crops. Policy instruments used over the past ten years have been many and varied. Success in meeting food production goals was severly hampered by the severe drought experienced in the mid 1970's. Production relationships in those years should be viewed as atypical.

The objective of this section is to provide a brief historical review of the economic and political forces surrounding the production of non-rice crops, provide a summary of the current policy setting and finally, to set the stage for recommendations in Part Three and external assistance recommendations in Part Four.

1. Historical Setting

Coarse grains, oilseeds and pulses have historically been used as minor supplements to rice and wheat as sources of food. Rice production has been given primary attention as the major domestically-produced food grain. Emphasis has been directed toward allocating resources to the rice sector. Technical development activities in the form of research and extension programs as well as subsidization of inputs have focused on rice production. Consequently, non-rice grains have been produced in a fairly extensive manner

with minimum technological improvement in varieties or inputs. Policy directions began to change in the early 1970's, particularly in response to the general shortfall in world food supplies that began in 1972 and by drought conditions which resulted in a serious shortfall in rice production in Sri Lanka in 1975. Specific government policies in the early 1970's involved the prohibition of imports of a wide range of non-rice food crops, thus forcing market prices for many "chena"[6] crops to increase rapidly. The prices of coarse grains and pulses increased sharply in 1972 and 1973, triggering significant acreage increases in most of the dryland crops. Prices increased further in 1975 as a result of the shortfall of rice production mentioned earlier. These price increases undoubtedly made chena production far more profitable and induced considerable increases in dryland crop acreage. These adjustments indicate that the large unused land base in the form of uncultivated chena land that has traditionally been operated under slash-and-burn cultivation is a potential source of significant supply response to price changes in the short and intermediate terms.

Based on visits to chena farming areas near Anaradhapura, the study team determined that some chena land had been cropped continuously for as long as five years. The key to the apparent success of such efforts was application of appropriate production technology. This pattern of permanent cultivation is the exception rather than the rule, however. Historically, chena acreage has varied inversely with rice output of the preceding season. Poor rice harvests drive up the price of dryland crops and force subsistence rice farmers to seek temporary sustenance in the chena lands.

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[6]"Chena" is a slash-and-burn system of dryland agricultural production practiced by "squatters" on land owned by the Government.

2. The Place of Coarse Grains and Pulses in the Diet

Recent data from the Food Balance Sheet indicate that rice and wheat flour comprised about half of the total food consumed in 1977 (Table 6). Based on their estimated nutritional content, the two staple foods accounted for about 63 percent of calories and about 71 percent of protein consumed. Coarse grains and pulses have not played a major role in meeting the dietary requirements of Sri Lanka. Maize, millet, pulses and "other" grains make up only about 2 percent of total food intake and account for an estimated 2 percent of calories and 4 percent of protein consumed.

Table 6
Per Capita Consumption of Major Food Items in Sri Lanka, 1977

Item	Consumption kg/yr	% of Total
Wheat flour	43.0	14.0
Maize	2.56	a
Rice	109.00	35.5
Millets	1.32	a
Other grains	.13	a
Total	156.01	-
Roots and tubers	35.72	11.6
Sugar	8.80	2.9
Pulses	1.64	a
Coconut	30.68	10.0
Vegetable & onions	33.91	11.0
Fruits	10.01	3.3
Meat	1.52	a
Fish	6.19	2.0
Milk & milk products	13.87	4.5
Oils and fats	8.3	2.7
Total	306.65	97.5

Source: The Food Balance Sheet, Department of Statistics and Census.

[a]Less than 0.1

3. Cultivation Patterns and Production Practices

Three major cultivation systems are practiced on farms in Sri Lanka. The first and most important system is found in the irrigated land areas found on low-land and terraced slopes. These land areas are almost exclusively devoted to rice production. The availability of water appears to be the limiting factor as to whether one or two crops of rice are produced each year on the irrigated land. The second type of cultivation is that which occurs on the homestead plot surrounding the dwelling. Production on the latter land is highly varied in extent and intensity, but typically takes the form of a scattered garden-type planting of vegetables, pulses and some coarse grains, mostly on a subsistence level, with occasional surplus quantities offered for sale. The third and potentially very important form of cultivation is on the chena lands. These are nonirrigated areas adjacent to or near the farmer's homestead; they are government-owned lands, but are available for use of those who would cultivate them.[7] The extent of these lands was estimated at 4 to 5 million acres of which typically about 1 million acres are under cultivation at any given time. The remainder of this latter land area remains fallow and is periodically tilled under a random slash-and-burn cultural system.

It is on the chena land area that increased production of coarse grains, legumes and pulses is most likely to occur in the future. Population pressures in recent years have brought an increase in the cultivation of chena land. In some cases total farming operations are based on continuously cropping dryland areas. Resettlement schemes in some chena areas, however, have met with limited success, with abandonment of dryland-based farms

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[7]No charge is made for use of these publicly-owned lands.

occurring in many instances. The precise reasons for these failures are not well documented.

The team visited several chena farms near the Maha-Illuppallama research station. Experiences on these farms suggest that, with proper technological support and access to necessary inputs, viable economic units could be established on some of these land areas. The extent of this potential development is highly unclear. It appears that the chena lands across the country vary considerably in topography, soil types and annual rainfall. Because of these differences in land resource quality, economic research is required to ascertain the economic feasibility of dryland farming development across various regions of the Island.

Chena crop cultivation techniques are very poor. Yields are far below those achieved in many other areas of the world, suggesting that some form of technological barrier exists.[8] Even with substantial increases in price in the 1970's, there was no perceptable increase in yields. Greater demands for dryland crops in the past have been met by planting larger acreages with these crops. Further increases, at the point where land becomes the limiting resource, will require greater intensification. However, dryland crop production is concentrated in the dry and intermediate rainfall zones where availability of chena land is the greatest (Appendix Table 7).

The team was unable to find any substantive economic studies that have evaluated resource use alternatives. Simple cost of production studies and comparative advantage analyses were unavailable. Studies evaluating internal (domestic) or external (export) demand factors for dryland crops to provide

[8]The problem has many facets; improved varieties, better cultural practices, application of fertilizers and improved forms of pest control are all apparent needs.

the necessary basic economic information for policy decisions have not and are not being conducted.

It appears that the research and extension resources available to the GSL have been concentrated on production and marketing of rice and that non-rice crops have received a minimum of emphasis. Current research programs, if successful, may greatly enhance the production potential for dryland crops and may point the way to measurable reductions in per-unit production costs.

4. Major Dryland Crops

Three broad categories of dryland crops are grown: corase grains, oil-seeds, and pulse crops. Dryland areas also support significant production of chillies and root and tuber crops; these latter crops were not evaluated in the present study as they were beyond its scope of work.

a. Coarse Grains.

(1) Production. The major coarse grains produced in Sri Lanka are maize, finger millet and sorghum. Maize and finger millet are by far the most important coarse grains, accounting for 95 percent of the coarse grain acreage in about equal shares. Sorghum accounted for 5 percent or less of the total coarse grain acreage during the 1970-79 period. The area planted to coarse grains approximately doubled between 1970 and 1976. Acreage declined substantially in 1977, however, and indications are that a further decline was experienced in 1978 (Table 7).

Production of three major coarse grains increased approximately in proportion with acreage sown, indicating either that no major technological improvements were adopted to increase production or that land brought under cultivation was about equally productive as land previously cultivated. Technological change has probably not been great as unused chena lands are

abundantly available in many areas. As a result of the zero land cost very few purchased inputs are used by producers, making it logical to assume that farmers follow relatively extensive cultivation practices, maximizing returns to seed and labor. The team's observations confirmed that supposition.

Table 7
Coarse Grain, Maize, Finger Millet and Sorghum
Acreage and Production, Sri Lanka, 1970-77

Year	Acres	Production (mt)
1970	99,567	28,331
1971	98,714	26,274
1972	106,136	29,517
1973	150,349	39,747
1974	188,739	46,541
1975	220,720	54,671
1976	200,501	56,520
1977	158,811	40,286
1978[a]	122,370	N/A

Source: Department of Statistics and Census.

[a]Maha season only.

The growth in coarse grain production from 1970 to 1977 no doubt stems in part from the response of farmers to rising grain prices during the first half of the 1970's. Basic economic policies introduced by the government in 1972 were aimed at encouraging domestic production of dryland crops by prohibiting imports of most competitive food crops from 1972 until the latter part of 1977. The elimination of imports no doubt contributed significantly to dramatic increases in coarse grain prices. Farm-gate maize prices increased from about Rs 12 ($0.79) per bushel in 1970 to over Rs 50 ($3.29) per bushel in 1974. Similarly, farm-gate millet prices increased from Rs 13.50 ($0.89) per bushel in 1970 to Rs 66.50 ($4.38) per bushel in 1974.

It appears that high prices during 1974 stimulated production response from farmers beyond what existing markets could utilize, thus causing prices to decline and precipitating a lagged decline in acreage. The acreage response resembles the traditional "cobweb" response of farmers to price adjustments. Adequate data were not available to permit specification of the time lags associated with supply response in the system, but it would appear that the recent response cycle may have been of two or three years duration. It appears there will be a shortfall of maize and sorghum from 1978-79 crops, resulting in possible imports of coarse grains by the Oils and Fats Corporation.[9]

Further evidence that the present price cycle for coarse grains has bottomed out was indicated by Oils and Fats Corporation and Livestock Board offers to buy maize from farmers at prices higher than prevailed in 1977-78. If the 1978 Maha acreage reports are accurate (Table 8), further coarse grain price increases can be expected in 1979, causing farmers to respond with larger plantings for the 1979-80 season.

Table 8
Maha Acreage Estimates for Major Non-Rice Crops,
Sri Lanka, 1977-78

Crop	Year	
	1977	1978
	- - - (acres) - - -	
Finger Millet	75,190	66,304
Maize	64,753	52,638
Sorghum	4,474	3,428
Green Gram	19,858	19,849
Cowpea	18,817	21,063

Source: Department of Census and Statistics.

[9]Based on an interview with Dr. De Silva, Chariman of the Oils and Fats Corporation, March 8, 1979.

(2) Utilization. Detailed data on coarse grain utilization are not available, necessitating that evaluation of demand and demand potential be based on fragmented published information and on interviews with government officials and personnel in the marketing system.

The principal use of coarse grains is home consumption as foods. A wide range of food preparations can be made from coarse grains. Finger millet and maize are said to be preferred to sorghum as foods (see Section 6, below, for discussion of preferences implied by price relationships). Compared with rice and wheat, the coarse grains are relatively unimportant as sources of starchy food, however. There may be potential for greater substitution of coarse grain for rice and wheat flour, but consumer preference studies are required to determine the extent of substitution possible (see Section 6, below). Several studies have suggested coarse grain blends with wheat flour as a possible way of expanding coarse grain utilization for human food.

A small portion of coarse grains is purchased for use in livestock feeds. Because the livestock industry is relatively limited in Sri Lanka, a very small percentage of the total coarse grain crop has moved into feed channels. Based on livestock numbers, there is no evidence that feed grain consumption is increasing. However, declining coconut production in recent years has reduced the supply of coconut meal (poonac), historically a major ingredient in commercial feed mixes. The reduction in coconut meal has stimulated some increased demand for maize. The magnitude of the increase in coarse grain demand caused by this shift is difficult to assess: however, because total maize production is relatively small, the change could cause a significant percentage increase in demand.

One of the factors most limiting to increasing coarse grain production in the past has been the lack of a clear-cut policy towards pricing and the

development of marketing infrastructure. Published reports contain frequent references to lack of coarse grain markets for farmers at fair prices. Further, it has been indicated that PMB and the Marketing Department have frequently lacked the ability to buy a large enough quantity from farmers to maintain stated floor prices (Table 9); price data in Appendix Table 6 support the contention.

Table 9
Marketing Department and PMB Purchases of Non-Rice Grains, Sri Lanka, 1974-78

Crop	Year				
	1974	1975	1976	1977	1978[a]
	- - -	- - - - - -	- - (MT) -	- - - - - -	- - -
Maize	106.2	446.3	10.9	33.4	8,145.6
Kurakkan[b]	206.3	49.8	14.0	25.2	3.7
Sorghum	86.7	826.8	72.5	107.5	82.0
Cowpea	13.3	85.9	296.2	1,087.5	204.0
Green Gram	80.8	23.9	199.1	211.8	58.7
Black Gram	--	--	26.7	7,208.0	7,126.0
Soybean	--	11.2	8.4	10.9	315.0
Total	493.3	1,443.9	627.8	8,684.3	16,435.0

Source: Department of Marketing and PMB.

[a]1978 data not complete. [b]Finger millet.

Coarse grains traditionally have moved through private trade channels; however, records of volume and prices are difficult to obtain. Several references to exploitation of farmers by private traders were encountered, but documentation was not available. A further market channel for a small but increasing quantity of maize seems assured by demands of the CARE program for local grains to be used in the production of Thriposha for their food distribution programs in Sri Lanka. Projected needs in 1981-82 are for slightly more than four tons of maize (Table 10).

Table 10
Projected Grain and Oilseed Needs of CARE Programs,
Sri Lanka, 1978 to 1981-82

Year	Free Distribution				Commercial Marketing		
	Maize	Soybean	Local Cereals	Recipients	Maize	Soy-bean	Recipients
	- - - (MT) - -		(% of Total)	(No.)	- - (MT) - -		(No.)
1978-79	1,346	449	25	500,000	---	---	---
1979-80	2,550	851	30	500,000	90	30	49,500
1980-81	3,252	1,085	35	600,000	369	123	75,000
1981-82	3,717	1,239	40	600,000	563	188	100,000

Source: CARE/Colombo.

In summary, coarse grain production has generally responded to price incentives generated by either government policies as in the case of import restrictions or by competitive market price changes through shifts in supply or demand. In either case, the coarse grain market would appear to have cyclic tendencies generated by the lagged supply response of farmers. Rationally planned price stabilization efforts should have a mitigating influence on the magnitude of the cylcic production swings.

b. Oilseed Crops. The major oilseed crops grown in Sri Lanka are sesame, soybeans and castor bean. Sunflower is an additional oilseed presently being grown on an experimental basis on very limited acreage. The Ministry of Agriculture Sector Plan for 1978-82 (15) expresses considerable optimism about the future of the sunflower crop. While it is too early to predict the course of sunflower development, it is likely that intensified research on this crop would help identify its potential in Sri Lanka.

The most important oilseed crop is sesame with over 40 thousand acres grown in 1977. The acreage of sesame more than doubled from 1970 to 1977. The yield did not change appreciably over the past decade, suggesting that there may have been little improvement in production practices in recent years. Production response appears to be related to price increases that

have occurred since 1970. Farm-gate prices have increased steadily since 1970. The price in 1970 was Rs 23.4 ($1.54) per bushel, that in 1977 Rs 112.03 ($7.37).

Sesame is a chena crop produced during the "Yala" or fall season. Traditionally, sesame acreage has varied with rainfall conditions; however, acreage has increased steadily since 1970. The trend in recent years is most likely in response to price increases over the same period.

Sesame, produced for its edible oil, is exported as whole seed. The extent of home consumption or domestic crushing cannot be readily identified. Soybeans are a relatively new crop in Sri Lanka, with experimental acreage beginning as recently as 1972. While acreage was only 3,500 in 1978, interviews with production specialists indicated the likelihood that the soybean will far out-produce most of the traditional legume seed crops. Though there is some direct home consumption of soybeans, considerable research is under way to explore many additional processed food uses. One of the more promising processed foods involves the blending of soybean and wheat flour to produce a substitute for coconut milk traditionally used as a base for curry foods. In addition, it is hoped that home use will include a wide range of preparations based on home processing of the whole bean. Marketing studies and economic analyses are needed to determine the full potential of soybean production.

Castor beans are grown on a very limited acreage, estimated at only 2,000 in 1977. The oil is used for medicinal and industrial purposes. Little is known about the economic potential of this crop. It is planted on a scattered random basis throughout chena lands. Its major advantage on dryland acreage is that it is highly drought tolerant, thus providing farmers with relatively stable production.

c. Pulse Crops. The major pulse crops grown in Sri Lanka are cowpea, green gram and black gram. The production of these crops occurs on a limited scale in the dryland farming areas. The acreage of all three of the pulse crops has increased significantly during the 1970's in response to generally high prices (Appendix Table 6).

Cowpeas are the major pulse crop; their acreage increased from 10,223 in 1970 to 34,096 in 1977. The farm-gate price increased from Rs 15.40 ($1.01) per bushel in 1970 to Rs 94.96 ($6.25) in 1977.

Acreage of green gram increased from 9,329 in 1970 to 29,277 in 1977. Farm-gate prices increased from Rs 27.14 ($1.79) per bushel in 1970 to Rs 154.02 ($10.13) in 1977.

A full series of data for black gram was not available, but Ministry of Agriculture sources indicate that the 1974 acreage was 3,400, that for 1977 30,900. Farm-gate prices for black gram were not available, but presumably they followed a pattern similar to those for other pulse crops.

Yields of all the pulse crops are relatively low reflecting limited application of technology and limited adoption of high-yielding varieties. Very little research has been directed toward the pulse crops; production technology consequently is not far advanced. Interviews with research personnel at the MI Station indicated that work is under way to resolve insect and disease problems; however, hybridization programs are not being considered at present.

5. Market Channels for Dryland Crops

The majority of the dryland crops that move into commercial markets are purchased by private traders. Roving buyers typically move through the country at harvest time buying surplus grain, oilseeds and pulses from farmers. In addition to this market outlet, periodic purchases of coarse grains and

pulses have been made by PMB at GSL floor prices; however, these purchases have been too small and infrequent for effective support of floor prices. The Marketing Department has also purchased dryland crops, but again, interventions have been infrequent and ineffective in supporting prices. Limited direct purchases from farmers are also made by the Oils and Fats Corporation and by the Livestock Board for feed. Livestock feed requirements (commercial operations only) are indicated in Tables 11 and 12. Feed demand at present and in the foreseeable future is extremely limited relative to the apparent ability to produce feed stuffs.

A common dissatisfaction of farmers regarding government purchase of produce has been the long waiting period for payment after the crops are delivered to the government store. Farmers frequently need rapid payment at harvest time to settle debts, necessitating sale to private traders who traditionally make payment at delivery. Reports abound that private traders enjoy unusually high marketing margins; however, attempts to obtain data on marketing costs and margins were unsuccessful.

In summary, there appears to be considerable potential for increased production in the dryland sector. Potential demand is harder to assess, but appears to be a severely limiting factor. There are numerous limitations to future development in terms of organization of the necessary production resources and the development of necessary market institutions to handle expanded movement of dryland crops in the commercial sector. The following sections identify some of the major impedements and suggest development policies that will assist in remedying the problems.

6. Pricing Policies

Price ratios in Tables 13 and 14 can be used in tracing Government pricing policies and in testing apparent consumer preferences. All of the

Table 11
Major Livestock Producing Districts,
Sri Lanka, 1978

Egg Production[b]	Broiler Production[c]	Dairy Production[d]
Puttalam	Puttalam	Batticoloa
Badulla	Ratnapura	Vavuniya
Galle	Kandy	Badulla
Kurunegala	Kegalle	Kandy
Kalutara	Jaffna	Puttalam

[b]Constitutes approximately 58 percent of farmers (commercial) Island wide. "Commercial" refers to 1,000 + head capacity for poultry and 5 + head capacity for dairy.

[c]Constitutes approximately 96 percent of farmers (commercial) Island wide.

[d]Constitutes approximately 83 percent of farmers (commercial) Island wide.

Table 12
Feed Requirements by Commercial Farms,
by Major Districts, Sri Lanka, 1979

District	Amount (tons)
Puttalam	1,560.9
Badulla	293.2
Galle	1,424.1
Kurunegala	714.3
Kalutara	5,357.1
Ratnapura	143.0
Kandy	10,033.0
Kegalle	1,250.0
Jaffna	2,501.7
Batticoloa	84.8
Vavuniya	285.7
	23,647.9

Source: Agricultural Implementation Program, 1978.

Table 13
Prices of Selected Coarse Grains and Pulses Relative to Each Other
and Relative to Price of Rice, Sri Lanka, 1970-1978

Year	Maize/ Sorghum		Maize/ Millet		Sorghum/ Millet		Maize/ Rice[a]		Sorghum/ Rice		Millet/ Rice		Cowpea/ Green Gram	
	GPS	Mkt.[c]	GPS	Mkt.[c]	GPS	Mkt.[c]	GPS	Mkt.[c]	GPS	Mkt.[c]	GPS	Mkt.[c]	GPS	Mkt.[c]
1967	1.27	0.88	1.27	1.62	1.00	1.85	0.42	0.52	0.34	0.59	0.34	0.32	0.68	0.75
1968	1.37	-	1.37	1.58	1.00	-	0.46	0.47	0.34	-	0.34	0.30	0.50	0.56
1969	1.22	-	1.64	1.75	1.34	-	0.55	0.55	0.45	-	0.34	0.31	0.50	0.58
1970	1.22	1.01	1.64	1.60	1.34	1.63	0.55	0.47	0.45	0.47	0.34	0.29	0.63	0.57
1971	1.22	1.12	1.64	1.96	1.34	1.75	0.55	0.52	0.45	0.47	0.34	0.27	0.63	0.42
1972	1.22	0.75	1.64	1.96	1.34	2.59	0.55	0.57	0.45	0.75	0.34	0.29	0.63	0.36
1973	1.51	1.53	2.03	0.99	1.34	0.65	0.49	0.40	0.33	0.26	0.24	0.41	0.63	0.38
1974	1.00	0.75	1.96	1.37	1.96	1.81	1.13	0.63	1.13	0.84	0.58	0.46	0.67	0.65
1975	1.00	0.61	1.86	1.57	1.86	2.57	0.99	0.55	0.99	0.90	0.53	0.35	0.67	0.59
1976	1.00	0.73	1.86	1.57	1.86	2.16	0.99	0.46	0.99	0.64	0.53	0.29	0.67	0.78
1977	1.00	0.63	1.86	1.68	1.86	2.66	0.97	0.51	0.97	0.80	0.52	0.30	0.67	0.62
1978[b]	0.85	1.29	1.12	2.20	1.32	1.70	0.49	0.51	0.58	0.39	0.44	0.23	0.75	0.74

Source: Computed from data in Appendix Table 6.

[a]Milled rice-equivalent = 1.47 (paddy price); no allowance for milling or logistical costs. GPS paddy prices were weighted by number of months price was in effect where price changed during the year.

[b]June Colombo paddy price (Island average for year not available).

[c]Farm-gate market prices.

Table 14
Prices of Imported Wheat[a] Relative to Prices of Alternative Coarse Grains, and Rice from Alternative Sources, Sri Lanka, 1970-1978

Year	Wheat/Maize		Wheat/ Sorghum		Wheat/ Millet		Wheat/ Domestic Rice		Wheat/ Imported Rice
	GPS	Mkt.	GPS	Mkt.	GPS	Mkt.	GPS[b]	Mkt.	
1970	0.77	0.86	0.94	0.86	1.27	1.40	0.50	-	0.63
1971	0.81	0.82	0.99	0.92	1.33	1.62	0.53	-	0.80
1972	0.81	0.74	0.99	0.56	1.33	1.45	0.44	0.42	0.83
1973	1.31	1.18	1.98	1.81	2.67	1.17	0.65	0.52	0.83
1974	0.65	0.78	0.65	0.59	1.27	1.07	0.73	0.49	0.60
1975	0.71	0.96	0.71	0.59	1.32	1.51	0.70	0.53	0.79
1976	0.62	1.17	0.62	0.85	1.16	1.85	0.62	0.54	0.84
1977	0.55	1.00	0.55	0.63	1.02	1.69	0.53	0.51	0.72
1978	1.29	1.26	1.10	1.62	1.45	2.76	0.63	-	0.60

Source: Based on data from Department of Census and Statistics and Paddy Marketing Board.

[a]Wheat-equivalent prices of imported wheat flour (assumed milling factor of 0.72).

[b]GPS rice-equivalent paddy (milling factor of 0.68); no allowance made for milling or logistical costs. Prices weighted by number of months price was in effect where prices changed during the year.

[c]Farm-gate market prices.

ratios were calculated on an equal-weight (lb., cwt., kg., etc) basis. Those for wheat reflect the expected milling yield of the wheat, presuming milling by-products will not be used as food.[10] The market prices are average annual prices paid farmers. Retail prices, unfortunately not available, would provide a much better test of consumer preferences and would permit some general assessment of the potential size of the market for each of the various food crops. The existence of the ration system has no doubt dampened market price movements for all food commodities and particularly those of the lower-cost staples. The effects of the ration system make it difficult, in the absence of consumer preference studies, to evaluate preferences from price data alone. The free rice and subsidized wheat flour sales have no doubt had some impact on demand for other grains. In the absence of reliable consumer preference surveys, the size of the impact cannot be established.

Nevertheless, the GPS ratios [11] can be compared with farm-gate market price ratios in evaluating in a general way whether GPS prices of one crop relative to another are in alignment with market evaluations. By comparing market price ratios of one crop relative to another with ratios of caloric content in the case of the cereals and protein content for the pulses, one can establish in a general sort of way the extent to which the various

[10] Since flour rather than wheat has been imported, the by-products have not been available. Preliminary reports suggest that by-products from the mill now under construction will be exported.

[11] Guaranteed Pricing Scheme "guaranteed" prices for paddy, "floor" prices for dryland crops.

grains (or pulses) are viewed by consumers as substitutes.[12] If they are substitutes for rice or wheat flour, programs to enhance their output would at least be supported by consumer demand. Price ratios which may over time deviate substantially from ratios of nutritional equivalency would suggest consumers view the foods as poor substitutes and would bode ill for a program designed to replace imported rice or wheat flour with dryland crops such as maize, sorghum or millet. Finally, comparison of official prices with world market prices provides a measure of the competitiveness of domestic production, under the mantle of the Government prices, vis a vis world markets.

GPS and market price ratios for all of the food crops have been highly variable over the past nine to twelve years. At least part of the variation in GPS ratios stems from erratic pricing policies and apparent overreaction to short-term adjustments in domestic supplies. Much of the variation in market price series and part of that in GPS prices is no doubt attributable to unwillingness of consumers to substitute one food for another even given wide variations in relative prices. While it is true that markets in Sri Lanka may at times reflect supply and demand conditions imperfectly (poor transportation, poor market intelligence, storage problems, imperfect competition, etc.), it seems unlikely that prices for one food crop could vary with respect to other food crops to the extent they have in Sri Lanka in recent years unless the foods were viewed by most consumers as

[12] Calories and protein are, of course, not the only nutritional aspects of cereal grains and pulses, but caloric content is perhaps the single most important factor in comparing the cereals and protein content the most important in comparing pulses. Moreover, nutritional ratios are affected by processing; where processing varies from one food to another, the ratios of the raw foods may be altered significantly. Except for wheat processing (milling), these effects have not been considered.

being generally poor substitutes. In several instances ratios for a given pair of crops have not even been consistently either greater than unity or less than unity, suggesting that neither crop is regarded as "superior" to the other. The most probable explanation is that such crops have substantially different uses, e.g., sorghum may be used primarily for food, maize for livestock feed. Variations in the relative prices of the latter two grains over time strongly suggest their non-substitutability.

The GPS ratio of maize to sorghum prices has been 1.0 or higher for all except the last of the past 12 years. While the Government valued maize higher than sorghum on a pound-for-pound basis, the open market was not so sure; the maize/sorghum price ratio was 1.0 or higher in only 4 of the last 12 years. Sorghum appears generally to be preferred to maize; 1973 and 1978 are notable exceptions when maize prices were considerably above those for sorghum. The former year was one of an exceptionally poor rice crop (1972 was even worse) and world market prices were high. The year marked a transition to much higher market and floor prices (a higher plateau). Prices for products which might normally be regarded as being inferior are apparently bid up sharply in years of food scarcity.

Millet is clearly deemed inferior to maize on a pound-for-pound basis. Both GPS and market prices for maize have historically exceeded those for millet. Maize has generally been relatively more highly valued than millet in the market than by the Government (1978 was one of the exceptions). Sorghum, too, appears to be regarded by both Government and market as a grain superior to millet in terms of weight.

Comparisons of coarse grain prices with those for milled rice yield highly variable results. Official rice prices per pound have always exceeded those for maize except during the period 1974-77 when prices for the two

were nearly equivalent (maize/rice price ratio was 1.13 in 1974). Market prices for maize relative to rice have always heavily favored rice, ranging from 0.40 in 1973 to 0.63 in 1974. Government pricing policies between 1974 and 1977, however, were highly favorable to maize relative to rice; that policy apparently was discontinued in 1978, with posting of relative prices for the two grains which are in alignment with market evaluations.

Price patterns for sorghum and millet relative to rice have been similar to those for maize to rice. Official prices overvalued each of the coarse grains relative to rice between 1974 and 1977, with official prices in 1978 moving more in line with market dictates, except for millet where the floor price ratio for millet to rice was a relatively high 0.44 (the market ratio stood at 0.23).

Official relative prices for the pulses have, with the exception of 1972 and 1973, deviated little from market price relationships. The GPS ratio of cowpea/green gram prices in 1978 was, at 0.75, virtually identical to the market ratio of 0.74. Lack of an open market pricing history for soybeans precludes drawing comparisons with that crop.

While important, the market is only one yardstick against which to relate official prices. Since a major raison d' être for Government intervention is alleged pricing inefficiency in private markets, it is important to make other tests. One such test is the ratio of prices of one grain to another vis a vis the ratio of some measure of nutritional value of the two grains. As discussed above, calories and protein content provide perhaps the most logical standards of comparison for the cereals and pulses, respectively. Nutritionists have developed composite measures of nutrient value for some of the staple foods; these may also be useful in evaluating the "nutritional efficiency" of Government pricing policies and may aid in establishing the

extent to which apparent consumer preferences for a food are conditioned by relatively favorable prices for the food. The approximate nutritional equivalencies in Table 15 are useful as benchmarks against which to measure the efficacy of Government policies and the apparent preferences of consumers.

If prices of maize and sorghum were determined by their relative caloric values, they would be of a ratio of 1.05:1. Sorghum is higher in protein than maize, however (sorghum about 11 percent, maize 8.9 percent), making their overall relative values perhaps roughly equal. That market price ratios have deviated one way or the other over time from a ratio of approximate nutritional equivalency is further suggestive that the two grains are put to uses in which they are generally not competitive.

In terms of their relative caloric content, maize has nearly always been greatly overvalued relative to millet by both Government and market. Millet also contains about 9.9 percent protein to only 8.9 percent for maize. GPS prices were realigned in 1978 such that the resulting maize/millet price ratio of 1.12 is realistic from a nutritional standpoint. The market disagreed, however, continuing to prefer maize by a ratio of 2.2:1, the highest margin of preference in 12 years. Recent reports of feed shortages are probably the major factor. It would appear logical that both millet and sorghum should move into livestock feed channels at present market price relationships; both are good buys relative to maize. Market imperfections (probably physical distribution and communication problems) are the likely reason for anomaly. The non-substitutability of the coarse grains for each other, at least in the present scheme of things, is underscored by the chronic non-coincidence of market price ratios with nutritional ratios.

Nutritionally, sorghum is now and traditionally has been overvalued relative to millet by both official and market prices. The Government has

Table 15
Approximate Ratios of Nutritional Value
of Selected Comparison Cereal Grains and Pulses

Calorie Ratios			
Grains	Ratio	Grains	Ratio
Maize/Sorghum	1.05	Maize/Rice	0.96
Maize/Millet	1.06	Sorghum/Rice	0.91
Sorghum/Millet	1.02	Millet/Rice	0.90
Wheat/Maize	0.96	Wheat Flour/Maize	1.05
Wheat/Sorghum	1.00	Wheat Flour/Sorghum	1.10
Wheat/Millet	1.02	Wheat Flour/Millet	1.12
Wheat/Rice	0.92	Wheat Flour/Rice	1.01

Protein Ratios		Composite Ratios[b]	
Grains	Ratio	Grains	Ratio
Cowpeas/Soybeans	0.67	Wheat[a]/Rice	0.756
Cowpeas/Grams	1.11	Corn/Rice	0.610
Grams/Soybeans	0.60	Wheat/Maize	1.239

Source: U. S. Department of Agriculture (28).

[a]Value of wheat expressed in flour-equivalent of a unit of wheat; milling by-products not used as food.

[b]Obtained from Department of Grain Science, KSU.

moved, since 1975, to reduce the disparity in its relative prices, but the market persists in its preference for sorghum. The two grains clearly are not substituted for each other on a nutritional basis.

The market has always undervalued maize relative to rice in terms of their relative nutritional content. Such a situation is to be expected in a country where rice has long been the preferred food. High GPS maize prices from 1974-77 pushed price ratios for the two grains temporarily in line with their caloric values, a nonsustainable state where consumer preferences clearly discriminate against maize.

Sorghum/rice and millet/rice price patterns also reflect consumers' clear preference for rice. A GPS policy of sorghum/rice prices in line with their relative caloric value, from 1974-77, was at variance with market price relationships and was abandoned in 1978. Pound for pound and calorie for calorie, consumers obviously prefer rice to sorghum or millet.

The GPS and market ratios of prices for cowpeas relative to those for green grams, while consistent with each other, have been low relative to the protein ratio of the two pulses. Gram for gram of protein, consumers prefer green grams to cowpeas.

While GPS and farm-gate prices of most of the grains, pulses and oilseeds are sufficiently low relative to world market prices (Appendix Table 5) to make production for domestic markets preferable to imports, exports appear out of the question for most. Present GPS prices for soybeans are exceptionally high--Rs 2.80 per pound compared with Rs 2.20 CIF Tilbury (U.K.). Given these prices, soybean production will have to be utilized locally as exports would require a subsidy of massive proportions. Soybean prices have increased recently, however, bringing the Sri Lanka official price somewhat more in line with the realities of world markets. Research

is needed to determine whether costs of production are low enough to warrant consideration of production for export markets. Exports of black grams apparently are being subsidized by the amount of transportation and handling costs as the floor price is the same as the FOB Colombo price. Sesame prices, however, are low at Rs 2.43 per pound relative to the CIF Japan price of Rs 5.85, making exports potentially attractive. The millet floor price is only about one-third that of the CIF London price; present volume of production in Sri Lanka is extremely low, however, and export prospects hinge on development of local market infrastructure and on long-run costs of production. The support price for paddy is much closer to world market price than the comparisons in Appendix Table 5 imply since PMB rice is generally of much lower quality than that traded in world markets.

PART THREE

POLICY ASSESSMENT/GUIDELINES/RECOMMENDATIONS

A. Policy Development

B. PMB Organizational Structure and Operations

C. Paddy and Rice Marketing Policies

D. Coarse Grains, Pulses and Oilseeds

A. Policy Development

One of the most serious weaknesses of the state-owned and controlled marketing agencies is the multiplicity of agencies under various ministries, performing duplicate functions, or having, as in the case of rice, control over different segments in the marketing chain. The integration which is so badly needed cannot be effected quickly or easily, however. The complexity problem is so deeply rooted and so serious that only decisive policy actions can correct the situation.

The possibility for coordination of existing paddy and rice agencies does exist, but probably will not occur because of deficiencies in marketing analysis. The development of sound forecasting and crop estimation techniques would advance the ability of PMB and FC to coordinate actions and would allow PMB to identify market outlets needed for given levels of procurement. While the development of analytical processes would not automatically cause coordination to occur, it would provide the analytical background for marketing policies leading ultimately to coordination.

Figures 2 through 5 illustrate the profusion of agencies often competing with each other in performance of the same functions. Market disturbance actions rather than market intervention actions are the common result. The problem stems from political rationalization of the system at the expense of economic rationalization.

Government has failed to make strong policy decisions or to establish a set of well defined policy objectives. The policy objectives of the PMB are a case in point. They are so open-ended and vague that the Board could almost write its own policies.

At the present time, coordination is possible only by chance. Rationalization of this system with a set of marketing policies would require

willingness of the Government to initiate a four-step program. These steps are: (1) development of a data collection, analysis, and dissemination system, (2) development of greatly expanded capabilities for marketing and agricultural economic analysis, (3) development of an interface or coordinating body between the expanded analytical arm and policy decision makers and, finally, (4) willingness to use the results of marketing and economic analysis in constructing rational economic policies and in realignment of market organizations aimed at prevention of wasteful duplication and other inefficiencies.

1. Need for Basic Decisions

The current situation is such that certain basic decisions must be made by Government if there is to be fundamental improvement in the agricultural marketing sector.

a. Collection, Analysis and Dissemination of Statistical Data. A decision must be made as to which government agency is to be responsible for this task. Policies must be formulated for upgrading and reinforcement of the agency's abilities so that government planners, implementing agencies and the private sector alike will have appropriate and timely information required to perform effectively. This same high-quality information is needed, on the same timely basis, to support marketing policy analysis. The collection, analysis and dissemination of statistical data clearly are the responsibilities of public agencies; private industry cannot perform these functions effectively. It is imperative that high priority be given to addressing this need. Data collection should receive first priority. Analytical needs cannot be met adequately until the data base has been upgraded.

b. Agricultural Marketing Analysis. Information is essential to support development of sound marketing policies and efficient marketing programs,

both at Ministry level and within implementing agencies. No organized marketing analysis unit presently exists. Policies must be formulated for the development and placement of such an organization. It is recommended that the unit be within the Ministry of Agricultural Development and Research.

c. Research-Policy Interface. Plans must be drawn up for interfacing expanded research capabilities with Government policy-making activities. Guidelines must be established to assure that research will result in analyses most useful to policy makers. At the same time, it is important that the analytical output of the research agency be put to effective use in planning activities. The new Food Policy Committee might be the logical focus for this most important activity. The Committee would be the critical point of contact between Cabinet-level policy makers and the source of analytical assessment of alternative policies.

d. Rationalization of Operational Agency Structures. An early result of the upgraded policy formulation apparatus should be rationalization of the organizational structures of operating agencies in the sphere of agricultural marketing. Policies must be formulated for structural realignments aimed at improving coordination at operating levels and at ensuring that lines of responsibility and authority are clearly drawn.

e. Improvement of PMB's Operational Capabilities. The organizational structure of PMB must be revised if it is to operate efficiently and if donor support of its activities is to be utilized effectively. Specific recommendations for such revision are outlined below in Part Three, B, 1 (see organizational diagram, Figure 9).

f. Private Sector Support. While there is apparent general agreement within Government as to the need to strengthen the role of the private sector, there is no indication of what specific policy actions may be taken. The

appropriate role of the private sector in the marketing of coarse grains, pulses, and oilseeds is difficult to assess because so little is known about the structure of markets for these crops. The void results from the extreme dearth of marketing analysis mentioned repeatedly in this report.

A clear government policy specifying its intended role for private enterprise would be more productive than anything else at this point in time. Private sector investments are strongly influenced by positions taken by central governments. It is often the atmosphere within which firms operate more than the availability of financing that affects investment activity in the private sector.

The development of yet another marketing agency, such as the proposed Agricultural Produce Marketing Board would not only complicate an inefficient and ineffective government marketing structure, but would impede effectiveness of the private sector since it would constitute an implied policy of government domination over marketing activities. Private enterprise would undoubtedly take the hint that it is to have a role subsidiary to that of government and make investment decisions accordingly.

2. Food Policy Committee

The role planned for the proposed Food Policy Committee is not clear. Many conflicting points of view are in evidence, leading to the conclusion that Government has not yet carefully defined the role of this committee in relation to market policy formulation. The following suggestions are made as to the appropriate role of such a committee:

a. Overall Purpose. The most logical purpose for the committee might be that of an interface between a marketing analysis unit and policy makers at Cabinet level. A second function would be establishment of linkages between the data collection, dissemination and market analysis units, and

between these units and the planning units in various implementing agencies.

b. Objectives. The primary objectives of such a committee would be: (1) Provision of analytical capability for resolution of problems requiring policy decisions. Scope of activity would include problem formulation, identification of alternative courses of action, and expected results. (2) A closely allied objective is that of screening the output of ongoing analyses to identify signals of changes needing the attention of policy makers. In fulfillment of its market analysis/operating agency linkage function, the committee must have the analytical ability to answer questions posed by operating and/or implementing agencies, questions, for example, concerning changes in operating systems which might increase effectiveness and/or efficiency. The committee should also be charged with responsibility for reviewing whether statistical data dissemination is adequate and timely and whether the output of marketing analysis flows as needed to planning units of the affected implementing agencies.

c. Need for Analytical Capability. The need for such capability appears not to be generally recognized. The lack of understanding of analytical procedures, together with the lack of top-level government support appears to have thwarted effective decision making.

It appears that a Food Policy Committee, if formed, would be composed of high-level secretaries of various ministries. Performance of committee functions and achievement of objectives set forth above will require the development of a market analysis unit under its immediate direction. Formation of the committee with no underlying provision for analytical competence is likely to perpetuate the status quo of policy-making based upon ad hoc, "brush fire" technical efforts with resulting failure to clarify either the problem or alternative courses of action.

3. Analytical Needs to Support Marketing Policy Development and Operational Activities

The assessment of current needs presented in this subsection represents the study team's evaluation based upon discussion with Sri Lankan Government officials and on first-hand field observations.

a. Collection, Analysis and Dissemination of Current Supply and Price Information.

(1) Current crop estimates of acreage, yield, and production by district and DRO (District Revenue Officer) division.

(2) Average monthly farm-gate prices by district and DRO division.

(3) Average monthly wholesale market price by market.

(4) Current weekly and daily wholesale market prices by market.

(5) Monthly stocks of commodity by position by district and DRO division.

(6) Current daily and weekly retail market prices by market.

b. Collection, Analysis and Dissemination of Current Demand Information.

(1) Current situation reports of demand conditions.

(2) Current situation and outlook reports on marketable surplus and flows by district.

c. Supply Patterns, Production Costs, Supply Response and Demand Projections.

(1) Short and long-range supply forecasting.

(2) Farm production costs.

(3) Shifts in cropping patterns.

(4) Shifts in demand patterns.

(5) Production response to alternative levels of price supports.

d. Analysis of Marketing Patterns and Systems.

(1) Analysis of market organization, structure, conduct, and performance.

(2) Analysis of marketing functions, channels, costs, and margins.

(3) Analysis of supply and demand balances and impacts upon markets.

(4) Analysis of physical and institutional infrastructures affecting the performance of marketing systems.

(5) Analysis of existing and alternative technologies in agricultural marketing, including internal and external constraints.

e. Analysis for Evaluating Marketing Policies, Programs and Projects.

(1) Analysis of locational requirements of storage and processing systems to gain efficiencies in the transport network and to test various trade-offs in the systems.

(2) Economic feasibility studies.

(3) Analysis of changing structural relationships in markets and marketing systems.

(4) Short and long term projections of the impacts and results of current policies and programs.

(5) Analysis of expected results of alternative policies and programs for improving the marketing system.

(6) Analysis of master plans for implementation of stated price and marketing policies.

(7) Monitoring, reporting, and evaluation of price and marketing policies and programs.

B. PMB Organizational Structure and Operations

An organization such as the Paddy Marketing Board cannot be expected to operate effectively nor to fulfill the objectives with which it is charged in the absence of appropriate institutional arrangements. Relatively too much attention has been focused upon physical facility and equipment needs and too little upon institutional development. The current status of the

organization is such that its ability to assimilate a major development project is highly questionable.

1. Structural Improvements

Depending on the extent of the span of control or span of management permitted in a given organization, the organization may be classified as having either a "hi-tier" or "low-tier" structure. A hi-tier structure, compared to a low-tier structure (Appendix IV), has more hierarchical levels resulting, naturally, in a limited span of control given to managers at all but the highest levels. Such a structure is required for centralized control as the decision-making process for operational control occurs in the upper half of the triangle. The low-tier organizational structure (Appendix IV) provides decentralized control with the decision-making process for operational control occurring in the lower half of the triangular structure. This type of structure is normally appropriate only where special span-of-control conditions exist. Limiting factors include abilities, state of training, experience and personality of personnel, effectiveness of communications, and nature and extent of operations.

The current structure of PMB resembles the low-tier model. Unfortunately, the organization lacks the prerequisites for making such a structure work effectively. The centralized structure as proposed in Figure 9 is strongly recommended. Span-of-control difficulties are minimized in a structure of this type which makes allowances for the limitations of man as a supervisor and as a follower. A scalar principle, known as chain-of-command in military organizations, advocates a clear line of authority from the top to the bottom. The proposed organizational structure will greatly clarify this line of authority. While the structural outline in Figure 9 follows these concepts, the specific departmentalization of such a structure should be based upon results of a management audit.

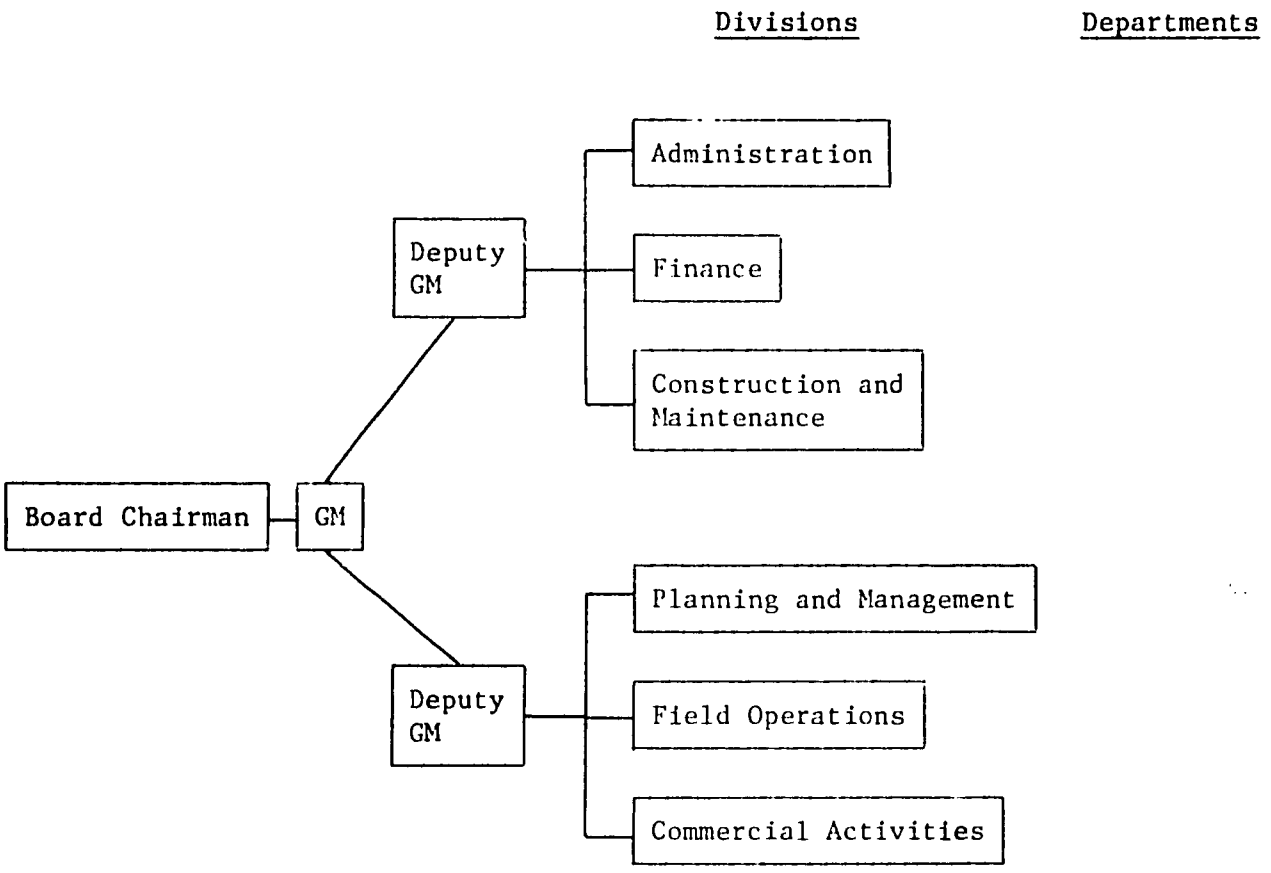

Figure 9. PROPOSED PMB ORGANIZATIONAL STRUCTURE

Although rationalization of the organizational structure can improve its internal operational efficiency, it will not solve the problem of conflicting objectives imposed upon the agency from above. The latter issue is addressed in the following section.

2. Separation of Objectives

The business operations objectives of the Board are quite different from those of RPDC (or other departments which might be charged with private sector development). It is for this reason that RPDC has been omitted from the structure recommended in Figure 9. Even if management were completely unbiased, conflicting objectives are untenable. Where management is biased, for example, against the private sector or sees no need for aggressive research and development work, conflicting objectives can never be resolved. Such appears to be the current situation.

RPDC should be removed from the control of PMB and given institute status within the Ministry of Agricultural Development and Research. Development of the private sector would be a major objective of the new institute. The institute would address problems in improving technical and pricing efficiency of both the private and public sectors on a consultant basis rather than as an agency in competition with private industry. This approach would free PMB of conflicting objectives, permitting it to concentrate on its role of market intervention. A management audit is needed to lay out the optimal specifics of the reorganization.

3. Management Audit

There is a clear need for a management audit to closely define organizational needs. A management audit would evaluate the operation of PMB in relation to its objectives, its functions and linkages between activities and functions. Such an audit would provide the basis for designing a new

structure with appropriate channels of command and communications. Such an audit can identify appropriate internal objectives and structural refinements and lay an operational base upon which improvements in efficiency can be built.

Management normally has multiple and interrelated objectives. In a business organization, public agency, or other institution, these objectives are derived from the total purpose or overall policy setting within which the entity operates. However, a given overall objective may be separated into subsidiary objectives. The achievement of subsidiary objectives should lead logically to achievement of the total objective or policy goal. Objectives are the cornerstone of management. They are the beginning and the end. Objectives enable management to plan, organize, direct, and control personnel and other resources effectively and efficiently.

Within a departmental structure, a set of objectives and functions must be established in relationship to the overall objectives of the firm. From this base a management audit can develop a process of appropriate departmentalization and therefore a sound organizational structure.

A management audit can, as it proceeds, establish the various departmental information needs and determine how such information should flow, thereby leading to development of a management information system and to identification of planning needs.

4. Management Information System and Planning Requirements

A restructured organization is necessary but not sufficient to meeting the Board's objectives. Lack of information appropriate for operational decisions is another critical deficiency. There is need for development within PMB of a planning and information division and a management information system. The ability to tabulate needed operating data, analyze the

data in the context of problem solution, and disseminate the results in such form as is required by management are all critical to the ability to manage. Staff support functions are vital to the efficient operation of a complex organization such as PMB. Planning is highly important for an agency faced with monitoring, evaluating and stabilizing markets for the basic food grains. PMB lacks the capacity for all but the most elementary kind of planning activity. There is virtually no planning staff as such. Planning that does occur is based on incomplete data of questionable reliability and proceeds without benefit of systematic or rigorous analysis.

5. Role of Marketing Management

In view of the foregoing needs and suggestions, it is evident that the direction of PMB should be one of market intervention at the paddy purchasing level rather than as a purchasing agent for the ration system. Past data indicate that the procurement levels of PMB have varied in response to changes in the ration system (1). If PMB is to be the implementing agency for the GPS, it must have the ability to reach the farm level in its purchasing operations. New off-ration markets must be developed to dispose of rice not channeled into the ration system. Something other than the current strategy of money-losing stores is called for.

Staff functions such as inventory control and transportation and traffic management are critical to the organization's success. No overall system has been developed at the central office for coordination of these activities. A centralized system of inventory control should be established to coordinate flows of paddy and rice throughout the procurement and distribution system. Such a system would assure that requirements are met promptly and at the lowest combination of storage, milling and transportation costs.

Efficient utilization of transportation services requires careful planning whether vehicles are owned or contracted. A system must be established to plan and implement these needs.

C. Paddy and Rice Marketing Policies

Specific goals for government intervention in paddy marketing activities are not well defined. The long-run role of paddy marketing agencies in the development of the agricultural sector needs clarification. A clearer definition of broad policy goals and specific guidelines for marketing agencies is prerequisite to the success of many of the recommendations in this section. Moreover, the policy-making apparatus is badly handicapped by a severe shortage of reliable data and an almost total lack of quantitative analytical capability. Finally, the fragmented nature of operational authority and responsibility in the marketing sphere, along with awkward internal organizational structures of certain marketing agencies (Part Two, A, above), are likely to limit the success of marketing improvement efforts.

1. Optimum Size, Type, Location and Timing of New Storage and Handling Facilities

Near-term facility needs have been adequately researched. The recent KSU analysis by Borsdorf and Hugo provides detailed guidelines for facility expansion (1). There will be a recurrent need for facility replacement, however, and it is essential that a capability be developed within PMB for analysis geared toward meeting these needs. A detailed cost/benefit analysis should be made prior to making long-term investments in facilities. Optimization requires considered analysis of a number of variables. Optimal location, for example, is affected by variables such as regional patterns of consumption and production, location of existing facilities, road conditions and climates which create extremely adverse storage conditions; grain should

perhaps not be stored for extended periods of time in certain of these areas. Transportation constraints should be considered; grain should not be stored where road conditions during rainy seasons make shipments difficult or impossible.

No thorough analysis has been made of the relative costs and benefits of alternative types of storage facilities; the issue of bag vs. bulk storage should be researched carefully. Climatic conditions are a factor in the choice since, where climatic conditions are adverse, it is somewhat easier to maintain quality of grain in bulk. Capital costs of bag warehouses tend to be much lower, however, than for bulk silos. Bag warehouses are also more flexible as they can be put to other uses if need be. Operating costs of bag warehouses may be higher, however, depending on local costs of labor. The potential for natural air drying is another "type" factor since air drying is more effective in bulk storage. Natural air drying is less costly than heated air drying and would conserve foreign exchange; heated air may be the only feasible method except in drier parts of the country, however.

These and other variables should be considered as future plans for facility replacement and construction are formulated. All costs, including those of facility construction and operation, quality preservation, and transportation, must be accounted for.

Basic weather data--rainfall, relative humidity and temperature patterns at various locations over time--should be collected and incorporated into any analysis of facility design and storage needs. A program for computer analysis of coded weather data is available at KSU.

2. Food Grain Reserves

Evaluation of present GSL grain reserve programs is complicated by the lack of a clear policy statement setting forth the goals of the program.

If the goals are simply price supports for producers and price protection for low-income consumers, with less regard for broader economic and social considerations such as technical and pricing efficiency, progressiveness, and national income stability, then the program might be rated as generally successful, Viewed more broadly, in terms of possible implied goals, evaluation is complicated by lack of previous rigorous analysis. Little apparent effort has been directed toward analyzing actual or potential effects of grain reserve policies and procedures beyond first-round implications for producers and consumers of cereal grains. Since costs of paddy production have not been subjected to recent and thorough analysis, implications for producers can only be inferred from apparent significant response to increasing farm-gate prices. On the distribution side, it is clear that income transfers to low-income consumers of ration rice have been substantial.

The basic purpose for the Government's storage program needs clarification. The goals which are to be furthered by the program must be set forth clearly. Operational guidelines for PMB which further these goals can then be established. The performance of reserve programs and of agencies, such as the MPCS's, PMB and FC, which administer them, can then be evaluated in terms of the established goals.

The need for the ration system will diminish as economic development of the country moves ahead and as per capita incomes increase. The need for an alternative stabilization mechanism will then arise. Consideration should be given to moving toward a market-oriented buffer stock program with provision for modest carry-over stocks to meet emergency needs as well as price-buffering goals. Prices might be allowed to fluctuate within some preset range. Producer prices would be set as they are now prior to harvest; releases from stocks could be adjusted to keep consumer prices within the

predetermined bounds. Purchase prices and release triggers would have to be based on thorough and ongoing analyses of supply and demand conditions. The analyses could be performed only if there were timely access to supply and demand intelligence. Data collection, tabulation and evaluation capabilities all will need substantial improvement. Cost-of-production studies must be produced annually. Consumer demand functions must be estimated through careful empirical analyses.

Although reliable estimates of neither expected costs of large reserve stocks nor expected economic benefits from such stocks are available, it is clear that the costs of a reserve large enough to dampen price fluctuations completely would be prohibitive. Furthermore, while average costs of a buffer reserve increase more or less in proportion to the size of the reserves, benefits increase at a diminishing rate. Complete stability is therefore an unrealistic goal.

The degree to which price instability can be tolerated is in part an economic issue, in part a social and political one. The economic aspects of reserve sizing and management can be addressed using procedures developed by Phillips and Sorenson at KSU (20). The technique can be used to establish the expected costs and benefits of alternative reserve policies. Costs and benefits must be calculated on a probabilistic basis since future production variability can be addressed only in terms of probability. Discounted costs and benefits are highly sensitive to the timing as well as the magnitude of future shortfalls and surpluses of domestic production.

In any case, a goal well short of complete price stability makes sense. The size of reserves needed to achieve a given degree of price stability depend on the size of the market, the expected production and import variability and the price elasticity of demand for the grains to be stored.

Elasticity of demand for cereals in Sri Lanka was conservatively assumed to be in the neighborhood of -0.2 (Part Two, B, 1, above). Historical production and import variability were traced in Table 2. The inventory implications of a policy allowing rice prices to vary within a range of plus or minus 15 percent around the long-term price trend are set forth in Table 16. If price elasticity of demand is -0.2, variations in available quantities must be held to within plus or minus 3 percent of the quantity trend. Such a reserve policy implicitly assumes that means other than buffer stocks can be used to redress any inequities resulting from price variations within the allowed range.

Had such a reserve program been in effect during the period 1952-77, it would have operated as outlined in Table 16. Deviations in total available cereal supplies (domestic production plus imports), identified in column 1, would have been buffered by adjustments in reserve stocks (column 3). Resulting year-end balances of stored cereals are found in column 4.

As can be seen, very large reserves would have been required to hold price variability within 15 percent of the long-term trend line. Based on annual production and import data (annual data do not permit examination of actual inventory adjustments or intra-year import patterns), more storage would have been required on three past occasions (1970, 71, and 77) than PMB (or predecessor) had then or even projects to have by 1980. The costs of building additional facilities and holding stocks of this size would be substantial.

Imports will no doubt be required for a long while to come. (Construction of the flour mill at Trincomalee implies anticipated continued needs for wheat, at least continued imports are projected in the recent analysis by Borsdorf and Hugo (1). Careful timing of these imports can reduce, but not

Table 16
Operation of Hypothetical Buffer Reserves, Sri Lanka, 1952-1977
(Long Tons)

Year	(1) Deviation from Minimum Supply Target[a]	(2) Allowable Deviation[b] ±	(3) Change in Reserve Stocks	(4) Year-End Balances[c]
1952	-4,669	28,191		37,589
1953	-26,657	28,826		37,589
1954	-52,187	29,576	-22,611	14,978
1955	-39,511	30,345	-9,166	5,812
1956	-63,281	31,133	-32,146	---
1957	-478	31,844		---
1958	+77,782	32,775	+45,007	45,007
1959	+112,023	33,627	+79,296	124,303
1960	+17,494	34,502		124,303
1961	-59,796	35,400	-24,396	99,907
1962	-90,555	36,320	-54,235	45,672
1963	-153,464	37,265	-116,199	---
1964	+274,254	38,148	+236,106	236,106
1965	-235,675	39,051	-196,624	39,482
1966	+233,822	39,676	+194,146	233,628
1967	-194,376	40,923	-153,453	80,175
1968	+48,173	41,893	-6,280	73,895
1969	-27,434	42,885		73,895
1970	+345,748	43,901	+301,847	375,742
1971	-54,510	44,941	-9,569	366,173
1972	-189,576	45,857	-143,719	222,454
1973	-98,913	46,865	-52,048	170,406
1974	-30,218	47,858		170,406
1975	-33,891	48,871		170,406
1976	-149,510	49,906	-99,604	70,802
1977	+318,548	50,865	+267,683	338,485

[a]Column 7, Table 2. "Supply" includes domestic rice production, imported rice and imported wheat flour.

[b]Three percent of minimum supply target (column 6, Table 2), based on allowable price variation of ±15 percent of long-term price trend and assumed price elasticity of demand for cereal grains of -0.2.

[c]Starting reserve in 1952 assumed to be 4 percent of minimum supply target.

eliminate the need for buffer stocks of paddy. Wheat storage at the new mill will be limited to 60,000 tons, however, thus restricting the potential for accumulation of temporary stocks. Moreover, milling costs per ton would increase sharply if the mill were utilized much below its capacity of 10,000 tons per week in an attempt to buffer effects of a large paddy crop by that means. The cost trade-offs between larger buffer stocks and alternative levels of flour mill utilization are an important aspect of the detailed analysis required for establishing the specifics of a rational reserve policy.

Purchases of grain in world markets, if properly timed, can contribute to price stability in domestic markets and reduce storage requirements of PMB. It is clear that food grain imports will be required for the foreseeable future. In the long run, foreign trade can provide benefits from specialization. Sri Lanka should specialize in production of commodities for which it has the greatest comparative advantage. It is important that domestic pricing policies be established with a view toward world market conditions. Present market intelligence efforts are inadequate for the task. A system should be established for the ongoing collection of market information covering major import and export crops.

While every effort should be made to program food grain imports so as to contribute to price stability, it is unlikely that imports can ever be relied upon fully to meet stabilization goals. The pipeline to grain import sources is sometimes undependable. Imports to meet domestic shortfalls may arrive too late to be useful; their arrival might even coincide with the next bumper harvest and thereby destabilize prices. Domestic reserves, in addition to adjustments in foreign pruchases, will be necessary if prices are to be stabilized effectively.

3. Quality Control

A well-defined policy addressing the issue of quality control of cereal stocks in public sector marketing channels is needed. Standards must be established for rice moving into the ration system and into off-ration channels. Whether the same standards are to apply to ration and off-ration rice must be determined. The public sector should take the lead in establishing grades and standards for the private as well as public sector. A system must be established which will assure that paddy purchased from farmers meets prescribed specifications and that rice provided to consumers meets established standards. Quality must be monitored and controlled as the paddy and rice move through the various public-sector marketing channels. A system of incentives and disincentives adequate to assure that grain meets established specifications must be developed.

The present highly simplified public-sector two-grade system (discounts applied to mixed-variety grain) may be adequate for the time being. Consideration should be given, however, to establishing a grading system with objective standards and discounts applied for varying levels of moisture, foreign material and damaged grain.

Installation of driers at procurement points (if this is to be their location) will make establishment of moisture discounts particularly desirable so that farmers delivering dry grain will be properly rewarded. Appropriate moisture discounts are easily established. The price of a unit of dry grain relative to a unit of wet grain should reflect the fact that the additional moisture contained by the wet grain has no market value. The appropriate formula is:

$$P_1 = P_2 \frac{(100 - M_1)}{100 - M_2}$$

where:

M_1 = moisture, % wet basis of grain before drying

M_2 = moisture, % wet basis of grain after drying

P_1 = price for wet grain

P_2 = price for dry grain

The above formula accounts only for the loss of weight incurred during drying. An additional penalty, based on actual costs of drying, should be assessed. These costs will have to be established through careful cost analysis. Costs should be measured over the full range of anticipated moisture levels since drying costs per unit of moisture removed are higher for drier than for wetter grain.

Appropriate discounts for foreign material can be readily established. One percent of foreign material represents one percent of nonexistent nutritive value and the price should be discounted by one percent.

It is important that grades and standards employed by PMB reflect actual consumer preferences in Sri Lanka. Samples of paddy, along with their respective selling prices, should be obtained from wholesale markets. The data collection effort should be country-wide (all major wholesale markets) and extend over an entire year. After grading the samples, a multiple-regression analysis should be made to determine the extent to which market price is affected by each quality variable. The study would be invaluable in determining appropriate discount rates to be applied to each of the grading factors.

Although private sector marketing is relatively undeveloped and may not be in great immediate need of official grades and standards, as development proceeds and as trading becomes more impersonalized, the need will become

critical. RPDC should be given the lead in establishing appropriate parameters for private as well as public sector grades and standards for paddy and milled rice.

4. Operation and Management of Government Procurement and Sales Programs

The most critical need is for clarification of the roles which PMB, FC and the cooperative system are to play now and in the future. Second, operational agencies should be given increased autonomy to operate within clearly established guidelines. Their performance should be evaluated in terms of these guidelines.

Basic price policies are now and undoubtedly should be established at the Cabinet level of Government (see Part One, above). The administration of these policies, however, should be carried out within established guidelines, with a minimum of interference, by operational agencies--primarily PMB and FC (or successor agency or agencies) in the case of paddy. Basic policies, if they have sound economic and social bases, need not and should not be in constant flux. Operating agencies need assurance that their guidelines will be relatively stable. Such stability will allow major authority for program administration to be lodged at operational levels.

Operating agencies such as PMB and FC must be able to program their own transport needs, control inventories, plan for new facilities as needed and carry out their basic mandate with a greater measure of autonomy than prevails at present. PMB should be expected to provide recommendations to ministerial-level policy makers relative to pricing and other fundamental policy matters. To carry out such a mandate, analytical capabilities of their staff must be upgraded substantially.

Establishment of appropriate policies and programs is hampered by inadequate data gathering and evaluating procedures. Limited analytical

capabilities are a particularly serious handicap to policy making and to everyday operations of PMB and FC. Appropriate purchase prices cannot be established without appropriate data and analyses. Procurement prices at a level which best meets policy goals must be established prior to planting time, must be well publicized and must be consistent over time if they are to be used as forward prices to facilitate planning by farmers and market intermediaries. Price levels should be in keeping with goals, whether support or stabilization, but must also be consistent with capabilities of operational agencies. Guidelines for the release of stored grain must be developed and operating agencies must have latitude for decision making within these guidelines.

Government pricing policy in the rice sector has been relatively successful in stimulating increased production. Little can be recommended to improve on that performance. Official prices for paddy are presently in about the right alignment with world prices and with apparent costs of domestic production. Costs are increasing, however, and GPS paddy prices should be increased in the near future to about Rs 45 per bushel.

Although a reduction in imports of rice and wheat flour would no doubt drive domestic market prices for rice much higher than at present and provide further incentive for added production, the social and nutritional implications of such a move must be considered carefully. While a dimunition in the scope of the ration system is something to strive for in the future, income and political realities do not bode well for a rapid retrenchment of the system. In the meantime, continued wheat flour (or wheat) imports appear to be a logical means for meeting the country's chronic shortfalls in domestic cereals production. Imports of rice rather than those of wheat should be phased out as increased domestic agricultural productivity allows. The

issue is discussed again in Section D, 3, below, in the context of potential substitution of expanded dryland production for wheat imports.

The present paddy pricing structure is highly simplified with no allowance made for temporal or geographic differences in prices paid to farmers. Such a structure may be adequate for the time being and may be the only one administrable given present staff limitations. Consideration should be given, however, to future refinements in which prices would vary seasonally and geographically in keeping with costs of storage and transportation. Allowance should be made for the fact that harvest patterns vary widely from one area of the country to another. These differences offer the potential for substituting transport for storage, a possibility which needs further study. Staggered harvest patterns may, at the same time, reduce seasonal price differences and thereby limit the potential storage margin accruing to PMB.

D. Coarse Grains, Pulses and Oilseeds

Three basic policy goals frequently expressed by GSL officials are: (1) adequate food supplies for consumers at reasonable prices, (2) price incentives for producers to encourage greater production, and (3) "self-sufficiency" in food production. Specific avenues of policy for implementing these broad and vague policy goals are not clearly stated. Nor is there an adequate analytical basis for making specific policy decisions within the context of the above broad "framework."

1. Need for an Integrated Dryland Policy

Policies affecting the dryland farming sector emanate from many sources. Several ministries and semiautonomous boards have responsibility for marketing of dryland crops. Coordination of these efforts is minimal. The supply of imported farm inputs and the flow of technical guidance from the extension

services also appear to lack coordination. There is a need to coordinate all of these efforts if a successful program of production and marketing of crops from the dryland sector is to be developed.

One or two key crops that have been identified as having the greatest economic potential should be the focus of a comprehensive production and marketing program. Secondly, the effort should initially be concentrated in geographic regions having the greatest economic potential. Once the geographic production areas have been selected and production goals identified, a marketing program can be initiated. Key elements in the marketing program include the establishment of grades and standards, development of storage and handling facilities, identification of market locations and transport requirements and means of establishing and implementing pricing guidelines for producers and middlemen.

2. International Trade Policies

Trade policies have taken many forms in Sri Lanka ranging from complete prohibition of importation of many agricultural products in 1972 to current export restrictions on coconut. The changing nature of these policies suggests the need for analysis of the relation of the agricultural sector to the rest of the world.

Specific trade issues in need of analysis are the potential for export of crops produced in dryland areas, the use and need for import quotas or tarrifs and the role that concessional and commercial imports of wheat are to play in national food policy.

It is important in planning the development of the dryland crop sector that both domestic and foreign market potentials be considered as production and marketing resources are encouraged to flow into specific crop areas. Because the domestic markets for most coarse grains, oilseeds and pulses are

relatively small, it is highly probable that a well organized production program will meet domestic needs and generate exportable supplies as well. For example, soybeans appear to have considerable production potential in the dry zone but current domestic markets are limited to the amount that can be produced on only three or four thousand acres. Exports, however, appear not to be feasible given current price relationships. It is not clear whether present floor prices reflect production costs.

Utilization research being carried out by INTSOY (UNDP/University of Illinois) offers promise for development of several important food products that will increase domestic soybean consumption. The research, however, will take time, and development of product markets even more time. If production costs prove to be sufficiently low, the development of export market outlets would provide price stability in years when production exceeds domestic needs and encourage orderly development of soybean production. Development of a soy-product substitute for coconut milk (used domestically in curry preparations) might allow for expanded coconut exports.

It is possible that some form of import restrictions will be needed to protect domestic producers of some crops during the production and market development stages. If duties or other means are used to maintain internal prices above world market levels, export subsidies will be needed if surpluses are to be disposed of in world markets. Such subsidies could become very costly and might, if continued for long, hold an umbrella over inefficient producers. It may be sound economic policy to protect some of the more promising crops with duties or other trade barriers in the short run, however, because it appears that, with the adoption of known and developing techniques, farm production costs might be lowered in a comparatively short time, thus eliminating the need for price protection in the long run.

Significant amounts of concessional wheat flour imports move into the country under PL-480 and other programs (Table 17). These imports have been identified, in several written policy statements, as a deterrent to the development of rice-substitute markets for coarse grains and pulses. The statements do not, however, develop specific interim alternatives to subsidized wheat flour sales and the rice ration in meeting basic nutritional needs of low-income households. Wheat and flour imports have often provided a lower cost source of calories than do rice or other grains. Roughly comparable in caloric content, recent imports of wheat flour cost Rs 1.12 ($0.74) per pound,[13] rice imports Rs 1.82 ($0.120). The real-income and nutritional consequences of eliminating or significantly reducing wheat supplies need to be considered carefully. While it cannot soon, if ever, supplant flour (or wheat) imports, encouragement of dryland crop production could provide consumers with a better nutritional balance. Consideration should be given to extending the current ration system to include coarse grains and pulses. These additional food grains could be made available to the low-income segments of the population at subsidized prices, thus eliminating the general subsidization of wheat flour to all segments of the population. Wheat flour and bread quantities released for market sale should be priced at levels that reflect world prices and costs of importation.

As long as the present ration system exists, prospects for substituting significant amounts of coarse grain for rice or wheat flour appear dim. In the absence of reliable consumer preference surveys, it is impossible to determine the extent to which consumers now on the ration system would accept

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[13] Wheat flour is sold at cost (weighted average cost of commercial and consessional flour imports).

Table 17
Concessional Flour Imports as Percentage of Total Flour Imports, Sri Lanka, 1972-78

Year	Concessional (mt)	Pl 480 (mt)	Other Concessional[a] (mt)	Concessional/ Total (%)	Commercial (mt)	Commercial/ Total (%)	Total (mt)
1972	245,034.6	193,521.0	51,513.6	74.5	84,083.4	25.5	329,118.0
1973	217,607.9	58,774.9	158,833.0	58.6	153,591.0	41.4	371,199.5
1974	101,547.0	19,996.6	81,550.4	22.6	347,338.7	77.4	448,885.7
1975	190,672.3	101,433.8	89,238.5	41.2	271,850.6	58.8	462,522.9
1976	167,837.6	99,969.3	67,868.3	43.9	214,338.4	56.1	382,176.0
1977	287,568.8	199,767.8	87,801.0	54.0	244,674.7	46.0	532,243.5
1978	271,568.1	185,993.5	85,574.6	44.3	341,022.4	55.7	612,590.5

Source: Based on data from Food Commissioner.

[a]Non-Commercial imports other than those under U.S. PL-480 programs; specific country sources not identified.

coarse grains in lieu of part or all of their ration. Nor is it possible to determine, in the absence of a ration system, the extent to which low-income consumers would substitute coarse grains for rice and flour at present prices. One thing is clear: consumers who presently buy their cereal grains in the market have a definite preference for rice and wheat flour. Finally, it is not possible to assess the precise social and political implications of either alternative.

3. Pricing Policies

Two serious handicaps to price policy formulation exist. The first and most basic difficulty is the lack of a current and readily-accessible central data bank. A central data base with adequate retrieval systems should be established as soon as possible. A second difficulty is the absence of an economic research unit capable of analyzing the economic implications of an expansion of dryland crops. It is essential that such a research unit be created and that it be charged with responsibility for long- and intermediate-term analyses. Development of economic policies that will foster viable economic growth is virtually impossible without sound data and analysis.

It is premature to make final judgements about price stabilization schemes until further market analysis has been accomplished. It would seem unwise at this point to create a new government purchasing organization for dryland crops. Private sector marketing institutions may be capable of carrying out the necessary marketing functions. It is entirely possible that private institutions, operating within an appropriate regulatory framework, may be the most effective market organization. In order to assess that potential, more must be learned about private market institutions. It is recommended that intensive study be made of the structure and performance of existing markets in an effort to measure marketing costs and pricing efficiency in the private sector.

Sound economic analyses should be made of market potential for dryland crops in both foreign and local markets. The ultimate goal of such research is to provide a basis for determining which crops offer the greatest comparative advantage for farmers and for the Nation. It seems likely that certain of the many potential dryland crops that can be grown in Sri Lanka will prove to have greater potential than others if careful economic analysis is focused on their selection.

Cost of production appears to have been a basic consideration of pricing policy for each of the dryland crops. While costs are a key pricing constraint, market demand for each of the cropping alternatives is of equal importance. If the government is to have workable support prices for dryland crops, the prices must be based on realistic appraisals of demand prospects since too much price incentive can cause production to quickly outstrip domestic needs. Production can be encouraged by setting high support prices, but unless the market will absorb the added production at the support price, the government will have to export the product, subsidize its sale in domestic markets, ration access to the support price or renege on its support agreement. Export markets can be difficult to break into; relatively large volumes are needed to gain marketing economies. Exports of most crops are likely to involve subsidies in terms of present GPS/world price relationships. Sesame is an exception; exports of this crop would yield profits to the government. Official prices for millet, too, are well below world levels.

Coarse grains are a good buy nutritionally relative to wheat flour and rice (except for consumers eligible for ration rice). Consumers, however, prefer rice and wheat flour to coarse grains; educational programs aimed at changing their minds are likely to have little success in the short run, but should be undertaken in hopes of longer-term benefits.

Consideration should be given to a small increase in coarse grain prices. Based on world prices and on a very cursory look at demand prospects, it appears that higher prices and higher production are warranted. The official price for maize, in particular, is low relative to apparent consumer preferences. If paddy prices are increased as recommended previously, maize prices, too, should be raised to keep their relative prices in proper alignment.

In terms of their relative feed values, sorghum and finger millet are underpriced relative to maize. An educational program should be mounted to inform local livestock producers of the nutritional merits of alternative ration formulations. A market price information system is needed to keep producers of livestock and feedstuffs informed of market trends and prospects.

The soybean price is very high relative to world market prices. It may make sense to provide short-term subsidies to get the new crop established, but too little is presently known about production costs and demand prospects. More attention should be directed toward exploring the production potential of indigenous pulses and oilseeds; these latter crops are known to be well adapted to Sri Lankan conditions and may have considerable unexploited potential.

PART FOUR

IMPLICATIONS FOR DONOR SUPPORT

A. Policy Development

B. PMB Post-Production Development Project

C. Dryland Sector Project

The need for institutional development has been emphasized throughout this report. There is need for a major effort aimed at upgrading policy-making capabilities. There is major need for organizational rationalization. It has been stressed that problems are likely to be encountered in mounting support efforts within the present institutional framework. At the same time, the need for support is overwhelming. The team recognizes the need to start somewhere; that being the case, recommendations for donor support are grouped in Part Four into three categories. The first category, "Policy Development," will require an exceptionally large and long-term support effort. Certain positive actions on the part of GSL must be taken before assistance is warranted. Remaining donor support recommendations are grouped into two categories and are aimed directly at reinforcing ongoing or proposed mission projects: "PMB Post-Production Development Project" and the "Dryland Sector Project." While "Policy Development" recommendations would complement the thrust of shorter-term recommendations aimed at PMB and the dryland sector, they are not essential to their success. These latter support efforts can be mounted without commitments to major change on the part of GSL.

A. Policy Development

A need for major effort aimed at enhancing the capability of GSL in formulating agricultural marketing policies and programs emerged during the investigation of food grain policy development and implementation in Sri Lanka by the KSU team. Time and the broad terms of reference did not permit adequate study of these needs nor of the specific requirements for meeting them. The preliminary recommendations included herein are designed to help GSL and USAID in laying the groundwork for future support in formulating agricultural marketing policies and programs. The recommendations should be seen as guides

by the above groups and by future technical assistance teams, with the recognition that they will be superceded by specific GSL plans when the stage for in-depth planning is reached.

The basic needs for (1) data collection, analysis and dissemination and (2) agricultural marketing analysis, were discussed in Part Three. These needs present a challenging opportunity for USAID donor support. The support would be a large-scale effort, phased over several years, and aimed at developing GSL capabilities for formulating marketing policies. The total effort would require 10-15 years and might cost US $15-20 million.

The institutional framework which now exists does not, however, provide a favorable setting for development processes. Prerequisite to assistance is the need for GSL to (1) identify the institutional structure responsible for data collection, analysis and dissemination; (2) clarify the role and responsibility of the proposed Food Policy Committee; and (3) recognize the necessity for providing the Food Policy Committee with greatly improved analytical support. When these conditions are met (details outlined in Part Three), a base will have been created for effective donor support.

From the above base, two lines of development can proceed. First must come reinforcement of the agency responsible for data collection, analysis and dissemination. Because of limited current GSL capabilities, a major support program, composed primarily of technical assistance and training, will be required. The U. S. Department of Agriculture may be the best source for much of the project development and technical assistance needed in support of this effort.

Second, an assistance program should be designed to aid in development of a new agricultural marketing analysis group. The bulk of this assistance should begin subsequent to the upgrading of data collection and dissemination

capabilities and to concurrence of GSL in the need for development of a capable analytical body within the Ministry of Agricultural Development and Research. Because of time lags in training programs, training to staff this body should begin concurrently with assistance for improved data collection, analysis and dissemination. Development of a donor project will require technical assistance to investigate the capabilities of the unit's initial staff and the specific needs for analytical capability. The present team had neither the time nor the authorization to explore with GSL its specific deficiencies and needs in this area. Required levels of technical assistance and training to be programmed into such a project should be established in very specific terms.

Both of the above projects are long-term development activities which should contain massive initial technical assistance and training support programmed to decline continuously over a period of years with the possibility of smaller specialized projects as follow-ups to the initial projects.

B. PMB Post-Production Development Project

1. Long-Term Training

Training programs are needed to meet short-term PMB staffing requirements and to lay the groundwork for future marketing policy development. Immediate initial investment in long-term training is required to reinforce PMB's capabilities and to create a base of human skills from which the recommended agricultural marketing analysis unit can be developed.

Consideration should be given to training agricultural economists and marketing specialists at the M.S. level to meet immediate needs of PMB and eventual needs of other government agencies. The needs are great; the number to be sent abroad for such training and the timing of their departure will

depend on when and in what number they can be spared from present duties. As many as five or six per year should be sent, if possible, over the next five to six years.

2. Short-Term Training

1. The in-country short courses as outlined in Borsdorf's working paper of August, 1978 (2) should be given USAID support. The recommended training areas are (1) Agribusiness Management, (2) Marketing Management, and (3) Quantitative Analysis.

Training in these areas will meet the most critical and immediate needs of PMB staff. Upgraded agribusiness and marketing management capabilities are essential for effective management and control of the government paddy procurement system while enhanced quantitative analysis capabilities will assist in internal planning and decision-making. The training should be coordinated and concurrent with training recommended in items 3 and 4, below. Specific requirements for technical assistance to undertake the training and their expected costs are included in the working paper (2). As many as 25 participants should be trained in each of the three areas.

2. Three or four warehouse storage specialists from PMB, RPDC, and FC should be sent per year over the next five years to the summer short course in grain storage, processing, and marketing at KSU.

Upon their return, the graduates should work in cooperation with RPDC, PMB, and FC staff in setting up a training program for all PMB and FC facility managers.[14] A one- or two-week short course should be held each year. The

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[14] While such programs reportedly are conducted by the RPDC, they seem to have had minimal effect. PMB warehouses have a large number of deficiencies which can easily be corrected by employment of proper storage and handling procedures. The condition of RPDC facilities, in terms of proper sanitation for grain storage, is not exemplary. It is questionable whether the agency is well prepared to give unassisted instruction to others in proper procedures.

following technical assistance is needed to support the initial course:

Grain Marketing Specialists	-	1 mm
Grain Storage Engineer	-	1 mm
Stored Grain Entomologist	-	1 mm

3. Management Audit for Development of an Effective Organizational Structure and a Management Information System

Technical expertise will have to be provided to support the needed reorganization of PMB's operating structure and to develop and install (including provision for training) a management information system. Technical assistance is recommended as follows:

Management Audit Team

Grain Marketing Specialist	-	3 mm
Management Systems Specialist	-	4 mm
Management Economists	-	3 mm
Management Information Specialist	-	3 mm
Total		13 mm

4. Centralized System for Inventory Control and Traffic Management

A centralized system of inventory and traffic control should be established to coordinate flows of grain among PMB and other facilities with the aim of minimizing the costs of storage, handling, and transport. Support for this activity should be closely coordinated with and directly follow the support provided under item 3, above, so that the technical assistance provided for this area can build on and complement the results of the management audit in designing the appropriate system.

Technical assistance required:

Two Marketing Economists - 4 mm

5. Food Commissioner Warehouse Analysis

An analysis should be made of the costs and benefits of alternative numbers, sizes, and locations of FC warehouses. Major emphasis of the study will be to evaluate the net cost effects of reducing the number of warehouses in the system. All relevant costs such as storage, transportation to and from the warehouses, and handling must be measured under alternative warehouse configurations.

Technical support required for the study:

One Storage Engineer	-	2 mm
One Grain Marketing Economist	-	5 mm

6. Support of Private Sector Development

Predicated upon RPDC achieving the status of an independent institution and its being delegated the role of private sector development, there are many opportunities for direct support of private sector marketing activities and of RPDC research and training needs. PMB or RPDC facilities can be used as demonstration sites for illustration of appropriate techniques for storage, drying, or cleaning. Staff engineers might organize workshops on these same subjects. Staff members with training in economics or financial management could share their expertise with farmers, grain traders, and millers. Custom service systems could be developed; milling or drying services, for example, might be provided on a custom basis. Feed manufacturers might be assisted in developing least-cost rations employing rice by-products. Many other possibilities exist.

Basic grain market supply and demand data collected for PMB's use should be made available to the public. A system for the regular and timely dissemination of information of value to farmers, consumers, millers and other marketing groups would be useful. Coordination is needed between RPDC and

other information-generating agencies to assign direct responsibility for this function, to minimize duplication of effort and to assure timely release of important information.

Technical support for RPDC required to develop these and other private sector development programs:

One Grain Marketing Economist	-	4 mm
One Grain Storage Engineer	-	4 mm
One Grain Storage Entomologist	-	4 mm

Training requirements of RPDC staff should be appraised and met as recommended under items 1 and 2.

C. Dryland Sector Donor Support

Four separate but related packages are suggested for donor support of activities in the dryland farming sector.

1. Economic Feasibility Study for Soybeans

This study should examine market potential in both domestic and export markets. Secondly, the study should identify farm production costs and measure the comparative advantage of soybeans in the dryland sector. Finally, the regions that have greatest production potential will be identified.

Technical Support Requirements:

One Production Economist	-	2 mm
One Marketing Economist	-	2 mm
One Production Agronomist	-	2 mm
Total		6 mm

2. Pilot Production Program

If the results of the feasibility study in Item 1, above, are positive, a pilot program in soybean production should be launched in the most promising

production areas. It appears that much of the technical base in soybean production and utilization is well advanced. A marketing and production effort will lend necessary support to this sector of dryland crop production.

The pilot program should provide marketing support in the form of facility development and ongoing market demand analysis. Production support should be provided through technical assistance to extension programs and basic input support for seed, chemicals and tillage needs.

Technical assistance required to GSL agencies and INTSOY project:

Long-term Economist stationed at INTSOY

(provided for in Item 3, below) - 24 mm

3. Marketing Studies

A long-term marketing economist should be stationed at INTSOY to carry out intensive marketing studies on products being developed in the utilization project. Several new and potentially beneficial products have already been developed. Studies of consumer acceptance and the feasibility of commercial manufacture and marketing of soy products need to be made to clearly identify the future of soybean production in Sri Lanka.

One long-term Economist identified in

Item 2, above - 24 mm

4. Feasibility Analyses

It is very important that a joint program be initiated with GSL to analyze the economic feasibility of the major dryland crops. There is critical need for market demand studies of the structure and performance of existing marketing institutions.

Cost-of-production studies are needed in each of the dryland production areas to identify the comparative advantage of each of the major dryland cropping alternatives. Finally, international market potential for each of

the dryland crops should be assessed to determine the potential for and implications of marketing supplies in excess of domestic needs. Preliminary analysis by the team indicates that GSL floor prices are below current world market prices for certain dryland crops (see Appendix Table 4). This analysis would need to be extended much further to be conclusive but does suggest export market potential at the present.

Technical assistance required:

One Analytical Economist (project coordinator) - 36 mm

Short-term technical assistance to provide project support (specific needs to be identified by above Economist) - 48 mm

Additional dryland crop projects are likely to evolve from the analyses recommended in Item 4. Each of these projects will need to be developed as dictated by circumstances at the time.

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APPENDIX I

TEAM CONTACTS

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Mr. J. R. Ericksson	-	Assistant Director, USAID
Mr. C. Antholt	-	Agricultural Development Officer, USAID
Mr. J. Bonner	-	Assistant Agricultural Development Officer, USAID
Mr. J. Meenan	-	Capital Development Officer, USAID
Mr. G. Evans	-	Capital Resource Development Officer, USAID
Mr. S. Abeyratne	-	Agricultural Economist, USAID
Mr. J. Wimberley	-	IRRI
Mr. R. Wijeratne	-	Secretary, Ministry of Agricultural Development and Research (MADR)
Mr. R. Grigsby	-	LSU
Mr. J. Abeygoonasekera	-	Additional Secretary, MADR
Mr. A. S. Kunasingham	-	Additional Secretary, MADR
Mr. R. B. Alawattegama	-	Chairman, PMB
Mr. Mediwaka	-	Manager, Field Operations, PMB
Mr. Pulendiran	-	Deputy Food Commissioner, Ministry of Food and Cooperatives
Mr. C. Yasasiri	-	Assistant Director, Department of Census and Statistics
Dr. U. Nanayakkara	-	Director, Marketing, ADA
Dr. S. M. Hussain	-	FAO Agricultural Advisor, Ministry of Finance and Planning
Mr. Jayabalan	-	Deputy Director, APPU
Mr. Weeraratne	-	Deputy Commissioner, Department of Marketing
Mr. R. de Silva	-	Chairman Oils and Fats Corporation
Mr. C. de Silva	-	Chairman, National Livestock Development Board
Mr. Goodyear	-	CARE
Dr. B. V. de Mel	-	CARE
Mr. Jayawardena	-	Manager, Seed Production Farm, Aluththerama
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Dr. C. Hittle	-	Soybean Project, Gannoruwa
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Mr. B. Munasinghe	-	Manager, RPDC

Mr. Siriwardena	-	Research Officer, RPDC
Mr. L. Velupillai	-	Engineer, RPDC
Dr. W. Fernando	-	Deputy Director, Maha-Illuppallama (MI Research) Center
Mr. J. Fernando	-	Entomologist, MI Research Center
Mr. Kanagatharalingam	-	Pathologist, MI Research Center
Mr. Muthukuda	-	Maize/Sorghum Breeder, MI Research Center
Mr. Thavanesh	-	Kurakkan Breeder, MI Research Center
Dr. D. Tinnsley	-	IRRI Consultant, AID Cropping Systems Project
Mr. Fernando	-	PMB Stores Superintendent, Anaradhapura
Mr. Gurusinghe	-	Regional Manager, PMB, Anaradhapara
Mr. Simpson	-	PMB Technical Officer, Anaradhapura
Agricultural Instructor	-	Agrarian Service Center, Anaradhapura
Mrs. H. E. M. Perera	-	Statistician, Marga Institute
Mr. Ranatunga	-	Agricultural Economist, ARTI
Mr. M. Perera	-	Statistician, ARTI

APPENDIX II

ABBREVIATIONS

ADA	-	Agricultural Development Authority
APPU	-	Agricultural Project Preparation Unit
ARTI	-	Agrarian Research and Training Institute
CWE	-	Cooperative Wholesale Establishment
DA	-	Department of Agriculture
FAO	-	Food and Agriculture Organization of the U.N.
FC	-	Food Commissioner
GPS	-	Guaranteed Price Scheme
GSL	-	Government of Sri Lanka
IRRI	-	International Rice Research Institute
KSU	-	Kansas State University
LSU	-	Louisiana State University
MADR	-	Ministry of Agricultural Development & Research
MARKFED	-	Cooperative Marketing Federation
MD	-	Marketing Department
MDB	-	Mahaweli Development Board
MI	-	Maha Illuppallama (Agricultural Research Station)
MPCS	-	Multipurpose Cooperative Societies
NLDB	-	National Livestock Development Board
OFC	-	Oils and Fats Corporation
PMB	-	Paddy Marketing Board
RPDC	-	Rice Processing and Development Center
USAID	-	United States Agency for International Development
USDA	-	United States Department of Agriculture

APPENDIX III

WEIGHTS AND MEASURES

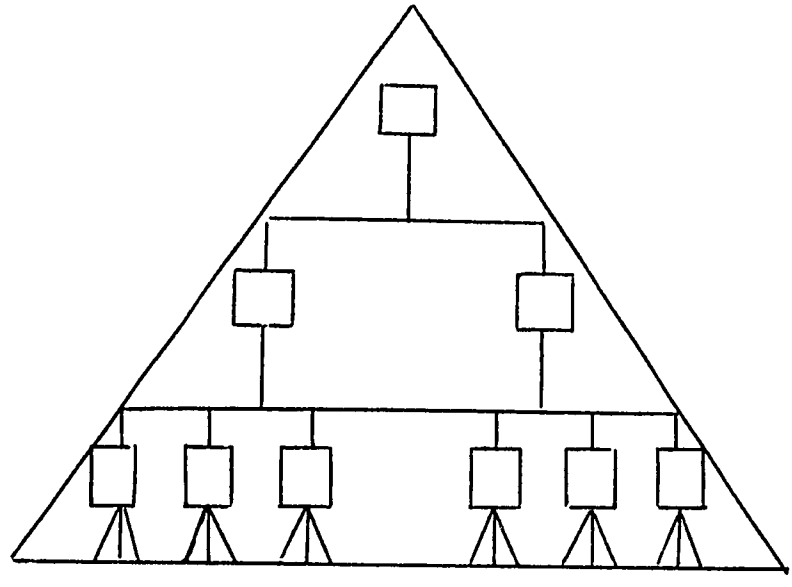
1 Long Ton	=	2240 pounds
1 Bushel (Paddy)	=	46 pounds
1 Ton paddy	=	48.7 bushels
1 Measure (Rice)	=	Approximately 2 pounds
1 Metric Ton	=	2204 pounds

EXCHANGE RATE

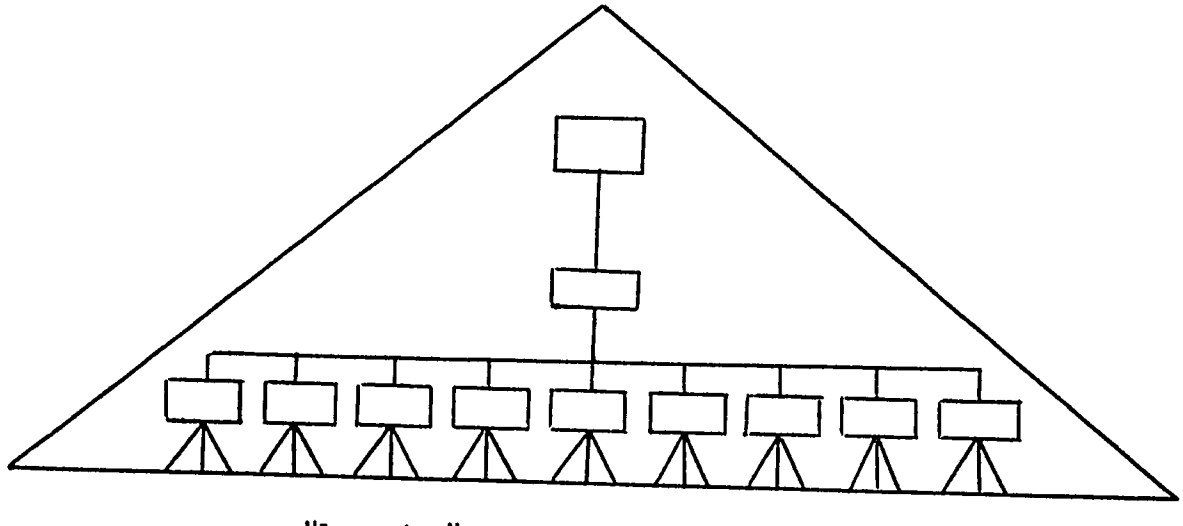
US $1	=	15.2 Sri Lankan Rupees (Rs)
Rs 1	=	US $0.066

APPENDIX IV

EXAMPLES OF ORGANIZATIONAL STRUCTURES



"Hi-tier" Organizational Structure



"Low-tier" Organizational Structure

APPENDIX V

TABLES

Appendix Table 1
Acreage, Production and Prices of Paddy, Sri Lanka, 1960-1978

Year	Yala Season			Maha Season			Total Production (mt)	Fixed Price (Rs/bu)	Farm Price (Rs/bu)
	Acres	Production (mt)	Yield[a] (bu/ac)	Acres	Production (mt)	Yield[a] (bu/ac)			
1960	535,871	345,487	36.36	856,992	545,785	35.92	891,272	12	11.54
1961	519,285	336,612	36.56	887,537	567,818	36.08	904,430	12	11.49
1962	561,999	375,173	37.65	936,264	634,033	38.19	1,009,206	12	10.59
1963	543,571	372,701	38.67	981,772	658,073	37.80	1,030,774	12	10.63
1964	554,894	383,008	38.93	979,826	670,617	38.60	1,053,625	12	10.60
1965	446,935	275,992	34.82	795,696	483,361	34.26	759,353	12	11.25
1966	505,291	318,827	35.58	1,007,711	641,290	35.89	960,117	12[b]	11.05
1967	560,579	418,827	42.13	1,006,408	728,655	40.83	1,147,482	14	13.66
1968	556,285	437,744	44.38	1,077,853	906,392	47.42	1,344,136	14	15.32
1969	460,882	396,237	48.48	1,078,100	991,451	51.86	1,387,688	14	15.21
1970	660,672	583,216	49.78	1,117,222	1,034,458	52.22	1,617,674	14	14.80
1971	625,379	513,024	46.26	1,078,966	875,746	45.77	1,388,770	14	14.45
1972	543,438	424,995	44.10	1,035,491	890,488	48.50	1,315,483	14[c]	14.81
1973	574,656	435,390	42.73	1,084,124	875,213	45.53	1,310,603	15[d]	26.22
1974	681,119	497,966	41.23	1,288,362	1,096,787	48.01	1,594,453	30	45.06
1975	600,483	434,678	40.82	875,301	722,838	46.57	1,157,516	33	43.64
1976	518,338	373,142	40.60	1,051,943	882,449	47.31	1,255,591	33	37.45
1977	683,053	531,779	43.90	1,250,013	1,153,893	52.06	1,685,672	33[e]	35.16
1978	---	---	---	---	---	---	---	40	39.66[f]

Source: Paddy Marketing Board, Department of Census and Statistics and (1).

[a]Yield = Production/(Gross Harvested Acres x .85)

[b]Price increased to 14 Rs/bu in mid-1966.

[c]Price increased to 15 Rs/bu November 1, 1972.

[d]Price increased to 18 Rs/bu February 14, 1973 and to 18 Rs/bu October 1, 1973.

[e]Price increased to 40 Rs/bu November 16, 1977.

[f]Colombo price, June 1978; Island average for the year not available.

Appendix Table 2
Annual Average Prices (Rs/bu) Paid to Producers for Paddy Sales Outside the GPS,
By Districts, Sri Lanka, 1953-1975

District	Year							
	1953	1954	1955	1956	1957	1958	1959	1960
Colombo	12.36	11.47	10.73	10.10	9.15	11.42	12.04	11.57
Kalutara	11.52	10.10	9.70	10.46	11.69	10.91	10.44	10.56
Galle	12.96	11.11	9.97	11.17	11.72	12.00	12.44	12.78
Matara	13.12	11.49	10.70	11.59	10.77	10.52	10.41	10.09
Hambantota	15.05	12.82	13.13	11.41	11.50	11.65	11.85	11.94
Jaffna	18.11	14.18	13.22	14.28	13.20	13.65	13.49	13.33
Mannar	15.24	11.80	11.17	11.87	12.00	11.76	11.63	12.08
Vavuniya	16.21	12.24	12.00	11.99	10.86	11.51	11.99	11.94
Batticoloa Region	14.05	11.86	12.04	12.10	12.41	12.44	12.11	12.00
Anaradhapura Region	13.48	11.53	11.96	-	-	9.45	9.79	9.16
Polonnaruwa Region	13.63	10.33	10.70	10.45	10.33	10.23	9.64	11.33
Trincomalee Region	15.66	-	11.39	11.58	11.46	11.93	11.42	11.45
Amparai Region	-	-	-	-	-	-	-	-
Kandy	13.11	11.16	9.99	10.97	11.04	11.49	11.87	10.97
Matale	13.14	11.39	9.90	-	10.87	10.87	11.15	10.80
Nuwara Eliya	13.26	11.77	11.30	11.30	10.42	11.99	11.92	12.00
Kurunegala	15.07	11.54	11.67	11.24	11.82	11.76	12.00	11.97
Puttalam	15.00	11.00	11.59	11.86	11.63	12.21	12.00	12.00
Badulla	13.98	11.99	11.97	10.80	11.33	11.86	11.64	12.00
Moneragala	-	-	-	-	-	-	-	-
Ratnapura	12.55	11.78	11.52	10.84	10.62	10.14	10.82	10.99
Kegalle	14.82	-	12.00	11.95	11.99	11.93	12.00	12.00
Island Average	14.12	11.64	11.33	11.44	10.74	11.49	11.53	11.54

Source: Department of Census and Statistics.

Appendix Table 2 (Continued)
Annual Average Prices (Rs/bu) Paid to Producers for Paddy Sales Outside the GPS, By Districts, Sri Lanka, 1953-1975

District	Year							
	1961	1962	1963	1964	1965	1966	1967	1968
Colombo	11.88	10.75	11.66	10.76	10.85	10.86	15.57	16.57
Kalutara	11.16	10.36	10.66	10.01	10.50	9.65	13.24	15.32
Galle	12.44	10.35	10.37	10.94	11.55	10.76	13.77	15.44
Matara	10.00	11.06	10.15	9.70	10.11	11.11	13.64	15.28
Hambantota	11.83	11.83	11.93	11.99	11.99	11.37	13.40	15.17
Jaffna	12.39	13.34	12.99	12.20	17.35	14.56	16.63	17.00
Mannar	12.00	12.02	12.00	12.00	-	12.00	12.27	14.62
Vavuniya	11.91	11.58	11.48	11.26	12.63	11.13	13.06	16.03
Batticoloa Region	12.76	9.25	8.78	9.08	10.00	10.21	15.20	14.89
Anaradhapura Region	10.14	9.19	9.83	9.73	12.00	10.25	13.58	14.86
Polonnaruwa Region	10.37	8.47	9.28	10.14	10.07	9.83	12.14	10.05
Trincomalee Region	10.96	11.01	11.85	10.63	-	11.57	13.14	14.75
Amparai Region	-	9.82	9.78	11.89	12.27	11.64	13.10	14.76
Kandy	11.13	10.14	10.41	10.52	10.32	11.59	13.11	18.55
Matale	10.37	9.85	9.84	9.73	9.85	10.06	12.83	15.72
Nuwara Eliya	12.00	9.73	9.93	9.73	9.33	10.09	13.63	15.36
Kurunegala	11.31	10.13	10.31	10.96	11.58	10.37	14.26	15.08
Puttalam	12.00	10.24	10.88	9.61	12.75	12.56	15.73	13.95
Badulla	11.65	10.70	10.64	10.82	10.33	10.58	13.77	14.57
Moneragala	-	10.89	9.96	-	-	12.00	12.72	14.07
Ratnapura	10.71	10.50	10.54	10.55	10.30	10.23	13.43	14.84
Kegalle	11.85	10.83	10.55	10.31	10.67	10.75	14.14	16.27
Island Average	11.49	10.59	10.63	10.60	11.25	11.05	13.66	15.32

Source: Department of Census and Statistics.

Appendix Table 2 (Continued)
Annual Average Prices (Rs/bu) Paid to Producers for Paddy Sales Outside GPS,
By Districts, Sri Lanka, 1953-1975

District	Year						
	1969	1970	1971	1972	1973	1974	1975
Colombo	16.55	16.44	15.60	16.79	25.38	44.35	45.98
Kalutara	15.89	14.10	13.94	14.64	26.14	45.24	43.55
Galle	15.66	15.96	16.36	15.91	49.50	50.50	42.50
Matara	15.27	14.82	14.00	14.16	51.62	56.25	40.00
Hambantota	15.26	14.78	13.81	-	31.33	35.71	35.63
Jaffna	18.95	19.11	17.88	18.12	18.88	72.00	-
Mannar	15.16	14.75	13.92	13.86	26.83	41.00	-
Vavuniya	15.48	14.59	13.95	14.10	22.90	39.75	42.75
Batticoloa Region	16.34	14.42	14.07	14.27	18.67	-	37.50
Anaradhapura Region	15.27	13.90	13.11	15.11	32.64	36.70	43.37
Polonnaruwa Region	14.82	14.62	14.73	14.08	26.95	37.75	40.95
Trincomalee Region	14.22	14.30	14.03	14.81	-	42.33	-
Amparai Region	14.85	14.87	14.06	15.29	25.13	37.59	39.00
Kandy	14.04	14.27	13.88	14.08	23.71	38.73	39.22
Matale	14.72	13.66	13.47	14.00	20.98	41.53	44.66
Nuwara Eliya	15.20	14.66	14.64	14.68	21.78	49.08	36.88
Kurunegala	15.15	13.79	13.69	14.25	25.20	43.50	46.95
Puttalam	15.14	14.60	14.98	15.11	34.21	39.52	55.55
Badulla	14.15	14.18	13.92	14.66	29.37	42.50	42.26
Moneragala	14.36	14.36	14.13	14.21	19.93	-	36.50
Ratnapura	13.67	14.94	14.33	14.33	20.62	50.00	41.25
Kegalle	14.52	14.58	15.40	14.58	23.79	56.25	45.42
Island Average	15.21	14.80	14.45	14.81	26.22	45.06	43.64

Source: Department of Census and Statistics.

Appendix Table 3
Monthly Average Prices (Rs/bu) Paid to Producers for Paddy Sales Outside the GPS,
By Districts, Sri Lanka, January 1976 - June 1978

District	Year: 1976												
	January	February	March	April	May	June	July	August	September	October	November	December	Average
Colombo	43.15	37.31	40.58	37.39	39.16	42.94	41.40	42.72	40.40	41.86	38.89	40.44	40.52
Kalutara	39.73	40.28	38.97	39.25	38.31	39.66	40.59	38.86	36.88	38.91	39.85	40.51	42.39
Galle	42.50	40.50	40.50	40.50	35.00	35.33	34.41	37.67	38.00	36.00	35.66	40.00	38.42
Matara	41.67	38.40	35.85	35.54	35.64	36.83	37.73	38.47	39.00	38.64	36.63	35.08	37.37
Hambantota	40.00	42.50	34.25	33.87	36.83	36.45	37.00	41.67	34.66	40.50	38.66	41.66	38.17
Kandy	37.26	38.54	34.88	33.04	34.55	35.33	38.78	38.00	36.48	35.33	35.83	36.85	36.24
Matale	40.49	39.87	35.41	33.96	32.84	34.24	38.50	38.95	35.33	36.18	37.24	38.57	36.84
Nuwara Eliya	40.00	35.00	34.00	-	33.00	36.33	-	-	37.50	39.00	-	-	36.40
Jaffna	-	35.00	45.33	34.00	35.00	35.00	-	-	-	-	-	-	36.87
Mannar	-	-	-	-	30.00	30.00	-	-	-	-	-	-	30.00
Vavuniya	45.00	37.00	34.61	33.66	34.50	35.66	41.75	40.33	-	-	-	-	37.81
Batticoloa	42.00	31.25	30.20	30.00	35.20	35.25	39.00	40.00	35.77	38.60	38.60	40.00	36.32
Trincomalee	-	-	-	-	-	-	-	-	-	-	-	-	-
Amparai	35.66	35.50	37.00	34.75	35.40	35.40	38.00	35.73	35.90	36.10	35.77	-	35.85
Kurunegala	40.33	30.07	34.68	35.13	36.97	39.44	44.58	41.95	36.81	38.19	38.21	40.00	38.61
Puttalam	46.66	36.67	36.66	36.05	36.61	36.73	40.00	37.65	36.70	37.87	39.72	40.12	38.45
Anaradhapura	41.00	40.66	32.21	39.25	36.18	34.39	42.25	39.60	39.50	36.64	35.08	40.10	38.07
Polonnaruwa	42.83	35.10	35.00	34.64	35.00	35.00	41.00	39.83	37.00	37.00	37.00	38.05	37.79
Badulla	37.92	39.08	36.83	36.08	36.08	35.16	37.87	37.05	38.14	38.09	38.62	38.13	37.33
Moneragala	41.33	40.62	33.75	36.33	35.00	35.00	34.42	39.75	30.08	35.75	37.00	39.50	37.29
Ratnapura	41.20	37.58	35.62	35.94	36.67	39.50	40.00	37.75	38.00	37.60	37.52	38.72	38.01
Kegalle	-	40.00	35.01	36.00	37.00	40.00	42.33	39.00	35.66	35.83	37.33	36.66	37.71
													37.45

Appendix Table 3 (Continued)
Monthly Average Prices (Rs/bu) Paid to Producers for Paddy Sales Outside the GPS,
By Districts, Sri Lanka, January 1976 - June 1978

District	Year: 1977												
	January	February	March	April	May	June	July	August	September	October	November	December	Average
Colombo	39.66	37.77	36.27	34.86	34.53	34.13	34.53	34.72	33.66	33.58	36.66	43.60	36.13
Kalutara	39.24	38.08	36.46	36.48	36.92	36.74	36.12	35.62	35.58	37.25	42.14	42.25	37.78
Galle	38.82	38.73	37.00	36.77	35.75	34.77	35.47	34.71	34.85	35.78	41.17	42.44	37.19
Matara	37.12	36.55	33.33	35.46	36.00	35.83	33.37	33.16	35.34	29.00	30.66	-	34.17
Trincomalee	-	-	35.00	-	31.94	32.70	33.75	34.59	33.07	32.06	35.25	39.33	34.19
Vavuniya	-	36.16	35.00	35.33	32.25	34.83	33.66	33.33	34.73	35.00	40.77	43.33	35.85
Badulla	38.66	37.76	34.33	34.80	34.16	34.00	34.10	33.66	33.20	33.40	42.40	42.33	36.07
Nuwara Eliya	-	38.00	35.67	35.00	32.67	32.00	33.50	33.50	-	35.00	-	-	34.42
Ratnapura	38.78	37.29	34.23	33.88	33.36	34.97	34.97	33.60	32.27	33.57	42.50	40.50	35.83
Kegalle	37.66	37.49	36.67	34.72	35.22	36.83	37.67	32.00	32.33	32.50	34.83	40.33	35.69
Hambantota	41.77	39.62	37.50	34.77	34.50	34.83	35.00	34.00	34.50	34.00	40.83	43.50	37.07
Mannar	-	-	-	30.00	30.00	30.00	30.12	30.00	-	33.37	40.00	40.00	32.94
Moneragala	39.22	38.62	36.50	34.33	34.33	35.25	37.11	35.25	38.88	34.12	33.66	43.00	36.69
Anaradhapura	40.28	36.62	30.96	30.48	30.96	31.65	31.93	32.53	33.40	30.86	37.04	38.84	33.84
Polonnaruwa	40.00	35.00	34.00	31.00	32.50	34.66	34.25	30.33	33.50	32.00	33.66	41.00	34.33
Batticoloa	41.50	31.00	30.33	30.50	30.80	30.60	30.60	30.20	29.00	31.20	34.00	40.80	32.54
Jaffna	-	31.67	31.83	32.64	31.43	40.00	35.00	37.50	35.00	36.50	35.00	40.00	35.14
Puttalam	38.13	32.00	31.13	32.58	33.25	33.25	33.27	32.50	30.87	33.47	38.97	34.60	34.17
Kurunegala	40.53	35.80	32.59	31.33	32.04	31.20	30.74	30.86	30.51	32.21	36.87	39.70	33.70
Kandy	38.43	36.11	34.77	32.83	34.67	33.91	35.96	35.73	33.97	33.06	41.00	39.43	35.82
Matale	38.94	37.00	31.69	32.15	32.60	33.50	33.46	32.83	31.85	33.13	40.89	37.67	34.64
Amparai	38.16	35.17	34.34	34.13	33.90	34.05	34.12	31.44	30.19	31.14	43.07	45.24	35.41
													35.16

Appendix Table 3 (Continued)
Monthly Average Prices (Rs/bu) Paid to Producers for Paddy Sales Outside GPS, By Districts, Sri Lanka, January 1976 - June 1978

District	Year: Jan.-June 1978					
	January	February	March	April	May	June
Colombo	45.58	45.02	42.23	45.00	42.66	39.66
Kalutara	43.83	43.52	43.58	43.04	43.55	43.95
Galle	42.72	42.10	42.58	42.49	42.59	43.36
Matara	-	-	39.76	39.64	39.16	39.93
Trincomalee	40.41	39.81	39.22	39.44	39.55	40.00
Vavuniya	38.00	38.00	36.58	35.88	38.66	39.94
Badulla	41.40	42.19	41.55	41.20	41.07	40.86
Nuwara Eliya	-	-	35.83	36.61	35.66	35.39
Ratnapura	43.12	42.67	40.86	40.55	39.90	41.75
Kegalle	40.16	41.00	42.44	40.73	42.33	42.42
Hambantota	43.00	42.50	43.33	36.47	40.66	41.00
Mannar	40.07	40.00	42.50	40.00	38.33	37.33
Moneragala	44.50	44.00	45.00	42.40	43.42	42.42
Anaradhapura	38.57	38.08	37.75	36.88	36.87	36.82
Polonnaruwa	40.00	38.00	38.00	40.00	40.00	40.00
Batticoloa	40.00	49.47	40.11	39.80	40.72	40.00
Jaffna	45.00	40.00	39.85	39.85	40.00	40.00
Puttalam	40.40	41.28	40.44	39.39	40.44	41.05
Kurunegala	39.93	38.90	38.75	38.05	38.85	38.85
Kandy	39.80	41.29	39.77	39.24	39.85	38.89
Matale	40.31	39.59	37.10	36.52	36.74	37.97
Amparai	45.03	43.30	39.44	39.91	39.51	39.81

Appendix Table 4
GPS Prices for Selected Crops, Sri Lanka, 1958-1978

Year	Maize	Finger Millet	Sorghum	Cowpea	Green Gram	Black Gram	Soybeans	Sesame
	(Rs/Cwt.)							
1958	14.50	15.00	15.50	24.00	40.32	--	--	--
1959	14.50	15.00	15.50	24.00	40.32	--	--	--
1960	14.50	15.00	15.50	24.00	40.32	--	--	--
1961	14.50	15.0	15.50	24.00	40.32	--	--	--
1962	16.50	15.00	15.50	24.00	40.32	--	--	--
1963	17.00	15.00	15.00	33.60	49.92	--	--	--
1964	17.00	15.00	15.00	33.60	49.92	--	--	--
1965	19.00	15.00	15.00	33.60	49.92	--	--	--
1966	19.00	15.00	15.00	33.60	49.92	--	--	--
1967	19.00	15.00	15.00	33.60	49.92	--	--	--
1968	20.50	15.00	15.00	33.60	67.20	--	--	--
1969	24.64	15.00	20.16	33.60	67.20	--	--	--
1970	24.64	15.00	20.16	42.56	67.20	--	--	--
1971	24.64	15.00	20.16	42.56	67.20	--	--	82.61
1972	24.64	15.00	20.16	42.56	67.20	--	64.96	82.61
1973	30.50	15.00	20.16	42.56	67.20	--	112.00	82.61
1974	110.00	56.00	110.00	112.00	168.00	112.00	112.00	243.48
1975	104.16	56.00	104.16	112.00	168.00	112.00	112.00	243.48
1976	104.16	56.00	104.16	112.00	168.00	112.00	280.00	243.48
1977	104.16	56.00	104.16	112.00	168.00	112.00	280.00	243.48
1978	62.72	56.00	73.92	179.20[a] 168.00[b]	291.20[c] 224.00[d]	224.00[c] 201.60[d]	280.00	

Source: Ministry of Agricultural Development and Research; from Department of Census and Statistics.

[a]White
[b]Other varieties
[c]Large
[d]Small

Appendix Table 5
Current Government Floor Prices for Major Crops
Compared to World Market Prices, Sri Lanka, 1979

Crop	Floor Prices		World Market Prices	
	(Rs/lb)	($/lb)	(Rs/lb)	($/lb)
Maize	.63	0.0414	.86[e]	0.0566
Sorghum	.74	0.0487	.84[e]	0.0553
Soybeans	2.80	0.1842	2.20[f]	0.1447
Green Gram	2.24	0.1474	2.44[g]	0.1605
Black Gram	2.01[c]	0.1322	2.00[h]	0.1316
Finger Millet	.56	0.0368	1.48[i]	0.0974
Cowpea[a]	1.79	0.1178	2.44[g]	0.1605
Rice[b]	1.28	0.0842	1.82[h]	0.1197
Sesame	2.43[d]	0.1599	5.85[j]	0.3849

[a]White variety.
[b]Assumes a 68% milling yield; not adjusted for milling cost.
[c]"Small" varieties.
[d]1977 price; current price not known.
[e]Price CIF Rotterdam.
[f]Price CIF Tilbury.
[g]Price based on lentils CIF Colombo.
[h]Price FOB Colombo.
[i]Price CIF London.
[j]Price CIF Japan.

Appendix Table 6

Acreage, Production and Prices of Major Non-Rice Crops in Sri Lanka, 1960-1978

Year	MAIZE					SORGHUM				
	Acres	Prod. (mt)	Yield (bu/ac)	Fixed Price (Rs/bu)	Farm Price (Rs/bu)	Acres	Prod. (mt)	Yield (lbs/ac)	Fixed Price (Rs/bu)	Farm Price (Rs/bu)
1960	36,827	8,291	8.86	8.12	-	3,742	975	574.3	8.68	-
1961	32,470	9,088	11.02	8.12	-	4,069	1,430	774.6	8.68	-
1962	28,380	7,530	10.44	9.24	-	2,786	445	747.6	8.68	-
1963	36,806	10,426	11.15	9.52	-	4,598	1,693	811.5	8.40	-
1964	27,464	8,823	12.64	9.52	-	2,806	802	629.9	8.40	-
1965	29,408	9,448	12.64	10.64	-	4,008	1,371	753.9	8.40	-
1966	30,433	9,199	11.90	10.64	-	3,435	1,285	824.5	8.40	-
1967	35,322	15,928	17.75	10.64	12.63	3,813	1,083	848.5	8.40	14.42
1968	40,663	11,341	10.98	11.48	12.83	2,265	648	630.8	8.40	N/A
1969	49,500	15,695	12.48	13.80	14.89	3,021	1,080	787.9	11.29	N/A
1970	47,101	13,695	11.44	13.80	12.43	1,638	537	722.6	11.29	12.34
1971	44,487	12,020	10.66	13.80	13.58	1,933	551	628.3	11.29	12.12
1972	49,669	14,360	11.38	13.80	15.09	1,927	560	640.5	11.29	20.00
1973	72,122	19,648	10.72	17.08	18.97	3,629	995	603.3	11.29	12.38
1974	85,316	21,511	9.92	61.60	50.83	9,038	3,270	797.4	61.60	67.54
1975	98,094	25,754	10.33	58.33	43.08	14,352	5,937	911.7	58.33	70.57
1976	94,592	25,567	10.64	58.33	31.03	8,279	3,330	886.5	58.33	42.67
1977	67,875	17,062	9.89	58.33	31.87	5,432	2,190	888.8	58.33	50.42
1978				35.12	36.12	-	-	-	41.40	28.00

Source: Department of Census and Statistics. Post-1967 maize prices and post-1969 sorghum prices from Ministry of Agricultural Development and Research (MADR). Several of the original GPS or "fixed price" entries were at variance with those obtained from MADR sources; while it is not known which is most nearly correct, MADR data (see Appendix Table 3) were substituted into the present table where discrepancies were noted.

Appendix Table 6 (Continued)

Acreage, Production and Prices of Major Non-Rice Crops in Sri Lanka, 1960-1978

Year	SESAME					COWPEA				
	Acres	Prod. (mt)	Yield (lbs/ac)	Fixed Price (Rs/bu)	Farm Price (Rs/bu)	Acres	Prod. (mt)	Yield (lbs/ac)	Fixed Price (Rs/cwt)	Farm Price (Rs/cwt)
1960	35,629	14,931	923.6	-	-	8,057	3,607	986.7	24.00	-
1961	26,086	13,140	1,110.2	-	-	7,260	1,120	340.0	24.00	-
1962	23,981	9,641	886.1	-	-	5,427	1,332	540.9	24.00	-
1963	42,224	16,551	863.9	-	-	10,783	2,301	470.3	33.60	-
1964	38,461	16,546	949.2	-	-	9,097	2,174	526.7	33.60	-
1965	37,305	15,090	891.5	-	-	9,374	2,323	546.2	33.60	-
1966	26,171	11,242	946.8	-	-	10,287	2,478	530.9	33.60	-
1967	31,949	16,360	1,128.6	-	22.56	14,495	2,783	423.2	33.60	16.51
1968	33,746	16,331	1,066.6	-	24.61	10,076	2,373	519.1	33.60	17.50
1969	36,615	17,922	1,078.8	-	22.58	9,770	2,449	552.9	33.60	17.43
1970	29,626	13,269	987.1	-	23.20	10,223	3,055	658.6	42.56	15.40
1971	28,237	10,599	827.3	38.00	26.28	10,121	2,427	538.3	42.56	11.95
1972	30,274	14,059	1,023.5	38.00	27.97	13,564	2,900	471.2	42.56	27.97
1973	33,143	15,564	1,033.8	38.00	57.26	13,756	2,946	472.0	42.56	40.82
1974	49,120	18,675	837.9	112.00	77.32	14,268	3,122	482.26	112.00	86.81
1975	52,778	19,055	795.7	112.00	81.43	28,640	5,307	408.4	112.00	98.69
1976	63,717	25,790	892.1	112.00	108.20	28,588	6,946	535.5	112.00	113.54
1977	60,563	27,616	1,005.0	112.00	112.03	36,096	8,812	538.1	112.00	94.96
1978	-	-	-	-	139.11	-	-	-	168.00[a]	108.43

Source: Department of Census and Statistics; post-1968 cowpea prices from Ministry of Agricultural Development and Research.

[a]"Non-white" varieties.

Appendix Table 6 (Continued)

Acreage, Production and Prices of Major Non-Rice Crops in Sri Lanka, 1960-1978

Year	FINGER MILLET					GREEN GRAM				
	Acres	Prod. (mt)	Yield (lbs/ac)	Fixed Price (Rs/cwt)	Farm Price (Rs/cwt)	Acres	Prod. (mt)	Yield (lbs/ac)	Fixed Price (Rs/cwt)	Farm Price (Rs/cwt)
1960	88,811	16,283	404.1	15.00	-	11,610	1,919	363.4	40.32	-
1961	70,982	19,602	608.6	15.00	-	9,016	1,805	441.2	40.32	-
1962	57,326	15,668	602.4	15.00	-	7,469	2,165	638.9	40.32	-
1963	71,053	20,998	651.3	15.00	-	13,156	2,643	442.8	40.92	-
1964	55,750	16,367	647.1	15.00	-	9,582	2,340	538.2	40.92	-
1965	64,635	18,489	630.5	15.00	-	17,460	4,285	540.9	40.92	-
1966	55,084	1,898	756.9	15.00	-	12,621	2,388	417.0	40.92	-
1967	55,186	15,760	629.4	15.00	13.94	10,362	2,420	514.7	49.92	22.29
1968	51,287	14,329	618.5	15.00	14.48	10,304	2,425	518.7	67.20	31.17
1969	56,259	17,671	692.3	15.00	15.18	11,148	2,598	513.6	67.20	29.87
1970	50,828	14,099	611.4	15.00	13.55	9,329	2,188	516.9	67.20	27.16
1971	52,303	13,673	576.2	15.00	12.37	8,254	1,956	462.1	67.20	28.17
1972	54,540	14,597	589.9	15.00	13.77	11,206	2,385	469.0	67.20	77.01
1973	74,598	19,104	564.4	15.00	34.27	17,829	4,471	552.7	67.20	108.25
1974	94,385	21,760	508.1	56.00	66.49	21,713	4,709	478.0	168.00	133.99
1975	108,274	22,980	467.8	56.00	48.94	39,677	7,821	434.5	168.00	166.14
1976	97,630	22,680	512.0	56.00	35.21	29,639	5,234	389.2	168.00	146.27
1977	85,504	21,034	542.2	56.00	33.80	29,277	7,043	530.2	168.00	154.02
1978	-	-	-	56.00	29.36	-	-	-	224.00[a]	147.08

Source: Department of Census and Statistics, post-1967 fixed prices from Ministry of Agricultural Development and Research.

[a]"Small" varieties.

Appendix Table 6 (Continued)
Acreage, Production and Prices of Major Non-Rice Crops in Sri Lanka, 1960-1978

Year	SOYBEANS			
	Acres	Prod. (cwt)	Yield (lbs/ac)	Fixed Price (Rs/bu)
1960				
1961				
1962				
1963				
1964				
1965				
1966				
1967				
1968				
1969				
1970				
1971				
1972	116	495	427	64.96
1973	387	4,497	1,162	112.00
1974	3,232	1,964	608	112.00
1975	2,818	22,786	808	112.00
1976	2,000	15,731	786	280.00
1977	3,500[a]	31,500[a]	900[a]	280.00
1978	-	-	-	-

Source: Department of Census and Statistics, and Ministry of Agricultural Development and Research.

[a]Preliminary.

Appendix Table 6
Production Ranking of Slected Districts by Crop, Sri Lanka, 1978

MAIZE[a]	SORGHUM[b]	FINGER MILLET[c]	GREEN GRAM[d]
1. Badulla	1. Anaradhapura	1. Anaradhapura	1. Kurunegala
2. Anaradhapura	2. Kurunegala	2. Moneragala	2. Hambantota
3. Moneragala	3. Moneragala	3. Kurunegala	3. Ude Walawe
4. Amparai	4. Kandy	4. Hambantota	4. Ratnapura
5. Batticoloa	5. Matale	5. Badulla	5. Moneragala

COWPEA[e]	SESAME[f]	SOYBEANS[g]	BLACK GRAM[h]
1. Kurunegala	1. Kurunegala	1. Anaradhapura	1. Vavuniya
2. Anaradhapura	2. Anaradhapura	2. Polonnaruwa	2. Kurunegala
3. Puttalam	3. Moneragala	3. Kurunegala	3. Puttalam
4. Moneragala	4. Puttalam	4. Nuwara Eliya	4. Jaffna
5. Hambantota	5. Ratnapura	5. Moneragala	5. Batticoloa

Source: Based on Agricultural Implementation Program - 1977/78, Ministry of Agricultural Development and Research.

[a]Production well spread thru 19 districts with first five districts constituting 75%.
[b]First five districts constituting 75% of Island total.
[c]First five districts constitutes 80% of Island total with balance being spread over another 10 districts.
[d]First five districts constitute approximately 67% of Island total.
[e]First five districts constitute approximately 84% of Island total.
[f]First five districts constitute approximately 76% of Island total.
[g]First five districts constitute approximately 65% of Island total.
[h]First five districts constitute approximately 90% of Island total.