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Food processing and marketing in Thailand

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PREFACE

(i) This report forms part of a series of three country case studies organized by the UNCTAD secretariat on one or more aspects of the behaviour of the processing and marketing chain for particular commodity groups and the impact of Government policy interventions on the economic performance of this chain. It has been carried out in pursuance of UNCTAD Conference resolutions 87 (IV), 112 (V) and 143 (VI) and also resolution 18 (IV) of its subsidiary body the Committee on Transfer of Technology. The study represents part of the effort by the secretariat to respond to the conclusions and recommendations adopted at the UNCTAD Meeting of Governmental Experts on the Transfer, Application and Development of Technology in the Food Processing Sector (Geneva, 1-10 June 1982). It has been prepared at the request of the secretariat by Professors Nipon Poapongsakorn, Chirmsak Pinthong, Chitriya Pinthong (Tingsabadh) and Dow Mongkolsmai, all of the Faculty of Economics of Thammasat University, Bangkok. The views expressed in this study are those of the authors and do not necessarily represent those of the UNCTAD secretariat.

(ii) The programme of country-based research on the food processing sector would not have been possible without the generosity of the Swedish Government which gave financial support for this work through the Swedish Agency for Research Co-operation with Developing Countries (SAREC). The UNCTAD secretariat wishes to express its gratitude to the Swedish Government and SAREC for their co-operation and support.

cassava poultry rice

CONCLUSIONS

(i) This report considers some of the main issues involved in the structure and behaviour of four selected food industries, namely, broilers, hogs, rice and cassava and relates them to the effect of Government policies in terms of the competitive performance of the food processing sector.

(ii) The study has focused on the role of middlmen in each industry and it has become apparent that they do more than simply perform important marketing functions involving transportation, communication, processing, etc. As demonstrated by poultry, rice and cassava, it is through major Thai agri-business firms that technology has been adapted and transferred through each industry. In addition, they have supplied the sophisticated organizational skills required to ensure the efficient processing and movement of the commodity to the final consumer. For example, in a competitive industry such as poultry, they have been responsible for the introduction of vertical integration, which has resulted in a streamlined industry capable of competing with developed countries for a share of the international trade. For cassava, the middleman's acquisition of pelletizing technology was a major component in Thai success on the export market.

(iii) As demonstrated by poultry, it appears that middlemen make a reasonable return under competitive market conditions. Non-competitive situations do exist, however, in the hog industry in general and at certain levels with the other industries. Market distortions have been due either to natural phenomena, such as the remote location of producers, or to direct market interference. In these cases, it seems that middlemen reap excessive returns, usually at the expense of farmers. While marketing margins rise and fall according to the level of prices, factors such as: government policy, market segmentation, market information, commodity perishability etc., influence the amount of return paid to each participant.

(iv) The commodities differ in terms of industry characteristics, methods of processing and their importance at the domestic and export level, but the trade of each is sensitive to market signals and interference with the natural forces of supply and demand is felt throughout their respective systems. A review of the history of intervention has revealed some common consequences in terms of the choice of policy instruments.

(v) In discussing policy instruments, however, it must be remembered that the Thai Government is constrained by the nature of each commodity. Rice is Thailand's most important crop since it forms the basis of the Thai diet and the backbone of the general standard of living. Any move affecting rice produces strong repercussions throughout the Thai economy. Its manipulation constitutes the most important instrument in the distribution of national income. These factors restrict the Government's field of action. It has to try to strike a balance among the rice farmer, the Thai consumer and the export market. Prices must be high enough to stimulate farm production, yet remain at a level which is affordable to the poorest sectors of society. At the same time, rice can earn valuable foreign exchange on the export market at a price superior to that on the domestic market. Although poultry and pork are gaining importance in terms of animal protein, particularly to urban dwellers of the middle or richer classes, they are not as essential to the diet as rice. Poultry has a significant overseas market while pork does not. Success on the meat export market hinges upon these industries' ability to meet stringent foreign health standards and to remain competitive with other foreign suppliers. Cassava is

completely export-oriented. It has become one of the most important Thai agricultural exports but its prosperity is almost completely dependent on the policies of foreign Governments.

(vi) The study reveals that the use - singly or in combination - of quotas, licences or permits to control production, processing or exports has had distorting effects that have raised marketing costs artificially and provided an opportunity for middlemen to gain extra returns, usually at the expense of producers. For example, slaughterhouse permits have created monopolistic power for hog carcass wholesalers, licences to process cassava have lowered returns to farmers, and the use of quotas to export rice and cassava has resulted in increased marketing costs.

(vii) The use of taxes requires a well-defined focus as well as careful monitoring of the sector which is to be controlled and an understanding of who will bear the burden of the tax. At the export level, as demonstrated by rice, the extent to which the tax can be passed on to buying countries is dependent upon the elasticity of world demand for the commodity. Normally, world demand is highly elastic hence the tax must be paid in the domestic market. The problem is therefore to choose where and how to apply it. For rice, export taxes in conjunction with export quotas and licenses were criticized. Their judicious use as a sole policy instrument, however, was recommended both for rice and cassava.

(viii) In general, the study suggests that the Government should try as much as possible to avoid direct market interference but should set policies which relate to failures in the marketing system. In particular, it seems that Government intervention would be helpful in the area of infrastructure. For example, the development of the national transportation system has been of prime importance to the movement of all commodities. Its improvement has broken down the transportation barrier separating markets and served to help equalize prices among regions. Further progress could be made in the area of shipping goods overseas. Failure to gain control over the marketing, transportation and distribution of its products abroad could deny the country the full benefit of building up its industries.

(ix) Policies to guarantee the health standards and quality of poultry and cassava have enhanced international demand for these products while their absence in the hog industry has resulted in bans on Thai pork in many countries. Government-to-Government negotiation has assisted the poultry and cassava industries and is required to improve the prospects of pork. In addition, the development of more overseas markets could be undertaken through Government efforts.

(x) Within the domestic marketing system, fraudulent practices such as short-weighing or traditional percentage weight reductions for suspect quality could be greatly reduced by the use of third party or Government-regulated services. Supplying credit and storage facilities which the ordinary farmer can easily assess as well the provision of market information would assist farmers in general in making their marketing decisions and help to eliminate the distortions described in the study. The co-operative movement was discussed in this context. Its failure to date rests upon the fact that the associations created have not been organizations which truly represent the farmers' interests. In principle, co-operatives can help farmers, but their success hinges upon their ability to function properly. Increased agricultural extension work also could be a means of imparting technical and marketing knowledge to farmers.

Chapter I

THE AGRO-FOOD SECTOR AND GOVERNMENT POLICY

A. Introduction

1. Role of the agricultural sector in the Thai economy

1. Over the past two decades, Thailand's economic development has been rather impressive. During the 1960s and 1970s, real GNP quadrupled and GNP per capita doubled. During this period, however, there has been a structural change in the economy. The role of the predominant agricultural sector declined relative to that of manufacturing. The contribution of agriculture to GDP dropped from 40 per cent to 25 per cent between 1960 and 1980, while the share of manufacturing rose from 12 per cent to 21 per cent. The proportion of foreign exchange earnings derived from agriculture has also declined significantly. This is partly due to the fall in the value of traditional exports in the early 1970s, while export of new manufactured products expanded.

2. Within the agricultural sector, there has been a major diversification from the production of rice as the main crop to a larger variety of products for export. At the same time, the development strategy in the industrial sector has turned from an import substitution policy in the 1960s to an export promotion policy in the early 1970s. Thus, economic growth in the 1970s was based largely on an export-led intensification of land use for rice, as well as the expansion of the area under cultivation for upland crops which have become important sources of foreign exchange earnings in recent years. Industrialization strategies during this period also emphasized the establishment and growth of industries that involve intensive labour utilization, high value added, high utilization of local raw materials and export-oriented production. One such industry that fulfils these objectives is food processing. It accounted for approximately one-third of total value added in the manufacturing sector during the period 1970 to 1979.

3. The top foreign exchange earners in the food processing sector are respectively: rice milling, maize milling, tapioca manufacturing, cane sugar refining and canned pineapple manufacturing. In terms of domestic consumption, rice milling, sugar refining, animal slaughtering and vegetable oil processing are the major food manufactures. The following industries, therefore, have been chosen for closer inspection because they represent a major share of domestic consumption as well as being examples of export-led development: rice milling, cassava processing, and slaughtering of broilers and hogs.

2. Objectives of the study

4. This study examines various issues relating to production, technology, processing and distribution in Thailand's food processing sector. It examines the relationship between structure and performance at the domestic and export level as well as Government policies which are viewed as integral parts of the system. Specifically the objectives of this study are:

(i) To investigate the market structure and the degree of competition at various levels of production, processing and distribution;

(ii) To analyse market conduct, marketing margins, price movement and price formation;

(iii) To identify factors affecting the strength of the industry's capacity to increase incomes, productivity and employment; and,

(iv) To appraise and analyse various government policies concerning the production, processing and distribution of the four selected products.

3. Methodology, scope and organization of the study

5. This study was initially conceived as an integrated analysis of a single food processing industry. It was, however, recognized from an early stage that this "industry" actually consisted of a number of unrelated businesses. It was therefore divided into separate chapters by types of commodities, namely: broilers and hogs, rice and cassava. The analysis of each commodity is, as far as possible, presented by employing a common framework throughout. In each chapter, the structure of the market is discussed first, because it may exert a substantial influence on the performance of the industry. Secondly, pricing behaviour in the context of price movements and price formation, which are considered essential elements of public policy, are discussed at some length. Thirdly, the economic performance of each industry is evaluated and marketing margins at various stages of distribution are used as indexes of performance. Following the separate discussion of various factors that affect the growth of industry, each chapter closes with a discussion of government policies and measures affecting the food processing industry.

B. Significance of the agro-food sector

1. Food production

6. The major food crops produced in Thailand are rice, maize, cassava and sugarcane (table 1). The output of rice gradually increased from 9.5 million tons in 1960/61 to 17.4 million tons in 1980/81, the average growth rate was 3.8 per cent per annum. In comparison to the growth rates of production of other crops, rice output grew at the lowest rate, while cassava output grew at 16.4 per cent per annum, sugarcane at 10.7 per cent per annum and maize at 12.2 per cent per annum. In fact, the growth of rice output slowed until the early 1970s when double cropping was more widely practised.

7. The expansion of the cultivated area under each crop shows a pattern similar to that of output growth. While the expansion of paddy area was slowing down, there was an opening of upland areas resulting from a continuous diversification of agriculture. Over the period 1960 to 1980, the proportion of total farm land which was planted to rice declined from 60 per cent to 50 per cent while the share of major upland crops increased from 7 per cent to 19 per cent.

8. Consequently, the contribution of rice to agricultural value added, although remaining the largest among those of the various commodities, declined from 39 per cent in 1960 to 1965 to 29 per cent in 1976 to 1980. The share of cassava rose from 2 per cent to 6 per cent, that of maize, sorghum and sugarcane rose respectively from 2 to 3 per cent to 4 per cent in the same period.

9. As for livestock and fisheries (table 2) the production of buffalo, cattle and swine grew at 3.4 per cent per annum, poultry at 4.93 per cent per annum and fisheries at 11.97 per cent per annum between 1960 and 1980.

Table 1

Area cultivated and production of various crops, 1960 to 1980

Area cultivated ('000 hectares)	1960	1965	1970	1975	1980
Paddy	5 922	6 554	7 594	8 896	9 618
Maize	286	577	829	1 312	1 434
Cassava	72	102	224	594	1 160
Sugarcane	158	141	138	391	468
Mungbean	52	121	239	164	447
Soybean	22	19	59	118	126
Groundnuts	118	99	104	118	105
Coconuts	165	248	301	395	416
Tobacco	18	16	25	47	35
Rubber	493	941	1 276	1 406	1 538
Production ('000 tons)	1960	1965	1970	1975	1980
Paddy	9 475	10 978	13 570	15 300	17 368
Maize	544	1 021	1 938	2 863	2 998
Cassava	1 222	1 475	3 431	8 100	16 540
Sugarcane	5 382	4 480	6 586	19 910	19 854
Mungbean	60	125	151	121	261
Soybean	26	19	50	114	100
Groundnuts	152	131	125	142	129
Coconuts	1 040	1 170	713	842	735
Tobacco	9	12	22	43	37
Rubber	186	216	287	349	499

Source: Thailand Ministry of Agriculture and Co-operatives, Office of Agricultural Economics, Agricultural Statistics of Thailand, Bangkok, 1970, 1976, 1977, 1978, 1979, 1980, 1982.

Table 2

Production of livestock, 1960 to 1980

('000 head)	1960	1965	1970	1975	1980
Cattle a/	3 492	3 888	4 667	4 142	3 938
Buffaloes a/	4 830	5 297	5 735	5 597	5 651
Swine a/	3 189	3 718	5 132	3 548	3 021
Chicken a/	37 651	47 020	58 791	53 860	56 043
Chicken b/	..	..	136 300	198 500	301 900
Duck a/	6 475	6 634	7 109	10 946	11 020
Geese a/	560	556	577	559	..

Sources:

a/ Thailand Ministry of Agriculture and Co-operatives, Agricultural Statistics of Thailand. Crop years 1972/1973, 1979/1980, 1980/1981.

b/ National Economic and Social Development Board, Thailand, cited in Thai Investment and Securities, Ltd., The Broiler Industry in Thailand, submitted to Japan Trade Center, December 1979, pp. 6 and 48.

10. The change in the pattern of agricultural output from the traditional rice crop to a larger variety of cash crops has been caused by the responsiveness to world prices of various crops and concurrent disincentives to rice production induced by the trade and agriculture policies of the Thai Government.

11. Most producers of rice, maize and cassava are small farmers while sugarcane growers are relatively larger farmers. The size of paddy farms rarely exceeds 5 hectares so the output of rice per farm is not large. At the local level, the food market is rather competitive, as there are a large number of local buyers who purchase at the farm and then sell in a larger market centre. Each trader is able to enter the market freely and none has an appreciable influence on prices. At a higher level of market structure, however, certain degrees of monopoly and monopsony are likely to be found in the food market.

12. In the manufacturing sector, the contribution of food to total manufacturing has gradually declined from 34 per cent to 18 per cent between 1960 and 1980. Among the food manufacturing industries, rice mills had the largest share in gross value added of total food manufacturing, followed by animal slaughtering. In 1979, the shares were: rice mills 22 per cent, animal slaughtering 18 per cent, sugar mills and refineries 12 per cent and flour mills 7 per cent.

13. In respect of the number of food processing factories, the increase is most pronounced for starchy root processing, distilling, tobacco curing, vegetable or seed drying and fish preservation. Large-scale industries include: dairying, canned pineapple, vegetable oil, animal feed, beverages and beer. Other food processing industries are small in scale and mainly produce for domestic consumption.

2. Food trade

14. The major food export item of Thailand has traditionally been rice but recently other food crops such as cassava, maize and sugar have gained importance as well as frozen meat, especially chicken. The share of Thai rice exports in the world market averaged 22 per cent from 1976 to 1980, maize accounted for 3 per cent and castor beans contributed 46 per cent from 1976 to 1979. It was only in the late 1970s that sugar from Thailand became important, accounting for 4 per cent of the world sugar trade.

15. Food export has become more important over time in terms of its rising contribution to agricultural export value and an increased ratio of food export value to food value added. The former increased from 60 per cent to 78 per cent between 1960 and 1980, while the latter rose from 20 to over 30 per cent. However, the contribution of food to total export value slowly declined from 60 per cent to 45 per cent. The importance of rice and rice products to agricultural exports declined from 38 to 26 per cent in the period between 1959 and 1981, while the share of other food crops rose from 12 to 37 per cent, with cassava and cassava products alone accounting for 19 per cent in 1980.

16. Fishery products also became more important as a foreign exchange earner. Their share in agricultural export value rose from less than 1 per cent to 6 per cent, mainly due to the recent increase in the export of shrimp, cuttlefish and lobsters. Livestock and livestock product exports have remained constant at about 2 per cent of agricultural export value since 1965.

17. The particular items of interest to be discussed in more detail in this paper are: rice, cassava, chicken and swine. The export of these items will therefore be examined more closely.

18. The export value of rice increased from 2,570 million baht in 1960 to 19,508 million baht in 1980. The quantity exported increased from 1.2 million tons to 2.8 million tons. Export of cassava and cassava products rose from 0.3 million tons to 5.2 million tons and the value from 288 million baht to 14,880 million baht (table 3). The major destinations of Thai rice have been Asia and in recent years countries in Africa, the Middle East and Europe. Thai exports of cassava products have gone mainly to industrialized countries, especially the Netherlands, which has accounted for over 60 per cent of the Thai cassava export value since 1971.

19. Frozen chicken exports began in 1973 with 142 tons shipped to Japan. It increased rapidly to 24,000 tons in 1981 with an annual growth rate of 64 per cent. This is comparable to the growth rate of export value which is 68 per cent per annum. The major increases in frozen chicken exports occurred between 1976 and 1978. Exports increased by 500 per cent in 1976 and another 200 per cent in the following two years (table 4).

20. In 1973, the value of frozen chicken accounted for only 32 per cent of the total value of meat exports but this increased rapidly to 99.5 per cent in 1981. This was only 0.8 per cent of total agricultural export value in 1980 and 1 per cent in 1981.

Table 3

Export of rice and cassava products, 1960 to 1980

Year	Rice			Cassava products a/		
	Export value (mill. baht)	Share in agriculture export value (%)	Share in total export value (%)	Export value (mill. baht)	Share in agriculture export value (%)	Share in total export value (%)
1960	2 569.8	33.60	30.51	287.8	3.76	3.42
1965	4 334.4	40.31	34.29	598.5	5.57	4.73
1970	2 516.6	22.65	17.66	1 217.9	10.96	8.55
1975	5 581.3	16.54	11.52	4 594.1	13.61	9.47
1976	8 603.1	18.79	14.15	7 526.0	16.44	12.37
1977	13 382.8	25.82	18.99	7 716.5	14.89	10.95
1978	10 424.0	19.25	12.55	10 888.7	20.11	13.11
1979	15 592.4	22.68	14.66	9 887.3	14.38	9.30
1980	19 507.6	25.20	14.96	14 880.6	19.22	11.25

Source: Thailand Ministry of Agriculture and Co-operatives, Office of Agricultural Economics, Agricultural Statistics of Thailand. Crop years: 1965, 1970, 1974/75, 1979/80, 1981/82.

a/ Includes: cassava roots, cassava shredded, cassava flour and cassava pellets only. Cassava waste, tapioca and sago are not included.

Table 4

Export of frozen chicken, live pigs and frozen swine, 1967 to 1982

Year	Frozen chicken		Live pigs		Frozen swine	
	Quantity (tons)	Value (1 000 baht)	Quantity (tons)	Value (1 000 baht)	Quantity (tons)	Value (1 000 baht)
1967	-	-	10.9	12 694.9	-	-
1968	-	-	10.2	2 040.5	-	-
1969	-	-	4.2	845.0	-	-
1970	-	-	15.8	18 786.2	-	-
1971	-	-	9.5	10 531.5	-	-
1972	-	-	1.1	750.2	-	-
1973	157.4	3 147.8	10.8	12 845.2	-	-
1974	896.4	16 178.8	1.3	442.2	-	-
1975	392.5	7 770.1	0	0	90.2	3 046.7
1976	2 049.3	38 527.9	5.6	4 100.0	66.3	2 250.9
1977	2 942.6	78 850.9	0.6	463.3	8.1	255.4
1978	9 717.4	194 347.5	3.6	5 552.4	1 456.9	48 945.8
1979	13 265.0	350 391.2	7.4	11 840.0	493.0	14 913.0
1980	17 174.8	601 116.6	0.2	24.5	38.1	2 274.7
1981	25 401.0	968 693.1	0.6	1 694.7	3.6	180.4
1982	..	..	10.9	19 667.2	27.5	1 404.1

Sources: Thailand Ministry of Agriculture, Department of Livestock Development, Yearbook of Statistics, 1973 to 1981, part 4 (for frozen chicken) and 1967 to 1979, part 4 (for hogs and swine meat.

1980 to 1982 data for live pig and swine meat exports are taken from the Department of Customs, Foreign Trade Statistics of Thailand, December issues.

Note: Data from the Department of Livestock (Thailand Government) showed no export of live pigs in 1980 and no export of frozen swine in 1981. It also gave lower values of exports of frozen swine in 1980 and of live pigs exported in 1981.

21. In 1980, chicken exports from Thailand ranked 23rd among the largest foreign exchange earning products. The share of Thai chicken exports in world trade was 3.4 per cent and almost 100 per cent of such exports went to Japan. It is only recently that Thailand has begun slowly to expand into new markets such as Romania and Austria. The major obstacle in expanding exports to Japan is the high tariff rates (20 per cent) for boneless chicken from Thailand, as compared with those on frozen chicken with bone from the United States (13.5 per cent before 1983 and 11 per cent after 1983). Consequently, Thai exports of frozen chicken to Japan amounted to 732 million baht in the first six months of 1982 but dropped to only 464 million baht in the first six months of 1983. 1/

22. Exports of swine products represented only 4 per cent of the total tonnage of meat exports in 1979. The export patterns of live hogs and frozen piglets were extremely unpredictable in terms of both volume exported and country of destination. This reflects the unwillingness of foreign countries to accept unhygenic pork and the high perishability of disease-prone hogs from Thailand. Apart from live hogs and frozen piglets, small quantities of roasted pork slabs, bacon, ham and sausages, as well as bristle, guts, bladders, sinew and pig stomachs have also been exported. The major reasons for the stagnation of Thai pork exports are attributable to the poor conditions in the slaughter houses as well as to the state of the underdeveloped meat processing sector.

23. On the import side, Thailand, although a food surplus economy, has to import some food items such as livestock and dairy products, and some food crops such as wheat, salt and cereal preparations. The share of food crops in the value of food imports has been increasing since 1966 while that of livestock products started to decline after 1965.

24. Food import value as a percentage of total import value has shown a declining trend over the past two decades. The proportion of food imports to the value of food produced domestically has also been steadily declining. This suggests that the country's reliance on external sources for food has been diminishing relative to domestic production. Thailand, however, relies to a great extent on the import of agricultural inputs for food production, especially that of fertilizer and chemical inputs.

3. Food consumption

25. The Thai diet consists mainly of rice, vegetables, and a small amount of meat and fish. Rice is the staple food in all regions of the country. It contributes more than two-thirds of total calories and is the main source of protein. The rural diet derives the rest of its protein supply from vegetables while the urban diet contains more animal protein.

26. Over time, there has been a clear tendency for the percentage of rice consumption in the diet to decline while the percentage consumption of protein such as meat, fish, milk and eggs has increased in both urban and rural areas. However, the increase in fish consumption was more significant for rural households while the increase in milk and egg consumption was more significant for urban households. Even so, there is insufficient consumption of protein and

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1/ Further detail is given in chapter II, section C.

calories in rural areas and protein-calorie malnutrition is widespread in infants and pre-school children. The largest incidence of malnutrition in children aged 0-6 years has been found in the north-eastern region and the smallest incidence in the central region. The same problem exists for children in the Bangkok slums.

C. Government measures for improving the relative bargaining power and economic position of farmers

27. Although the government policies directly concerning the four selected commodities in this study will be discussed in the next three chapters, there are some important ones that apply generally to agricultural products. Since a certain number of these policies aim at improving the relative bargaining power and economic position of farmers, it is appropriate to discuss them in this chapter. These policies include: the agricultural credit policy, the co-operatives promotion policy and the price support programme. Since there have been no price support programmes for major crops such as maize and cassava (except rice and some other less important crops such as garlic and soybeans), discussion of the price support programme will be postponed to chapter II where it relates to rice.

28. One of the problems in agricultural development is an adequate supply of institutional credit in the agricultural sector. Most farmers obtain their loans from informal sources, which usually charge very high rates of interest. The rural need for more credit from institutional sources will become more important because agricultural growth has to be generated from intensification instead of area expansion as in the past. Agricultural intensification usually requires greater use of expensive inputs and capital stock and this means that the financial system will certainly play a key role. Since the Government has attempted to influence the rural financial sector by several directive measures, a brief review of the Government's credit policy will provide a better understanding of rural credit.

1. Agricultural credit policy 2/

29. One of the fundamental trends in the Thai rural economy in the past decade has been the relatively rapid increase in farm household income from off-farm and non-farm earnings, which grew at 12 per cent per annum over the 1972 to 1978 period. The rural sector's savings consistently exceeded rural gross fixed capital formation in recent years. For example, in 1980 farm household income was about 190,000 million baht and savings were about 24,500 million baht. This is why most of the rural financial requirements are from self financing. Household savings, however, are still not enough to meet resource requirements. Rural credit amounted to 46,000 million baht in 1980, 50 per cent of which came from non-institutional sources, 40 per cent from commercial banks and 9 per cent from the Bank of Agriculture and Agricultural Co-operatives (BAAC). Non-institutional lenders are grain middlemen, rice millers, local store owners, landlords, relatives and private individuals. Most of the merchants who make loans to farmers are chiefly interested in purchasing and selling the farmers' crops. For them, lending is often a technique for establishing a market obligation. The

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2/ This section is heavily drawn from: (a) R.H. Meyer, et.al., "Agricultural Credit in Thailand", Research Report No.6, Centre for Applied Economics Research, Kasetsart University (Thailand), May 1979; (b) World Bank, Perspectives for Financial Reform, Vol. 2, Report No. 4085-TH, December 1982.

interest rates charged by these lenders range from 2 per cent to 5 per cent per month. These high interest rates can be explained by: (i) the high risk in agricultural production; (ii) the high cost of enforcing the loan contract; and (iii) the scarcity of capital in the rural market.

30. Since the Government is particularly concerned with the problem of high interest rates for rural credit, it has adopted some measures to provide institutional credit to agriculture at below market interest rates and to increase the flow of institutional credit to agriculture. In pursuit of its objectives, the Government has:

- Established special rediscount facilities in the Bank of Thailand (BOT);
- Created mandatory credit allocations for the commercial banks; and
- Established a specialized institution, the BAAC, to serve agriculture.

(a) Special BOT rediscount facilities

31. Since 1967, the Bank of Thailand has been authorized to rediscount promissory notes arising out of agricultural transactions. Four different kinds of notes can be discounted covering production, marketing, livestock, and inputs. The commercial banks may have 90 per cent of their loans discounted at a rate of 5 per cent per annum for production loans and 7 per cent per annum for all others. By the end of 1977, only about 184 million baht of commercial bank notes were rediscounted through the BOT. The commercial banks offer two explanations for the limited use of the rediscounting facility. Firstly, they argue that the narrow spread between the interest rate changed by the BOT and the rate for borrowers is not an inducement to use the window. Secondly, the rediscounted loans cannot be counted against the mandatory credit requirements.

(b) Mandatory credit allocations

32. Prior to 1975, five of the 29 commercial banks were involved in lending to farmers. Since response to the rediscounting mechanism was so modest, the BOT in 1975 adopted a system of mandatory credit allocations to agriculture. The BOT required that, by the end of 1975, the amount of loans outstanding to agriculture should amount to at least 5 per cent of a bank's total outstanding deposits at the end of 1974. This quota could be met either by direct lending, or through deposit with BAAC. Subsequently, the quota was adjusted several times. The quota is now 13 per cent of total deposits at the end of the previous year, and 2 per cent may be used for agribusiness loans.

33. After 1975, the BOT relaxed its tight control on the opening of new bank branches in rural areas. All new rural and provincial branches are required within two years of opening to lend 60 per cent of their local deposits in the area served by the branch, of which one-third must be to farmers. There was a surge of new branch openings in 1976, but the rate has slowed as banks find increasing difficulties in meeting the mandatory credit allocations.

(c) Bank for Agriculture and Agricultural Co-operatives (BAAC)

34. In 1966, the Government established a specialized institution, BAAC, as part of its strategy to boost lending to agriculture. BAAC's activities are legally limited to lending to individual farmers, agricultural co-operatives and farmers'

associations for agricultural purposes, 3/ excluding agribusiness. Today, BAAC is the most important single institutional source of credit to farmers. In the fiscal year 1980, its loan disbursements totalled about 8.3 billion baht. One of the most striking features of BAAC's credit operations is its remarkably wide coverage. With 62 branches and 514 field units spread over the country, BAAC has been able to reach about 2 million farm families (about 1 million directly, and another 1 million through co-operatives and farmers' associations) through its credit operations. This represents about 40 per cent of the approximately 5 million farm families in Thailand. In comparison, commercial banks with about 1,460 branches reached about 200,000 families directly.

35. BAAC currently accounts for 8 per cent of rural credit and 25 per cent of agricultural credit. Commercial banks mobilize about 80 per cent of rural savings while the BAAC has only about 3 per cent because it has no incentive to mobilize: its lending rate is fixed at a level that allows little or no positive spread over the savings rate.

36. While the BAAC is a well managed institution within government rules and interest rate regulations, the operational framework is such that it cannot be an independent, financially self-sustaining institution. The financial viability of BAAC, per se, has not been the Government's concern, but the policy objective of promoting rural development through directed credit arrangements has been undermined to the extent that these arrangements have not functioned as intended. In addition, some of these arrangements have been very costly. For example, the annual combined subsidies to BAAC from all sources have recently been in the order of 700 million baht. To remain in business, BAAC relies heavily on notes payable, which are notes rediscounted with the BOT at subsidized rates of 1 per cent to 3.5 per cent per annum. The BAAC has found it extremely difficult to attract funds from the private sector, and has relied mainly on direct support from the Government, the BOT, and, since 1976, on compulsory deposits from commercial banks.

37. BAAC's loan collection performance is fairly good for individual farmers, but very poor for co-operatives and farmers' associations. In 1980, there was a 75 per cent recovery rate for individual farmer loans, which are generally made on a group guarantee basis. Most of these loans remain performing loans even when overdue, and more than 98 per cent are paid within three years. The amount of write-offs after 10 years appears to be negligible. The repayment of loans of co-operatives and farmers' associations is poor: co-operatives' repayments were about 45 per cent and farmers' associations about 35 per cent in 1980.

38. The existing incentive system prevents BAAC from mobilizing rural savings, because the rate on time deposits is 13 to 14 per cent per annum while the BAAC lending rate to individual farmers is 14 per cent and to co-operatives only 11 per cent per annum. This system, and its dependence on subsidies to BAAC, is sometimes justified as a means of helping poor farmers.

2. Agricultural co-operatives

39. Although the co-operative movement has been in Thailand since 1916, agricultural co-operatives are still weak and lack bargaining power in both the input and output markets. Instead of performing marketing services for their members, most co-operatives function only as money lenders who provide cheap loans for consumption purposes.

3/ In 1980, BAAC's disbursements to individual farmers were 72 per cent of total loans outstanding, to co-operatives 27 per cent, and to farmers' associations about one per cent of the total.

40. There are three types of agricultural co-operatives: (i) a local co-operative in each district (called amphoe), (ii) a provincial co-operative which consists of at least three local co-operatives, and (iii) one national co-operative. There are approximately 700 agricultural co-operatives with only about 600,000 members. Less than 100 co-operatives have their own rice mills. Their major activities are: to provide low-interest loans, to perform marketing and processing services, as well as to provide low-price fertilizer to their members.

41. In 1979, the BAAC evaluated the performance of 470 agricultural co-operatives. In its evaluation, the Bank constructed an index of success from detailed data on management, operation, financial status, and investment in fixed assets. It was found that only 12 co-operatives (or 2.5 per cent) could be classified as top-rated co-operatives and 88 were second-class.

42. There are several major problems in the operation of agricultural co-operatives. 4/ First, management is inefficient - for example, the actual capacity used by the 24 rice mills that are owned by the co-operatives is only 14 to 25 per cent of existing capacity. Secondly, most co-operatives lack qualified personnel. Thirdly, the major activity of most co-operatives is credit lending since more than 50 per cent of their annual income is from interest income. Most people join co-operatives because they hope to be able to obtain a low-interest loan, not because they want to do their business on a co-operative basis. Finally, most co-operatives suffer severely from lack of co-ordination. Some local co-operatives are so large (in terms of membership) that it is very costly for each member to join actively in the activities.

43. According to several studies of co-operatives, government intervention is the key factor in the failure of co-operative development. Many agricultural co-operatives were hurriedly established by the Government. Most of the members do not understand the principles and fundamentals of a co-operative and they do not understand the mutual benefits to be gained from co-operatives. Most of the members are relatively well-to-do people who are acquainted with government officers. The 1968 Co-operatives Act grants significant power to the government co-operative registrar to control the operation of the co-operatives. Since most of the farmers do not understand the principles of a co-operative, the co-operatives are run by the Government officers, being co-operatives of the officers, by the officers and sometimes for the officers. The rules and the accounting system of the co-operatives are too complicated for the poorly educated farmers to understand. All the farmers do is raise their hands to approve the annual report prepared by the officers. More importantly, the law regulates the rates for annual profits to be paid as dividends according to the average revenue made on the basis of the amount of business each member does with the co-operative, the bonus for personnel, investment in fixed assets, cash reserves, etc. Such regulation not only enhances the role of the government officers, but also limits the role of the co-operative members in decisions to allocate and distribute the profits. Since the take-home profit is very small, the members do not have an incentive to participate in the co-operative's activities. There are also other reasons for the slow development of agricultural co-operatives. For example, most co-operatives' managers will not risk investing their capital in ventures with farmers since most farmers do not have marketing experience. They prefer to give low-interest loans to their members. Finally, co-operatives are often used by some politicians as a means to obtain personal benefits. This is why co-operatives are granted special privileges by the Government e.g. the right to have all the pig slaughter permits and the right to sell paddy to the Government at a guaranteed price.

4/ P. Netayarak, "Analysis of Problems of Co-operatives in the Rural Development". A paper presented at a seminar on Social Institutions and People's Participation in Rural Development, ILO, Ubon Ratchathani, September 1978.

Chapter II

PRODUCTION, PROCESSING AND MARKETING OF BROILERS AND HOGS

A. Introduction

44. Livestock is the second most important subsector within the agricultural industry in terms of value added and employment. In 1981, it accounted for 3 per cent of real GDP or 12.2 per cent of value added in the agricultural sector. Crops, fisheries and forestry subsectors generated 18.8 per cent, 2.2 per cent and 0.9 per cent of real GDP, respectively. 5/

45. Within the livestock area, poultry and swine are the most important sectors and accounted for 28.9 per cent and 21.2 per cent respectively of real value added in 1981. The rapid increase in chicken production has made poultry more important both in terms of value added and as a source of cheap protein. The retail price of chicken decreased relative to pork from 0.91 baht per kg in 1960 to 0.72 baht in 1979. 6/ As a consequence, low income people can buy more chicken. Swine production has not been as impressive as that of broilers (table 5), hence, the swine industry has lost its importance as the largest subsector in the livestock industry. Nevertheless, pork is still the second largest source of animal protein after fish.

46. The livestock sector, especially swine, broilers and eggs, is important to the Thai economy in general, and to the rural sector in particular. Apart from its role as a source of food, traditional livestock production, which is closely integrated with the main production system of small land-holding farmers, is an alternative significant source of income for farmers. Moreover, the livestock sector generates a high degree of both backward and forward linkages through its demand for inputs from the rest of the economy and through its supply of food raw materials that undergo further processing, marketing and distribution. In 1980, chicken slaughterhouses and the chicken feed industry generated more than 30,000 jobs worth 250 million baht. 7/

47. This part of the study will cover only these two subsectors with an emphasis on broilers. 8/ Since the swine industry has had heavy government intervention while the broiler industry has had almost none, these sectors allow a comparison

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5/ The National Economic and Social Development Board, National Income of Thailand, 1981 edition.

6/ Calculated from the price data collected by the Department of Business Economics. Note that one US dollar was approximately 21 baht before 1981 and 22.9 baht thereafter.

7/ Association for Chicken Raising Promotion in Thailand, Under His Majesty's Royal Patronage, unpublished flier, 1981.

8/ In animal science, chickens includes broilers and layers. This study deals only with broilers.

Table 5

Number of broilers and swine produced, 1970 to 1981

(million units)

Year	Broilers a/	Chicken b/	Chicken c/	Swine d/	Layers b/
1970	-	136.3	58.79	6.86	25.45
1971	-	150.7	53.98	5.13	32.42
1972	-	166.8	52.78	4.62	40.05
1973	-	180.2	61.82	4.46	48.65
1974	36.4	190.6	47.81	3.53	53.72
1975	41.6	198.5	53.86	4.55	59.18
1976	58.2	206.4	49.89	4.04	64.59
1977	78.0	211.6	56.31	3.54	67.23
1978	104.0	216.9	65.32	4.25	69.93
1979	130.0(180) e/	222.0	60.54	4.11	72.56
1980	176.8(200) f/	301.9	..	4.15	..
1981	(288.0) f/	..	..	..	..

Source:

a/ Thai Investment and Securities Co., Ltd., The Broiler Industry in Thailand, JETRO, December 1979, p.6.

b/ National Economic and Social Development Board (NESBD) Thailand. Figures include broilers, indigenous chickens and layers.

c/ Thailand Ministry of Agriculture, Office of Agricultural Economics, Agricultural Statistics of Thailand. Crop year 1979/1980, table 56, p.79, includes mainly indigenous chicken.

d/ Vallentine Laurie & Davies Ety. Ltd., The Livestock and Meat Products Sector, UNDP/IBRD, Technical-Assistance Services to BIO, Interim Findings: Vol. IV, p.20.

e/ Ruan Prachachart Thurakit (People Union Business), 12 November 1980, p.7.

f/ From interviews with managers of some feed mill companies.

of the economic effects of government regulation. It is also interesting to contrast the structure of the swine industry, which has been more or less stagnant for a decade, with that of the rapidly growing broiler industry. 9/

This paper will:

- Investigate the structure of production, processing, distribution and main types of technology used in the broiler and the hog industries;

- Analyse the marketing margins, price movement and price formation in both sectors;

- Identify factors affecting growth in frozen chicken exports;

- Investigate various constraints in the processing and trading of chicken and hogs and assess their impacts on producers' income as well as other possible effects;

- Appraise and analyse some of the government policies concerning processing and distribution of chicken and hogs.

B. Market structure and technological profile

1. Structure of broiler production, processing and distribution

48. Figure 1 exhibits the movement of trade within the chicken industry. It can be seen that commercial broiler farms, which are major suppliers of chicken meat and chicken products to urban and foreign markets, depend heavily upon the

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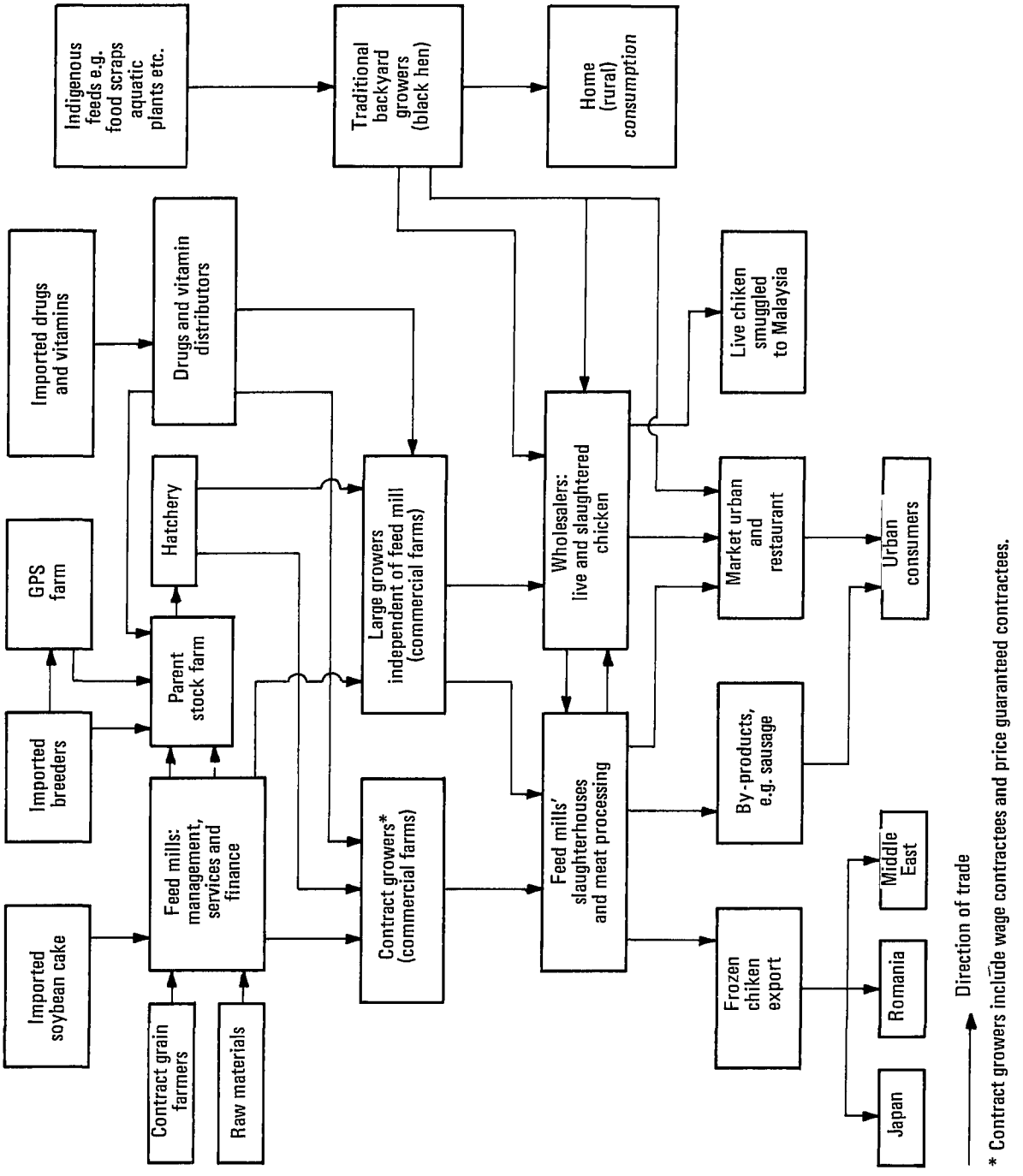
9/ In addition to information from the previous work of Nipon Poapongsakorn (see bibliography), this part of the study makes extensive use of information obtained from semi-structured interviews with top management officers at the Bangkok Livestock Trading Company (a subsidiary of the Charoen Pokphand Group - hereafter referred to as C.P.), Charoen Pokpham Feed Mill, C.P. Agriculture and Industry, Sri Thai Livestock, Saha Farm, Laemthong and others. Many visits to broiler-raising farms, swine farms, hatcheries, pullet farms, slaughterhouses, feed mills and retailers in Bangkok were made during the period of November 1981 to January 1982. Other important information sources were: major feed mill companies, the Chicken Raisers Association, the Department of Agricultural Economics, the Department of Business Economics and the Department of Livestock (Thailand). About 118 broiler farmers were interviewed by students in the Faculty of Economics at Thammasat University (Thailand) from October to November 1981. Most of the information in the related questionnaire concerns details of chicken contracts.

Figure 1
PRODUCT FLOWS FOR CHICKEN IN THAILAND



services and inputs of feed mills as well as imported inputs. Although backyard production of indigenous chicken is the main source of chicken consumption in rural areas, it will be shown that the production, marketing and processing of poultry requires a large, vertically integrated company that has a sophisticated knowledge of animal feeding, processing, marketing and disease control. Moreover, the structure of the industry is characterized and dominated by a few integrated firms in an oligopolistic setting.

(a) Hatchery

49. Major feed mill companies import breeding stock, feed technology, drugs and modern farm management techniques as a package of inputs and services, mainly from the United States, United Kingdom and the Netherlands. For example, C.P. imports breeding stock and various kinds of technology from Arbor Acres International 10/ of the United States. Although there are many multinational corporations in Europe and North America selling breeders and other inputs, firms in the United States play the most important role in the Thai broiler industry.

50. The imported day-old parent stock (called chicks or P.S.) are raised by companies' subsidiary farms. 11/ Eggs produced from these P.S. hens are either shipped to the company's hatcheries or sold to independent hatchery operators who, in turn, will produce day-old chicks that are to be sold to broiler raisers. Table 6 shows the different breeds of P.S. imported by various companies. Imports of parent stock (P.S.) rose from an estimated 610,000 in 1976 to 2,004,000 in 1979 and 1,265,000 in 1980. Imports of grandparent stock (GPS) pullets amounted to 48,000 in 1980. 12/

51. Among the five provinces around Bangkok 13/ which are the main areas of broiler production in the central plain, there are approximately 35 to 41

10/ The major shareholder of Arbor Acres International is International Basic Economic Corporation (IBEC).

11/ Betagro and Arbor Acres (which is partly owned by the C.P. group) also import grandparent stock (GPS) to be raised in the GPS hatcheries in Nakorn Ratchsima. The chicks produced are then shipped or sold to parent stock (P.S.) farms and their contracted farms.

12/ From data contained in the Department of Livestock Development, Book of Statistics 1979, Association of Agricultural Co-operative Press, 1981 and the Association of Chicken Promotion, Sarn-Kai (Chicken Bulletin), 29th year, No.10, October 1981, p.3. The nature of foreign involvement will be discussed later in this section.

13/ Namely, Chacherngsao, Nakornpathom, Prajinburi, Cholburi and Nakorn Ratchasima

Table 6

Sources and number of parent stock, 1978

Producer	Breed	Country supplier	Number of P.S.
C.P.	A.A.	USA (IBEC)	300,000
Centago	Ross 1	UK	300,000
Sri Thai	Hybro	USA	150,000
		Netherlands	
Laemthong	Hubbard	USA	n.a.
Inter Industry	Cobb 500	Denmark	60,000
	First Farm	UK	
Betagro	Tilch	USA	..
P. Charoenphan	Tatum	USA	..
Saha Farm	Ross 1	UK	..
Supreme Feed	Indian River	USA	..
Others	Shaver	Canada	..
	Star Bowl	USA	..

Sources: Thai Investment and Securities Co., Ltd., The Broiler Industry in Thailand. Japan Trade Center, 26 December 1979, p.4.

Interviews with industrial sources.

Note: (1) The mortality rate of PS was:

5 per cent aged 1 to 20 weeks,
5 to 8 per cent aged over 20 weeks.

(2) The ratio of PS to day-old chicks was 1:120-150.

(3) Centago has imported grandparent stock in a ratio of 1 GPS:40PS since 1980.

hatchery operators. 14/ About 50 per cent of the hatcheries, producing 50 per cent of the day-old chicks, are in Saraburi, 100 kilometers from Bangkok. Cholburi and Chacherngsao are the second and third largest day-old chick production provinces, respectively. Most of the new hatcheries are located in Cholburi. There are only a few hatcheries in each of the other provinces around Bangkok. No large hatchery exists in Nakorn Pathom because it is notorious as an area of "Chicken slums" or disease. About half of all hatcheries are subsidiaries or contracted hatcheries of the C.P. group (i.e. have contracts to buy day-old P.S., feed and drugs from C.P. and then sell day-old chicks to farms under C.P.). Other feed companies own only a few hatcheries 15/ and the rest (10 to 15) are independent operators.

(b) Broiler producers and location

52. The first major step forward in chicken raising occurred in 1973 when C.P. first began exporting frozen chicken after the expansion of the feed mill industry 16/ from 1969 to 1972. The average annual growth rate of broiler production during the 1974 to 1981 period was 29.6 per cent (table 5).

53. The rapid expansion of broiler production over the last decade has been made possible both by an increase in the number of commercial farms (having farm operators who raise chicken as a sole occupation) and by an increase in the average farm size, particularly in the provinces of Chacherngsao, Nakorn and Cholburi. 17/ It has been estimated that the number of commercial farms in the three provinces in the central plain increased from 814 to 1,034 in 1979. Table 7 shows that the average commercial farm size in the central plain, where major zones of broiler raising are concentrated, increased rapidly from 500 to 1,000 birds per farm to 5,000 to 15,000 birds from 1977 to 1981. The largest farm found in Nakorn Pathom in 1981 consists of 48 chicken houses and can raise

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14/ According to information from the Chicken Raisers Association (Thailand).

15/ The largest suppliers of day-old chicks (i.e. own production plus contracted production are: C.P., Laemthon, Inter-Industry Feed, P. Charoenphan, Betagro, Centago and Krung Thai Farm). These companies together control about 80 per cent of the weekly supply of day-old chicks which were estimated at 5 to 5.5 million birds in 1981.

16/ N. Poapongsakorn and P. Pipatkusolsook, "The Animal Feed Industry". A paper presented at a seminar on Asian Comparative Study of the Development of Labor Intensive Industry, ARTEP-ILO, Pattaya, Thailand, October 1980.

17/ In 1963, the Agriculture Census found 534,287 chicken holdings and 28,254 holdings reporting 50 chickens or more. The 1978 census found 2.638 million holdings. The average number of chickens per holding increased from 19 chickens in 1963 to 32 chickens in 1978.

Table 7

Size of broiler-raising farms in the central region

Birds per farm	Larsen (1968) a/	MAC (1977) b/	Pipatkusolsook (1981) c/	Nimmarnpairote (1979) d/	
	%	%	%	Size	%
500 - 1 000	89.9		-		
1 001 - 5 000	9.6	3.74	42.9 e/		
5 001 - 10 000	0.5	27.10	32.5	less than 10 000	8
10 001 - 15 000	-	25.23	10.5	10 000 - 30 000	50
15 001 - 20 000	-	14.95	3.5	30 001 - 50 000	30
20 001 - 25 000	-	10.28	-	50 000 +	12
Above 25 000	-	18.69	10.4		
Total %	100.0	100.0	100.0		100
Farms	(178.0)	..	(114.0)		(50)

Sources:

a/ P.B. Larsen and W. Sarasup, Marketing of chickens in 11 Provinces in the Central Region of Thailand, Division of Agriculture Economics, Ministry of Agriculture, 1968, (mimeograph), p.7.

b/ Thailand Ministry of Agriculture and Co-operatives, Office of Agricultural Business. The survey was done in 5 provinces of the central region in 1977.

c/ P. Pipatsolsook, Market Structure, Contract and Contract Integration: A Case Study of Formula Feed Industry, M.A. thesis, Faculty of Economics, Thammasat University, 1982, p.114.

d/ W. Nimmarnpairote, Chicken Contract Production in the Central Plain of Thailand, M.A. thesis, Faculty of Economics, Thammasat University, 1980 (Thai), p.16.

e/ The range of the class size is between 2,000 to 5,000 birds per farm.

between 600,000 to 700,000 birds at one time. The inclusion of backyard producers, however indicates that almost 70 per cent of all growers still have less than 20 birds. 18/

54. A large proportion of the chicken raised in other regions is indigenous. Modern commercial farms that enter into contracts with large feed mill companies or feed agents have begun to emerge as a result of the sales promotion efforts of the companies. Although provinces in the south and the north have also commenced broiler production, the growth of chicken raising has been the most rapid in the central region because of the closeness to sources of animal feed and to Bangkok, which is the largest chicken market and the port of export. Moreover, the endowments in these provinces may be more suitable than others for chicken or swine raising. Nakorn Pathom, for example, has been known as a livestock-producing province for a long time, which is why it has more small independent producers.

55. To analyse the concentration of chicken farmers, it is helpful to divide commercial farms into three groups: (i) independent producers, (ii) producers with guaranteed price contracts, and (iii) wage contract producers 19/ (table 8). Independent producers usually have substantial experience (10 years or more) in chicken raising. Since they buy day-old chicks, feed and drugs at current market prices and do their own marketing, they bear the risk of variations in output and prices. It has been found 20/ that 26 per cent of the producers in the central plain are independent farmers. Many independent large-scale producers are feed dealers who expect a large return from broiler raising since they have access to cheaper feed supplies and technical as well as modern farm management services from the feed company. Although the total number of independent producers is not known, there are about 12 to 15 independent farms that raise more than 100,000 birds at one time in each of the provinces of Chacherngsao and Nakorn Pathom. 21/ Besides raising their own broilers, these producers also have either an agreement to buy broilers from small independent producers at a guaranteed price or a contract to hire small producers who have their own farms to raise chicken. About 50 per cent of all chicken raised in Nakorn Pathom and Chacherngsao are controlled by these 25 to 30 independent producers.

18/ National Statistical Office, 1978 Agricultural Census Report, table 4.4-4.5.

19/ A description of the terms and duration of each type of contract is presented in appendix 1.

20/ Survey, Department of Agricultural Economics (Thammasat University, Thailand), 1977.

21/ Some chicken processors such as Sri Thai Livestock, Saha Farm, also have their own chicken farm. For instance, Sri Thai owns a 400,000 broiler farm in Prachinburi.

56. There are also small independent producers called producers on credit (table 8). They buy feed, day-old chicks and drugs from the feed dealers on credit. These producers still make their own production and marketing decisions but the actual marketing of the broilers is carried out by the feed dealers who charge a marketing fee for their services to the farmers. In addition, there are independent producers who have an agreement to sell part of their production at agreed prices. Table 8 shows that there has been a tendency for the number of small independent producers to decline while the surviving independent producers operate large-scale farms. This point will be analysed in section 4.

Table 8

Types of broiler-raising producers

	DAE 1977 a/ %	Nimmanpairoj b/ %	1979 No.	Pipatkusolsook c/ %	1981 No.
Independent	26.00	32	16	7.63	9
Credit account	19.17	-		2.54	3
Independent with PG	-	-		3.39	4
Price guaranteed	27.66	34	17	29.66	35
Wage contract	26.97	34	17	53.39	63
Closed down	-	-		3.39	4
Total	100.00	100	50	100.00	118

Sources:

a/ Department of Agricultural Economics, (1977), Thammasat University (Thailand), 1977.

b/ W. Nimmanpairoj, Chicken Raising on Contract in the Central Region of Thailand. Master of Economics thesis (English Language Program), Faculty of Economics, Thammasat University (Thailand), 1980, p.7.

c/ P. Pipatkusolsook, Market Structure, Conduct and Contract Integration: A Case Study of Formula feed Industry. Master of Economics thesis, Faculty of Economics, Thammasat University, (Thailand), June 1982, p.114. The survey was carried out from October to December 1981 in four provinces, i.e., Nakornsawan, Pathom, Cholburi, Chacherngsao and Prachinburi.

57. Price-guaranteed contract producers have become more popular, particularly in areas where there was a large number of small independent producers who had financial difficulties due to depressed chicken prices. These producers usually have agreements with local feed dealers (who also operate chicken farms) or feed mill companies whereby the latter sells chicks and feed to the producers at agreed prices. In turn, the producers sell back broilers at agreed prices. Details of the arrangements for each type of contract are given in the appendix to this chapter.

58. Table 8 indicates that more and more formerly independent producers have negotiated with large-scale producers or C.P. to raise chickens in return for a fixed fee or wage contract. C.P. was the first firm to initiate this type of contract in Thailand. It provides producers with an agreed number of chicks and the required amount of feeds, drugs and veterinary services at no cost. Producers who have no chicken houses can build one or two houses capable of holding 5,000 to 10,000 birds each by obtaining loans from commercial banks negotiated for them by C.P. In return, they sign a five-year contract to raise chicken under the close supervision of C.P. officers. Producers are currently paid between 1.20 to 1.59 baht per marketable broiler. A penalty is imposed if the broiler's weight is lower than that specified in the contract whereas a premium is paid for excess weight. Other producers who already have their own chicken houses can enter the same type of contract with C.P., other feed mill companies and local feed dealers. Not all of the major feed companies use this type of wage contract whose enforcement and supervision can be quite costly in the absence of proper organization. A survey in 1981 showed that about 50 per cent of wage contract producers were under the umbrella of C.P.

59. Since the volume of chicken raised by each type of producer and the total number of each type of producer is not known, it is not possible to estimate the concentration index of chicken producers. There are less than 30 farms who raise more than 100,000 birds but these do not have any monopoly power over prices because the quantity supplied by each is still a negligible percentage of the total supply. Moreover, a large number of small producers raise a product that is almost a perfect substitute. This does not imply, however, that the large producers do not have monopolistic power in the factor market. Since the large producers usually run a feed distribution business, they have been able to employ various types of contracts as a means to increase the profit from selling inputs to farmers who have contracts with them. Some feed dealers may have monopsonistic power over the guaranteed price for chicken raised by farmers contracted to them, since the number of feed dealers with whom a small producer is familiar is limited.

(c) Choice of contractual arrangements 22/

60. In analysing factors that affect the choice of contractual arrangement, it should be noted that there are no differences in the production efficiency of

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22/ This section is heavily drawn from P. Pipatkusolsook, "Market Structure, Conduct and Contract Integration: a Case Study of Formula Feed Industry", Master of Economics thesis, Faculty of Economics, Thammasat University Thailand, June 1982.

price-guaranteed growers or of piece-rate growers. 23/ Two important factors that explain differential contractual arrangements and the shift in the choice of contractual arrangements toward flat-fee contracts during the past few years are risk aversion and transaction costs.

61. Independent and credit account producers apparently bear both the risk of variation in output yield and the risk of price changes. The latter type of risk is very serious because chicken prices fluctuate widely and rapidly. The coefficient of variation of the farm-gate price was 25.1 per cent during the period 1970 to 1981. Under a price guarantee, the variance of the output price is distributed among the contracting parties, while the risk of variation in output yield is borne by the producer. This is because the integrator bears the loss when his guaranteed price is higher than the prevailing market price, but the farmer bears the loss when the market price is higher than the guaranteed price. Under a piece-rate contract, the integrator will bear most, if not all, of both types of risk.

62. The postulate of risk aversion 24/ can explain why former independent producers have become price-guaranteed producers, and why some producers switched to a flat-fee contract. This postulate would predict only the selection of a piece-rate contract. The existence of different contractual arrangements implies that there are other factors involved, namely the transaction costs that are associated with each arrangement. A price-guaranteed contract involves higher transaction costs, particularly to the producers, than a piece-rate contract, because: (a) the quality of feed provided by the contracting firm is sometimes uncertain; and (b) it is difficult for producers to force the contractor to catch sick birds, etc. With piece-rate contracts, the transaction cost to the contractor in terms of ensuring inputs and checking the quality of output is higher. Accordingly, all producers should have entered a flat-fee contract, while all contractors should have preferred a price-guaranteed contract. The fact that some producers are still under price-guaranteed contracts can be explained as follows. Transaction costs to price-guaranteed producers are partly minimized by the contractor because: (i) the contractor always makes a catch at the time agreed in the contract: (ii) when an urgent catch of sick birds is requested, the contractor always makes a catch without delay; and (iii) sometimes, producers are compensated for part of their loss by a reduction in the price of day-old chicks or drugs. From the contractor's standpoint, such compensation will be less costly than the

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23/ The mean test of the feed conversion ratios and mortality rate between these two groups reveals no statistical difference.

24/ Under the postulate of risk aversion, an individual will seek to avoid risk if the cost of doing so is less than the gain. He may avert risk either by searching for information about the future, by choosing less risky options when investing, or by choosing among arrangements with which his burden of risk can be dispersed to other individuals. S.N.S. Cheung, "Transaction Costs, Risk Aversion and the Choice of Contractual Arrangements", Journal of Law and Economics, (April 1969), p.24.

transaction cost that will accrue to him when the producers seek other options. If the contracted producers turn to other contractors, the former contractor will face the additional information cost of finding new producers. If the producers switch to the less risky piece-rate contract, the contractor will also incur the high cost of regulating the inputs used and checking the quality of output. The issue of the bargaining power of contract producers will be discussed later in this chapter.

(d) Traders and distribution

63. There are three major groups of buyers of live chicken: (i) large-scale independent producers who are usually local feed dealers; (ii) feed companies and major processors; and (iii) wholesalers from Bangkok central chicken markets. Although producers in the first group also buy a lot of live chicken from small independent farmers and contract farmers, they do not sell their supply directly to consumers or retailers in the markets. Instead, they sell almost all their supply to either the second or the third group of buyers.

64. The second group of buyers includes six major chicken processors 25/ as well as large feed mill companies such as: First Farm, Welgro and Interindustry, who buy chicken from their contracted producers and are obliged to sell them to carcass wholesalers in Bangkok. In the past, after buying live chicken directly from large-scale producers both the six major processors and the other large feed companies sold part of their secured supply to chicken wholesalers in Bangkok and sent the rest to their own slaughterhouses. Currently, with the exception of C.P.,26/ the processors send all their chicken to their own slaughterhouses.

65. The major companies in the second and third group are the ones who perform a marketing function. The following estimations 27/ were made of their respective shares of the Bangkok chicken trade: C.P. (44 per cent), Saha Farms (13 per cent), Centago (12 per cent), Betagro (7 per cent), Sri Thai (7 per cent), Laemthong (7 per cent), Klongton central market wholesalers and others (9 per cent).

66. Since the emergence of C.P. and other feed mills in the broiler trade, the most striking trend in the market has been the declining share of the Chinese wholesalers located in the Klongton central market and elsewhere. In the late 1960s and early 1970s, about 80 to 90 per cent of the chicken sold in Bangkok was slaughtered and traded by a group of 50 to 60 wholesalers in Chinatown, Klongtoey and/or Klongton. Today, there are 25 with less than 10 per cent of the market and it is expected that there will only be 5 to 8 Chinese wholesalers in a few years. Because of their direct links with poultry producers and the diversified nature of their operations, new firms have been able to capture major shares of the domestic and export markets, completely by-passing the Chinese wholesalers who have lost their traditional suppliers. The remaining wholesalers have been able to survive only on the basis of their long-standing ties with retail traders.

25/ These are: C.P. and its subsidiaries, Centago, Sri Thai, Laemthong, Betagro, and Saha Farm. In 1983, P. Charoenphan, which has been building a new slaughterhouse, was to have become another buyer.

26/ As well as selling chicken, C.P. (the largest trader) also buys live chicken from the Bangkok wholesalers when its secured supply is insufficient.

27/ Based on interviews with the leading firms.

(e) Chicken processing and retailing

67. Before C.P. started exporting frozen chicken in 1973, more than 90 per cent of the chicken sold in the retail markets were New York dressed (i.e. the chicken is not eviscerated; only the blood and feathers are removed; heads, feet and viscera are still intact). Chinese wholesalers at Klongtoey sold chicken both live and New York dressed. Both the wholesalers and retailers used the traditional method of manual slaughtering. As the number of Chinese wholesalers and their sales volume diminished, the modern abattoirs which are subsidiaries of the major feed mills rapidly captured the domestic market, even though they were designed to process chicken for export. Since only a few parts of the chicken 28/ are exported, there is a need to find outlets for the rest of the chicken in the local market. These processors 29/ have, therefore, aggressively expanded their local sales.

68. There are a large number of chicken retailers in the consumer market. For the 220 markets in Bangkok, there may be as many as 2,200 to 3,300 retailers, each selling approximately 50 to 100 birds per day. Some retailers still buy live chicken and kill them manually (including de-feathering), whereas others buy chicken parts from modern slaughterhouses such as C.P. and Laemthong. Most retailers buy New York dressed chicken from the slaughterhouses of C.P., Laemthong, Saha Farm or other feed companies or from the Chinese wholesalers at Klongtoey, Klongton, Chinatown and then cut the carcasses into parts.

(f) Vertical integration

69. The previous discussion has shown that significant production and market shares at all levels of poultry production, processing and distribution are controlled by a few large, integrated companies which can produce, process and market chicken at lower average costs than their rivals. Vertical integration has been necessary for several reasons. For a young industry such as the broiler industry, it is not possible to purchase inputs or services from other suppliers because they are not yet available. 30/ Since vertical integration usually involves a huge initial capital requirement, it is necessary for a vertically integrated company to plan an optimum scale of production at each stage so that economies of scale can be achieved and fixed costs can be covered. As the scale of production at each stage increases, the opportunities for specialization in the use of resource inputs also increases - for example, the ability of C.P. to put together a specialized staff. Large-scale firms often require proportionately less input per unit of output, simply because certain production techniques do not have to double inputs in order to get doubled output.

28/ Chicken parts exported are: boneless breast, boneless leg, filet, (sasami), wing, skinless-boneless breast with filet, and bone-in leg. Only a small number of New York dressed are exported by Saha Farm.

29/ Since most of the chicken moved by these slaughterhouses (about 70 per cent) is for their own processing, the estimates given previously for market shares can also be considered as their respective percentage share in chicken slaughtering.

30/ G. Stigler, "The Division of Labor is Limited by the Extent of the Market", Readings in Microeconomics, edited by William Breit and Harold M. Hochman, (Hinsdale, Illinois: Dryden Press, 1971), p. 140.

Vertical integration can help to reduce the problems of variation in: input quality, fluctuation in the demand for products at various stages and fluctuation in input supplies and prices. Finally, as will be discussed later, the costs of procurement of supplies and costs of sale between vertical stages can be reduced by the direct passage of materials and goods from one stage to another.

70. One possible index to measure the degree of vertical integration is the ratio of the value of inventory to sales because vertical integration may enable a firm to economize on inventory. The data from the financial statements of some animal feed mills in 1980 showed that the average ratio for the C.P. affiliates was the lowest (0.075), while the average ratio for the feed mills of the other large-scale firms which are C.P.'s major competitors (i.e. Betagro, Centagro, Laemthong and Sri Thai) was 0.109. The ratio of other medium- and small-scale feed mills was 0.1018 to 0.2155. This result suggests a higher degree of vertical integration for the large-scale firms.

71. Appendix 2 gives the names of these companies and their activities. Figure 2 shows the main activities in a vertical integration system for chicken. Some of the more important vertically integrated firms are: C.P., Laemthong, Betagro, Centagro, Sri Thai Livestock, and P. Charoenphan. Table 9 presents the production and market shares in different stages of the vertical integration system of these companies. The C.P. group not only controls the largest share in every operation, but also has more subsidiary companies, some of which are not in the business of agricultural-based products. The Bangkok Livestock Trading Company (BLT), which is the second largest firm in the C.P. group in terms of sales, profits and number of employees, is perhaps the only single firm whose operations are completely vertically integrated. It controls a few parent stock farms, the largest hatchery 31/ and the largest feed mill 31/ in Thailand. It has 133 contract farms producing about 2 million broilers every 7 to 8 weeks. These chickens are transported for slaughter and processing at its two slaughterhouses - one on Bangna-Trad Highway and the other at Minburi. The latter is the larger and more modern slaughterhouse which can process 70,000 chickens in one day. It has chicken sausage processing as well as chicken feather mill processing facilities. BLT also has restaurants which sell roasted chicken.

72. Since C.P. is the dominant seller in the broiler industry, it is interesting to briefly describe the nature of the C.P. conglomerate. Its first company, called Chia Tai Seeds and Agriculture, opened in 1921. It imported vegetable seeds from China. The success of the C.P. group began in the late 1960s, however, when it agreed with Arbor Acres International to set up Arbor Acres of Thailand in order to bring parent stock breeders and new technology to Thailand. The second factor underlying its success was the

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31/ Located in Cholburi.

Figure 2
INTEGRATION SYSTEM

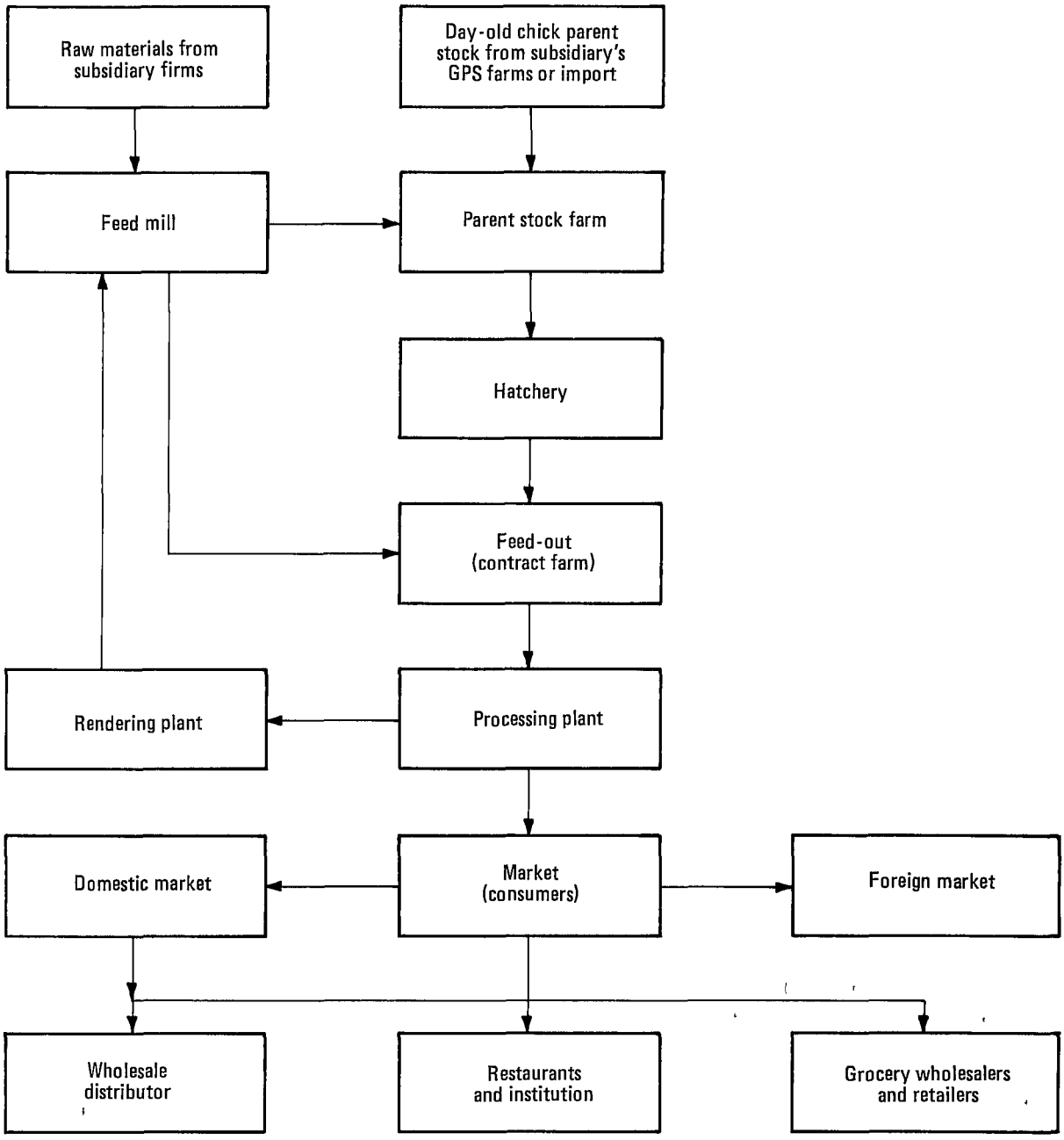

Table 9

A summary of market and production concentration

Activities	Firms	Share (%)	Year
(1) Day-old chick hatchery	(1) C.P.	31	1981
	(2) Top seven firms: C.P., Laemthong, Centago, Betagro, Thai Feed Mill Industry, Sri Thai and P. Charoenphan.	80	1981
(2) Animal feeds	(1) C.P. and its subsidiary	33-40	1980
	(2) Top eight firms: C.P., Centago, Laemthong, Betagro, Krung Thai, Sri Thai, Laemthong Kaset, Inter Industry Trade	70-80	1980
(3) Drugs, vitamins and pre mix	C.P. (Advances Pharma), May & Baker Diethan, Welknow, Pfizer, Thai Pharmi, etc.	..	-
(4) Broiler farm	(1) C.P. and its contracted producers	26-30	1980-1981
	(2) Top nine firms (own farms and contracted farms): C.P., Betagro, Centago, Sri Thai, Laemthong, First Farm, P. Charoenphan, Krung Thai, Saha Farm.	65-70	1980-1981
(5) Chicken trading (live chicken and chicken carcasses) in Bangkok	(1) C.P.	40-45	1981
	(2) Top six firms: C.P., Saha Farm, Centago, Sri Thai, Betagro, Laemthong	80-90	1981

Table 9 (continued)

Activities	Firms	Share (%)	Year
(6) Export	(1) C.P. (Bangkok Livestock Trading Co.)	38.9	1980
	(2) Saha Farm	32.4	
	(3) Laemthong	19.5	
	(4) Centago	9.2	

Sources: (1) Information was obtained by interviews with companies.

(2) N. Poapongsakorn, Marketing and Prices of Broilers and the Future of Small Independent Growers. A research report done under the project on Marketing and pricing Policies of Agricultural Products, No. 6 submitted to the National Economic and Social Development Board (NESDB), September 1980.

(3) N. Poapongsakorn, Marketing and Pricing of Hogs and Government Intervention. A research paper in a project on Marketing and Pricing in Agricultural Policy, NESDB and World Bank - International Bank for Reconstruction and Development (IBRD), December 1980.

(4) Thai Investment & Securities Co., Ltd., "The Broiler Industry in Thailand". Submitted to the Japan Trade Center, December 1979.

establishment in 1973 of a chicken slaughterhouse (named BLT) to produce frozen chicken for export. Before 1973, private firms were not allowed to operate a slaughterhouse. C.P. is not only the first firm to undertake the high risk of entering into the chicken industry on an integrated scale, it is also the only company that has employed the profit-centre concept of management while its competitors are still controlled by members of the families that own the company. Since the management of each subsidiary of the C.P. group is independently run by a capable personnel team, C.P. can rapidly expand the number of its subsidiaries. For example, a truck department in one subsidiary became a new company because its activities had increased so rapidly. By 1982, the C.P. group consisted of more than 45 subsidiaries. It also runs animal feed mills and broiler-raising farms in the People's Republic of China, Hong Kong, Indonesia and Singapore.

(g) The nature of foreign participation

73. There are two types of foreign participation in the broiler industry. The first is by joint venture between Thais and foreign shareholders. The Industrial Investment Act (1977) stipulates that the percentage share of foreign ownership in agriculture-related activities cannot exceed 40 per cent of the registered capital. Although most of the large-scale animal feed firms have foreign shareholders, their percentage share is not very large. 32/ Transnational companies (TNC) do not have shares in companies such as C.P. Feed Mill Co. Ltd. which has 100 per cent Thai shareholders, but it is not fully valid to consider the role of TNCs solely from their percentage shareholdings. Some feed companies have firm economic linkages with TNCs. For example, C.P. co-operated with Arbor Acres International in establishing the Arbor Acres Thailand Co. Ltd. (AAT), in which the Thais hold 51 per cent of the total shares. AAT has extended its business with other affiliated companies of C.P. and even has some shares in those firms.

74. In the chicken processing industry, Japanese shareholding can be found in most of the large-scale firms: BLT (4.7 per cent), Sri Thai Poultry Processing Co. Ltd. (7.5 per cent), Better Foods Co. Ltd., which is a subsidiary of Betagro, (40 per cent), Central Poultry Processing of Centago (40 per cent) and Laemthong Poultry Processing (4.5 per cent). Only P. Charoenphan, which is the new entrant, has an Australian partner. The reason for Japanese participation is that more than 95 per cent of Thai frozen chicken is exported to Japan via Japanese trading firms, namely: Mitsui, Itoman, Nisho Iwai and Kento Shoga.

75. The second type of foreign participation is through the sale of technology. Although some feed companies may have no TNC investment, they usually have long-term contracts to buy technology and inputs such as breeding stock, drugs and feed formula from the TNCs. Detailed information on the contracts was not available. In the case of imported P.S., buyers have to pay a lump sum fee for a right to import a particular crossbreed and an additional five dollars for each

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32/ Betagro has: British shareholders (21 per cent), Singaporian (11 per cent) and Taiwanese (5 per cent); Central Poultry Products of Centago and Laimthong both have: Japanese shareholders (40 per cent); and Welgro has Taiwanese shareholders (20 per cent).

imported pullet. This type of sale is known as multipart price discrimination because the TNCs have monopolistic power over the product sold.

2. Structure of hog production, processing and distribution

76. Although it is not the main focus of this study, the hog industry is worth discussing by way of contrast with the broiler industry. 33/

(a) Production and location

77. The largest swine production region, accounting for 36 to 40 per cent of total national production, is in the central plain, followed by the northern region (26 to 30 per cent), and the north-east (23 to 25 per cent). The south produces only 13 per cent because of the large Moslem population. In contrast to broilers, hog production and processing has remained un-industrialized. Backyard hog raising accounted for as much as 79 per cent of Thailand's 4.2 to 5.3 million pig population in 1978. 34/ There are mainly weaner-pig production and pig-fattening farms which raise only 1 to 4 crossbred pigs per farm. There is also the traditional small pig producer's operation. He raises 5 to 19 pigs per farm. 35/ Most of these producers fatten pigs by using low-cost indigenous feeds.

78. Only about 2.8 per cent of the pig farms in 1978 raised more than 20 pigs per farm. These are the so-called medium-scale farms created as a result of encouragement by a few feed mill companies and by government provision of a cheap supply of crossbred piglets and boars in 1978. The average number of swine raised per farm was still only 4.2, as compared with 2.7 in 1960. 36/

79. There was some evidence of the introduction of contract farming in hog fattening and piglet production, though it was extremely limited. Both price-guarantee and wage contracts can be found (chiefly in Nakorn Pathom, Rajaburi, Cholburi and Chacherngsao provinces). A small number of contract growers have been recruited by C.P. and general feed mills. The largest single contract farm is the "Nong Wa Project" in Chacherngsao, which belongs to Bangkok Produce Co. Ltd. The company bought a thousand acres of land and developed

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33/ The material on hogs is drawn largely from Nipon Poapongsakorn, Marketing and Prices of Hogs and Government Intervention, (op. cit.), which formed a part of the project "Marketing and Pricing Policies of Agricultural Products", submitted to the National Economic and Social Development Board (NESDB), Thailand, 1980.

34/ The National Statistical Office, Agricultural Census 1978, Table 4.4. Note that the figure estimated by the Office of Agricultural Economics, Ministry of Agriculture and Co-operatives was 83 per cent. See A Survey of Agricultural Production, Bangkok, 1978.

35/ According to the Agricultural Census 1978, there were 17.8 per cent of this type of farm.

36/ According to the national census.

a modern farm management system. Besides bringing in new technology, highly mechanized equipment and farm management, it hired poor landless farmers and put them on plots of land with housing - the ownership of which is to revert to them over the ensuing five to ten years. Terms of wage contracts in this project are similar to the broiler wage contracts described in appendix 1 to this chapter.

80. Besides the 30 families on contract farms at Nong Wa, the C.P. subsidiaries run similar projects in Chacherngsao, Cholburi and Saraburi (pig breeder farms) in the central plain, Chiangmai (72 farms) and Kampangpetch in the north, and Mahasaraharm in the north-east. Although all the contracts are wage contracts, the arrangements and terms of the contracts for each project may be slightly different. In some projects, the company in charge of the project will guarantee the loan of the contract farmers but in other projects C.P. does not guarantee the loan. For pig breeding, the contract producers are paid 80 baht for every piglet weaned. 37/ Under a pig fattening contract, pig raisers are paid one baht for every kilogramme of liveweight in excess of 20 kilograms liveweight, which is the weight of piglets before fattening. It was extremely difficult to supervise the amount of feed and work done by the contract farmers. Some farmers stole and sold the feed for cash. Therefore, a bonus scheme was introduced: a premium is paid if the actual feed-conversion ratio is higher than the target ratio.

81. Although in the short run, the contractual arrangements for broiler and pig raising can benefit farmers, contractors, and society, they may not do so in the long run. With wage contracts, the feed companies must be responsible for supplying all the inputs. Part of the farmers' loans from commercial banks are used by the company to acquire the necessary inputs, but the farmers have to bear all the interest costs. Although some major feed mills engage in chicken contractual arrangements, no major feed mills are in pig contracts. Those engaged in pig contracts are only feed agents or large-scale pig farms and a few medium-scale feed mills. C.P. may become a monopolist in the pig contract market in the future. Since C.P. is the largest firm in the industry and it has rapidly expanded the contract farming business into the major pig-producing provinces, there may be little room and only a small profit which may not be enough to attract other major feed firms into this area. For these reasons, contract farmers may be in a weaker position to bargain with C.P. in the future.

(b) Marketing and slaughtering

82. As hog raising is mainly a sideline backyard activity, the large number of small local middlemen, who travel from village to village on motorcycles and in small pick-up trucks, have played a major role in making it possible for urban dwellers to eat pork. About 60 to 70 per cent of these middlemen are carcass wholesalers, except in the north-east where the same proportion tend to be hog wholesalers and the remainder local assemblers. Few of these middlemen - many of whom are part-time farmers - handle more than 1,000 to 3,000 hogs annually. A number handle less than 1,000. It was estimated in 1975 that 85 per cent of marketable hogs were destined for Bangkok.

37/ The average number of pigs weaned per litter in the C.P. contract farms was 9 to 10 pigs while the number for regular commercial farms was 8.5 pigs. Clearly, contract farmers have an incentive to pay more attention to raising activities.

83. The small amount of relatively intensive commercial or contract hog raising is situated in the provinces around Bangkok, i.e. Chacherngsao, Cholburi, Nakorn Pathom and Rajaburi. Consequently, some elements of vertical integration can be observed including, in the case of contract producers, the provision of weaners, feeds and other inputs by feed companies which take the fattened hogs and ship them for slaughter in Bangkok where the carcasses are sold to meat wholesalers and retailers.

84. The structure and behaviour of the marketing and slaughtering of hogs is strongly influenced by far-reaching legal regulation under the provisions of the Animal Slaughtering and Meat Sale Control Act B.E. 2502 which (except 38/ in the provinces near Bangkok) prohibits the transport of animal carcasses across provincial borders. It allows only the transport of live animals with movement permits. The establishment of a slaughterhouse must be approved by local administrative officials, who generally refrain from granting such approvals in instances where slaughterhouses already exist. The law also requires carcass wholesalers to obtain a slaughtering permit and to pay a number of taxes in advance for each hog slaughtered.

85. Since each slaughterhouse can serve only the political sub-district where it is located and since the establishment of new slaughterhouses is restricted, carcass wholesalers who carry out the slaughtering are very limited in number and enjoy both monopsonistic power in the purchase of live hogs and monopoly power in the sale of pig carcasses. Generally, there is only one slaughterhouse per locality. In Bangkok, there are only five small slaughterhouses and one relatively modern abattoir. It is estimated that there is a total of approximately 350 slaughterhouses in Thailand, of which 100 are municipal.

86. In combination, the constellation of charges (tax slaughtering permit, slaughtering fee, quarantine fee, tax on each live animal or carcass shipped) paid by the carcass wholesaler is high. As a consequence, an estimated 50 to 65 per cent of hogs are slaughtered without a permit, i.e. illegally. 39/

87. After slaughter, either legally or illegally, the carcass wholesalers sell the pork to retailers or exporters and local meat processors. There are usually up to six retailers in small markets and up to 12 in larger ones. Although the larger retailers, who can also be wholesalers, can handle as many as 10 to 20 carcasses per day, the average is about 4 carcasses per day. 40/ There are an estimated 2,900 retailers in Bangkok. Meat processors produce a variety of products, such as: sausages, ham, bacon and roasted pork slabs or pieces. The domestic demand for processed pork is rather limited.

38/ Since 1979.

39/ N. Poapongsakorn, op. cit., September 1980, p. 151 to 152.

40/ P. Hathamart, et al., Livestock Marketing System in Thailand. The Center for Applied Economics Research, Kasetsart University, Thailand, Research Report No. 1, May 1976.

88. Exports flourished over the period 1959 to 1973 when Thailand sold a substantial number of live hogs to Hong Kong, chiefly through the Livestock Trading Corporation. The industry was plagued by diseases such as cholera and foot and mouth disease in the ensuing period - particularly 1975 to 1977. As a result, it lost this important market and has been trying to recover it. The country has again begun to export live swine to Hong Kong as well as a few thousand frozen piglets. In addition, the previously mentioned Government-sponsored swine raising project has recently begun operation, with exports to Singapore.

89. The final aspect of the distribution structure that cannot be ignored is the illegal sale by small-scale smugglers of live hogs into Malaysia in response to significant price differentials between the two countries. Due to a lack of information, no estimate of the amount smuggled can be made.

3. Technology, factor intensities and productivity

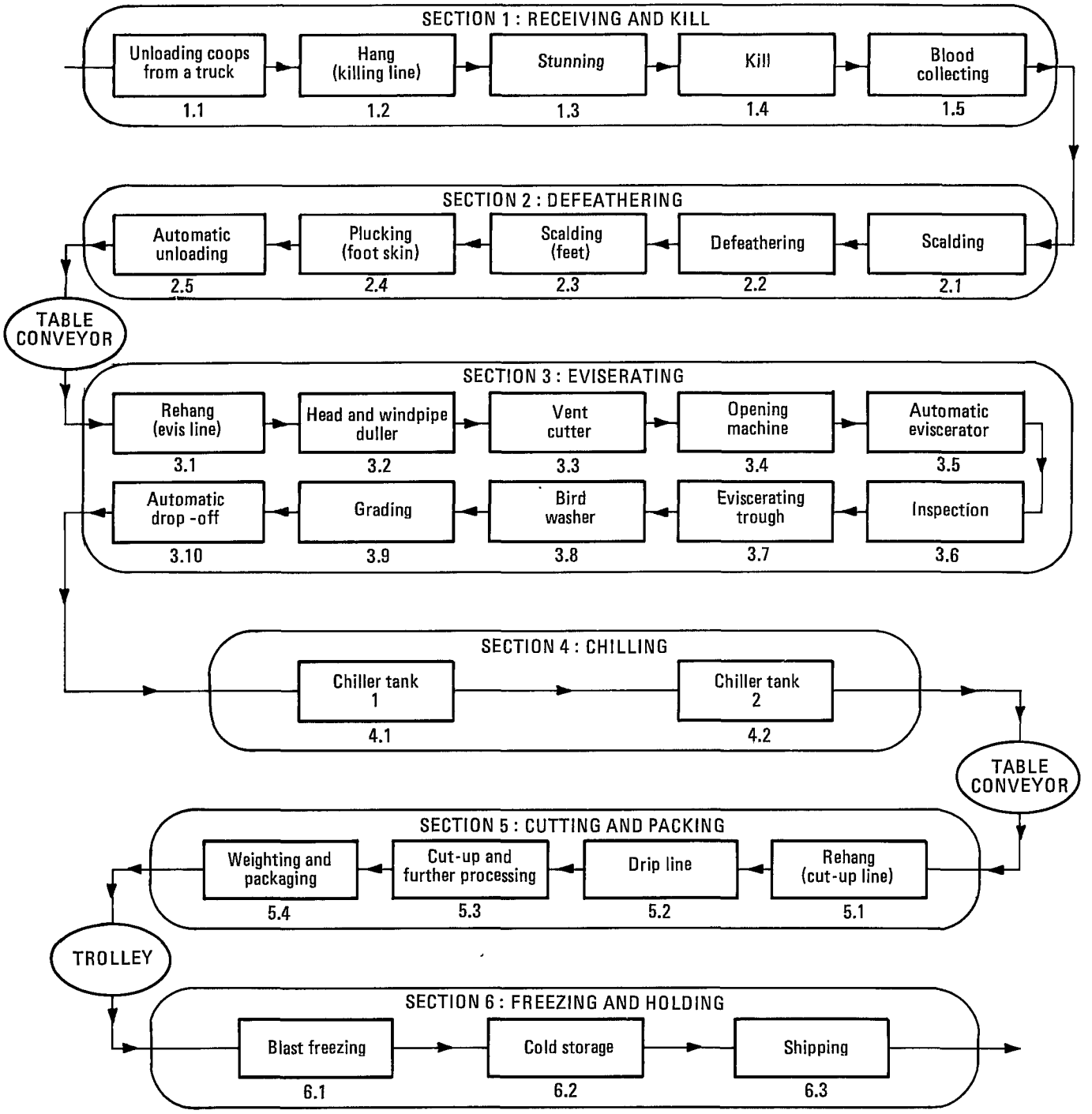
(a) Chicken processing

90. Poultry is slaughtered and enters the processing chain through three main avenues: (i) backyard slaughter at the point of sale, for example, for restaurants, markets and households; (ii) traditional slaughter by wholesalers in the central chicken markets of Klongton and Klongtoey; and (iii) registered export slaughterhouses operated by the major feed mill companies. Basically, the method used in (i) and (ii) is the same, except that defeathering is done manually in the former case. Live chicken are: killed manually by severance of the jugular vein; scalded in a large pot of boiling-water to remove dirt and blood; then plucked manually or by machine. After the feet are scalded and the foot skin is plucked, the carcass is kept in an ice box awaiting shipment to consumer markets. As mentioned previously, these chicken carcasses (called New York dressed) are neither eviscerated nor cut into parts. There is no Government inspection.

91. Figure 3 summarizes the operational details of a modern chicken processing plant. The plant consists of the following main sections: reception and killing, defeathering, eviscerating, chilling, cutting, packing, freezing and holding. At every step, the methods and machines used are modern and very hygienic because all of the modern chicken slaughterhouses are designed to process chicken that is frozen for export. After cutting and packing, the products are frozen at a temperature of minus 40 degrees celsius, then they are held in cold storage at minus 20 degrees celsius until shipping.

92. Most wholesalers in the central chicken market (who also trade in live chicken) use commercial building space for traditional manual slaughtering to produce New York dressed chicken. The investment cost in slaughtering facilities other than the building is low (less than 50,000 baht per firm). Typically, 15 to 25 workers are employed for slaughtering and defeathering and, on average, 2,000 to 3,000 birds per night are slaughtered during normal periods and 6,000 to 7,000 are killed during festival periods. Wholesale slaughtering operations are thus rather labour intensive. The capital-labour ratio is much lower than that of modern slaughterhouses.

Figure 3
POULTRY-PROCESSING OPERATIONS



93. The characteristics of modern slaughterhouses, which are owned by a limited number of feed mill companies, are shown in table 10. The investment promotion privileges that have been granted to most of these firms by the Board of Investment (BOI) apply only to firms with at least 50 million baht in investment. This explains the high capital-labour ratio (0.112 to 0.255 million baht per worker) compared with traditional wholesalers' slaughterhouses (0.04 to 0.10 million baht per worker) and with the 25 industries surveyed 41/ in 1978 (0.113 million baht). All the equipment and machinery is imported from the United States and the United Kingdom. The major supplier of slaughtering facilities in Thailand is Gordon Johnson of the United Kingdom. About 50 to 60 per cent of the labour input is used in cutting up the chicken.

94. The ratios of output to the number of workers and the value of assets as indicators of productivity show that the Bangkok Livestock Trading Co. (CP), Saha Farm and Centago have the highest input productivity in the industry (table 10). These firms also have a comparatively high rate of capacity utilization.

95. There are other important characteristics of these export-oriented slaughterhouses. Japanese capital is invested in every slaughterhouse presented in table 10. This is understandable because more than 95 per cent of Thai frozen chicken is exported to Japan via Japanese trading firms. In 1981, a New Zealand firm entered a joint venture with P. Charoenphan. This is seen as an attempt by private exporters to diversify their export markets as well as to obtain technical assistance from foreign firms. Because a significant percentage of slaughtered chicken is sold and consumed domestically, the eight to ten working hours of every slaughterhouse are at night. Since Thai people still prefer to eat fresh meat and to shop early in the day, the supply of dressed and cut-up chicken must be ready for distribution to the consumer markets before four o'clock every morning except Sunday. Most plant workers (80 to 90 per cent) are women and many are seasonal i.e. on temporary leave from the farm during the dry season (January to April). Therefore, the worker turnover rate is quite high. Fortunately, the skill required in the slaughterhouses is not difficult to learn. It takes only two to three months before a woman can skilfully cut up a chicken.

(b) Hog slaughtering

96. There are three types of slaughterhouses in Thailand. There are: (i) two modern abattoirs owned respectively by the Bangkok Municipal Authority and a State organization which processes and cans pork for military use; (ii) municipal slaughterhouses found in the main urban districts and (iii) simple slaughterhouses found mainly in rural areas. Only the two abattoirs have freezing and refrigeration facilities, whereas the municipal slaughterhouses are distinguished from the rural ones by virtue of their having holding pens, cement killing floors and separate rooms for carcass storage. All of the slaughterhouses use

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41/ S. Tambunlertchai et al., "Labor-intensive and small-scale manufacturing industries in Thailand." A paper presented at a seminar on ASEAN comparative study on the Development of Labor Intensive Industry, ILO-ARTEP, Pattaya, Thailand, October 1980.

Table 10

Some characteristics of chicken slaughterhouses[c/]

Characteristics	BKL1	BKL2	SF	LT	OG	ST	BG
Start-up date	1973[b/]	2/1979	1975[a/]	1977[b/]	4/1981	7/1981	12/1981
BOI privileges	No	Yes	No	No	Yes	Yes	Yes
Registered capital	n.a.	5.2		5.0			
(million baht)	44.0		0.1	20.0	5.0	30.0	20.0
Assets-1st year	41.0	90.0	n.a.		73.5	79.5	45.0
(million baht) 1981	250.0		120[a/]	80.0	73.5	79.5	45.0
Factory workers	400	500	800	322	297	400	401
(Cut-up workers)	(200)	(300)	(400)	(n.a.)	(n.a.)	(200)	(n.a.)
Office workers	80		60	15	(n.a.)	20	(n.a.)
Capacity birds/day	36 000-50 000	54 000-70 000	115 200	57 600	36 000	40 000	36 000
Export capacity (ton/year)	n.a.	13 572	10 000	n.a.	10 627	10 800	3,447
Production (birds/day)	36 000	54 000	75 000	16 000	32 400	32 400	18 000
Working hours	3 PM - 1 AM		7 PM - 4 AM	6 PM - 2 AM	10 hours	5 PM - 1 AM	n.a.
Foreign Ownership	0	0	0	0	40% Jap.	3.5% Jap.	40% Jap.
Asset-labour ratio	(0.180)	(0.315)					
(million baht)	0.255		0.140	0.223	0.247	0.189	0.112
Output-labour ratio	(82.76)	(99.08)					
(birds/man)	91.84		87.21	44.57	109.09	77.14	44.89
Output-asset ratio							
(birds per baht)	360.0		625.0	200.0	448.0	407.5	400.0

Table 10 (continued)

Characteristics	BKL1	BKL2	SF	LT	OG	ST	BG
Capacity-labour ratio	122.4		133.9	158.77	121.1	95.2	89.8
Utilization rate	72-100%	77-100%	65%	28.78%	90%	81%	50%

Sources: Board of Investment (Thailand) "Firms Granted Certificates 1960-1981".
Interviews with management personnel in each firm.

Note:
BKL1 = Bangkok Livestock Trading at Bangna
BKL2 = Bangkok Livestock Trading at Minburi
SF = Saha Farm
LT = Laemthong
CG = Central Poultry Processing (of Centago)
ST = Sri Thai Livestock
BG = Better Foods (of Betagro)

a/ Saha Farm's plant was established in the early 1970s but it has been gradually renovated until it has total assets of 120 million baht in 1981. Hence its asset-labour ratio is higher than it should be.

b/ Laemthong and C.P. also have subsidiaries which use the traditional method of chicken slaughtering. The company that belongs to Laemthong is Laemthong Livestock Trading Co., while C.P. has Charoensak Farm Company.

c/ In 1981, P. Charoenphan, General Food Poultry of New Zealand and United Trading jointly invested in a slaughterhouse with 15,000 tons of chicken capacity.

d/ Laemthong also has another slaughterhouse, which uses the traditional technique, with a daily production of 4,500 birds.

traditional manual methods of slaughtering involving killing by gun or hammer. Even where it is available, the use of modern equipment is avoided by wholesalers because of their desire to escape the imposition of taxes and the rigours of meat inspection. Since more than 50 per cent of the hogs are slaughtered illegally and since the Department of Local Administration does not have enough meat inspectors, careful meat inspection is not practised.

97. Carcass wholesalers bring in their own workers to slaughter pigs in the slaughterhouses. In addition to being unhygienic, slaughtering is also labour intensive and productivity is not high - averaging about 10 pigs per worker in the simple rural slaughterhouses and 30 in municipal slaughterhouses, with considerable dispersion around these averages. 42/

(c) Distribution and marketing

98. Both broilers and pigs are bought, placed in plastic or bamboo coops, and shipped to slaughterhouses on large trucks at night to facilitate capture and minimize weight loss and the risk of mortality during transport. This is also in line with the need for wholesalers to deliver the meat to retailers in the fresh market by four or five o'clock in the morning.

99. Trucks carrying broilers are generally scheduled to arrive at the slaughtering plant 15 to 30 minutes before the broilers are to be unloaded. The short transport time - usually one to one and a half hours - and the absence of queuing are intended to keep down weight shrinkage and mortality. In fact, weight losses do not exceed 1.5 per cent of total body weight.

100. Queues for hog slaughtering can be quite long. As a result, animals experience much more loss of weight than in the case of poultry. Carcass wholesalers are said to benefit and hog wholesalers to be harmed by this state of affairs.

101. In the case of broilers, shipping of the frozen chicken is by cold storage trucks when it is sent for export. Both poultry and pork destined for home consumption are delivered without refrigeration. Hence delivery to retailers must be effected very shortly after slaughter - within one to two hours in the case of pig carcasses.

4. Factors affecting the growth of large producers, traders and processors

102. From a part-time, backyard activity of small farmers selling to small traders, poultry raising has seen the emergence in the early 1970s of large, vertically-integrated firms. The variety of technological, economic and

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42/ P. Harthamart, S. Tagsinavisuti and C. Dayanada, Livestock Marketing System in Thailand. The Center for Applied Economics Research, Kasetsart University, Thailand, Research Report No. 1, May 1976.

financial considerations that have combined to bring about this change are described in this section. 43/

103. Between 1972 and 1976, the application of new, imported technology in the fields of nutrition, genetics, disease control and farm management contributed to a drastic reduction in the cost of raising broilers. This included: lowering the marketing age of chickens from 75 to 56 days, lowering the average amount of feed required to produce one kilogram of chicken meat from 2.55 to 2.00 kilograms and by reducing the amount of farm labour required to one worker per 10,000 birds. In order to realize the resulting benefits, farmers had to construct pens large enough to hold at least 5,000 to 10,000 birds and to increase the number of trucks for loading this large volume of birds in order to economize on the loading cost. Large growers were able to buy feeds and drugs in volume. They also became eligible for one to three months credit from feed suppliers or even from commercial brokers and could engage specialized veterinarians to care for their birds rather than rely on their own experience.

104. Similarly, the introduction of modern processing technology sharply reduced the amount of time to slaughter chicken. Whereas the drum type of defeathering equipment used by small Chinese and Moslem wholesalers processes 200 birds per hour, the more advanced rubber-finger feather picker used by the large export processors can remove the feathers of up to 2,800 to 9,000 birds per hour depending on the scale used. Such technology is essential for the production of the high quality of graded and standardized poultry products demanded in the international trade where competition is keen and inspection requirements are severe. The technology is imported and the investment outlays are high. Small chicken processors serving the local market can never compete in the established international market.

105. Paralleling introduction of advanced technology and the growth in size of production units has been the integration within the industry of production, processing and marketing. A prominent role in the process of vertical integration has been played by the feed companies - a natural outcome of the fact that feed represents the largest single input in chicken raising (70 to 75 per cent of the cost). Initially giving credit in the form of feed supplies, these companies have entered contracts-to-grow with small and large producers in order to ensure a regular supply of chicken for their own processing plants. Hatcheries and independent processors themselves have become involved in integrated operations in order to protect their investments and ensure the production of healthy chicks and a steady supply of broilers.

106. Several examples can be cited of the ways in which costs are reduced through vertical integration. Higher feed conversion and lower chicken death rates can be achieved by a laying hatchery in an integrated firm by virtue of being able to detect the performance of various flocks of parent stock at the company's breeder farm. Such improved rates are also favoured by the provision of modern farm management and veterinary services to the contract producers. Similarly, marketing and distribution costs under integrated operations are lowered through improved packing of day-old chicks, bulk delivery of feeds and better programming of arrival times of trucks carrying chicks and broilers.

43/ In contrast, the hog industry is still dominated by small growers and traders. A more detailed analysis of the hog industry in Thailand can be found in Nipon Poapongsakorn, Marketing and Prices of Hogs and Government Intervention, a research report for a project on Marketing and Pricing Policy in Agriculture, NESDB and IBRD, Thailand, December 1980.

107. The achievement of these economies requires millions of baht of investment and a national organization. Consequently, the structure of the industry has been rapidly evolving towards fewer larger firms, each controlling greater market shares in the intermediate stages. The advantages of the vertically integrated over the single activity firm are reflected in their enhanced ability to survive the periodic chicken "crises" in the Thai domestic market. During the period October 1980 to 1981 when chicken prices fell sharply in response to an increase in the supply of day-old chicks, many independent growers - particularly small producers - went into bankruptcy. Contract producers survived because the integrated firms not only had better financial resources to endure the hardship, but also had the export market as another outlet for their products. In contrast, the market share of Chinese and other small wholesalers has, as mentioned previously, declined as they have faced increasing difficulties in obtaining chickens from independent producers.

C. Behaviour and performance of marketing, processing and distribution in the broiler industry

108. Whereas more than half of the chicken commercialized in Thailand in the past was sold to local assemblers and live chicken wholesalers, the structure of today's broiler industry in Thailand can be characterized as oligopolistic with a few vertically integrated firms - six major processors - dominating the industry. Knowledge of the sources of market power of these firms, described in the previous section, helps in understanding the behaviour and performance of the industry.

1. Price determination in the Bangkok market

109. Although the six major processors have monopolistic power - or more precisely, monopsonistic powers - over the prices offered for live broilers, the actual formation of prices is more complex. The final product market (domestic or foreign) is the most important source of price formation at other levels. The demand for live chicken is a derived demand from the demand for the final product, i.e. chicken meat. The demand for chicken meat, like that of other final products, is a function of retail chicken prices, income, taste and the prices of chicken meat substitutes and complementary goods. All of these factors, plus the homogeneous nature of the product (more or less considered the same by consumers, regardless of sector) mean that the demand curves facing sellers (processors) can be highly elastic.

110. On the production side, the supply of chicken meat depends on the supply of live chicken which, in turn, depends on its expected price, the price of animal feed and of day-old chicks and the price of other inputs. Since variation in the number of chickens raised is quite high due to seasonality and to the sensitivity in the export price of chicken relative to the cost of feed and of day-old chicks, supply plays a more important role in the determination of price movements than demand.

111. Desirous of maintaining a steady and growing demand for feed, and being broiler producers and processors themselves, feed mill companies have adopted various methods aimed at assuring that the supply of chicken is not too far out of line with the amount demanded. On the one hand, they have taken the initiative in negotiating contracts with broiler producers for the supply of chickens in

exchange for the provision of credit for feed, day-old chicks and drugs and of veterinary services and farm management guidance. On the other hand, in order to control the supply of chicken and to increase profits, they have entered into operations themselves at various stages in the industrial chain, such as processing and egg hatching. Through acquisition of ownership of 75 to 80 per cent of the egg hatching flocks, for example, feed manufacturers were able to forecast the number of chickens marketed and also to monopolize the market for day-old chicks. During a period of favourable prices, feed manufacturers were able to earn excess profits by imposing on producers the requirement of advance deposits and tied sales for the purchase of day-old chicks. Excess profits in the hatchery industry during this time induced breeder operators to accelerate the importation of parent stock pullets with the result that the number of eggs hatched in 1981 increased by 40 to 45 per cent and the price of day-old chicks collapsed. Collusive arrangements among operators to restrict the supply of day-old chicks have proved ineffective in preventing price cutting and "excess" production.

112. Since the integrated feed companies no longer sell their live broilers to wholesalers in the Bangkok central markets, wholesalers have become of marginal importance and their price determining role has been replaced by C.P. which controls 50 per cent of total supply. Although C.P. is the price leader, price is still sensitive to seasonality and other supply and demand factors noted above. Thus, its price setting power is far from absolute.

2. Price formation in other provinces

113. Although poultry technology has begun to spread into other provinces, particularly in high per capita income provinces such as Chiangmai and Lampoon in the north, Songkla and Surat Thani in the south, and Khon Kaen in the north-east, chicken marketing is still largely carried out by small middlemen. C.P. is the only company that has introduced contracts with chicken growers in these provinces. But the number and the extent of contracts are still relatively small.

114. Since most of the broilers raised in other provinces are consumed locally and each province is self-sufficient in broiler production, the prices of live chicken are determined by the local conditions of the chicken demand and its supply. This has been true particularly since 1975 when the expansion in chicken raising activity in the four largest producer provinces enabled them to provide a sufficient supply of chicken to more than cover the needs of the Bangkok market.

3. Marketing margins and price trends

115. During the 1970 to 1981 period, the farm-gate price of chicken averaged 15.23 baht per kilogramme with the lowest price of 8.40 baht in April 1972 and the highest at 22.36 baht in December 1980. Data on chicken prices indicate that during the 1973 to 1974 energy crisis, chicken prices went up significantly but increased much more slowly thereafter. The coefficient of variation of the farm-gate price is estimated at 25.1 per cent during 1970 to 1981. The total cost of one kilogramme of live chicken varies around 14 to 15 baht depending upon the feed prices (table 11), and a few baht (e.g. 3 baht) reduction in the farm-gate price can cause a big loss to chicken producers.

Table 11

Cost of production of broiler chickens, 1977 to 1981

Cost elements	1977	1978	1979	1980	1981[a/]
Variable costs per bird					
Stock	5.33	5.32	5.41	5.77	6.23
Feed	17.68	20.44	19.73	20.89	26.75
Labour	0.48	0.37	0.36	0.46	0.73
Veterinary costs	0.28	0.43	0.46	0.38	0.42
Utilities	0.13	0.10	0.14	0.12	0.25
Equipment	0.03	0.03	0.02	0.02	0.01
Fuel	0.02	0.02	0.04	0.01	0.04
Maintenance	0.08	0.01	-	-	0.01
Investment cost	n.a.	0.35	0.35	0.54	0.69
Sub-total	24.03	26.72	26.16	28.19	35.13
Field costs per bird					
Land	0.01	0.01	0.01	0.01	0.02
Depreciation	0.19	0.18	0.20	0.23	0.2
Opportunity cost	0.05	0.07	0.09	0.14	0.13
Repairs and maintenance	0.03	-	-	-	-
Sub-total	0.28	0.26	0.30	0.38	0.35
Total cost per bird	24.31	27.33	26.81	28.57	35.48
Total cost per kg. liveweight	13.99	14.13	14.55	15.81	19.28
Farm price	15.44	13.30	15.59	16.32	16.96
Profit	1.45	-0.83	1.04	0.51	-2.32

Source: Thailand Ministry of Agriculture, and Agricultural Co-operatives, Economics of Livestock Section, Office of Agricultural Economics, Broilers: Problems and Measures. May 1981, p. 15 to 16.

a/ Average of first four months.

116. At first glance, the high degree of price instability seems surprising in view of the high responsiveness to price changes implied by the small amount of time - 40 to 60 days - it takes to raise chicken before it is ready for sale. After the ninth week of growth, the efficiency of feed conversion is so extremely low that producers have to sell chicken even if prices are very unfavourable. Moreover, chickens are disease prone and sensitive to changes in weather conditions. These factors can greatly affect chicken supply and thus produce sharp price movements.

117. To estimate the profit of each trader, detailed cost breakdowns are required. Unfortunately, some cost items may change frequently. This makes it difficult and inaccurate to measure profits. The estimates of price margins and profits presented in table 12 must be interpreted with great care because of the frequent changes in some of the cost items and the lack of detailed cost breakdowns. The table shows that the net profit to chicken producers was 0.30 baht per kilogramme (or 2 per cent of the farm-gate price) in 1974 but up to 2.26 baht (or 13 per cent of the farm-gate price) in 1980. Sometimes producers had losses, especially in 1978 and early 1981 when there were crises in the industry. 44/ An analysis of chicken production costs for independent producers showed that in 12 months there were three months of profit, three months of loss and six months of breaking-even. 45/ While contract producers usually earned approximately 0.39 to 0.66 baht per broiler, the independent producers earned as much as 2.16 baht. 46/ The higher rates of return received by independent producers is explained by their willingness to bear more risk.

118. The margin between the farm-gate price and the wholesale price of live chicken in Bangkok can be used as a proxy of the gross profit of chicken assemblers (or large producers who also buy chicken from small producers or from contract producers). The margin ranges from 1.75 to 6.69 baht per kilogramme. The 6 baht margin occurred only once in 1970. Mostly, the margin averaged 2 to 3 baht per kilogramme. This implies strong competition at the farm level and/or a high risk of price fluctuation incurred by chicken middlemen, particularly feed manufacturers who have contracts with producers.

119. In 1981, the margin between the wholesale (selling) price of dressed chicken (or carcass) and the wholesale (buying) price of live chicken was in the range of 2.05 to 5.60 baht per kilogramme with an average of 3.71 baht per kilogramme. Since the operating and administrative costs are 3.00 to 3.50 baht per

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44/ In 1981, the farm-gate price decreased from 22 baht per kg in May to 14.5 in June. Ruam Prachachart Thurakit (United People's Business), 4 July 1981. From September to October 1980, the chicken price decreased to 9 baht. There was also a chicken crisis in 1978. N. Poapongsakorn, "Disclosing Monopoly Forcing Higher Price", Economics, (December 1980) p. 9 to 13, (Thai).

45/ Nimmanpairoj, Chicken Raising on Contract in the Central Region of Thailand. Master of Economics thesis (English Language Program), Faculty of Economics, Thammasat University, (Thailand), 1980, p. 7.

46/ Ratchathom, Broiler Raising Business in Thailand, National Economic and Social Development Board, (NESBD), Thailand, August 1980, p. 46.

Table 12

Marketing margins of broilers

Items	(1) North-eastern 1963/1964		(2) NAREE March-July 1974		(3) DBE April 1978		(4) DAE May 1980	
	baht/kg.	% of selling prices	baht/kg.	% of selling prices	baht/kg.	% of selling prices	baht/kg.	% of selling prices
1) Producer								
Selling price			14.80	100.00	10.00	100.00	17.50	100.00
Cost of production			14.50[a]	97.98	n.a.	-	15.24	87.08
Profit			0.30	2.02	n.a.	-	2.26	12.91
2) Wholesaler of live chicken[e]								
Selling price	7.27	100.00	15.92	100.00	12.82	100.00	19.50	100.00
Farm buying price	6.25	85.96	14.80	92.96	10.00	78.00	17.50	89.74
Transportation cost	0.22		0.26	1.63	0.30	2.34	0.42	2.16
Coop	-	-	0.05	0.32	0.10	0.78	0.06	0.31
Wage	-	-	0.03	0.19	0.25	0.95	0.25	1.28
Weight loss	-	-	-	-	-	-	0.70	3.59
Others	0.15[b]		0.29[b]	2.82	0.17[b]	1.33	-	-
Profit	0.65		0.49	3.08	1.50	11.70	0.57	2.92
3) Carcass wholesaler[f]								
Selling price	9.77	100.00	18.38	100.00	16.78	100.00	21.50	100.00
Buying price	6.96	71.23	15.92	86.62	12.82	76.40	19.50	90.70
Transportation cost	0.06	.61	0.28	1.52	0.25	1.49	0.30	1.40
Wage	0.32	3.28	0.17	0.92	0.30	1.78		
Slaughter fee	-	-	0.33	1.80	1.00	5.96	1.20[d]	5.58
Others	1.33	13.61	0.21[c]	1.14	0.27[c]	1.62	-	-
Profit	0.56	5.73	1.47	8.00	2.14	12.75	0.50	2.50

Table 12 (continued)

Items	(1) 1963/1964		(2) March-July 1974		(3) April 1978		(4) May 1980	
	baht/kg.	% of selling prices	baht/kg.	% of selling prices	baht/kg.	% of selling prices	baht/kg.	% of selling prices
4) Retailer								
Selling price	12.69	100.00	22.03	100.00	20.00	100.00	24.00	100.00
Buying price	12.00	94.57	18.38	83.44	16.78	83.90	21.50	89.58
Stall rent	-	-	0.22	1.00	-	-	0.14	0.58
Water	-	-	-	-	0.15	0.75	0.04	0.58
Electricity	-	-	-	-	-	-	0.10	0.42
Ice	-	-	-	-	-	-	1.00	4.17
Wrap and coop	-	-	0.58	2.63	0.25	1.25	0.20	0.83
Wage	-	-	-	-	-	-	0.06	0.25
Transportation cost	-	-	0.58	2.63	0.25	1.25	-	-
Others	-	-	-	-	0.07	0.35	-	-
Profit	0.69	5.43	2.27	10.30	2.50	12.50	0.96	4.00

Sources: Column (1) Department of Agricultural Economics, Marketing Margins and Marketing Channels of Major Agricultural Commodities and Livestock in the North-eastern Region of Thailand, 1963-1964, (Bangkok: Co-operative Wholesale Society of Thailand, 1968), p.68.

Column (2) Naree Ratanavarinchai and Waravet Thamrongton Yarat, The Price Analysis of Ducks, Chicken and Eggs, Department of Business Economics, (Bangkok: Commerce News Press, 1975), p. 35.

Column (3) Naree Ratanavarinchai, The Analysis of Marketing Margins, (Bangkok: Commerce News Press, 1978), p. 36.

Column (4) Thailand, Ministry of Agriculture, Department of Agricultural Economics, Office of Agricultural Economics, "Chicken Situation in 1980-82", 1982.

a/ During the survey in July-August, 1974, the prices of feed and broilers were quite high.

b/ Other expenses incurred by live chicken wholesalers were feed and office expenses.

c/ Other expenses incurred by carcass wholesalers were wrappings, plastic bags, coop and stall rental.

d/ Labour costs incurred by carcass wholesalers included slaughtering cost.

e/ The wholesaler of live broilers in the north-eastern region was a local wholesaler.

f/ The carcass wholesaler in the north-east was a provincial wholesaler.

kilogramme, 47/ net profits of the large processors would be about 0.21 to 0.71 baht per kilogramme. Profits of the small carcass wholesalers in the central markets may be higher because their investment and hence operating costs are lower. Table 12 reveals that their net profits in the periods sampled were in the range of 0.50 to 2.15 baht per kilogramme, or 5.73 to 12.75 per cent of the selling price. The large processors and the small wholesalers can still compete with each other because the volume of chicken processed by the former is 20 times higher than that of the latter 48/ and is more than enough to compensate for the lower profit per broiler.

120. It is difficult to confirm whether intermediaries' profits are excessive. There are times that these processors - large or small - make losses. In 1980, the Bangkok Livestock Trading Co. also reported a loss of 1.45 million baht. The important source of profit for the large processors is profit from export. If estimates of the profit rate of the small wholesalers are compared with the 10 per cent profit rate of carcass wholesalers and the 14 per cent of beef carcass wholesalers who enjoyed monopolistic power, 49/ it can be said that chicken wholesalers may have lower profit rates. If account is taken of the fact that cattle carcass wholesalers often sell to retailers on credit without charging interest, 50/ it becomes difficult to conclude that they enjoy excessive profits. In economics, the most appropriate measure of profit rate is the return on investment. Due to lack of data on investment, however, it is not possible to have a comparable rate of return for every type of middleman.

121. According to the statistics, 51/ the price margin between the ratail and wholesale prices of dressed chicken averaged 3 to 4 baht per kilogramme during 1980, whereas the retailers' cost shown in table 12 was about 1.50 baht. Net profit, therefore, was between 0.69 to 2.50 baht per kilogramme, or 4 to 12.5 per cent of the selling price. However, the cost estimates in table 12 are likely to exclude several items such as sellers' opportunity costs, labour costs, transaction costs of collecting debt, and the cost of unsold and spoiled meat. Moreover, the long hours of work by retailers are not taken into account. Finally, the profit rate of chicken retailers is not higher than the 10 per cent rate earned by pork retailers. Therefore, it may be concluded that the profit of the chicken retailers is probably not excessive.

47/ From interviews with the officers at Laemthong and C.P.

48/ While the largest slaughterhouse of C.P. slaughters 60,000 birds per night, the typical wholesaler at the central market can slaughter only 2,000 to 3,000 birds per night.

49/ N. Poapongsakorn, Government Policies on Marketing, Slaughtering and Prices of Cattle, National Economic and Social Development Board (NESDB), Thailand, May 1981, p. 134.

50/ From interviews with the wholesalers and the retailers.

51/ Supplied by the Officer of Agricultural Economics.

4. Grading and prices

122. Live chicken is neither classified by species nor by sex. All species imported by feed manufacturers from western companies yield nearly equal quality carcasses. The Thais have not been particular about the quality of different parts of the chicken since they usually cut the whole chicken into small pieces (with bone) for cooking or cook the whole chicken.

123. A number of factors relating to quality can lower the buying price for live birds by one to two baht per broiler. These include: sickness, lack of vigour, bruises and missing plumage. Chickens also command different prices according to whether they are old hens retired from breeding farms, broilers, capons or native chickens. Native black-plumed, slow-maturing chicken commands a higher price because of the strong flavour, despite the toughness of its meat.

5. Growth of exports and production of processed chicken

124. As described in Chapter I of this study, Thailand's exports of chicken have grown spectacularly since 1973 when the first lot of frozen chicken was exported to Japan. With 25,400 tons exported, chicken was the twentieth largest foreign exchange earning product in 1981. Most of its exports have gone to Japan where it supplied 27.5 per cent of the market in 1981. 52/ Thailand has also recently begun exporting to Romania and Austria and was expected to acquire Singapore as its major customer in 1982. 53/ Of the six major processing forms, C.P. and Saha Farm are the leading exporters.

125. Thailand's exports of chicken to Japan have consisted of frozen chicken parts e.g. as boneless breast and leg. Its cost advantage over United States producers in selling to the Japanese market is attributable to its lower labour cost in processing boneless meat, which machines cannot do well, and to its shorter distance to Japan. The country's success in exporting to Japan has been also made possible by the Japanese trading companies, which perform an important marketing function in Japan. These are: Marubeni, Itoman and Co-operative Farm of Japan. The higher cost of producing feed in Thailand, however, puts it at a distadvantage compared with the United States in processing New York dressed chicken, which requires much less labour. As further advances are made in automatic cutting machinery, Thailand's continued ability to compete in Japan and elsewhere will depend on the success of its measures to reduce feed costs. Since April 1980, the Japanese Government has reduced the duty on imported bone-in-leg frozen chicken from 20 to 17.5 per cent and it will be further reduced to 10 per cent by 1987. At the same time, the duty on boneless frozen chicken has been maintained at 20 per cent. Since 67 per cent of the United States exports and only 15 to 20 per cent of Thai exports are bone-in-leg frozen chicken, Thai exports of frozen chicken are at a disadvantage.

52/ The United States is the largest exporter to Japan (with a share of 37 per cent of Japanese imports) and China is the third largest exporter (13.9 per cent share).

53/ Singapore lifted its ban on meat imports from Thailand at the end of 1981.

126. Other competitors of Thai chicken exports in Japan are The People's Republic of China and Taiwan Province of China. Although both are closer to the Japanese market, Taiwan Province is not able to produce as much animal feed as Thailand. Taiwanese labour cost is also more expensive. Although The People's Republic of China has cheaper labour costs and abundant feed ingredients, it still lacks the modern technological know-how that the Thais have enjoyed. In the near future, when it starts using foreign technology, it will become the most important competitor in Japanese and other Asian markets.

127. Although Thai exporters have attempted to enter the Middle-East and the Singapore markets, they have found it difficult to expand their share. Most of the Thai competitors are exporters from the Common Market countries and Brazil who are usually subsidized by their Governments. This is the reason that c.i.f. 54/ prices of frozen chicken from Europe and Brazil are cheaper than Thai chicken.

6. Economic and technological constraints

128. Constraints affecting the poultry trade may arise anywhere in the chain of production, processing and handling. For this reason, this section discusses factors which influence chicken production and quality as well as those occurring during processing and marketing.

(a) Production and related factors

129. An assured supply of live chicken of reasonable quality and at low cost is a critical factor for chicken processors. On the cost side, it has already been mentioned that Thailand cannot export frozen New York dressed chicken to Japan because fee costs make its price higher than chicken from the United States. The quality of chicken is affected by such factors as inexperience and poor management generally, over-crowding and unsanitary conditions in chicken co-ops, as well as high temperatures and humidity during the months of March and April which increases stress. This leads to the processing of low grade carcasses and their subsequent rejection by the Department of Livestock which is responsible for carrying out compulsory inspection of exported processed chicken. According to interviews with processors, rejection rates in 1981 were in the order of 5 to 8 per cent. Low grade carcasses afflicted by Marex's disease 55/ accounted for more than 30 per cent of the total rejected. In the past, the rejection rate was much higher.

(b) Constraints during handling and processing

130. A survey of carcass inspection of one slaughterhouse in 1981 found that about 75 per cent of the chicken rejected was due to diseases and poor farm

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54/ The term c.i.f. means the price quoted includes: costs, insurance and freight.

55/ There are two types of Marex's disease, which is caused by the Herpes virus, i.e. leukotic lesions and skin leukosis. It accounts for 43 per cent of producers losses.

management. Only 2.5 per cent was due to handling and processing errors within the slaughterhouse. 56/ This shows the high technological standards of processing and good management in private slaughterhouses. Strict meat inspection, quality control and careful sanitation in processing, packaging and storage helped boost the popularity of Thai frozen chicken in the Japanese market, where cleanliness and high health standards are decisive factors.

131. There are still some limited problems in meat cutting. In general, 35 per cent of a 1.8 kilogramme carcass should be boneless meat. In some slaughterhouses, only 28 to 30 per cent of the meat can be obtained because of inexperienced workers. A high rate of labour turnover is prevalent because the working hours are at night. Since it takes a few months of on-the-job training to cut up chicken efficiently, the turnover adds to costs.

(c) Logistical and related problems

132. The centralized location of export processing facilities in Bangkok has the disadvantage that the average transportation distance from the outlying producing areas is 100 kilometers. The death rate of chickens during transport is 1 to 2 per cent at night (increasing to 4 to 5 per cent with day-time transport) compared with only 0.3 per cent in the United States. This disadvantage of locating slaughterhouses in Bangkok is outweighed by its advantages over the nearby provinces in having access to good communications, utilities and, especially, clean water. Twenty litres of water is required per processed chicken and fresh clean water is scarce in the production areas.

133. The sharp seasonal peaks and troughs in both domestic and foreign demand for chicken makes it necessary for processors to keep inventories of more than two weeks of processed chicken output, thereby adding 1.5 baht per kilogramme to costs. Added to this problem is the difficulty of ensuring space on ships going to Japan.

(d) Chicken by-products

134. The pressures of competition have made the utilization of by-products a growing trend in most food processing industries. Processing of by-products, however, is rather underdeveloped in Thailand where even exported by-products (amounting to 111 million baht in 1979) are unprocessed. The domestic market for bone products and feathers is still rather limited with the result that prices are frequently depressed, thus discouraging processors from making a serious effort to market them. Although the Board of Investment has recently granted promotion certificates to enterprises for production of bone and feather products, further investment will not be possible until demand is higher.

(e) Small carcass wholesalers

135. Whereas the prospects for expanding production in large-scale processing are still bright, the business of small-scale carcass wholesalers in Bangkok is in stagnation. In part, this is due to the increasing difficulty to secure

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56/ Ruam Prachacthart Turakit (United People's Business), 28 April 1982,p.9.

live chickens from farmers who have entered contracts with large processors and feed manufacturers who own their own processing plants. It is also attributable to the inability of family managed businesses to handle and extend credit to an expanded number of customers.

7. Effects of production, processing and distribution systems

(a) Growers' income

136. Evolution towards the present system of production, processing and distribution has contributed to an increase in producers' incomes. The average net income of a farmer who raises 10,000 chickens is about 1,950 to 10,800 baht per month, assuming that he raises five flocks of birds in one year. This is the average farm income net of all costs including the producer's own labour cost. The independent producer earns 10,800 baht but with relatively higher risk; the price guaranteed producer gets 3,300 baht with moderate risk of output variation, and the wage-contract producer obtains only 1,950 baht with the lowest level of risk. 57/ Comparing this with the per capita income of 1,165 baht per month in 1980, and the average monthly income of 2,330 baht of the agricultural household in provinces surrounding Bangkok 58/ in 1978/79, chicken raising provides good income to farmers.

137. Modern chicken-raising technology has helped to reduce production costs by increasing feed-conversion efficiency and shortening the marketing age of broilers. If the processing and distribution system had not undergone substantial improvements, marketing costs would still be relatively high and producers' profits smaller than they are.

138. In addition, producers can earn indirect income from selling chicken manure, feed bags and the paper boxes that carried day-old chicks. Indirect income accounts for two to three per cent of total income from raising chicken.

139. Although the income generated from chicken production is satisfactory, the number of producers is limited because chicken raising is a large-scale activity requiring large amounts of capital. 59/ Only those who have their own land and some working capital can become chicken producers. The system of contracts-to-grow, in which the feed firms help producers to obtain construction loans from commercial banks at low interest rates has benefited chicken producers.

140. The number of small independent farmers is bound to decline because they cannot exploit economies of scale for production and marketing; and they usually lack the working capital to survive a few months of heavy losses due to unexpected

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57/ Ratchathom, Broiler Raising Business in Thailand, National Economic and Social Development Board (NESDB), Thailand, August 1980, p. 46.

58/ Office of Agricultural Economics, Survey of Farmers 1978/79, cited in the World Bank, Growth and Employment in Rural Thailand, Report No. 3906-TH, 1983, p. 4.

59/ The costs of building a 10,000 bird house including equipment were about 300,000 baht or 14,286 dollars in 1981. The average monthly income of an agricultural household in the provinces surrounding Bangkok was 2,330 baht in 1979.

declines in chicken prices or increases in feed costs. The smallest producers in the future will be those with at least a 10,000-bird house and contracts with feed manufacturers or processors.

(b) Dependence on imported technology

141. The success of Thailand's chicken processing industry has been heavily dependent on imported technology (as well as a small amount of imported feed ingredients, such as soya) ranging from breeders, machinery and equipment to vitamins, drugs and vaccines. Although gross foreign exchange earnings from chicken exports were 968.7 million baht in 1981, it is not possible to calculate net earnings without information on the costs of these imports. The only information on the cost of imported technology is the c.i.f. value of imported fowl, ducks and other poultry, for breeding purposes which amounted to 75.9 million baht in 1981 and 97.4 million baht in 1982.

142. Thai firms are not entirely free to select their own imported technology. For reasons not determined in this research, Japanese trading companies on whom Thai processors depend for marketing their frozen chicken require the use of processing equipment supplied by Gordon Johnson of the United Kingdom. Only one of the six major processors uses other equipment.

143. Local technological innovation is also occurring. Feed companies have begun imitating imported machinery, especially hatchery and some processing equipment. C.P., for example, has set up a few construction firms and equipment factories to repair imported equipment and to rebuild some parts of the machines and equipment. It has even reached the point of supplying this equipment to its subsidiaries in Indonesia and China.

144. Technological imitation is far more difficult in the case of breeding stock, drugs, feed and vitamins. Millions of dollars of painstaking research would be needed to produce high performance breeding stock. In the absence of a basic chemical industry, Thailand will continue to have to import all of its poultry drug requirements. Imported nutritional know-how is also difficult, but to a lesser degree, to replace domestically. C.P. has set up a research centre to study the nutrient content and toxic effects of grains, plants and weeds that can be used in the production of feed.

D. Behaviour and performance of marketing, processing and distribution in the hog industry

1. Price formation and marketing channels

145. The farm-gate price of hogs in the main producing provinces is determined by the retail price of pork in Bangkok. The reason is that there is little export (other than smuggling) and merchants find it profitable to ship hogs to Bangkok, the largest deficit area of hog production. Hence, prices of hogs in the north and the north-east as well as in the central region (from whence hogs are shipped for slaughter to Bangkok) are equal to prices in Bangkok plus marketing and transportation costs. Owing to the large number of hog

assemblers and wholesalers and even larger number of small pig farmers, no one can influence price. 60/ During the periods of free trade in Bangkok, 61/ live pigs and pork carcasses from other provinces were allowed in Bangkok markets. Statistical analysis of these periods using a market integration (or price linkage) model found that wholesale pig prices in Bangkok were highly correlated with those in the north (correlation coefficient or r = 0.8928), and those in the north-east (r = 0.9133). This suggests a very high degree of integration between different markets which implies that the pig market functions efficiently.

2. Marketing margins

146. Table 13 presents a breakdown of the marketing margins of local assemblers, carcass wholesalers and pork retailers. 62/ The total marketing margin for live hog wholesalers was about 5 per cent of the retail price, while it was about 10 per cent for carcass wholesalers and for pork retailers. The profit rate for the hog wholesalers was 3.1 per cent of the retail price. Carcass wholesalers earned 6.7 to 8.4 per cent and retailers received 12 to 12.5 per cent profit (table 14).

147. The high profit shown for retailers is questionable because: (i) the costs of unsold pork were not included in the cost estimate; (ii) the implicit wages for family members who helped to sell pork were not estimated; and (iii) the retailers' work (10 to 12 hours per day) was not taken into account. Moreover, their volume of business is small relative to carcass wholesalers.

148. While the profit earned by live pig wholesalers was not high compared to that of broiler assemblers (about 2.2 to 2.4 per cent), the carcass wholesalers received a higher profit rate than the chicken carcass wholesalers who earned about 2.1 to 6.7 per cent during the 1974 to 1980 period. Moreover, the carcass wholesalers may earn a larger amount of profit than other wholesalers

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60/ For the statistical analysis in support of these conclusions, see appendix 3.

61/ From January 1969 to June 1978 and from August to December 1979.

62/ Details of the calculations for table 13 can be found in table 8 of the author's previous work (N. Poapongsakorn, op. cit., December 1980, p. 76 to 80). Please note that there are peculiar items such as costs of weight cheating and illegal charges paid by shippers to patrolmen. These costs are the results of Government intervention as will be discussed in the policy section.

Table 13

Marketing margins of hogs marketed in Bangkok

(September 1978)

Items	Baht/kg.	Per cent of retail price
I Pig producer		
1. Selling price	12.02	52.60
2. Production costs	14.32	62.67
3. Profit	-2.30	-10.07
II Live hog wholesalers		
1. Revenue	13.64	59.69
2. Expenditure	1.14	4.99
2.1 Commission	0.06	0.26
2.2 Transportation cost	0.15	0.66
2.3 Wage	0.15	0.66
2.4 Co-op	0.10	0.44
2.5 Ice	0.05	0.22
2.6 Income tax	0.10	0.44
2.7 Weight loss	0.50	2.19
2.8 Illegal charges	0.03	0.13
3. Profit (II(1)-II(2)-I(1))	0.48	2.10
III Carcass wholesalers		
1. Revenue		
1.1 Selling price	17.38	76.06
1.2 Extra income from 2 kg. of carcass, overcharging retailer	0.36	1.58
2. Total expenditure	2.28	9.98
2.1 Slaughtering and quarantine permits	0.28	1.23
2.2 Slaughtering fee	0.20	0.88
2.3 Labour for loading & unloading	0.05	0.22
2.4 Income tax	0.02	0.09
2.5 Office expenses	0.04	0.18
2.6 Weight shrinkage due to slaughter (10 per cent)		
2.7 Transportation cost of carcass	0.15	0.66

Table 13 (continued)

Items	Baht/kg.	Per cent of retail price
3. Implicit revenue by weigh scale cheating - 2 kg./pig	-0.28	-1.23
4. Profit (1.1 + 1.2) - (2 + 3) - II (1)	2.1	9.19
IV Retailer		
1. Revenue (selling price)	22.85	100.0
2. Expenditures	2.29	10.02
2.1 Booth rent	0.53	2.32
2.2 Labour cost	0.75	3.28
2.3 Wrapping cost	0.16	0.70
2.4 Utilities	0.04	0.18
2.5 Sales tax	0.01	0.04
2.6 Loss due to cutting	0.40	1.75
2.7 Loss due to cheating by wholesaler (2kg./pig)	0.40	1.75
3. Profit [IV (1) - IV (2) - III (1.1)]	3.18	13.92

Source: N. Poapongsakorn, op.cit., December 1980, p. 76 to 80.

Table 14

A comparison of profit and marketing margins of broiler and hog traders, 1974 to 1980

(per cent or retail price)

Traders/profit and cost	Broilers[a/] 1974, 1978 to 1979	Hogs[b/] 1978 to 1979	Hogs[c/] 1975
Producers' profit	5.4	(-5.9)-4.6[d/]	-
Wholesalers of live animals			
Marketing costs	4.5	4.9	
Profit	4.3	3.1	2.3
Wholesalers of carcasses			
Marketing costs	6.6	10.0	
Profit	6.3	6.7	8.4
Retailers			
Marketing costs	5.3	10.9	
Profit	8.3	12.5	12.2

Sources:

a/ N. Poapongsakorn, Marketing and Prices of Broilers and the Future of Small and Independent Growers, A research paper submitted to the National Economic and Social Development Board (NESDB), Thailand, 1981, p. 66-68.

b/ N. Poapongsakorn, Marketing and Prices of Hogs and Government Intervention, A research paper submitted to the National Economic and Social Development Board, Thailand, 1980, p. 76-80 and 83.

c/ Calculated from P. Hathamart, et.al., Livestock Marketing System in Thailand CAER, Kasetsart University, Thailand.

d/ The Department of Agricultural Economics, (Thammasat University) estimated that from 1977 to 1981, hog producers' profits (losses) varied between -2.11 baht to 5.17 baht per kilogramme, with an average of 0.15 baht (or less than one per cent of retail price.

since their volume of business is greater. The reason for the pork carcass wholesalers' higher profit is their local monopoly power sanctioned by the law. This will be discussed in the next section. 63/

149. Table 13 also indicates that the marketing costs of hog wholesalers are higher than broiler wholesalers. Higher marketing costs resulted from the lower volume marketed by small hog wholesalers. Chicken wholesalers incurred lower marketing costs because there are economies of scale in marketing. Since hog markets consist of a large number of small traders and since the carcass wholesale business is locally monopolized, it is understandable that pig producers and small live pig wholesalers received less profit or often made a loss. Pig producers, therefore, have no incentive to expand and improve their production. Small farmers still raise native pigs in their backyard for a small return. Uncertainties in government policies, and the adverse effects of the slaughtering privileges received by carcass wholesalers have discouraged commercial-scale pig producers from expanding their business for fear of heavy losses and being cheated by the co-operatives established by the Government.

3. Seasonal and cyclical fluctuations in prices

150. The seasonal movement of hog prices at the farm level has a shape similar to that of the chicken price index, prices being higher during festivals when consumption is high and lower during the hot season when hogs are prone to infection and during the rainy season when fresh-water fish, shrimp and crab are widely available.

151. Cyclically, the fluctuation of hog prices is greater than for chicken. Over the period 1967 to 1980, the coefficient of variation was 35.4 per cent. The large observed variations in the price of pigs are due to a mismatching of supply and demand. Since most of the producers are small and the process of disseminating price information is slow, long cycles are common - ranging from 18 to 48 months during the period 1963 to 1980. Among the several factors affecting hog cycles, the hog-bran price ratio is perhaps the most important. A gradual reduction in the length of cycles in recent years may be attributable to a shorter fattening period as a result of improved nutrition technology, more rapid dissemination of price information and somewhat reduced uncertainty about Government intervention in the hog market.

4. Constraints in the swine industry

152. As will be discussed in section E, most of the factors, which constrained the growth of the pig industry, can be attributed to the nature of Government intervention in the pig market.

63/ This issue is discussed in greater detail by N. Poapongsakorn, op. cit., December 1980, p. 60 to 88.

153. Because the law prohibits shipping pig carcasses across the trading area of each slaughterhouse and because there is usually one slaughterhouse in each trading area, live pigs are usually hauled a long way to market. They are not well managed during transport because no premium price is guaranteed for a pig (as there would be if there were disease inspections at the slaughtering phase). Though, they are usually transported in the cool of the night, they are shipped a long distance (sometimes several hundred kilometers for more than 10 hours) without water or feed and in overcrowded conditions. In addition, they are subjected to loading, unloading and confinement in holding yards. This means that the pigs arrive at the slaughterhouse in poor condition - dehydrated, bruised or more seriously injured and stressed. Shipping live animals instead of carcasses also involves carrying fodder and wastes. As there is only one slaughterhouse in the districts, pig owners have to sell even if the prices offered are much lower than expected or the buyer insists on a large weight discount. Thus, the current system unnecessarily increases marketing costs, which means lower income for producers and wholesalers. The distribution of the incidence of high marketing costs upon various traders and producers depends upon the price elasticities of demand for pork and the supply of live pigs. Appendix 3 shows that in the short run for every baht increase in marketing costs, pig farmers bear 82 to 89 per cent of the total incidence, i.e. the farm-gate price is reduced by 0.82 to 0.89 baht.

154. The major constraint on the development of this industry, however, is the limitation placed on the export of fresh, chilled and frozen pork as a result of unsanitary conditions in slaughtering. Much slaughtering is done illegally. The same problem has constrained the development of pork processing. It is difficult for producers to obtain undamaged, disease-free meat unless they also own a slaughterhouse or have some control over slaughtering and make a careful selection of carcasses. This increases their costs which makes them unable to compete in the world market. 64/

64/ The cabinet has recently voted to allow private firms to establish slaughterhouses for export purposes, but this does not change the structure of the industry. The minimum amount of capital investment required is 100 million baht. This will lead to monopoly in the industry in the future.

155. These impediments in the marketing and the slaughtering sectors reduce returns and thereby discourage production improvements. Low prices have perpetuated traditional production methods and discouraged serious disease control. Since pigs are usually slaughtered without disease inspection, farmers can always sell their swine. This has become a vicious circle.

E. Government policies and institutions

1. The chicken industry

156. Table 15 gives summary information on government policies and institutions involving the chicken and swine industries. The lack of government intervention in the marketing and slaughter of poultry, apart from inspection, appears to be a key factor in the industry's rapid modernization and development. Unlike swine, acceptance of Thailand's chicken products in export markets has been enhanced by modern and hygienic slaughtering and processing practices, careful quality control and strict meat inspection by the Government (Department of Livestock Development). The export tax appears to be so minimal that chicken parts from Thailand are highly competitive in the Japanese market. In fact, the Government seems to have helped in expanding the export market. For example, the Singapore Government banned Thai chickens in the belief that Thai chickens were diseased. After Government-to-Government negotiation, it lifted the ban at the end of 1981 and trade will resume after the contractual agreements are reached.

157. The investment promotion privileges granted to the modern slaughterhouses that process chicken for export as well as to the feed mills have contributed to the rapid expansion of chicken exports. On the other hand, the low-interest poultry loans from the Bank of Agriculture and Agricultural Co-operative have not yet become a major factor affecting chicken production, and during the 1967 to 1973 period only 1.3 per cent of the BAAC's short-term lending for agricultural activities went for poultry. Although the Bank of Thailand's rediscount facilities have not been used extensively by animal producers, many contract producers in the CP contract project obtained such facilities via the Thai Farmer Bank.

158. The only negative effect on the growth of the poultry industry is the method of computation of income tax. Producers with annual revenues exceeding 20,000 baht who are proprietors or are self-employed have to pay income tax. The law permits them to take a 75 to 85 per cent standard deduction on their revenue and certain exemptions from their annual income during the tax year. In practice, this means that they must always pay tax, even though their net income may have been negative in the current year. Losses from the previous year cannot be deducted from the current year's profit as is the case with corporate income tax. The high standard deduction allowed has discouraged farmers from keeping expense accoutns because they could result in higher tax liabilities. The result is an under-reporting of income and erosion of the tax base.

2. The swine industry

(a) Effects of animal slaughtering and meat sale control

159. The Animal Slaughtering and Meat Sale Act (B.E.2502) is a major constraint to the development of the swine industry. The purpose of the law, which puts slaughterhouses under the control of local authorities and restricts the shipment of carcasses across the boundaries of localities in which the slaughterhouses are

Table 15

Government policies on broilers and hogs

Policy	Broiler	Swine
A. Input		
1. Breeding & vaccine	-Genetic upgrading of local chickens at Cholburi Center (DLD)[a]	-Boar-loan service (DLD) -Selling three-way cross weaners at subsidized price (DLD) -Producing vaccines, sera and antigens (DLD)
2. Credits	-Rediscount facilities (BOT)[b] -Low interest loan from BAAC[c]	-Same -Same
3. Feeds	-Used to have price control (1977-1980) by DIT[d] -Quality control since 1972 (DLD)	-Same -Same
B. Processing		
1. Ownership	-Freely operate by private firms	-No private slaughter-house but allow private operators (in some cases, slaughterhouse operators are also carcass wholesalers).
2. Fees	-No slaughtering fee or permit	-Slaughtering permit (10 baht/head) -Slaughtering fee (15 baht) -Quarantine fee (3 baht) (by DLA)[e]
3. Disease control	-Disease inspection strictly enforced at export plant	-Supposed to strictly enforce

Table 15 (continued)

Policy	Broiler	Swine
	-No zone	-Prohibition of shipping animal into disease-free sones (DLD) -Shipment license: a one-year license is 200 baht for live animals, 50 baht for a carcass, 800 baht for export, and also a small permit fee (DLD)
C. Trade		
1. Carcass	-None	-Prohibition of carcass shipment across provinces (except to Bangkok) since 1959 by DLA
2. Export quota	-None	-Quota on frozen piglet export by DFT[f/]
D. Price control	-None	-Minimum farm gate price in 1959 by DIT -Maximum carcass wholesale price 1948 to 1980 by DIT -Maximum pork retail price 1948 to 1980 by DIT
E. Tax		
1. Income tax	-Single proprietor pays individual income tax, but large firm pays corporate tax (DT)[g/]	-Hog shipper pays 10 baht for each hog (DT)[g/] -Carcass dealer pays 20 baht per carcass (DT)
2. Export tax	0.50 baht per kilogramme	-n.a.
F. Investment promotion	-Various privileges slaughterhouses for export	-Expecting to grant privileges for export slaughterhouses soon

Table 15 (continued)

Policy	Broiler	Swine
G. Research and information	-Research on breeding, nutrition and disease -Little market information except Daily Trade News by MC[h/]	-Same
H. Government investment	-None	-Sing-Thai Farm in Hat Yai is a Government/ private joint venture to raise, slaughter, process and export hogs to Singapore.

a/ DLD = responsible department is Department of Livestock Development
b/ BOT = Bank of Thailand
c/ BAAC = Bank of Acgiculture and Agricultural Co-operatives
d/ DIT = Department of Internal Trade, Ministry and Commerce
e/ DLA = Department of Local Administration, Ministry of Interior
f/ DFT = Department of Foreign Trade, Ministry of Commerce
g/ DT = Department of Income Tax Ministry of Finance
h/ MC = Ministry of Commerce

located, is three-fold: (i) to provide a regular source of income for the local Government (as well as for the local officers who control the slaughterhouses); (ii) to control, through a system of licensing of livestock movement, meat inspection and slaughtering permits, illegal and/or unsanitary slaughter; and (iii) to prevent monopoly. The actual effects of the law are as follows: (i) health standards for the slaughterhouses are so low that the slaughterhouses probably spread disease; (ii) operators have no direct interest in slaughterhouse standards since they do not own the slaughterhouse; (iii) improvements or investments in the slaughterhouses are not made and as a result there is poor hygiene and an overall deterioration in slaughtering methods and procedures, waste and even pollution.

160. The charges and income taxes levied on every pig traded or slaughtered (even when the wholesalers incur losses) have promoted illegal slaughter in these government slaughterhouses. Between 50 to 60 per cent of pigs are illegally slaughtered.

161. Since meat inspection is under the control of the Department of Local Administration (DLA) instead of the Department of Livestock Development (DLD) as in the case of chicken processing, meat inspectors are either not qualified to undertake their duties or are intimidated and/or paid a fee to pass suspect organs or carcasses. As a result, most of the meat sold to consumers has not undergone inspection for disease and has been prepared under unsanitary conditions.

162. By prohibiting the shipment of carcasses across each legal trading area, the law has created local monopoly in the carcass wholesaling trade. In each administrative or trading area, only one private operator (and hence one slaughterhouse) is granted the privilege of managing the slaughterhouse. This is, in fact a very rational limitation imposed by local government officers who want to maximize their own benefits. These local monopolists are too small to influence market prices for hogs themselves, which are still largely determined by the forces of demand and supply, 65/ but they have used at least the following two methods to maximize their profits: (i) they have employed various ruses to discount the weight and quality of the animal, such as use of inaccurate weight scales; and they often claim that animals are injured after keeping them in a pen for an extended period; (ii) some carcass wholesalers, particularly those who slaughter their pigs at the slaughterhouse of the Livestock Trading Corporation, have lobbied the Government to obtain exclusive rights of slaughtering.

(b) Government intervention in pig co-operatives and other regulations

163. In addition to the above-mentioned effects of the regulation of hog slaughtering, other types of Government intervention and frequent changes in Government policies have also affected the performance and efficiency of the hog industry.

65/ Twice during the period 1959 to 1979, a co-operative consisting of carcass wholesalers and pig growers was formed. The granting of slaughter permits exclusively to this group resulted in monopoly in the wholesale pork trade in Bangkok leading to pressure on pig raisers to accept lower prices. Both times, the co-operative was short-lived due to mismanagement.

164. Of all the co-operatives in Thailand, perhaps pig co-operatives are the most powerful group. In 1959, when the Government enacted the Act of Animal Slaughter and Meat Sale Control, the Ministry of the Interior prohibited the shipment of pig carcasses from other provinces into Bangkok. The Pig Raisers and Traders Co-operative Federation, which was established by the Minister of the Interior in 1956, was granted a monopoly to buy and slaughter live pigs and to market pig carcasses in Bangkok; but the co-operative did not belong to pig raisers. In fact it was controlled by only one Chinese wholesaler 66/ and the profit from the co-operative was shared by the Minister of the Interior and other high ranking officers. In 1962, it was dissolved by the order of the Revolutionary Party. In 1978, the Bangkok market for pig carcasses was closed again and the Office of the Prime Minister granted all the slaughter permits in Bangkok to the Pig Raisers' Co-operative of Bangkok. Again the co-operative was not a real pig raisers' co-operative. Although most of its members were pig producers, the manager and most of the committee members who ran the co-operative were: pig wholesalers, a military general and a major as well as some politicians. The committee members lobbied the Government for the slaughter permits. Pig producers and pig wholesalers who brought their pigs to sell to carcass wholesalers in Bangkok had to sell them through the co-operative. Carcass wholesalers who wanted to buy live pigs had to pay an extra 12 baht for the slaughter permit in addition to the regular permit fee charged by the Ministry of the Interior. The co-operative went under when corruption by several committee members caused the co-operative to go several million baht into debt at the expense of the pig producers. It was declared bankrupt in 1979.

165. In fact, from 1959 to 1979, the Bangkok market for pork carcasses was closed three times. In each period of restrictive trade, the Bangkok pig carcass market was monopolized and the live hog market was monopsonized by a small group of carcass wholesalers who also controlled the co-operative in Bangkok. Statistical analysis of the time series prices of live pigs and pork carcasses confirmed that, during the period of trade restriction from July 1978 to July 1979, the wholesale prices of live pigs and pork carcasses in the north and the north-east had a low and insignificant correlation with those in Bangkok. In fact, the correlation coefficients were negative. 67/ These results, which are opposite to those found during the period of free trade in Bangkok, imply that the pig market during this period of trade restriction was inefficient. 68/

66/ This man was a close friend of the Minister of the Interior at that time.

67/ D. Assawanich, "An Analysis of Market Integration in the Pig Market System in Thailand, 1969-1979", Ramkhamhaeng University, Thailand, 1981.

68/ Previous studies have suggested that uncertainties created by shifts in government policies and measures partly account for the frequency and exaggerated amplitude of hog cycles as well as the stagnation in the production of swine in Thailand. N. Poapongsakon, op. cit., December 1980, pp. 112 to 158.

166. While the Pig Raisers' Co-operative of Bangkok was struggling for survival, the Ministry of the Interior, which lost control of pig trading to the Office of the Prime Minister, attempted to regain power. It set up the Swine Raiser Co-operative Federation Ltd. in 1978 and asked the Governemnt to grant all of the slaughter permits to the Swine Raiser Co-operatives. As a result, existing carcass wholesalers must pay the co-operative 20 baht (called economic rent) in addition to the slaughter permit fee. 69/ Most, if not all, of this extra cost is shifted either to consumers or pig producers. In some provinces strong producer co-operatives could try to run a carcass wholesaling business, but it would create a conflict of interest with existing wholesalers. 70/ In summary, the market power of the co-operatives was not obtained by the spirit and effort of members' co-operation. It was acquired by politicians who wanted to reap benefits from co-operatives in return for privileges.

167. Prior to 1979, the Department of Internal Trade controlled the wholesale price of pork carcasses and the retail price of pork but this system did not work because of the high cost of enforcement. On a few occasions, when there were shortages of pigs, the Governemnt tended to strictly enforce the law in response to the demand of the public. Consequently, a black market in pork and excessively high pork prices occurred.

F. Evaluation of government policy and recommendations

168. This study has demonstrated that the rapid growth of the broiler industry can be explained by technological and structural factors as well as a liberal Government policy that has permitted smooth and efficient functioning of the production, processing and marketing of broilers. Modern technology in nutrition, disease control, breeding and farm management have contributed significantly to the reduction of production costs. Thailand's abundance of feed grains and fish meal have also contributed indirectly to this growth. To maximize returns, feed manufacturers have had to combine various vertical stages of production with their management. Vertical integration has been necessary in order to ensure a regular chicken supply at stable prices and to keep production and marketing costs down. Because of reduced marketing costs and economies of larger-scale

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69/ In 1982, there were 75 swine raiser co-operatives. Only 20 co-operatives are in the business of buying and selling live pigs.

70/ In the past, some existing wholesalers proposed to buy some of the slaughter permits from the co-operative, while others decided to illegally slaughter hogs and to sell the illegal carcasses to their existing outlets in the consumer markets. Some members and managers of the co-operatives were shot to death because they took away the business of pig slaughtering and wholesaling from the influential wholesalers. According to the annual report of the Swine Raiser Co-operative Federation Ltd. of the southern region in May 1983, 11 co-operative members and managers were assassinated from 1981 to 1983. The report also complained about increasing illegal slaughter.

production, farmers have been able to obtain an increasing share of the income generated by the industry. Consumers and society as a whole have become better off because they can enjoy a cheaper source of animal protein, despite some short run difficulties. 71/

169. In contrast, the swine industry continues to be dominated by many small low-input, backyard producers. Although technology is available, large-scale commercial farms are still very limited. Foot-and-mouth disease (FMD), hog cholera, pneumonia and viral influenza still plague the country. Slaughterhouses are unsanitary, substandard, and disease-spreading. Illegal slaughter is universal and meat inspection is rare. Both the wholesale and the retail trade are in the hands of many small traders. Although the market can be characterized by a competitive model, the carcass wholesalers and slaughterhouses have local monopoly power. It is monopoly-inducing government intervention and lack of understanding of the functions of the market that foment most of the problems.

1. Some policy recommendations for the broiler industry

170. Although there may intermittently be chicken crises, they are of a temporary nature. There is evidence that the dominant feed mill firms have attempted to organize collusive arrangements among themselves. Fortunately, such action often fails due to the temptation to cheat and to counter action by independent producers. There seems to be a lack of market information about the demand/supply situation. Although future chicken production does not require any government assistance, an information centre is needed. Broiler producers make their decisions by using only the price information of the past. Prices of the past, however, are not always good predictors of future trends. It takes only 45 to 55 days to raise a marketable broiler and the number of broilers produced can fluctuate drastically from the past trend. To help producers predict the future supply, information is needed on: the number of day-old chicks supplied to producers, the number of eggs hatched, and the number of PS and GPS pullets imported by month, as well as other information such as the prices and production of feed ingredients on both the domestic and the world market. This information, if accessible to all producers, would be useful for production planning which, in turn, could help to reduce the probability of an over-supply of chicken.

171. An information centre could collect and disseminate information to all the parties in the industry. Since the provision of information is by nature a type of public good, it is difficult to expect private firms to assume the task. One possibility would be to have a university manage the centre with government support. It not only has qualified manpower and facilities but is independent of private vested interests. Such an information centre could be financed by specific duties levied on imported GPS or PS pullets.

172. In respect of taxes, the current high standard deduction allowed for self-employed tax payers (including chicken producers) which encourages false accounting (keeping accurate accounts could result in higher taxes) should be gradually phased out. 72/

71/ Twice, between 1979 and 1981, there was a temporary glut in the chicken market as a result of producers' incorrect expectation of profit. Many small- and medium-scale producers were driven from the industry.

72/ Medhi Krongkaew, Fiscal Reforms for Resource Mobilization in Thailand: A Summary Report. From a research project entitled, "Fiscal Policy for Resource Mobilization Study", submitted to the National Economic and Social Development Board (NESDB), Thailand, April 1981, p. 17.

173. Research needs to be undertaken and measures implemented to improve the productivity of feed-grain farmers. For instance, research to develop high-yield varieties appropriate to Thailand's environment should be supported on a larger scale. Existing government export tax and export quota policies that depress farm-gate prices should be revised and phased out.

174. To reduce the risk of depending upon one market, the Government should continue to take an active role in negotiating with foreign Governments for access to their markets.

175. Backyard local chicken production should be encouraged as another potential source of animal protein for the majority of the rural poor. In support of this aim, foreign aid programmes as well as tax proceeds from the industry should be mobilized to help develop local technology and local breeds suitable for production of both meat and eggs.

176. If investment promotion privileges remain in effect, they should be used to redirect the location of the broiler raising and processing industry into rural areas where animal feeds are abundant. Such relocation policies could help to reduce transportation costs and improve income distribution.

2. Some policy recommendations for the hog industry 73/

177. The Animal Slaughtering and Meat Sale Control Act must be drastically revised to allow for both private ownership and operation of slaughterhouses. The carcass or meat trade must also be liberalized. Permission to establish a slaughterhouse should be granted by the Department of Factories and a strict, new system of animal and meat inspection by veterinarians from the Department of Livestock must be devised.

178. The existing practice of income tax collection from hog shippers and carcass wholesalers must be reformed so that the incentive to avoid tax is reduced. The same system of income tax should be applied to both chicken and hog producers as well as to other self-employed persons.

179. The Government should launch programmes that will wipe out or control pig diseases. No animal should be allowed into the disease free zone. While intensive, commercial farms have an incentive to keep animals healthy, hogs raised in the backyard of small farmers are still the major factor causing outbreaks of disease.

180. No export quota should be applied but inspection of meat for export must be strictly enforced as in the case of chicken. A variable export tax and subsidy may be devised to help stabilize the domestic price with the major aim of helping producers. When there are neither serious shortages of pork nor excess supplies, the instruments of tax and subsidy should not be used.

73/ For a more detailed discussion, see N. Poapongsakorn and Rungsun Thanapornpun, Some Policy Recommendations on the Hog Industry. A research paper submitted to the NESDB, Thailand, December 1981, (Thai).

181. Small pig farmers should be encouraged to raise weaners. This requires a package of measures ranging from provision of credit and good breeding stock as well as information on nutrition, farm management and marketing. Although this type of contract farming is already practised by some feed companies, the Bank of Agriculture and Agricultural Co-operatives (BAAC) which makes loans to small farmers may be in a position to finance the project and act as an intermediary if private companies can be persuaded to become involved. A rationale for asking the BAAC to finance the project instead of the commercial banks is that the BAAC charges small farmers lower interest rates. Farmers without collateral can also qualify for loans if there are enough farmers with collateral to jointly guarantee them.

182. Since a reasonable export potential for processed meat such as ham and bacon already exists, 74/ technical assistance in slaughtering and meat processing is required to help overcome the poor image which Thai food products have on overseas markets. The development of the slaughtering industry requires the following aspects of technical development. After liberalizing the slaughtering sector, there must be improvements in slaughterhouse conditions to provide Thai consumers with a safe, quality product and to satisfy export market requirements by following the accepted standards of meat slaughtering. The Government, with private co-operation, should launch a serious marketing programme to convince foreign buyers that health and quality standards have improved significantly.

183. Some of these difficult tasks can never be achieved if the law is not changed. No incentives exist for private entrepreneurs to invest in this industry under the current marketing and slaughtering system.

74/ For example, Hong Kong and Japan have already imported some pork and frozen piglets from Thailand. Singapore has also just begun to buy Thai hogs from the Sing-Thai project. Other untapped markets include: Republic of Korea, Taiwan Province of China and probably some countries in Europe.

Chapter II

Appendix 1

SUMMARY OF TERMS AND DURATION OF ARRANGEMENTS BETWEEN BROILER PRODUCERS AND BUYERS ("INTEGRATORS") IN VERTICAL INTEGRATION SCHEMES

Type of integration contract	Terms of contract			
	Inputs	Outputs and marketing	Payment	Duration
1. Price guarantee				
1.1. Producer-commercial broiler processing plant (written contract)	-Chicks, feeds, and drugs have to be bought from the integrator who also provides veterinary services. -Prices of feeds and chicks are stipulated. -Cash payment is required for chicks.	-A certain number of marketable broilers (50-60 days old) must be rendered to the integrator, i.e. 97% of the total number of day-old chicks supplied to the producer. -There are occasional farm-gate catches by the integrator of 'Soi' Middlemen who buy the broilers through the former.	-Bahts per kilo -The guaranteed price has to be varied in proportion to changes in prices of feeds 15 days after new prices of feeds have been announced. -For farm-gate transactions, the price paid to the producer will be one baht lower than that at the plant for the producer has no expenses from transportation, weight loss, and higher mortality en route.	One year
1.2. Producer-local feed dealer (verbally-made contract)	-Chicks, feeds, and drugs are furnished on credit by the integrator. -Collateral may be demanded from some producers, e.g. loan contracts, land deeds, 5.50 to 10.0 baht for each chick.	-Catch of birds is mostly upon the integrator. -Broilers are sold to 'Soi' or local middlemen at farm-gate prices or directly to the broiler processing plant.	-Bahts per kilo. -No change in the guaranteed price since prices of feed are determined at the outset without any variation through the termination of contract.	Flock-by-flock

Appendix 1 (continued)

Type of integration contract	Terms of contract			
	Inputs	Outputs and marketing	Payment	Duration
2. Piece-rate 2.1 Flat fee -Producer/local feed dealer (verbal contract)	-Chicks, feed and drugs are furnished by the integrator while the producer provides house, labour, and other supplies.	-The producer must inform integrator when the broilers fall ill. -Title to the broilers remains with the integrator who can sell them to either the processing plant and 'Soi' or local middlemen.	-A flat sum per live bird, currently 1.00 to 1.50 baht.	Flock-by-flock
2.2 Combination 2.2.1 Producer/local feed dealer. (verbal contract)	-As stated in 2.1 (above) -Feeding programme, such as daily record of the amount of feed used and mortality, is required from the producer.	-As stated in 2.1 (above)	-A flat fee subject to adjustments i.e. mortality clause, market price index, birds' age, etc.	Flock-by-flock
2.2.2 Producer/food manufacturer- -Sriracha project (written contract)	-The integrator guarantees the farmer's mortgage of land to the banks that grant loans to the farmers for construction of a firm-specified modern chicken house. -Chicks, feed, veterinary services, and complete technical training are provided to the farmers who pay costs of disinfectant, electricity, etc. and provide labour; -The farmers are required to design a feeding programme and are liable for 30% of drug expenses in case of disease outbreaks together with 30% loss of dead birds.	-96% of chicks must be rendered to the integrator after 50 to 60 days; -The birds may be shipped by the integrator to its processing plant or sold to the 'Soi' middlemen.	-An average flat sum per live bird: for instance, during the first five years of the contract, farmers are paid a flat sum of 0.56 baht per bird or 2,304 baht per month in the case of two-month fattening; -The above flat sum is subject to the following adjustments: -the weight of broilers, -mortality clause, -period of production, and -feed conversion efficiency.	Five years

Appendix 1 (continued)

Type of integration contract	Terms of contract			
	Inputs	Outputs and marketing	Payment	Duration
2.2.3 Producer/feed manufacturer's affiliate -Boon Agriculture Co. (written contract)	-As stated in 2 & 3.1, the producer is liable for 30% of the drug expenses.	-The producer must inform the integrator within 24 hours if the birds are sick; -Marketing is similar to that described in the Sriracha project.	-Payment is made using the following adjustments: -rent for chicken house (0.06 baht/day/m^2) -the weight of the broilers, -the mortality clause, and -feed conversion efficiency	Flock-by-flock
3. Open account -Producer/local feed dealer	-Chicks, feed and drugs are furnished on credit by the integrator.	-The producer is free to decide when his broilers should be sold whereas the integrator markets the birds. -The integrator may bring the middleman to the farm in case of farm-gate transactions or sell to the processing plant.	-Market price	Flock-by-flock

Source: P. Pipatkusolsook, Market Structure, Conduct and Contract Integration: A Case Study of Formula Feed Industry, M.A. thesis, Faculty of Economics, Thammasat University, Thailand, 1982, pp. 133 to 134.

Chapter II

Appendix 2

Names of vertically integrated firms and their subsidiaries

Parent Company	Subsidiary Groups	Activities
(a) Charoen Pohphand (C.P.) 49 firms	1) C.P. Produce, Bangkok Fishery, C.P. Textile, Bangkok Industrial Seeds, Bangkok Produce, Chia Tai, Chon-Charoen Inter., Agro-Chemical Industry, etc.	Production and distribution of agricultural inputs e.g. seed, corn, fish meal, pesticides, fertilizer, gunny bags, etc.
	2) Advance Pharma, C.P. Import-Export	Importation and distribution of drugs and chemicals and animal feed production
	3) C.P. Feed Mill, Bangkok Feed Mill, World Anifeed, C.P. Industry, Bangkok Pokaphand, Sri Raja Feed Mill, etc.	
	4) Bangkok Farm, Bangpakong Farm, Arbor Acres, Charoen Kaset, etc.	GPS and PS chicken breeder farms, pig breeder farms and duck farms
	5) Bangkok Livestock, Charoensak Farm	Slaughtering, processing, restaurant and export
	6) Charoen Industrial Machinery, Asia Industrial Machinery, Feed Engineering Consultant, etc.	Agricultural equipment
	7) C.P. Intertrade, Bangkok Import-Export, C.P. Kaset-Industry, etc.	Internal and foreign trade
(b) Sri Thai Livestock Co.	1) Sri Thai Livestock Co. Sri Thai Poultry Processing	PS chicken breeder farm, broiler farm
	2) Teparat	Animal feed
	3) Sri Thai Vet.	Drugs
	4) Sri Thai Food Products	Selling day-old chicks and eggs.

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Appendix 2

Parent Company	Subsidiary Groups	Activities
(c) Laemthong Sahakarn Co.	1) Laemthong Farm	GPS and PS farms
	2) Nakorn Chaisri Farm	Broiler farm
(30 firms)	3) Kana Company	Drugs and medicine
	4) Laemthong Sahakara Co.	Silo, animal feed, trade, etc.
	5) Laemthong Food Products	Slaughtering, processing export, feather mill, etc.
(d) Centago	1) Centago Farm	
	2) Centago Feed Mill	Slaughtering, processing and export
	3) Centago Chicken	
(e) Saha Farm (organizing and co-operative)	1) Saha Farm Co., Ltd.	Broiler farm, slaughtering, processing and export
	2) Sri Mahapo	PS breeder farm
(f) Betagro	1) Betagro	Broiler farm, animal feed
	2) Betagro Farm	PG breeder farm
	3) Better Food	Slaughtering, processing and export

Chapter II

Appendix 3

Incidence of higher marketing costs

As described in the text, many government measures have helped to create higher (artificial) marketing costs. These measures include: prohibition of the shipment of pig carcasses across the trading area of each slaughterhouse and; the government's decision to issue all the slaughter permits to the pig co-operatives, which forced the carcass wholesalers to pay extra money for the permits.

The distribution of incidence of the increase in the marketing costs can be computed from the following formula:

$$\text{Pig producers' incidence} = Ed/(Ed + Es)$$

$$\text{Consumers' incidence} = Es/(Ed + Es)$$

where Ed is the price elasticity of the final demand for pigs and Es is the price elasticity of the derived supply of pigs at the same market level.

Since pig products are produced jointly and since we do not have direct estimates of Ed and Es for each product we have to estimate them from the following formula:

$$Ed = \frac{\sum_i P_i W_i}{\sum_i E_i^{-1} (P_i W_i)}$$

where P_i = the price per kilogramme of pig product i

W_i = the fixed yield of product i per unit of pig

E_i = the price elasticity of the final demand for product i.

Unfortunately, we know the price elasticities of only two products, namely pork and pork lard. To facilitate our estimation, we will assume that the demand schedules for other joint products are perfectly elastic with respect to price change. This assumption is defensible because pork and lard account for more than 65 per cent of the total weight of a pig. Therefore, Ed can be calculated as follows:

$$Ed = \frac{P_1 W_1 + P_2 W_2}{\frac{1}{E_1}(P_1 W_1) + \frac{1}{E_2}(P_2 W_2)}$$

because all E_3^{-1}, E_{4-1}, ..., En^{-1} equal zero by assumption.

Since E_1 (pork) is -0.713 and E2 (lard) is -0.702 a/, W = 0.2703, W = 0.1951, Ed_1 = 0.7099.

We do not have estimates of the price elasticity of the derived supply of pork at the retail level. We have, however, the price elasticity of the supply of pigs slaughtered (Ess) which is about 0.06 to 0.108 in the short run and 0.22 to 0.409 in the long run b/. If the marketing costs are assumed unaffected by the number of pigs traded, then the price elasticity of derived supply at the retail level (Esr) can be derived from:

$$Esr = Ess \left(\frac{P_r}{P_s}\right)$$

where Ess = the price elasticity of the supply of pigs slaughtered at the wholesale level.

P_r = is the weighted price of pigs at the retail level or $\sum_i P_i W_i$ where W_i is the fixed yield per unit of pig = 14.6433 baht.

P_s = is the price of pig slaughtered at the wholesale level = 10.486 baht.

Esr = 0.0838 to 0.1508 in the short run.

or = 0.3072 to 0.5712 in the long run.

Estimates of the percentage share of the burden of higher marketing costs are given in the following table. It can be seen that in the short run, the pig producers have to bear more than 80 per cent of the burden and more than 55 per cent in the long run.

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a/ P. Triratvorakul, "Food Demand and the Structure of Thai Food System", Ph.D. dissertation, Harvard University Graduate School of Business Administration, 1981

b/ N. Hongpairot, Supply Response of Hogs to Number of Hogs Slaughtered, Thai Studies Research Institute, Research No. 3, Thammasat University, Thailand, 1979.

Distribution of the incidence of marketing costs

Price elasticities	Incidence shared by pig producers (%)	Incidence shared by consumers (%)
1. Short run		
E_D = 0.7099		
E_S = 0.0838	89.4	10.6
E_D = 0.7099		
E_S = 0.1508	82.5	17.5
2. Long run		
E_D = 0.7099		
E_S = 0.3072	69.8	30.2
E_D = 0.7099		
E_S = 0.5712	55.4	44.6

Chapter III

PRODUCTION, PROCESSING AND MARKETING OF RICE

A. Introduction

1. Location of production

184. Rice is Thailand's most important crop and accounts for about 30 per cent of total agricultural value added. The average production over the period 1977/1978 to 1979/1980 was about 17 million tons per year. Rice is generally classified into two types, non-glutinous and glutinous. The average production of non-glutinous rice is around 11 million tons per year. About 6 million tons per year of glutinous rice are grown.

185. Production of non-glutinous rice is concentrated in the heart of the central plain (near Bangkok), in Pichit province and in the south of the north-east (Surin and Burirum) while production of glutinous rice is concentrated in the northern part of the north and the north-east.

186. Rice is produced by several million small farm families throughout the country. In 1980, there were 17.5 million farmers or about 4.4 million families, 80 per cent of which were rice farmers. The average size of land holding per farm family was 25 rais. 75/ These rice farmers are independent and small. Large rice plantations and production co-operatives are rare except for a few cases of large consolidated projects in the central region. Therefore, farmers are price takers when they sell their products.

187. There has been an attempt by one private agribusiness firm to promote rice production through the initiation of a contract farming project in 1980. One of the objectives of the project was to increase rice yield per rai by improving the methods of production. The details of the rice contract are given in Appendix 1 to this Chapter.

2. Location of consumption

188. About 80 per cent of total rice production is consumed domestically, with 40 per cent accounted for by farmers' own consumption and the rest is marketed. Non-glutinous rice makes up the main portion of the diet of both urban dwellers and villagers in the central, east, south and metropolitan areas. In these regions, glutinous rice makes up only one half per cent of the diet in towns and less than 3 per cent in villages. Glutinous rice is consumed mainly in the north and north-east. Taste or preference is the only factor which can explain these differences.

3. Export of rice

189. Although less than 20 per cent of total rice production is exported, Thailand supplies between 20 to 30 per cent of the world rice trade. The main export markets for Thai rice are in Asia with markets in Africa, Middle East and Europe becoming more important. Hong Kong, Indonesia, Malaysia and Singapore are major regular customers.

75/ One acre is approximately 2.5 rais.

190. Thailand exports mainly white, head, non-glutinous rice. Glutinous rice export is only 4 per cent of total exports. Within the white head non-glutinous category, the share of good grade 76/ (100 per cent or 95 per cent unbroken) tends to be large.

B. Market structure

1. Market structure

191. Rice is the main staple of the Thai people and has always been the major export crop of Thailand. Structures of the markets in which basic crops move from farm to consumer or point of export may exert a substantial influence on the performance of any economy with a significant agricultural sector. In the case of Thailand, an analysis of the market structure is of importance not only because of the basic economic significance of rice and rice markets, but also because opinions on how the rice market functions have been inextricably bound up in public issues involving the rice premium. Facts regarding the market structure of rice are in doubt. Some studies conclude that ... "on the whole the rice trade is highly competitive" 77/ while others 78/ have found, "In some areas a near monopoly condition exists in the processing sector, with the same family or group owning several rice mills in the same market area." 79/

2. Marketing channels

192. Bangkok is not only the centre of rice export, but also a central market for distributing rice to the south. Therefore, Bangkok functions as a milled rice central market for the collection, distribution, export and price determination of rice.

193. Figure 4 shows the movement of paddy out of the surplus areas in the north, the north-east and the central plain. There are three channels through which paddy and rice are marketed: (i) Farmers employ the small rice mill 80/ normally located within villages or nearby, to mill paddy for their own consumption. The small rice mill actually does not separate head rice from large broken rice (A1-grade). Therefore, the outcome from milling paddy is: mixed rice (head rice and large broken rice), small broken rice and brans

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76/ For an explanation of rice terminology, see section D.

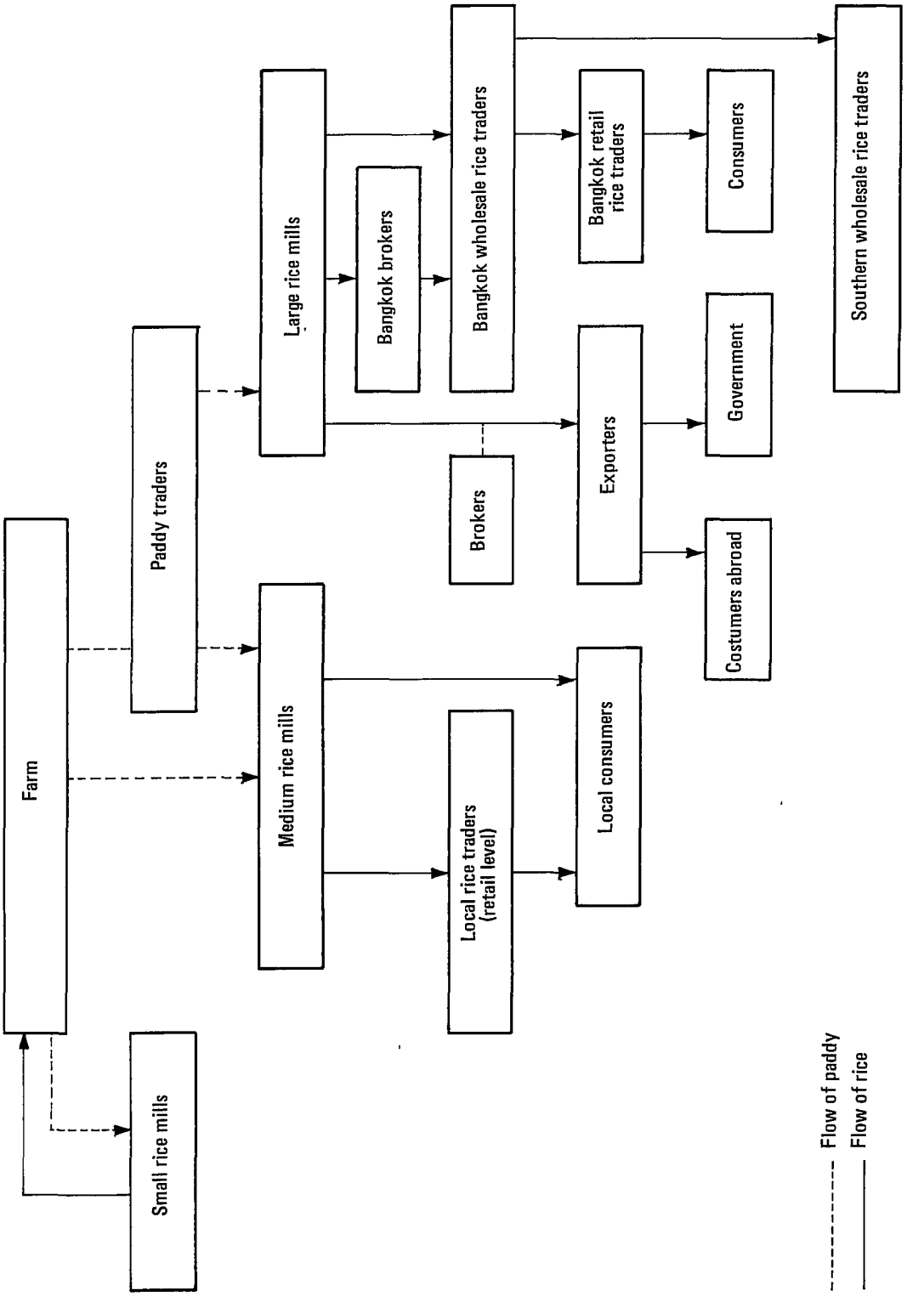
77/ D. Usher, "The Thai Rice Trade" in Thailand : Social and Economic Studies in Development. T.H. Silock, editor, (Canberra : Australian National University Press) Australia, 1967.

78/ Division of Agricultural Economics, Office of the Under-Secretary of State, Ministry of Agriculture, Marketing Margins and Marketing Channels of Major Agricultural Commodities and Livestock in the North-eastern Region of Thailand, 1963-1964 (Bangkok : Ministry of Agriculture, 1964).

79/ T.H. Silcock, The Economic Development of Thai Agriculture, (Ithaca : Cornell University Press, 1970) p. 19.

80/ Capacity: less than 5 tons per day.

Figure 4
PADDY AND RICE FLOW IN THE NORTH, NORTH-EAST, AND THE CENTRAL PLAIN OF THAILAND



(coarse and fine). The miller normally takes small broken rice and brans as milling fees. In the villages, where there is less competition, the miller is able to charge a few baht for milling one picul (approximately 60 kg.) of paddy; (ii) farmers also sell paddy directly to medium-size rice mills 81/ or to a paddy trader who then sells to the medium-size rice mills. After milling, the miller sells the rice directly to local consumers as well as to local rice traders (at the retail level); and, (iii) rice reaches Bangkok mainly via the large mills 82/ which generally buy paddy from paddy traders who earn their living from the margin between the farm price and the wholesale paddy price less their transportation costs. The rice millers sell their rice to exporters and wholesalers through brokers in Bangkok. The wholesaler sells rice to the retailer who then sells to Bangkok consumers. Bangkok wholesalers can supply rice to the southern regions, although some southern wholesalers buy rice directly from rice mills in surplus regions.

C. Behaviour and performance of marketing, processing and distribution

1. Rice processing

(a) Location of rice mills

194. Rice mills have been established in Thailand for more than 60 years. 83/ Large mills are concentrated in the central plain because they have a high fixed investment cost which they need to minimize by milling as many days per year as possible. In the central plain, 84/ millers can find paddy year-round 85/ and have the added transportation advantage of being relatively close (both by water and land) to their major sales market in Bangkok.

195. Small- and medium-size rice mills are mainly found in the north-east and are intended primarily to serve local consumption needs - mostly of farmers and poor people who consume glutinous rice which is grown locally. The transportation network has greatly improved in this region and the introduction of gasoline and kerosene milling machines have been successful in reducing milling costs in the north and north-east.

81/ Capacity: 5 to 20 tons per day.

82/ Capacity: more than 20 tons and up to 500 tons per day. The newest and largest mill has a capacity of 1,000 tons per day.

83/ Previous studies have recorded a number of rice mills in each region: G. Skinner, Chinese Society in Thailand : An Analytical History. Ithaca : Cornell University Press (United States), 1962.
C. Pinthong, A Price Analysis of the Thai Rice Marketing System. Ph.D. dissertation, Stanford University (United States), 1977.

84/ Irrigated rice areas are mostly located in the central plain.

85/ Paddy marketing time in each region is different. The north and the north-east begin in mid-November and December; the mid-central plain follows in January and February and the south of the central plain gets under way in March and April. The second crop also begins in the north in May, followed by the central plain from July to September.

(b) Rice mill operation

196. To understand the operation of mills, many factors such as: (i) sources of power, (ii) milling technology, (iii) mill utilization, (iv) mill workers, (v) milling cost, (vi) mill storage, and (vii) transportation of paddy and rice have to be briefly described.

(i) Sources of power There are three types of engines available to rice mills: steam, diesel and electric motor. Steam engines are the most popular among the big mills as they are the most economical because they can run continuously. The cost of investment is high but the variable cost is very low. Rice husks which are a waste product from milling can be used as fuel to heat the steam, instead of expensive diesel fuel used for diesel engines. Diesel engines and electric motors are more popular in the small- and medium-size mills where each operational period is short.

(ii) Milling technology There are many techniques for milling rice. Hand pounding and use of a clay disc are the simplest methods and are generally used by families. Stone rollers are employed in small mills. 86/ They are simple to operate and have a low investment cost. The stone roller can also be used as a whitening unit. The rice milled from this type of operation is very poor in quality. It generally supplies local demand.

197. The two milling machines commonly used by the large mills are the disc husker and the rubber roller husker. The rubber roller husker, though not yet popular in Thailand, is expected to gain greater acceptance because it yields superior quality milled rice. The rubber roller is expensive and can wear out in three days. More attention and technical knowledge are required for its operation than for the disc husker but it yields at least two per cent more head rice as well as finer bran. Both products command higher prices but returns 87/ are still not sufficient to induce millers to undertake the high investment cost in converting to this type of husker. Most new mills, however, have installed the rubber disc husker.

198. Milling one unit of paddy can yield five to six joint products: head rice, broken rice (A1, C1 and C3 grades) and bran (fine and coarse). The conversion ratio depends on the milling machine, the variety of paddy, and the moisture content. The conversion ratio is in general higher for non-glutinous than glutinous rice. The non-glutinous rice produced in the central plain can yield more head rice than rice from the north and north-east. The structure of marketing and pricing makes the price of rice sold in the central plain higher than in other regions and has been a good incentive for farmers to carefully dry paddy and select good seed varieties.

(iii) Mill utilization There are two seasonal milling peaks. Generally, mills in all regions are fully utilized just after the first harvest (December to April). When the second crop is harvested from July to September, the mills in the central plain operate at full capacity. They can also enjoy economies of scale in buying paddy in large lots from other regions. At peak times, mills run 24 hours per day almost every day during the month except for two or three days of repair and maintenance.

86/ Small- and medium-size mills are mainly family operations which serve local areas.

87/ Prices of good grade rice have been kept deliberately low by the Government through the use of export taxes (see section F).

(iv) Mill workers During peak periods, millers hire two crews to work alternately. There are two types of worker - a temporary worker who is paid on a daily basis or on a piece-work basis and a permanent worker who is generally guaranteed an annual wage. The miller is able to be more flexible by employing a temporary worker during the non-peak season.

199. Among large rice mills, the ratio of the number of permanent workers to temporary workers is high for those with a capacity of around 30 tons per day and more than 200 tons per day. For the mills with a capacity between 30 to 200 tons per day, the ratio is lower. This is due to the fact that permanent workers employed by the small mills are not assigned to any specific job. One worker may work in many kinds of jobs. This reduces the number of temporary workers since some of the jobs are already taken care of by permanent workers. The biggest mills, with capacities of 300 tons per day, seem to use a small percentage of temporary workers compared with the mills with capacities of less than 200 tons per day. The very big mills tend to use more capital intensive technology, and replace manual workers by machines. The average total number of workers per ton of capacity, in general, decreases as the size of the mill increases.

(v) Milling cost Previous studies have estimated the average milling cost of one ton of paddy by type of machine, capacity and rate of mill utilization. 88/ The studies generally concluded that large mills are able to mill at a lower per unit cost. The average cost within the same type of mill but at different rates of utilization varies according to the utilization rate: the higher the rate, the lower the average fixed cost.

(vi) Mill storage Big mills need to store a working stock of paddy. Due to physical properties, there are lower losses from paddy storage than from milled rice storage. 89/ Most big mill owners buy paddy at harvest time (when the price is low) and expect to mill it into rice when the price is at a higher level. Almost all big rice mills have their storage located in the rice mill area. They usually fill the storage in December and January. They cannot estimate how long they expect to keep the paddy as it will be milled whenever the Bangkok price is high enough for them to earn some profit. More details on storage and an intertemporal analysis will be presented in Section D.

(vii) Transportation of paddy and rice Transportation cost is one of the biggest elements in the rice trade. 90/ In general, transportation cost is the biggest element in the marketing cost if the mill is located 200 kilometers from Bangkok. Within 200 kilometers the milling cost, approximately 50 baht per ton, seems to be the highest cost item. There are three modes of

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88/ N. Somboonsub, Rice Milling Technology and Some Economic Implications: The Case of Nakorn Pathom, Thailand, 1974. Unpublished Master's thesis, Faculty of Economics, Thammasat University, Bangkok, 1976, p. 119.

89/ See details in section D.

90/ Transportation costs constitute almost 100 per cent of the marketing cost from the farm to the mill and about 30 per cent from the mill (located in Nakornsawan) to the wholesaler in Bangkok.

transportation 91/: truck, barge, and rail (See appendix 2 of this Chapter, tables 1 and 2). Before 1952, paddy was transported by rail from the north to the central paddy market in the central plain and then by barge to the mills. Since the highway system has expanded, trucks have become increasingly popular. Even in areas where there are no passable roads, trucks can use dry paddy fields after the harvest. Rail transport has now been completely replaced by trucks carrying paddy to the central market at Nakornsawan. Trucks have been substituted more and more for barges on the inland waterways. Rail remains popular, however, for carrying rice from Bangkok to the south because the distance is shorter by rail.

200. While barge transport is cheaper than truck transport for short distances, and for longer distances rail cost is competitive with the cheapest trucking costs, it is interesting to look at relative costs over time. For the period 1965 to 1976, barge transport cost increased 100 per cent while trucking costs increased 30 per cent. The reason for this is that the road system has been continually developing while nothing has been done to improve inland waterways. Direct route highways have been built and many sideroads have been paved in the last decade. The development of roads reduced cost by improving accessibility to truck transport and the relative cost of truck transport. Although it is not generally favoured, transport by rail has become more frequent as oil prices have increased. Not many roads are constructed to connect provinces to each other. Most of them are built to connect the provinces to Bangkok. New roads have brought trucks, buses and traders. Agricultural output 92/ has shown a large increase in areas served by new roads. The decreases in transportation costs have had greater effects on the economic components of rice agriculture than the negative effects of cost increases. In particular, the north and north-east show the greatest changes in value of production when transportation costs change. Per cost decrease, increases in the value of production are about six times greater in the north-east and four times greater in the north than in the central and southern regions. With decreases in transportation costs, increases in value per rai are the greatest in the north, the north-east and the south, respectively.

201. In general, truck transport, though somewhat more expensive is much preferred for the following reasons:

(i) In addition to the disadvantage of inflexibility in routing, transport by rail involves minimum weight (10 tons) requirements and rice must be unloaded at its destination within four hours - heavy fines are imposed for non-compliance; graft must also be used to get a rail car quickly;

(ii) There are limitations in the use of inland waterways. Rivers and canals are mostly navigable for rice transport only in the central plain at a point lower than Nakornsawan province. Barge transport is cheap but slow sometimes taking two to three days to arrive in

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91/ Coastal shipping is the cheapest mode of transport but it is prohibited to prevent smuggling of rice out of the country. The domestic rice price is much lower than in nearby Malaysia.

92/ Before the construction in 1958 of the Friendship Highway (built by the Thai and United States Governments) to provide a direct link between the south and central plain, maize exports from the Korat Plateau amounted to 10,000 tons per year. Within two years exports increased to 200,000 tons per year valued at 300 million baht.

Bangkok in comparison to a half day by truck. It also requires additional shipment by truck unless the origin and destination of the cargo happen to be on the banks of accessible rivers.

(iii) If a miller transports his rice by truck, the Bangkok buyers, through the commission agent are likely to unload his rice sooner than if it comes by barge. Buyers have a contract with truck companies to pay compensation (normally 200 baht per day) if they do not finish unloading by a certain time. This kind of arrangement has never been made with barge transporters. Sometimes rice transported by barge is not unloaded for two to three days.

202. Analysis 93/ has shown that the share of rice transported by truck, rail and barge is sensitive to changes in trucking costs. If trucking costs were reduced by 30 per cent, barge and rail shipments would drop to zero. If trucking cost were increased by 30 per cent, the three modes of transport would have almost equal shares of total rice shipments.

2. The nature of truck transport

203. There is one public trucking firm, Express Transport Organization (E.T.O.), run by the Government. The head office is in Bangkok with district offices in major cities throughout the country. Its pricing policy upcountry is to accept market rates as it finds them and to set its prices to meet the competition of private traders. In trade with Bangkok, however, its rates are higher than those of private trucking firms. This is the reason why no miller was found using E.T.O. trucks to transport their rice to Bangkok.

204. There are no large private truck firms doing business nationally, but there are many truck firms which provide transport from Bangkok to one or two provinces in the same region. One province may have many truck companies. Generally, trucks carry manufactured products, books, stationery, and imported goods from Bangkok to the country and transport food, agricultural products, and raw materials back to Bangkok. The truck companies try to earn revenue on the journey back and forth, but earn their main revenue from transporting products out of Bangkok; the revenue from the return trip is only complementary. Many big rice mills have their own trucks to transport rice to Bangkok.

205. Truck transportation costs fluctuate seasonally. Different regions have slightly different seasonal patterns. In general, truck transportation cost is high in rice harvesting and marketing seasons and is low at transplanting time. At harvesting time, there are several agricultural products to be shipped to market and demand for transportation increases thus putting pressure on trucking prices.

3. Paddy central market

(a) Development and location

206. The paddy central market is located at Payuhakeri, Nakornsawan Province, which is as far up the Chao Phya River as barges can go from Bangkok. The market was established more than 20 years ago as a natural meeting point for rice traders. Since the paddy supply from the north had to be moved to the central plain for milling, the most economical mode of transport was by barge

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93/ D.M. Conley, C. Vathana, A. Ruayruen, and A. Roongsawang, "Effects of Transportation Cost Changes on Rice Agriculture." Unpublished paper for Seminar on Agricultural Development Planning in Thailand, 29 to 30 July 1975.

along the inland waterways. Thus the central market first functioned as a loading/unloading terminal where traders could change the mode of transportation from truck to barge. Eventually, market facilities for buying, selling, weighing, loading, etc., began to develop.

207. Since transportation by road has improved, the relative price among the different modes has become more favourable to truck transport and the need for changing from truck to barge at the central market is declining. The volume of trade, however, has not diminished but is slowly increasing for the following reasons:

(i) Shipping paddy from the northern provinces directly to millers in the central plain is too far to run an empty truck back. Paddy traders (sellers in this market) need to fully utilize their truck. The Nakornsawan area is at an optimum distance enabling them to buy paddy at the farm gate in the north during the day, sell it at the central market in the evening and go back to the farm on the following day.

(ii) Because there are many sellers and buyers, traders find the market competitive.

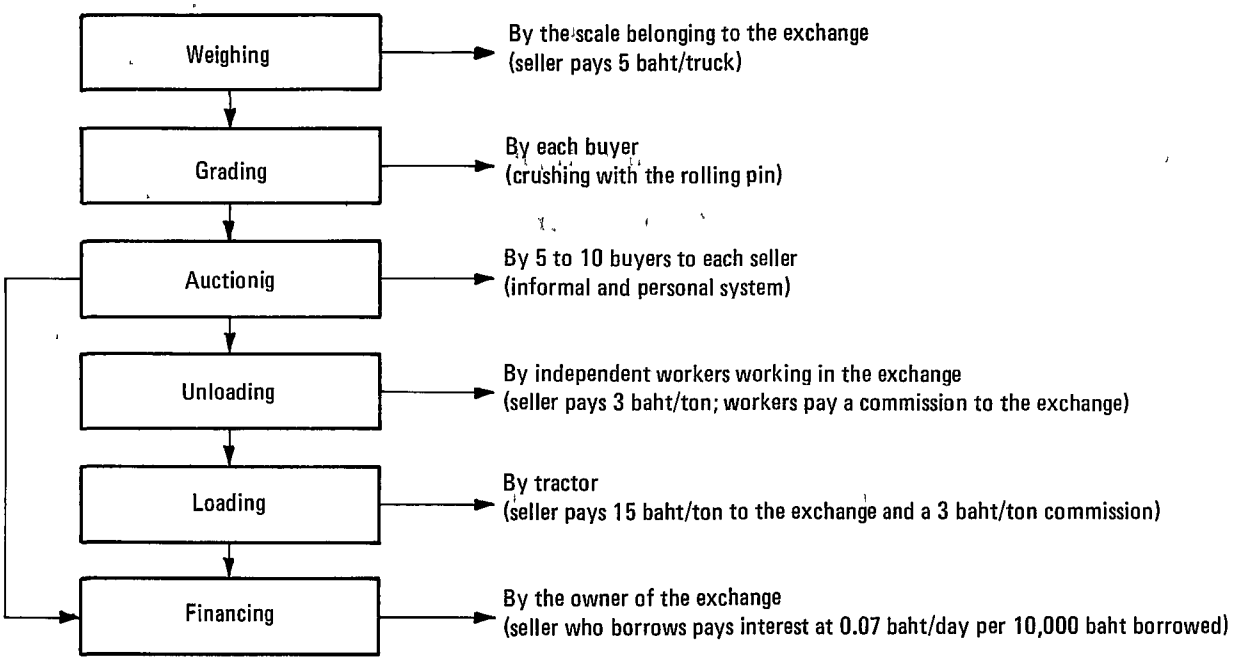
(iii) The central market is already established and well known to all traders. It is run by a private operator who has never interfered in buying or selling.

(b) Operation of the central market

208. The central market consists of a number 94/ of rice stations or exchanges closely located to each other. The market is open 24 hours per day and the largest station is attended by approximately 100 buyers and 500 sellers. The sellers come from the north while the buyers, who are mostly millers, come from the central plain. During the peak paddy marketing season (December to April), about 5,000 tons per day pass through the central market. The annual movement of paddy is about 600,000 tons of which half is traded in the peak period.

The normal trading procedure is summarized in the following diagram.

94/ There have been as many as five stations (since 1976) in the central market but currently there are only three operating.



(c) Future prospects and recommendations

209. Although the paddy central market at Nakornsawan is running very well, some measures could be taken to help strengthen trading.

(i) There is no established system of price information in the exchange. Prices are available only to the trader who asks the exchange staff. A systematic price and market information service could help traders by providing unbiased information.

(ii) The communication system at the exchange badly needs improvement. There is only one telephone available to traders although the volume of trade is estimated to be 300 trucks per day or 11 million baht per day.

(iii) There are no storage facilities for speculators to use on a long-term basis. Paddy traded at the exchange has to be moved out within a few days. Storage facilities could facilitate and encourage speculators to do more business at this exchange. This implies that the market would be able to function more smoothly and prices would not be biased.

(iv) There is a general concern among the people involved in the market that Government officials (who may not understand the functions of the exchange) will intervene in the market. Inappropriate intervention may increase marketing costs and cause market inefficiency and distortions.

(d) Looking for a new exchange

210. The paddy central market at Payuhakere, Nakornsawan plays a significant role in the trading of paddy in the north and the central plain. There is no similar market in the north-east region where paddy is collected and transported to the central plain. The limitation of inland waterways to link the north-east and the central plain is a major problem. If one were to learn from the development of the Nakornsawan market, a paddy central market might also be established in the area of Korat province where two highways merge (to the east of the north-east, and to the north of the north-east). The distance from paddy farms to this point and from this point to the rice mills in the central plain is similar to the Payuhakere market. The need for a rice market should be investigated and a feasibility study undertaken. Location, ownership, and method of operation are the most important questions that have to be raised. A new paddy central market will not be useful, operational and efficient if it is established by officials. Such a market can only be created if buyers and sellers see mutual benefit in trading there.

(e) Classification of markets

211. The paddy central market is a special market which has developed because of transportation difficulties. Generally, the market for rice and paddy may be classified into three categories.

(i) Rural market. This type of market has no established purchasing or selling point but is in a rural area where paddy or rice is traded at villagers' houses or on the road. The traders collect small amounts of paddy from farmers and sell it to medium- and large-size rice mills. Small rice mills may be included in this classification.

(ii) Regional assembly market in amphurs or provinces. These markets usually have fixed marketing locations. They serve as collection points for paddy brought by the traders in rural markets. The paddy may be milled or sold directly to other provinces. The medium-size rice mill which buys rice directly from farmers or sometimes from local traders sells most of its rice in provincial cities. The big rice mills buy paddy from the local rice trader and sell rice to Bangkok. The paddy central market falls within this category.

(iii) Bangkok terminal market. This market caters to a large number of final consumers. It also functions as a rice centre where rice is collected from the surplus area in the north and north-east and is distributed to the deficit area in the south or is exported.

D. Formation and structure of the rice price

212. The price of rice in Thailand is not composed of a single price quotation but is made up of a myriad of prices, differing according to location, season and grade. Prices do not move independently. They move jointly following quotations from a central market.

1. Rice price: locational structure

213. Since Bangkok is the largest deficit province and the centre of trade and transport, many rice traders buy rice in the north, north-east and central plain and resell it in Bangkok. The southern region of Thailand is a rice deficit area and normally gets its supply from Bangkok. Thus rice prices in all provinces in the south are higher than Bangkok prices. Price changes in Bangkok affect local rice prices throughout Thailand.

214. Although Thailand is one of the major rice exporters with a 20 to 30 per cent share of the world rice trade, the amount of Thai export is only a very small proportion of world production and consumption. Thailand, therefore, cannot determine, but may have a small influence on the world price of rice. The extent of its influence can be roughly measured by the price elasticity of world demand for Thai rice. The elasticities of demand reported in three studies suggest that the price elasticity of demand for Thai rice is very elastic. This implies that the Thai export price in general cannot deviate from the world price. Rice is not a homogeneous product, however, and it is possible that some degree of monopolistic power in the world market could be maintained for some special varieties of Thai rice.

215. The Thai Government plays a very important role in influencing the Bangkok wholesale price of rice. There are three major export taxes, namely the rice premium, the rice reserve requirement and export duty, which serve as policy instruments (see details in section E). The main objective of the export taxes is to separate the world price and the domestic (Bangkok) price in order to keep the domestic rice price at an acceptable level to consumers.

(a) Rice price information system

216. There are about 40 rice brokers with offices in Bangkok, who keep track of export prices and solicit bids from exporters 95/ and the many wholesalers who buy for resale to other localities. Brokers relay price and other marketing information daily to local merchants upcountry. By acting as intermediaries, the brokers earn a commission on sales. Brokers may deal in two or three crops although rice brokers generally specialize only in rice and are distinct from upland crop brokers.

217. Brokers also provide information to the rice miller. At the warehouse, brokers weigh and measure shipments and act as agents for millers. From the payment due their clients, brokers deduct unloading charges and advance the balance. Then they collect from the exporter or wholesaler who has bought the lot. Brokers charge between 0.5 per cent and 1 per cent for their services to the millers depending on the customer and the miller's location. Most local, upcountry millers keep in touch with two or three brokers as a cross-check on price, even though prices do not seem to vary much from broker to broker.

218. Because brokers check prices with exporters and wholesale merchants in Bangkok, the market system is sometimes mistakenly taken as a monopoly directed by exporters or wholesalers. They neither set, nor do brokers accept, prices in a vacuum. When exporters or wholesalers quote too low a price, merchants upcountry

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95/ While there are roughly 200 registered rice export companies, there are only about 20 people who are actively involved in the rice trade. The registration number is high because most exporters have several companies registered in their name.

delay shipment, awaiting a better offer. Exporters or wholesalers who quote too low a price will be unable to purchase enough of a commodity to cover the necessary volume to do business economically.

(b) Price structure and price policy

219. An analysis of the survey taken of the internal market structure and price formation indicated that price information seems to be transmitted very well through the market, originating in Bangkok and passing through the system down to the farm level. The marginal price effect and the elasticity term were estimated in order to determine the effect of Bangkok price changes on farm prices. Millers (i.e. the middlemen) calculate the price at which they will buy paddy from the wholesale rice price at Bangkok. This price information is sent by commission agents. Prior knowledge of the milling ratio and all of the marketing costs which they will incur (i.e. transportation, milling, commissions and gunny-bag) are included in their calculation.

220. The rural wholesale paddy price tends to be equal to the wholesale price of rice in Bangkok minus the relatively constant cost package of the middlemen (i.e. millers). The farm price also tends to be equal to the rural wholesale paddy price minus transportation cost (from farm to mill) and the middlemen's margin.

221. The marginal price effect and the elasticity term were estimated in order to determine the effect of Bangkok price changes on farm prices. Middlemen seem to charge only in terms of absolute margin thus marginal changes in the Bangkok price are transferred in their full amount to the farm price. A change of 1 per cent in the Bangkok wholesale rice price will cause the farm price to change somewhat more than 1 per cent. Any tax burden which cannot be shifted to the foreign customer will be fully passed to the farmer. 96/

222. When the rice price is formed in Bangkok and disseminated throughout the country, the rice price in the provinces within the surplus region will be lower than the Bangkok price by as much as transportation costs. This means that the farmer who lives near Bangkok will get a higher price than the one who is further away.

223. In 1975, the Government tried to introduce a guaranteed price in every locality but the plan was not realized after a change of Government. The idea met with opposition when the proposal was reintroduced in 1981. The idea of guaranteeing every locality the same rice price runs counter to the normal structure of prices. The best way to stimulate the farm price is to intervene in the Bangkok rice price and allow the price increase to spread naturally to outlying areas.

224. If the scheme to have the same local rice price for the whole country were accepted, differentiated subsidies would have to be paid to private merchants to equalize transportation costs. This arrangement would be difficult to administer, entailing calculation of subsidies, verification and follow-up. An alternative is for the Government to accept the costs of marketing and buy commodities itself. This method would make sense only if the private sector were operating inefficiently

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96/ Since the world price elasticity of demand for Thai rice is not perfectly inelastic, the whole tax burden cannot be shifted to foreign buyers. See section E for a detailed discussion.

and local middlemen were getting an unfair profit. To render the same service as the middlemen, but on lower margins, the Government would need a large budget and enough staff to displace the traders throughout the country.

2. Rice price relationships by grade

225. There are two methods to classify rice: classification by consumption preference and classification by commercial characteristics or milling quality. Glutinous versus non-glutinous and long grain versus short grain are the primary consumer distinctions.

(a) Glutinous rice price

226. In order to understand the formation of the glutinous rice price, it is very important to understand the characteristics of the glutinous rice market, production and consumption. Exports account for only 2 per cent of total output, with: Hong Kong, Indonesia, Japan, Republic of Korea, People's Democratic republic of Lao, Malaysia and Singapore, as the major glutinous rice export markets.

227. Because the glutinous rice market is smaller than and somewhat separate from the market for non-glutinous rice, any change in its production (whether due to the weather or a shift in the farmers' planting pattern) tends to have greater effect on prices in its own narrow market. There is evidence that price fluctuations are more serious for glutinous than for non-glutinous rice. The level of the glutinous rice price is, on average, lower than that of non-glutinous rice. This is due to the fact that farmers in the north and north-east usually plant just enough glutinous rice for their own annual consumption plus a little more as a buffer stock against a poor harvest. Without this precaution, they would have to trade their surplus non-glutinous rice for glutinous rice which is a loss in terms of transportation costs. As a result, the glutinous rice market seems to be in excess supply most of the time and the price of glutinous rice seems to be lower than the price of non-glutinous rice.

228. Both glutinous and non-glutinous rice are graded by milling quality and composition of head rice and broken rice. The quality called "100% rice" means rice with 100 per cent head rice while "5% rice" means rice composed of 95 per cent head rice and 5 per cent broken rice. In general, with the exception of 100 per cent rice, the percentage means the composition of broken rice mixed with head rice. Paddy is classified into four basic grades:

(i) Special grade which yields 100 per cent white rice;

(ii) First grade which yields 5 per cent broken white rice;

(iii) Second grade which yields 10 per cent broken white rice;

(iv) Third grade which yields 20 per cent broken white rice or less.

229. Paddy is graded by the buyer at the farmer's threshing floor according to the buyer's assessment of its moisture content and the estimated milled yield. Many grades of rice are bought and sold in the market at every level. Despite the complexity of the trade, all parties are familiar with the entire system of grading.

230. One cannot raise the question of rice quality and its improvement without considering the factors which determine rice quality. These include: variety of paddy, moisture content, quality of rice mill, and the price incentive for farmers to grow good variety paddy, and for millers to improve milling quality.

231. Before the millers buy paddy from traders or farmers, they take a sample of paddy and mill it by hand. After the husk is separated, head rice and broken rice will be separated again. The quality of the paddy is measured by looking at the proportion of head rice and broken rice. More head rice implies fewer broken kernels and means good quality. The shape and colour of the kernel are also considered as well as the moisture content. A high moisture content means poor milling quality because the kernel will be easily broken by the milling process. The higher the moisture content, the more weight for the same volume. Thus, mills which buy paddy on weight have to be careful. There is no scientific measurement of the moisture content and other characteristics. Millers judge the paddy by their experience.

232. Price incentive is obviously a very important economic factor. The paddy price in Thailand has been distorted by Government export tax policies as, for example, during the crop year 1981/1982. Government officials have claimed that Thailand has a strong foreign demand and a good market for good quality rice but not for lower qualities. Thus, good quality rice should be taxed more than lower quality rice.

233. While there is a clear indication that foreign customers prefer the good grade, the official argument may be correct only if Thailand were a price maker and could pass on the export tax burden to foreign buyers. All the estimates of price elasticity of foreign demand for Thai rice, however, do not confirm this argument.97/ Most of the export tax burden is actually passed on to farmers through the domestic market system.98/ Since the export tax on the good grade is higher than on the lower grade, the margin between grades is smaller than what it should be. This is not an incentive for millers to improve milling practices and does not provide an incentive to farmers to: improve their cultivation system, select good seed varieties, and dry paddy properly. Distortions of the rice price among the various grades will make Thailand produce rice which may not suit market demand in the longer run.

3. Seasonal price variations

234. Rice harvesting is concentrated during a few months of the year while demand is spread evenly throughout the year. An opportunity, therefore, exists to stockpile paddy at harvesting time at low prices and to sell when there is a shortage

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97/ A. Siamwalla, C. Pinthong et al., Pricing and Marketing Policies of Agricultural Products: A Main Report. National Economic and Social Development Board, April 1981.

98/ A previous study has shown that the domestic market is competitive enough to pass back almost all burden to the farmer. See C. Pingthong, A Price Analysis of the Thai Rice Marketing System. Ph.D. dissertation, Stanford University (United States), 1977.

of supply at higher prices. Before 1981, most storage was done by private traders and rice farmers. Government involvement was minimal.99/ Monthly prices related to the storage cost.100/

235. As mentioned earlier, there are three groups of market participants: farmers, traders (including millers) and Government. If any group is encouraged to store more, the other two groups will store less. Many Government officials advise farmers to keep stocks or to try to use a Government organization to store rice in order to speculate on price fluctuations.

236. Whenever paddy is produced there will be storage available somewhere within the three groups. The effect on the paddy price and on the economy as a whole will be the same if these three groups have equal access to market information and equal capability to manage and to run a storage facility. It would be ill-advised to help farmers to acquire granaries to speculate and compete with merchants who have much better access to market information unless and until they have similar advantages.

237. It would be very difficult for a Government agency to run a stockpile more efficiently than the many small private traders. This is because the Government would have to manage the stockpile on a large scale and it is very hard to run on this basis. Poor management, lack of market information and less incentive on the part of a federal agency could make the poor farmer even poorer since the increase in marketing costs would be passed back to him.

E. Analysis of the marketing margin

238. The marketing margin will be examined according to the structure of the market 101/ at three levels:

(i) Farm to rice mills (paddy trader's margin);

(ii) Rice mills to Bangkok wholesaler (miller's margin);

(iii) Bangkok wholesaler to exporter (exporter's margin).

1. Paddy trader's margin

239. The trader's margin depends on the market power which he has over farmers in the area. 102/ Although Thai rice farmers are very familiar with the techniques

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99/ In 1981, the Government introduced a policy to build up a rice stockpile controlled by the Public Warehouse Organization (PWO) whose operation will be discussed briefly in the following section.

100/ Storage costs consists of: rent, weight loss (loss in moisture content), loss from insects, insurance, and interest cost (opportunity cost).

101/ See section B.

102/ A. Siamwalla, "Farmers and Middlemen" in Love Thailand in Honor of Puey Ungphakorn, edited by N. Adrasenee and R. Thanapornpun, (Bangkok: Social Science Association), Thailand (Thai), 1976.

of growing rice, methods of grading and the system in general, some still must rely on one trader. This is due to: a limited transportation system, and lack of alternative financial sources and marketing networks. In some areas in the north-east, the paddy trader is one of the villagers who has strong local political power and in effect is a patron to the other farmers. The farmers have no choice in selecting or transferring their trade to other traders. Paddy trading in the central plain, is in general more competitive than in the north and the north-east. 103/

240. Farmers (clients) can borrow money from the trader (patron) at the beginning of the transplanting season and pay back in paddy when the paddy is harvested. The rate of "interest" is usually 80 kg. of paddy for every 100 baht borrowed over four to six months. This rate varies from one village to another according to the degree of competitiveness. In general, one may conclude that paddy traders in remote areas where there is poor transportation and not much competition can get a very high margin.

2. Miller's margin

241. This section considers the margin earned by the miller who buys paddy from paddy traders, mills it to rice and sells the milled rice to Bangkok or to local wholesalers.104/ The miller's margin has been estimated using an econometric model.105/ The results show that the marketing margin charged by the miller is constant. When the marketing costs (i.e. transportation, commissions, milling, bagging) are deducted from the average margin, the results show that the market in general is quite competitive. Only in the north-east, where the margin fluctuates seasonally, is the profit margin high. This is because the number of large rice mills in the north-east relative to the quantity of rice produced in the area is small.106/ Insufficient regional milling capacity, distance from the central plain and transportation bottlenecks, enable mills to buy at lower than normal prices at harvesting time when a large supply of paddy comes off the farmers' land. The miller gets a normal margin during the rest of the season.

3. Export margin

242. Table 16 calculates the total margin which is the difference between the Bangkok f.o.b. paddy price and the farm paddy price for 5 per cent rice.107/ The last column shows export taxes per ton of paddy. The taxes are composed of the three major rice export taxes namely: the rice premium, the rice reserve requirement, and export duty (5 per cent of the value). The tax burden is the summation of each export tax which is imposed on any product from milling one ton of paddy.

103/ Based on material from the survey carried out under this study.

104/ The small-size mill has already been discussed in section B.

105/ C. Pingthong, op. cit., 1977.

106/ In section B, it has been pointed out that big rice mills are concentrated in the heart of the central plain because millers can find paddy year-round and can thus minimize their average fixed costs.

107/ The f.o.b. paddy price is the value of paddy at the export f.o.b. level. It is calculated from the value of the products of milling one ton of paddy and selling it at the f.o.b. rice price. The farm paddy price is the average Nakonratchasima price paid to farmers.

243. It can be seen that the margin has a very high correlation with the export tax expressed per ton of paddy. This implies that whenever the f.o.b. price of rice goes up, the rice export tax is raised to a level at which all the price increase can be absorbed. The Government's aim is to stabilize the domestic rice price at a level which the rice consumer finds acceptable.

Table 16

Calculated total domestic marketing margin and calculated total export tax

(Expressed per ton of paddy, 5 per cent grade, at Nakhonratchasima)

Crop year	F.O.B. paddy price a/ (i)	Farm paddy price (ii)	Total domestic marketing margin (i) - (ii)	Total export tax expressed per ton of paddy
1974/75	4 601.02	2 281.00	2 320.02	2 068.76
1975/76	3 087.56	1 992.90	1 094.66	645.80
1976/77	3 096.20	2 126.35	969.85	602.63
1977/78	4 235.13	2 353.86	1 881.27	1 288.25
1978/79	3 656.11	2 468.00	1 188.11	953.68
1979/80	4 754.40	3 233.33	1 521.07	1 180.16
1980/81 b/	5 606.80	..	..	1 475.85

Sources: Thailand Ministry of Agriculture and Co-operatives: Thailand Ministry of Commerce.

a/ Total value of products (e.g. head rice and broken rice of one ton of paddy) valued at Bangkok f.o.b.

b/ From November 1980 to April 1981.

(a) The export premium is a tax with almost 30 years of history and discussion on its abolition.108/ This specific tax effected in 1955 has been changed often. Before 1975, the revenue from the rice premium went to the Ministry of Finance for inclusion in the central budget, but since 1975, all revenue from the rice export premium has gone to the Farmer's Aid Fund under the Farmers' Aid Fund Act of 1974.109/ In 1979, the revenue collected from the export premium was 1.73 per cent of total Government tax revenue.

108/ A. Siamwalla, "A History of Thai Rice Price Policy Since the Second World War" in Finance Trade and Economic Development in Thailand. Edited by P. Sondysuvan, (Bangkok: Khunying Suparb Yossundara Foundation, Thailand) 1975.

109/ The Farmers' Aid Fund is controlled by the Ministry of Agriculture and Co-operatives and is independent of Parliamentary control. The Fund is spent mainly on agricultural development projects but not always related to rice farmers. The Fund is also an emergency fund for the Ministry to lessen pressure on the Government e.g. for a support price programme in some areas.

(b) The export tax is a 5 per cent ad valorem tax collected on the export price. The export price used in the calculation is normally announced by the Department at the beginning of each month. In 1979, revenue collected from the export duty was 0.86 per cent of Government tax revenue.

(c) The rice reserve requirement which was established in 1962 assumed its major role after the rice price crisis in 1973 but was suspended in 1981. After mid-1973, there were two retail prices of rice in Bangkok, the free market price and the "Government" rice price. The first one was the price at which general retailers sold rice in the market.110/ This price was highly correlated to the Bangkok wholesale price. In addition, Bangkok consumers were able to buy low-priced "Government" rice (normally 5 per cent white rice) from authorized retailers, Government agencies and other outlets at subsidized prices about 15 per cent below the corresponding free market retail prices. This low-priced rice was obtained by the Government through the rice reserve requirement. In general, the exporters had to surrender to the Government a fixed proportion of the rice they exported (e.g. 1:1) of a specific grade (usually 5 per cent or 10 per cent white rice but mostly 5 per cent). The Government paid a "reserve-rice-price" which was lower than the Bangkok wholesale price for the same grade, and presumably below the price that exporters had to pay for the rice. Therefore, the exporters were forced to incur a "loss on rice reserve".

244. The Ministry of Commerce adjusts these tax measures, according to the world market situation in order to protect domestic rice consumers. When the world price of rice is high, the Ministry of Commerce still raises taxes to absorb the differential, and when the world price is low taxes are reduced. However, the total burden of these taxes is never negative which means that the Government has never subsidized rice farmers. Government policy, therefore, is to stabilize the domestic rice price at a very low level.

F. Evaluation of Government policy and recommendations

1. Export intervention measures (export level)

(a) Tax measures

245. The marketing margin at the export market level is high because of the various Government export taxes. Three kinds of measures are used to intervene in rice export by the Ministry of Commerce: premium, export duty and the rice reserve requirement. The total export tax on paddy in 1980 was 1,228.62 baht per ton (see appendix 3).

246. Government officials have sometimes argued that the price elasticity of demand for Thai rice is very low, that export taxes cause the export price to be higher than it would otherwise be. The burden of the tax is therefore passed on to the foreign consumer. Most economists 111/ agree that the rice export taxes

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110/ Generally, rice in Thailand is sold in specialist shops dealing in rice alone. There are many rice shops scattered throughout the city. It is easy for consumers to find whatever quality they want. Rice is sold in three unit sacks of 100 kg., "tangs" of 20 litres (approximately 15 kg) and litres.

111/ J.C. Ingram, Economic Change in Thailand (Stanford University Press, 1971).

have little, if any, effect on the world price of rice. They argue that even though Thailand is one of the major rice exporters, its exports represent only a tiny fraction of the total world price as determined by demand and supply conditions at any given time.

(b) Government to Government rice trade (G-G trade)

247. About one-half of Thai rice export is conducted by the Government. The Foreign Trade Department (FTD) of the Ministry of Commerce negotiates with foreign customers. When the shipment is due, the FTD announces the type and volume of rice needed and asks exporters to specify the amount each wants to sell through the Government at a price calculated from two sources of local wholesale prices collected by the Internal Trade Department and the Board of Trade. Generally, the exporters propose to sell more than the FTD wants for two reasons: first, the price which the FTD sets may sometimes be higher than the market price; and second, exporters' supplies to the Government count as part of their export performance which may be used for future export quota allocations. 112/

248. The difference between the price at which the FTD buys from exporters and the sales price to foreign customers amounts to the Government's high taxes. This difference allows the Ministry of Commerce to benefit for three reasons:

(i) The FTD can make selective price reductions to foreign customers, which is equivalent to giving a selective discount on the taxes of any specific shipment to foreign consumers;

(ii) The FTD risks no price change or loss on sales since export taxes provide a wide margin between the Bangkok and the world price. This enables FTD officials to buy rice domestically whatever may be the price sold to foreign customers;

(iii) Because the Ministry of Commerce has such a strong position within the export trade, it can indirectly have authority over and maintain close ties with exporters.

(c) Export licensing and quota policies

249. From time to time, the FTD has limited the number of exporters and required every private potential exporter of rice to seek prior permission to export. Any exporter who negotiates a sales agreement with a foreign customer has to share the volume of export with other exporters (90 per cent of the export order has to be shared with other exporters). In addition, the exporter needs a permit for each shipment sold at a price higher than the minimum price which is set by the Ministry of Commerce. This price-setting process resembles a Ministry of Commerce-backed cartel, but exporters know how to give under-the-table discounts to their customers. 113/

112/ Although the rice export trade is not controlled, exporters always fear a change in Government policy. Export performance is a kind of precaution in anticipation of policy changes.

113/ A. Siamwella, C. Pinthong, op. cit., p. 83.

250. The Ministry of Commerce also uses quotas to limit exports especially in years when there is a world shortage. The main purpose is to assure sufficient rice for domestic consumption. In 1974, the value of this quota licence was 2,000 to 3,000 baht per ton. The effect of quotas on the price of rice is again a lower paddy price for poor rice farmers.

251. In principle, one would like to recommend total abolition of all export barriers as a first best policy. There is no reason to depress the price of rice which the poorer section of the population produces while the richer gets the benefit. Poor rice consumers (i.e. upland crop farmers or city labourers) need to be supported by other methods such as direct subsidy. Indirect subsidy by depressing the price of rice is in effect a transfer of income from poor rice farmers to the other poor sectors.

(d) Pricing

252. Since rice is a political commodity, the Government is very much concerned with its pricing policy. The social and political structure in Thailand shows an unbalanced power distribution between consumers and producers of agricultural products. The policies recommended to abolish export barriers have, therefore, never been seriously implemented. Taking the political constraint into consideration, the following policy recommendations may have to be moderated:

253. The Government should have a clearly stated price policy for each marketing year. A target price should be announced in the middle of the calendar year for the main crop that will enter the market at the end of the year. One proposed method of calculating the target price has as its main objective the gradual narrowing of the income differential between farmers and urban workers. The target price to be announced would be the target price that is related to the rice price in the Bangkok wholesale market. The market mechanism should be allowed to relay the price back to each region. The announcement of a target price should imply a broad commitment by the Government to keep the actual price in the Bangkok market within a range of 10 per cent above or below the target price.

254. To keep this target price commitment, an export tax or an export subsidy should be the Government's sole instrument. The present export duty and export premium should be merged into a single export tax which may at times become a subsidy. Such a tax/subsidy scheme should be used solely to keep market prices within the target price range.

255. The volume of rice to be exported should no longer be controlled by the Ministry of Commerce. Thus, the system of export licensing would end.

(e) Welfare

256. The Government should replace the cheap rice distribution programme run by the Internal Trade Department and the Public Warehouse Organization (PWO) with a programme directed towards those households most vulnerable to malnutrition. Before launching such a programme, however, a study must be made on the nature and incidence of malnutrition and on the appropriateness of providing rice as a solution to the problem. Both the study and the administration of the programme should be placed in the hands of the Public Welfare Department of the Ministry of Public Health and should be financed from the central budget. The Ministry of Commerce should cease to have any role in this area.

(f) Uncertainty

257. Government export policies have often been changed. This has created uncertainty for traders and speculators and has increased their marketing costs. To lessen uncertainty about the tax rate, bonded warehouses should be opened and operated by the PWO. Any exporter should be able to place rice in storage at these warehouses on signing a contract backed by a bank guarantee committing him to the export tax rate at the time of storage. When the rice is moved out of storage for export, the tax would be paid.

(g) Price differentials

258. The price differences among grades should not be distorted. Large price margins between grades will encourage farmers, in the long run, to produce more good grade paddy. Similarly, rice mills will be encouraged to improve their milling techniques. Thai rice production should be adjusted to meet world demand which is stronger for higher qualities.

(h) Government-to-Government sales

259. Government-to-Government sales of rice should continue. The agency responsible should, however, be made to pay the full export tax (or should receive the subsidy). This would enable the Government to obtain a clear picture of the profitability of this trade. This recommendation implies that G-to-G sales should be conducted by an agency that has more operational flexibility than the Department of Foreign Trade, currently in charge of G-to-G sales. An Agricultural Trading Corporation should assume this role.

260. The system of procurement for G-to-G exports should be reformed. A trading floor should be opened up, and accredited rice traders (who need not be exporters) should be allowed to bid and to sell rice, in relatively small lots, to the agency in charge of exports. This activity could serve as a nucleus for a future rice exchange.

2. Domestic market intervention

261. No price guarantee or price support in the real economic sense has ever been implemented. Only a procurement programme has been in operation. Two types of procurement programmes have been tried, i.e., a paddy procurement programme at farms and a rice procurement programme at mills.

(a) Paddy procurement programme

262. The Market Organization for Farmers (MOF) is responsible for buying paddy from farmers at the Government's target price. In 1982/83, the MOF was instructed to buy 0.53 million tons of paddy (about 2.9 per cent of paddy production) from farmers and agricultural co-operatives. The target price, for example, for 5 per cent white rice was 3,300 baht per ton which was about 450 baht higher than the market price in the central region. Besides a working capital of 1,700 million baht for the purchase of rice, the Government also gave the MOF additional expenses (about 500 baht per ton) for milling, storage, and transportation of the rice to exporters in Bangkok. The rice was exported on a Government-to-Government basis.

263. Since the MOF's purchasing price was substantially above the market price and since purchasing was carried out at selected rice mills, 70 per cent of the paddy bought was the paddy that the rice millers had bought from the farmers at the market price. Only 30 per cent of the paddy was bought directly from the farmers and they received 200 baht less than the target price. The difference went to the rice mills and Government officers. Therefore, the benefits of the programme did not go to the farmers alone. In fact, out of the total 236.25 million baht spent, 28.4 per cent went to rice exporters, 12.9 per cent went to policy makers and politicians, 13.9 per cent went to the Government officers who were responsible for the project, 18.4 per cent went to rice mills, 6.3 per cent went to farmer leaders and only 20.1 per cent went to farmers.

264. Other criticisms of the scheme were:

(i) The MOF ran the scheme from 1980 to 1982 with too few officers and was too ambitious;

(ii) Since the MOF did not have its own facilities to store, mill and transport rice, it had to use private facilities and was often cheated;

(iii) MOF officers lacked experience in buying, grading and management;

(iv) The programme itself could have benefited local people but there was political pressure on the MOF to buy paddy in non-target areas causing distortions to the aim of the programme.

(b) Rice procurement programme

265. In 1980/1981, the Government started a new scheme of buying rice from millers at a high price hoping that millers also would buy paddy at a high price. The Public Warehouse Organization 114/ was given directions to run the programme. The PWO purchased 1.1 million tons of rice (about 10.7 per cent of rice production) from rice mills and co-operatives by using a price bidding method. The Government claimed that it was very successful in the first year (1980/1981) but an evaluation of this scheme gives the opposite conclusion. From 1980 to 1982, the PWO's loss from the scheme was more than 3,600 million baht. The paddy price increased in 1980/1981 because the world price increased to a very high level while the Ministry of Commerce maintained the level of export taxes. 115/

266. The PWO scheme created two rice price systems: the market price at which millers traded rice through the normal private route and the PWO buying price. There was no need for millers to buy paddy at a high price. Since the PWO did not buy all the local supply of rice, the private trade was relatively unaffected. As a result, millers enjoyed a better margin on the PWO rice. The scheme created collusion among the millers. The auction method which the Government employed provided an incentive for millers to join hands in price bidding. All millers understood that the Government's hidden objective was to buy rice at a high price.

114/ Rice purchased by the PWO is sold to poor consumers at a subsidized price. The cheap rice programme was first initiated in 1962. Before 1980/81, the Government bought rice from rice exporters at below-market price (rice reserve programme). It was found that the total cost of the programme in 1980 was 18,044 million baht. Net loss to society was 86.75 million baht.

115/ Employing statistical data to separate the effect of the world price and the rice procurement programme proved that without the procurement programme, the paddy price would have been increasing in 1980/1981 at any rate.

267. There was no suitable storage facility for the PWO. Loss in storage in rice form is generally much higher than in paddy, if there is no proper storage. Normally, traders store paddy. To direct the PWO to store rice implies a higher marketing cost. In addition, since the rice had to be kept in local provinces before being transported again to Bangkok, the loading and unloading cost was at least doubled.

268. There was political pressure to force the PWO to buy specific grades of rice in some provinces. In fact, millers tried to get the PWO to buy rice in their provinces at the grade which was already in their warehouses.

269. The same scheme was again used in 1981/1982, when the world price was very low. It was not until the Ministry of Commerce reduced part of the loss on reserve requirements that the paddy price started to improve. This confirms the argument against a tax burden. In both instances, the scheme seemed unsuccessful in raising the price which the farmers received. Even if the scheme had been very successful, the margin which can be squeezed from this level of the market would not be big enough to improve the general price and situation of the farmers. Once again the margin at the export level should be the target and the best way to achieve success is to reduce export taxes.

(c) Policy recommendations

270. From the arguments in the last section and the recommendations presented in the previous chapters, recommendations on Government policies in the domestic market, at both wholesale and farm levels, can be briefly stated as follows.

271. The Government should end the present system of rice procurement which buys rice from millers and reduce considerably the scope of existing procurement programmes. It should choose target areas for a procurement programme, using criteria that relate directly to failures in the marketing system, in particular the absence of sufficient competition among traders.

272. An Agricultural Trading Corporation which has less than 50 per cent Government control and operates as a profit-making private organization could be set up. It would be more flexible than the MOF or the PWO and political pressure to buy paddy in non-target areas would be avoided. The corporation would help increase the degree of competition in the target area. In buying at a price slightly higher than the local market price, the corporation would not only stimulate the market but could make some profit.

273. The Government can improve the "central market" as follows:

(i) Improve the existing paddy central market at Nakornsawan in three areas: telecommunications, price information, and storage facilities; (see details in section B);

(ii) Encourage development of a paddy central market in the north-east. Nakornratchasima province looks very promising but further study is still needed (see details in section B);

(iii) Encourage development of a rice trading floor in the Bangkok suburban area. This would help improve the efficiency of the Government procurement programme.

274. The Government should establish a "Centre for Market Information" with the following functions:

(i) To collect market information within and outside the country, i.e. rice production and policies in both competing and client countries;

(ii) To disseminate information on prices and market conditions to farmers and traders in the country. The price information should specify three dimensions: place, grade and time. An understanding of the price structure (section C) will enable the centre to give price information which is specific to every city. This will make price information more accessible and informative from the farmers' point of view.

275. The Government should encourage the establishment of firms to provide weighing and grading services to farmers.

276. Currently, agricultural extension work is purely technical. There is a need to have marketing extension which provides official services to farmers covering: market channels, market structure, trade procedure, and traders' tactics. The objective would be to educate farmers so that they would not be cheated and could help themselves in the longer run.

3. Special recommendations for glutinous rice

277. As indicated in section C, market conditions for glutinous rice are different. Policy recommendations will thus have to be partly different. Although the export market for glutinous rice is small, export procedures and policy should be identical to those for non-glutinous rice. Since the glutinous rice market is narrow and more vulnerable, the Government should consider the following additional policies:

278. The Government should initiate a buffer-stock programme specifically for glutinous rice to stabilize its price. The target price for glutinous and for non-glutinous rice would be announced simultaneously. Since glutinous rice tends to be in over-production, the glutinous rice price should be set at 95 per cent of the non-glutinous rice price target. Should the price fall 10 per cent below that target price, the PWO would buy an unlimited amount at the floor price (target price minus 10 per cent). Should the market price rise 10 per cent above the target price, the PWO would sell all the rice at the market price.

279. For this activity, the PWO should receive financing at subsidized interest rates from the Bank of Thailand or from the Bank for Agriculture and Agricultural Co-operatives (BAAC).

Chapter III

Appendix 1

Contract farming in rice production

In 1979, a subsidiary firm of the Charoen Phokphan Co. Ltd., which is the major agro-industry firm, introduced contract farming in rice production in four provinces of the central region. The purpose of the project is to introduce appropriate methods of production to the farmers so that production yields can be increased by more than 100 per cent from the average yield of 400 kg of paddy per rai.

Under the contract, the company provides all the necessary inputs through its local agents as well as other production services such as ploughing and harvesting services on credit. These expenses are deducted from the farmers' revenue when their rice is sold. The company sends a team of agronomists to stay in the same village where the farmers live so that they can supervise and give advice to the farmers. The inputs and services provided are charged at market prices. The company charges 100 baht per rai as a management fee. When the rice is harvested and threshed, the company contacts the local grain dealers to buy paddy from its contract farmers. The decision to settle a deal with any merchant is made by the farmer himself. The company benefits from retailing its products which are: fertilizers, seeds, pesticides, etc. More importantly, the company gains a reputation for social consciousness. Although the area under contract had increased from 609 rais in 1979 to 12,000 rais in 1981, the project has not been as successful as broiler and pig contracts. The major difficulty encountered is that 40 to 50 per cent of the farmers sustained losses because: (i) water was inadequate, and (ii) since rice export was taxed heavily, the rice price was too low to cover all the expenses.

Appendix 2 table 1: Distribution of rice and paddy and mode of transportation from large mills in the central plain

Number of rice mills and provinces	Capacity tons/day	Buy paddy from (%)		SALE TO %				Mode of transportation to Bangkok (%)		
					Retailer					
		Trader	Farmer	Consumer	in the same area	in other areas	BKK	Truck	Boat	Train
Supanburi										
1	320	100	-	-	-	-	100	100	-	-
2	300	70	30	-	-	5	95	80	20	-
3	200	100	-	-	5	5	90	100	-	-
4	150	100	-	-	10	10	80	70	30	-
5	135	20	80	-	20	-	80	100	-	-
6	110	10	90	-	50	-	50	100	-	-
7	70	50	50	-	-	20	80	100	-	-
8	40	-	100	-	25	-	75	100	0	-
9	40	70	30	-	40	20	40	100	-	-
10	28	5	95	10	90	-	-	90	10	-
11	20	-	100	-	100	-	-	100	-	-
Ayuthaya										
12	70	90	10	-	-	10	90	-	100	-
Chonburi										
13	40	70	30	-	80	20	-	100	-	-
14	40	60	40	-	70	-	30	100	-	-
15	24	20	80	30	40	30	-	100	-	-

Appendix 2 table 2: Distribution of rice and paddy and mode of transportation from large mills in the north-eastern and northern regions

Number of rice mills and provinces	Capacity tons/day	Buy paddy from (%)		SAIE TO %				Mode of transportation to Bangkok (%)		
					Retailer					
		Trader	Farmer	Consumer	in the same area	in other areas	BKK	Truck	Boat	Train
Nakhom-rachasima										
1	120	90	10	-	60	-	40	100	-	-
2	100-120	90	10	-	-	-	100	100	-	-
3	60	80	20	-	40	-	60	100	-	-
4	30	20	80	-	80	-	20	100	-	-
5	30-40	100	-	-	-	-	-	100	-	-
Ubon-rachathani										
6	100-120	99	1	-	10	20	70	20	-	80
					10 Glutinous	60	30			
7	50	100	-	-	30	-	70	100	-	-
8	45	80	20	-	10	-	90	85	-	15
9	35	70	30	-	-	20	80	90	-	10
10	30	70	30	-	5	25	70	100	-	-
Chiang-mai										
11	130	100	-	-	70	10	20	90	-	10
12	65	5	-	-	50	-	50	100	-	-
13	40	95	5	-	-	-	100	100	-	-

Source: The survey.

Appendix 3: Calculation of the export tax expressed per ton of paddy
July 1980
(baht per ton)

Paddy products	Premium	Export duty	Loss on rice reserve	Total	Milling output	Tax
Rice, 5 per cent	900.00	405.00	1 091.60	2 396.60	0.45	1 078.47
Broken, A1 super	500.00	215.00	0.00	715.00	0.15	107.25
Broken, C1 super	500.00	215.00	0.00	715.00	0.06	42.90
Broken, C3	500.00	215.00	0.00	715.00		
Total						1 228.62

Source: - premium, Ministry of Commerce
- export duty, Ministry of Finance
- loss on rice reserve, see note
- milling output authors' survey

Note: According to the Ministry of Commerce regulations on the rice reserve requirement, a rice exporter has to sell one-half ton of rice exported. The regulations do not apply to broken rice. The ratio of rice to be reserved is four parts of non-glutinous rice, 15 per cent, to one part of glutinous rice, 10 per cent. The price of the mixture is set artificially low, 2,950 baht per ton market prices of 5,586 baht per ton for non-glutinous rice, 15 per cent, and 4,122 baht per ton for glutinous rice, 10 per cent, imply a loss of 1,091.60 baht per ton of exported rice.

Chapter IV

THE CASSAVA INDUSTRY

A. Introduction

280. Cassava, also known as manioc, tapioca and yucca, is a tropical root crop which originated in South America and was introduced to the Far East in the early nineteenth century. Over the years, the species grown in Thailand has evolved disease and drought-resistant characteristics. It has three main end uses: as a staple form of carbohydrate for human consumption; in the animal feed industry as a carbohydrate additive to compound feed; and as a source of starch in the food manufacturing and textile industries. Cassava is a staple food in most developing countries in which it is grown except Thailand where the national diet is based on rice. Almost all cassava produced in Thailand is therefore exported.

281. The value of cassava lies in its high starch content. It is an easily digestible, high-energy feed with an extremely low protein, vitamin and mineral content. It can grow in poor soils and tolerates drought well. It has, therefore, become a popular crop for farmers in north-east Thailand, the country's most impoverished region. Since the plant perishes rapidly after harvesting, further processing is always undertaken before the commodity is exported from the producing country.

282. There are four basic forms of processed cassava: starch, meal, dried chips, and pellets. During the 1950s, Thailand exported small quantities of chips and meal to Europe. In 1967, pelletizing was introduced and this proved to be the catalyst to extensive production and export. In volume terms, exports of cassava increased six fold between 1970 and 1981, at which time cassava became Thailand's second most valuable agricultural export commodity. In 1980-81, there were 1.05 million hectares planted which produced 17.9 million tons of cassava roots (table 17). Roughly 90 per cent of the production was exported, earning $US 700 million. It is estimated that a large proportion of the rural population is engaged in the production of and trade in cassava. Some approximations indicate that eight million persons, or one fifth of Thailand's population, are involved in the cassava industry. These probably include all persons deriving some portion (large or very small) of their income from cassava, e.g. those working on the crop on a short seasonal basis; truckers involved in moving the pellets to market; and others. Thailand and Indonesia are the only countries to have developed a pelletizing industry. Thailand is the world's fifth largest producer and the world's largest exporter. All exports are shipped to Western Europe. The major importers are the Netherlands, Federal Republic of Germany, Belgium and France. The Netherlands is a particularly large importer since its land surface area for producing feedgrains is very small. Most imports into the whole of Europe enter through Rotterdam as it is the only port at which large vessels can unload.

283. The major starch markets have been: Japan, the United States, and Taiwan Province, although exports to Japan and America have been declining due mainly to increased competition from domestically produced cornstarch.

284. Cassava was initially cultivated in the central region, east of Bangkok. As new land was used up, production spread north and north-east, especially to the provinces of Nakorn Rajsima and Chaiyaphoom. Roughly 60 per cent of cassava cultivation is now concentrated in the north-east.

Table 17

Area planted, yield and production of major crops, 1959-1980

	1959/60 a/	1969/70	1978/79P	1979/80P	1980/81P
Area planted ('000 ha)					
Paddy	6 065	7 584	10 046	9 435	9 140
Rubber	n.a.	1 244	n.a.	n.a.	n.a.
Maize	200	680	1 386	n.a.	1 716
Sorghum	-	35	n.a.	n.a.	n.a.
Kenaf	44	377	320	227	211
Cassava	62	191	1 323	1 042	1 050
Sugarcane	148	118	492	437	480
Tobacco (Virginia)	18	22	n.a.	n.a.	152
Coconut	134	297	n.a.	n.a.	n.a.
Cotton	48	93	67	n.a.	n.a.
Groundnuts	100	103	106	n.a.	120
Soy beans	22	48	156	n.a.	143
Mung beans	46	208	422	n.a.	n.a.
Castor beans	28	37	n.a.	n.a.	38
Sesame	21	26	n.a.	n.a.	31
Yield (kg/ha) b/					
Paddy	1 394	1 768	1 745	1 670	1 952
Rubber	n.a.	227	n.a.	n.a.	n.a.
Maize	1 585	2 500	2 186	n.a.	2 354
Sorghum	-	2 000	n.a.	n.a.	1 028
Kenaf	1 136	989	1 056	978	n.a.
Cassava	17 468	16 120	12 094	10 687	16 899
Sugarcane	33 703	43 237	41 057	29 350	43 489
Tobacco (Virginia)	444	909	n.a.	n.a.	572
Coconut	6 754	2 428	n.a.	n.a.	n.a.
Cotton	276	473	1 343	n.a.	1 154
Groundnuts	1 240	1 204	1 274	n.a.	1 249
Soy beans	1 000	1 000	968	n.a.	1 052
Mung beans	1 000	817	621	n.a.	n.a.
Castor beans	1 214	804	n.a.	n.a.	1 075
Sesame	810	731	n.a.	n.a.	731

Table 17 (continued)

	1959/60 a/	1969/70	1978/79P	1979/80P	1980/81P
Production ('000 m ton)					
Paddy	8 454	13 410	17 532	15 758	19 000
Rubber	n.a.	282	460	n.a.	510
Maize	317	1 700	3 030	n.a.	3 700
Sorghum	-	70	n.a.	n.a.	n.a.
Kenaf	50	373	338	222	200
Cassava	1 083	3 079	16 000	11 136	17 900
Sugarcane	4 988	5 102	20 200	12 826	18 600
Tobacco (Virginia)	n.a.	20	43	n.a.	1 800
Coconut c/	905	721	670	n.a.	900
Cotton	37	44	90	n.a.	153
Groundnuts	124	124	135	n.a.	112
Soy beans	23	48	151	n.a.	120
Mung beans	46	170	262	n.a.	175
Castor beans	34	37	45	n.a.	26
Sesame	17	19	25	n.a.	23

Sources: Agricultural Statistics of Thailand, 1972-1973.

Agricultural Statistics of Thailand, 1975-1976.

Agricultural Statistics of Thailand 1977-1978, and preliminary data from Office of Agricultural Economics for 1978-1979 and 1979-1980.

P = Preliminary

a/ Crop year beginning 1 July.

b/ On the basis of area planted.

c/ Production converted at 1.25 kg per nut.

285. Because cassava is soil exhausting and since few fertilizers are used, yields tend to drop with continuous cultivation. For this reason, new areas have been opened up. For the small landholder, cassava is an easy crop to grow requiring only family labour. Virtually no cash outlay is needed, since no insecticides, fertilizers or other chemicals are currently used. It tends to be a mono-crop and efforts to restrict acreage and to encourage intercropping have not been successful since income from cassava is higher than income from other crops. In many areas, cassava is not a crop of choice but one of no other choice. Its expansion into upland scrub and grazing land as well as illegally occupied forest land has caused much concern to the Government.

286. Recent official statistics on the average size of cassava planting are not available but estimates suggest that in 1975 in the three major producing provinces (Chonburi, Rayong, and Nakhonratchasima) the average planting was 4.29 hectares compared with 1.97 hectares in other provinces.

287. In animal feeds, cassava has increasingly been substituted in overseas markets for higher-priced cereal grains. It is normally mixed with protein-rich commodities such as soybeans to form a ration for pigs and, to a much lesser extent, for cattle and poultry.

288. Cassava products are bulky to transport, have low value added with processing and deteriorate three days after harvesting. Therefore, to reduce costs, processing plants are located near the supply of roots. Starch factories tend to be concentrated in the east while chip and pelleting factories are in the north-east.

289. In 1980, total starch demand was estimated at 391,000 tons for local consumption and export 116/ which is about half of Thailand's production capacity. With little prospect of increasing local consumption or exports, there will be continued considerable under-utilization in the Thai starch industry.

1. Technology transfer and development

290. All cassava produced in Thailand was originally used in the starch industry. Extraction was performed in small family mills which had a capacity of 2 to 3 tons of starch per day. In 1967, two European companies, which were financed and managed by European shippers, revolutionized the industry when they introduced a radically new form of processing technology that produced a cassava pellet for use in animal feed. Thai machinery manufacturers copied and adapted the original patented European equipment and enabled Thai entrepreneurs to set up their own factories for producing native pellets at a much lower cost than foreign producers.

2. Nature of the technology

291. The cassava root is normally harvested by hand when the plant is 10 to 12 months old, before the fibre content becomes too high. After harvest, the tubers are collected by truck and taken to a chipping factory. While most pelletizing factories have their own machines, they also purchase roots from

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116/ Dr. A. Rodger and Dr. C. Tingsabadh, "Action Plan for Cassava", Division of Economics, Ministry of Foreign Affairs, Thailand, 1980.

companies that specialize in the business. The roots are chipped and spread on concrete floors to dry in the sun. This is a labour intensive process involving either factory workers or hired farm labour. It takes two to four days for the chips to dry. Then they are put into 70 to 80 kilogramme burlap sacks (if the chipping is not done at a pelletizing factory) and moved by truck to a pelletizing mill. In Thailand, two types of pellets are made: brand pellets and native pellets. Brand pellets have been mainly manufactured by European companies. They have: higher quality, lower moisture content, lower content of foreign matter and greater hardness than native pellets. These characteristics are achieved through better quality control and through differences in the processing procedure. An extra step in preconditioning chips before they are pressed into pellets and a modified step, the use of greater heat and pressure in the formation of the pellet, are employed in the manufacture of brand pellets. In the production of native pellets, the chips are moved via conveyor belt from a hopper to a presser. Heated pellets are formed and are moved to a cooler where the finished pellets emerge. These pellets are soft and tend to disintegrate during shipment. Up to 1981, roughly 80 to 90 per cent of all pellets shipped from Thailand were native pellets.

3. Technology adaptation

292. In 1978, two important considerations spurred Thai machinery innovators to adapting native pellet processing equipment so that it better suited market needs. First, the environmental laws in several EEC countries, principally the Netherlands, were causing difficulties for exporters of soft pellets. Since the pellets crumble easily, meal dust pollution was encountered in Rotterdam and in localities where feed compound manufacturers were established. As the severity of the pollution increased with the growth of cassava imports, regulations were enacted restricting the import of soft pellets. Secondly, when the world market for cassava was perceived to be moving into surplus, the Thai Government introduced a law prohibiting the opening of new pellet mills or the expansion of existing ones. This measure severely reduced the sales of Thai machinery manufacturing companies. They had to concentrate solely on the replacement of old equipment. As a result, they made great efforts to adapt machines to making hard pellets at a price which made it attractive to switch from the manufacture of soft pellets to that of hard pellets. Interestingly, feed manufacturers in the EEC were at this time so reliant on Thai cassava as a reasonably priced compound that they sent a mission of experts to provide technical assistance. By 1979, Thai manufacturers had perfected their machine and were filling orders not only from the domestic market but also from Indonesia and the Lao People's Democratic Republic. Because sales and manufacture of Thai machinery are not restricted or confined by licensing and patent complications, the selling price is about half that of European machinery.

293. Hard pellets get a 10 to 15 per cent price premium over native pellets but there is a higher production cost of about 10 per cent to produce brand pellets. Output per hour drops by roughly 35 per cent in the production of hard pellets. The capital cost required to convert machinery for the production of hard pellets is not prohibitive, at two to three million baht but the trade opted to try to improve the quality of native pellets. The Government imposed various administrative controls and penalties to encourage the production of good quality pellets. Initially these actions led to protests by pelletizers who shut plants because they said they could not conform to the quality

requirements. This led to hardship for the farmers who supplied roots. The problem eased when a discount premium system for delivered quality was introduced (see section E) and when vegetable oil was found to be a better and cheaper binding agent than molasses.

4. Quality control

294. Consistency in quality is a major consideration in the compounder's choice of suppliers. The compound feed industry is highly sophisticated in its manufacture of feeds and employs linear programmes for selecting ingredients to make up rations. It is essential, therefore, that the compounder should know the nutrient content of each element in advance.

295. Most pelletizing factories carry out a laboratory analysis of the chips before processing them and pay for each load according to its quality. Quality standards for cassava pellets are based on starch, moisture, fibre and sand content. The EEC has laid down stringent regulations 117/ with respect to these four factors. Both brand pellets and native pellets are sold on the basis of delivered quality and are analysed when they reach Europe.

296. The EEC has also enacted regulations in respect of the level of undesirable substances in feedingstuffs. In the case of cassava, the regulations apply to the tolerance of hydrocyanic acid, a toxic substance which is considerably reduced in the course of processing. Levels of bacteria and fungi are not governed by official standards, but attention is increasingly being turned in this direction. If not properly dried, warm, moist cassava will foster bacterial and fungal growth that may subsequently be injurious to the health of livestock.

297. As a feed compound, cassava is competitive with other high starch commodities such as corn and barley. Linear programmes daily calculate the most competitive ingredients for use in dairy rations. Besides absorbing significant transportation costs, cassava prices must be competitive with cereal grain prices in the EEC.

B. Market structure of cassava and cassava products

1. Market flow

298. The market structure and the marketing channels of the cassava industry in Thailand are quite well documented. 118/ The analysis of price formation (see section C), however, is closely related to a thorough understanding of the market structure of the cassava industry and trade. It is therefore worth a brief examination.

299. The marketing flow of cassava and cassava products is quite simple and is shown in figure 5. Fresh roots are brought by truck directly to local chipping, pelletizing or starch factories. Truck owners charge for their

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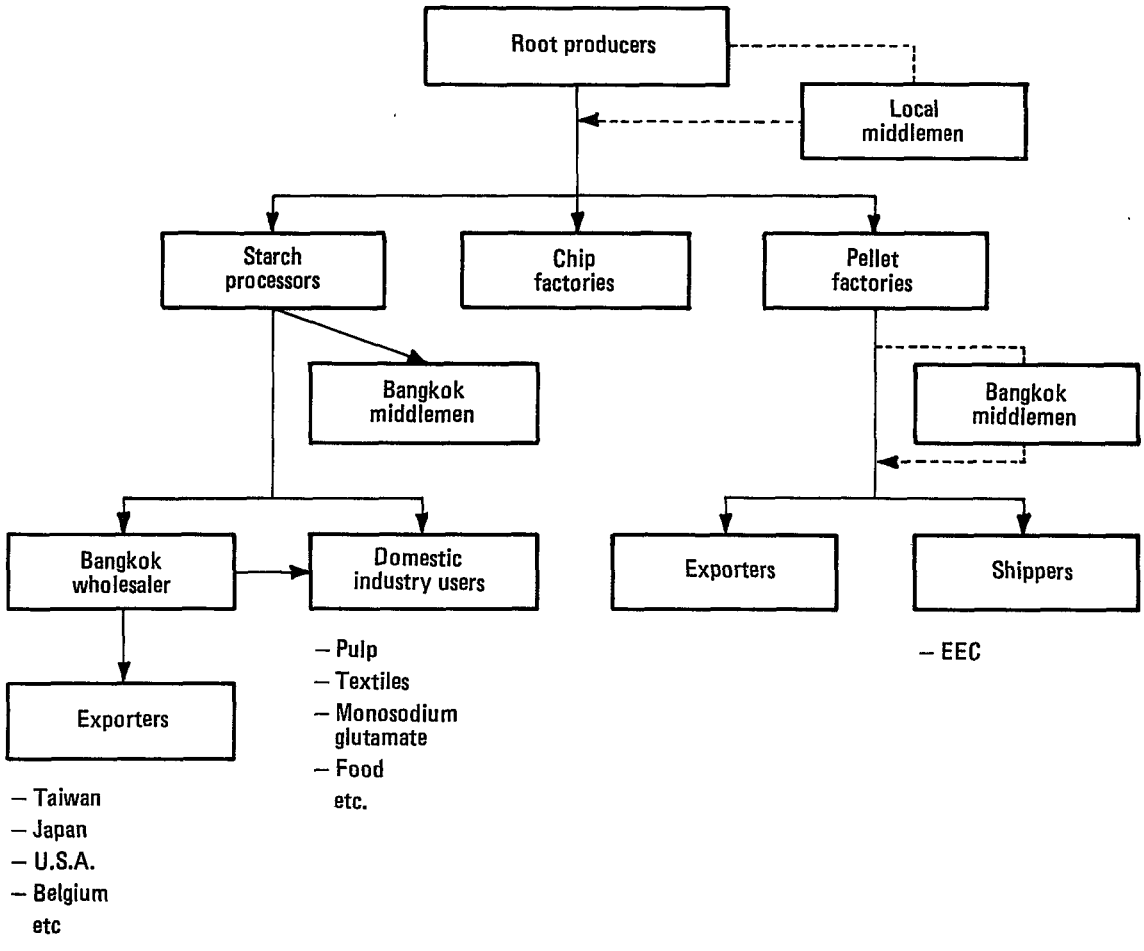
117/ EEC regulation 228/67/EEC.

118/ Boonjit Titawatanakun, "Analysis of Export Demand for Thai Tapioca". Unpublished Ph.D. dissertation, University of Minnesota, 1979.

Figure 5
MARKETING FLOW OF CASSAVA AND CASSAVA PRODUCTS



transportation services rather than act as middlemen between the producers and processors. 119/ There are relatively few middlemen between producers and processors and between processors and exporters. Processors sell most of their products directly to exporters who in fact act as "middlemen" between processors and shippers.

2. Market structure

(a) Roots

300. Cassava is not a plantation crop but is grown mainly by subsistent farmers as a major cash crop. Most roots are sold directly to chipping yards or starch factories. Only a small proportion goes through middlemen. There are also central markets for roots but the market organization is on a very simple cash basis.

301. Due to the low volume handled, the role of the middlemen is rather limited compared to paddy. This may be partly explained by the proximity between cultivation areas and processing factories; and by the relatively simple method of grading cassava roots. The middlemen, however, are quite specialized. They either deal in roots i.e. between producers and starch millers, or in moving chips and pellets from chipping yards to pelletizing plants and pelletizing plants to exporters. For the root middlemen, a small service charge is made - about one per cent of the root weight.

302. Direct dealings between growers and processors do not, however, imply equal bargaining position between the two sides since buyers (processors) have better access to market information and generally determine the weight and starch content. In this respect, cassava growers are not much different from rice farmers in dealing with millers although cassava growers may have a slightly better bargaining position. Cassava can be stored for a longer period in root form (underground) at a much lower storage cost than paddy or milled rice. Cassava farmers also have other sources of income from off-farm work.

(b) Starch

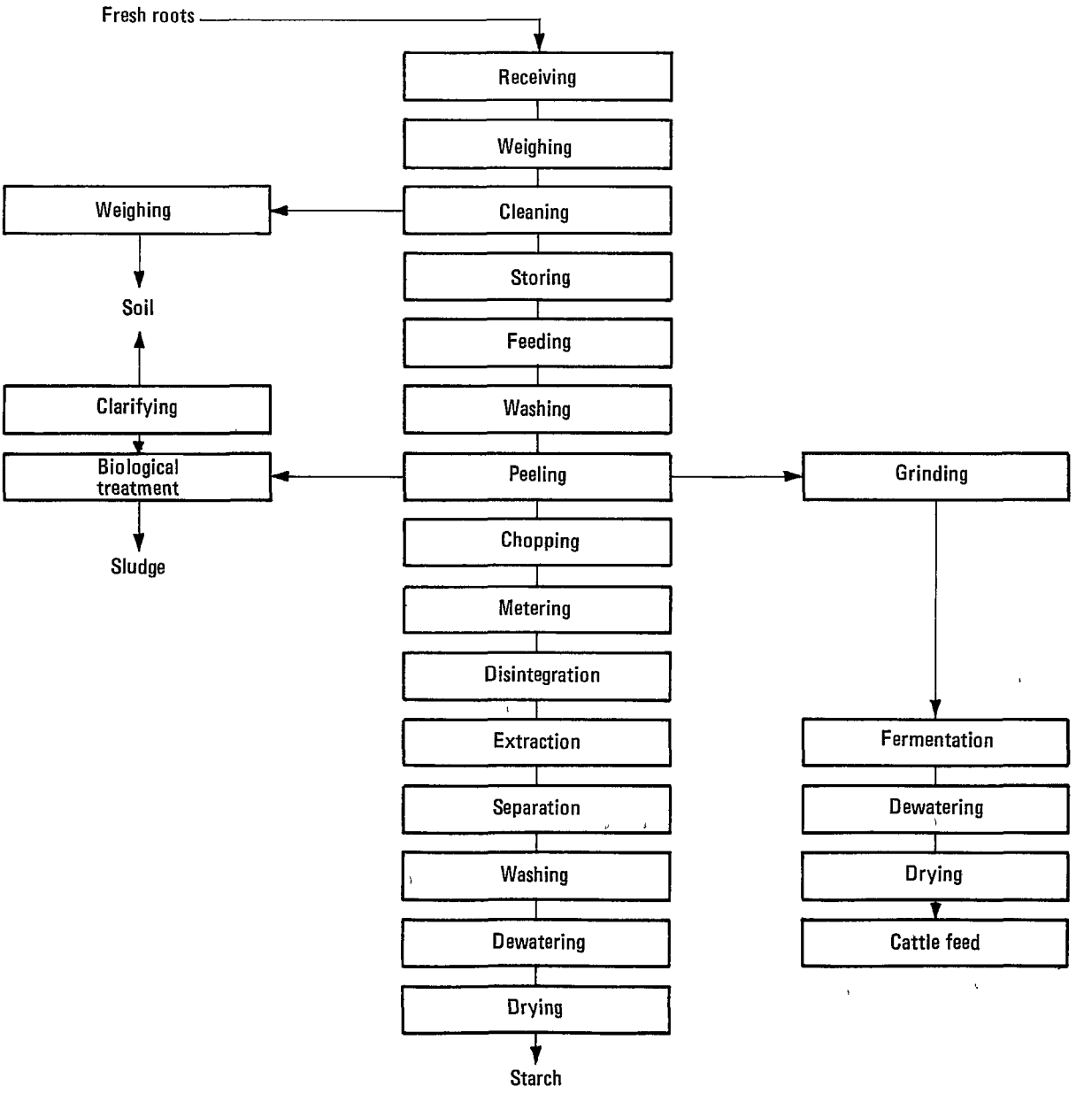
303. There are over 100 registered starch factories but only 50 are active. These operate considerably below capacity. The larger mills, about 30 of them, use a wet milling process which produces much better quality starch and is more economical than the traditional method of sedimentation. Figure 6 illustrates the processing of cassava starch.

304. The starch market is quite separate from the market for pellets which is effectively export oriented. Domestic consumption is about 50 per cent of total production while all pellets are exported. Starch production in general accounts for about 10 per cent of total root output. In 1980, the following industries 120/ respectively utilized total domestic starch production: paper (20 per cent), monosodium glutamate manufacture (31 per cent), textiles (8 per cent), and food (40 per cent).

119/ Suthiphand Chirativat, "Transnational Corporations in the Cassava Industry of Thailand", ESCAP, Bangkok, October 1979, p. 4.

120/ Usage of starch is: 4 to 5 per cent of the weight of cotton; 0.3 to 1 per cent of the weight of paper; 2 kg starch to make 1 kg monosodium glutamate; 1 kg per capita per year (food).

Figure 6
CASSAVA STARCH PROCESSING



305. Starch mills compete with chipping and pelletizing factories for roots. This has an impact on their respective cost and marketing margins. Starch mills either sell directly to domestic industrial users or to exporters.

306. Starch millers are more strict on root quality than chipping yards. Most use a simple starch content testing device to indicate the gravity of the roots. The higher the starch content of roots, the less the moisture content and the weight. Roots with a higher starch content get a better price. Chippers are not as concerned with starch content. Testing is simply done by cutting a sample of roots to see how white they are and whether the surface is clean and smooth.

307. The central markets for roots are simply organized. The roots are trucked to market by the growers or middlemen. Interested buyers take a sample to examine the quality of roots according to their respective criterion. A price is offered to the sellers who bargain with a number of buyers at one time. Sometimes it is the seller who makes the offer first and bargaining continues between the seller and the buyers. If the price is not satisfactory, the seller may take the roots to other markets in the area although this is very rare, or he may wait for a few days hoping for a better price. Since roots deteriorate quite quickly (within three days after harvesting) waiting is not a normal practice. If the price is satisfactory, the roots are weighed. The market owner does not become involved in dealing. He provides market and price information and minimum market facilities.

308. There are two methods used in starch processing: sedimentation and wet milling. Using conventional methods, a total processing time of about five days is required, much of this time being absorbed in repeated washing and resettling of starch. Modern technology has reduced the processing time to one day and allows a much higher extraction rate. The larger starch mills in Thailand, about 30 of them, use modern technology (wet milling process) which produces better quality starch and is more economical. Roots are carefully washed and peeled before being sliced into pieces. The chopped roots are fed to a disintegrator which breaks up the cells of the roots liberating the starch particles, which are then dried and collected.

309. For starch extraction plants to run successfully, very careful management is required. Continuous availability of freshly harvested roots is a major prerequisite, and for the production of top quality starch, the roots should be processed within 24 hours of harvesting. Roots older than three days produce a very inferior product. A continuous supply of water is also required. This may explain the concentration of starch production in the east where transportation is better and the water supply is more reliable than in the north-east, although roots grown in the north-east have a higher starch content.

(c) Pellets

310. Ninety per cent of cassava roots are pelletized and virtually all pellets are exported. Native soft pellets account for about 80 per cent of the market and hard pellets supply the remainder. There are 1,851 registered chipping and pelletizing factories.

311. Almost all pellets are exported to the EEC by five shipping companies: Krohn Co., Peter Cremer, Alfred C. Toepfer, Tradax Geneva SA and Trakulkam Feed Holland. In 1981, a Thai company was formed called Eurasian Corporation and began to trade directly with European animal feed compounders. Shippers buy pellets from so-called "exporters" who are more appropriately buying agents of the shipping companies (see appendix 1). Supplies from Thailand are shipped to the EEC in consignments of up to 100,000 tons. Bulk shipping is advantageous for low value added commodities (figure 7). The export market shares of the five shippers 121/ in 1980 were in percentage terms:

Krohn Co. (Bangkok) Ltd.	35.1
Peter Cremer	14.4
Alfred C. Toepfer Bangkok Ltd.	21.5
Tradax Geneva SA	13.7
Trakulkam Feed Holland	0.5

3. Distribution and export

312. As has been mentioned, cassava products are processed mainly in cassava growing areas. Starch is transported to Bangkok for wholesale distribution and export while pellets are sold to exporters in Bangkok who will supply them to shippers. Since all pellets are exported, pellets are transported to exporters' storage facilities. Modern loading facilities have been developed to handle the pellets. The Mahboon-krong (MBK) Silo Hatpadaeng, Chonburi came into operation in 1977, and shortly after, the Thai Bulk Services Co. (TBS) was established. Both are capable of handling a container up to 100,000 tons. Both MBK and TBS are wholly Thai owned and operated and provide services to shippers and exporters.

313. MBK Silo handles pellets shipped by Peter Cremer Ltd. and Tradax Ltd. It also handles pellets belonging to exporters. It is capable of loading about 700 tons of pellets per hour or 13,000 to 14,000 tons per day. A belt conveyor has been built on a jetty, three kilometers long, to load pellets. TBS operates a floating silo off Si-Chang Island with loading elevators being fed from lighters which come alongside. The loading capacity is similar at 700 tons per hour or 14,000 tons per day. TBS only handles pellets shipped by Krohn and Alfred C. Toepfer.

C. Formation of cassava price and price structure

314. Since 80 per cent of the cassava Thailand produces goes into pellets and is exported to the EEC for use in the compound feed industry, prices of cassava roots are effectively determined by the demand for pellets in the EEC. Like most agricultural products, cassava prices have a seasonal pattern which needs to be examined.

121/ See appendix table.

1. Price structure

315. As pointed out in section A, there are two separate markets for cassava, namely, the starch market and the animal feed market. Thailand is the largest exporter of both starch and pellets although the trade volume of pellets greatly exceeds that of starch. Since starch millers have to compete for roots with chippers and pelletizers, there is a connexion between the two markets at the root level.

(a) Pellets

316. High cereal prices in the EEC which are supported by the Common Agricultural Policy (CAP) make it more economical for animal feed compounders to use imported protein and energy ingredients. Pellets have, therefore, become competitive as an ingredient in compound animal feed, given the CAP price structure. This in turn implies that the demand for pellets depends almost totally on the artificially high price of cereals in the EEC. Changes in the CAP either to bring down the real price of cereals in the EEC or to make imported grain substitutes less competitive have a direct effect on cassava demand. At present, in order to safeguard farm income, EEC cereal prices have been fixed at levels that usually result in threshold prices above the world price. A variable levy, equal to the difference between the c.i.f. 122/ Rotterdam price and threshold price, is charged on cereal imports. For pellets (BTN 123/ 0706), there is a six per cent ad valorem tariff. Other non-grain feed ingredients, such as soybean meal, corn gluten, citrus pulp, etc., however are imported at zero duty. Demand for pellets depends on the price relationship between cereals, soybean meal and other cereal substitutes. Models which calculate the least-cost feed ration for different types of compound feeds commonly used in the EEC imply that the demand for pellets is quite elastic. It has been estimated that the elasticity of demand for cassava in the EEC is around 4.

317. Quotations for Thai pellets are made in Deutsch marks on a cost (c) and insurance (i) basis (also termed c.i.f. less freight). The exporter insures the cargo and is responsible for shrinkage, while the shipper pays freight, lighterage and stevedoring costs. Exports to Europe have expanded so greatly in recent years that cargo sizes have been vastly increased, from an average of 15,000 tons to consignments up to 100,000 tons, resulting in substantial savings for shippers. Since freight costs account for 17 per cent of the c.i.f. value, the competitiveness of cassava depends, among other things, on low transportation costs.

122/ c.i.f. = costs, insurance and freight.

123/ British Trade Nomenclature.

318. As shown previously, exports from Thailand are largely controlled by four multinational companies. These companies usually have direct links with feed compounders as well as grain traders. These shippers have better information on demand and supply in both the EEC and Thailand than Thai exporters who have very little information on the marketing of their commodity in the EEC.

319. Most animal feed compounders buy directly from shippers. Secondary trading has been declining, with stocks rarely being resold more than twice. Trading is normally carried out on a c.i.f. basis, although some trade is transacted f.o.b. Rotterdam. The preferred marketing channels vary from country to country. It is clear, however, that the bonds between shippers, importers, brokers and agents are well established. All are members of associations formed by the major grain merchants. Traders who have interests in the compound feed industry belong to the animal feed manufacturers' associations as well. Because of their common interests, there are usually close links between grain traders' and feed manufacturers' associations.

320. In 1975, the smaller Thai pelletizing companies attempted to find a way to sell directly to buyers in the EEC. The president of the Thai Tapioca Traders Association, to which all cassava exporters belong, went to discuss the possibilities with European buyers. He was discouraged by the prohibitive cost of renting a ship to transport their product. In addition, the Association found that it would have to be admitted to membership of the compound feed industry associations in order to have access to the required marketing and distribution channels.

(b) Starch

321. The market structure for starch is quite complicated. Thailand is simply a price taker in the market. Demand for export is effectively a residual demand after the local supply of starch in the importing countries is exhausted. The price of starch, therefore, varies directly with prices of starch in importing countries.

322. It is possible for starch and root prices to bear very little if any relationship to one another. As has been pointed out, pelletizers and starch producers compete for the supply of cassava roots. Root prices are determined by the demand of pelletizers which in turn depends on the demand of animal feed compounders in the EEC. Starch producers can easily risk a loss if root prices are high while demand for starch is slack.

2. Price determination and dissemination of price information

323. Given that cassava is almost totally an export-oriented crop, its prices are unavoidably related to prices quoted in Bangkok, which is the export centre of Thailand. Bangkok prices in turn are determined by the European demand for and supply of pellets from Thailand. Prices received at the farm gate and at processing plants on local markets can then be estimated by allowing for the marketing margin of the trader/arbitrager.

324. Although the bargaining position of farmers is weak in that they usually have no other crop to sell, this is partly offset by the fact that they have many agents to whom they can sell - starch millers, middlemen, chippers, at the local market or direct to pelletizers. Farmers usually also earn some off-farm income. The cassava prices they receive are competitive with what is offered throughout the country. Once the root is dug up, it is quite perishable but it can be harvested at any time or left in the ground. They are generally dug at 10 to 12 months maturity. When demand for pellets is high, shippers will go to farms to buy at the farm gate. When prices are depressed, correspondingly low prices are offered to farmers and buyers are quite particular in respect of grade.

325. The four major shipper exporters have monopoly power since they control the movement of the carriers which transport pellets to Europe. However, they have to compete for the supply of pellets mostly through local "exporters".

326. The role of local "exporters" in the pellet trade is unique. They are local traders who collect pellets for the shippers when the latter have shipping orders to be filled. In order to ensure a steady supply of pellets, they need to keep closely in touch with pelletizers, providing them with information on prices and other market conditions. This role is quite similar to the middlemen in the rice trade. Since the role of the middlemen is taken over by the "exporters", the relatively small number of so-called middlemen in the pellet trade or in the cassava marketing network within Thailand is not surprising.

327. Pellet prices in Europe are reported daily to the Bangkok shippers' offices. The exporters receive price information directly from the shippers either by telegram or telephone, especially when demand is high and prices are increasing. They cross-check price and market information regularly among the shippers.

328. Having received price and market information from the exporters, pelletizers make a decision on whether to sell. Stock position is a major factor in the decision since the pelletizer keeps 60 per cent of the working stock as stocked chips and another 40 per cent of chips as fresh chips. The acceptance of an order is based on a simple rule: the price of pellets must at least be equal to the price of chips (stocked plus fresh). At the root market level, roots are delivered mainly by farmers to the chippers or pelletizers. Fresh roots prices are advertized in front of chipping plants and farmers are free to sell their roots to any chipper.

329. The flow of information is not much different in the starch market. Starch millers contact wholesalers or exporters for market information or they get direct orders from wholesalers or exporters for a specific quantity at a certain delivery date and place.

3. Grading

330. Cassava and cassava products are graded by starch content, moisture content, and freedom from foreign matter (mostly sand). Cassava roots are checked meticulously for starch content and cleanliness by flour mills. The starch content is checked by measuring the specific gravity of a sample of roots. The price is discounted by 0.05 baht per kg for each 2 per cent drop in starch content. 124/ There used to be a further 10 per cent reduction in weight for muddy roots. The practice has become less common especially in Chonburi and the eastern region although it prevails in the north-east. This can be explained by the fact that competition for roots by processors (starch, chips, pellets) is much higher in the eastern region than in the north-east as a direct consequence of Government regulations prohibiting the expansion of processing plants.

331. Shippers pay on a delivered quality (D.Q.) basis which makes exporters responsible for quality control. Exporters buying from pelletizing plants look for moisture content and adulterants such as: dirt, sand, rice bran and molasses. Molasses was used by pelletizers as a binding agent but waste from vegetable oil has been substituted. These concerns reflect the EEC demand for quality improvements.

4. Regional price variations

332. The relatively efficient information system and free mobility of produce in the agricultural marketing system in Thailand mean that local demand and supply conditions are less a price determining factor than prices in the central market in Bangkok. Produce in surplus areas is transferred to deficit areas and prices in both areas tend to equalize after allowance is made for transport and handling costs unless there is distortion in the market system.

333. Cassava is no exception. The further away from Bangkok, the lower the price of cassava roots received at the farm gate: prices of roots recorded in Chonburi are higher than those recorded in Korat. Fresh roots are brought down from the north-east to the east and from the north-central to the north-east to be chipped and pelletized at a loss of economic efficiency and the wasteful transportation of "water" contained in fresh roots. Up to three days queuing can take place when the price trend is down and growers are anxious about further declines. This gives rise to root rot and bad quality chips. A large part of the distortions and inefficiencies could be avoided by lifting Government restrictions on the expansion of processing plants. This would eliminate the economic rent accruing to processors.

5. Seasonality

334. Prices of cassava roots and cassava products follow a remarkably regular seasonal pattern. The Rotterdam price index for pellets tends to pick up in August and September and remains fairly high as feed compounders in Europe accumulate stock for the winter until the end of the year. The pattern coincides with the seasonal variations in Thailand. Prices of chips and pellets begin to pick up in May and June reaching a peak around September and tend to decline or remain stable with March recording the lowest level. Starch prices also follow the same pattern since starch millers compete for roots with chippers.

124/ Root prices are quoted on the basis of 30 per cent starch content.

335. The seasonal price pattern has some implications for the profit margin of pelletizers and starch millers, which will be examined in detail in section D.

D. Analysis of marketing margin

336. An attempt was made to calculate the approximate margin of cassava growers, starch millers and pelletizers as follows:

1. Cassava grower: difference between root price and production cost.

2. Processors' margin

   Starch: difference between starch price and root price;

   Pellet: difference between pellet price and root price.

1. Margin of cassava grower

337. The margin for the cassava grower is defined simply as the difference between root price and production cost. The margins from the crop years 1975/1976 to 1979/1980 are shown below (also see appendix 2 to this chapter).

Margin for cassava grower 125/
(baht/ton)

Year	1974	1975	1976	1977	1978	1979	1980
Margin	210	230	190	70	470	330	138

338. It seems that the grower's margin, which has fluctuated from year to year has been declining since 1978. This raises the question of whether cassava is a "miracle" crop or a crop of no other choice for which profitability is only relative to other crops. The margin itself needs to be interpreted with care. Both root prices and costs of production used in the calculation are averages for the whole country which means that the regional variations are not highlighted. For the crop year 1980/81, for example, assuming that the average cost of production of 0.59 baht per kg. was fairly representative, the average Chonburi price and Khon Kaen price was 0.81 and 0.76 baht per kg. respectively, giving a margin of 0.22 and 0.17 baht per kg. for Chonburi and Khon Kaen growers. Given different soil and growing conditions, cost of production may not be uniform for the whole country which effects the calculation of the margin itself. If the Government were to set a guaranteed price for growers, there would be no single price which would give an equal profit margin to all growers.

125/ All prices are expressed in terms of the root price with the conversion ratio of 0.37 for pellets and 0.2 for starch.

2. Trends

339. Since 1978, the marketing costs for starch and pellets have continually climbed. The oil price rise in 1979 caused both increased processing and transportation costs. While processing is a very small proportion of total cost, transportation is a major item. In addition, stricter pellet quality control has added to processing costs. It has also meant more deductions from growers' returns because of sand content. The Government has passed licensing regulations to limit the number and capacity of processing plants. These licenses have taken on a value 126/ which has artifically increased marketing costs. In addition, an oversupply of roots for processing has resulted. Processors have offered lower prices than expected to growers who have accepted them rather than incur the additional transportation cost of taking their roots elsewhere.

3. Seasonality

340. The variable cost margin of starch mills and pelletizing plants reflects the seasonal price pattern discussed in section C.

(a) Pellets

341. Comparison of the monthly variable cost margin of pelletizing plants during the dry season (November to April) and the rainy season (May to October) of the same crop year shows a higher cost margin during the rainy season. This can be attributed to:

(i) higher chip prices - it takes longer to dry chips in the rainy season; and

(ii) the tendency of pellet prices to pick up around May and June.

(b) Starch

342. Comparison of the monthly variable cost margin of starch mills in the wet and dry seasons indicates that variable costs for starch differ between seasons. Three factors were put forward during interviews to account for this phenomenon:

(i) Lower raw material cost - root prices are lower in the rainy season since the demand for chips falls off and chippers unload their stock. Starch content is also lower in the rainy season;

(ii) High root prices in the dry season - starch mills have to compete for roots with pelletizing plants;

(iii) Risk factor. Starch mills operate year-round and make forward buying transactions. Their risk factor is much higher than pelletizing plants since the raw material cost is determined by the demand for pellets. Starch mills have to be able to speculate on the movement of pellet prices and root prices to calculate their return. Prices in the pellet market are more volatile in the rainy season, thus the risk of the starch mill is higher during those months of the year.

126/ Reported at 50,000 baht in Chonburi and even higher in the north-east.

E. Evaluation of Government policy and measures

343. Compared with other agricultural crops, the extent of Government intervention in cassava production, processing and trade has been minimal. The intervention which has taken place, however, in some cases led to inefficiency and distortions in the system.

1. Intervention at the production level

344. The rapid expansion of production from 1972 to 1976 together with the widely held belief that cassava depleted the soil and Government concern over forest encroachment to grow cash crops led the Ministry of Agriculture and Co-operatives to seek control over further extension of cultivation areas. In 1974, the Cabinet ruled that expansion of cultivation areas would be confined to six provinces where cassava production was already most concentrated. 127/ It was suggested that there should be: (i) a ban on the establishment of new processing plants outside the designated zones (the six provinces), (ii) a review of expiring licenses for processing plants outside the zones, (iii) plant waste disposal regulation, and (iv) discouragement of flour/starch production. It was not until 1978, however, that the Ministry of Industry prohibited expansion and the setting up of any cassava processing plants. The regulation came out just before the EEC approached Thailand to restrict the export of pellets to the 1978 level of 5.9 million tons.

345. In response to the EEC demand for pellets, however, areas under cassava continued to expand after 1979, possibly at the expense of kenaf and sugar cane. Strong demand for pellets by the EEC continued to make cassava more attractive for farmers to grow than other cash crops. Input costs for cassava are lower resulting in a higher net income. Government control has therefore proved unsuccessful. Control has only led to increased profitability for existing flour/starch factories and pelletizing plants as output of roots exceeds processing capacity.

346. In 1981, the Government set a minimum farm-gate price of 0.71 baht per kg with the object of increasing production and income to the farmers to offset the effects of the drought in the previous year. The price was not related to the price in Europe but was based on the national average costs of production of 0.56 baht per kg, plus a land opportunity cost, plus 20 per cent profit. The farm-gate price then varied between 0.68 baht per kg in Khon Kaen and 0.75 baht per kg in Chonburi. The policy was instituted without any supporting mechanism and was announced just when the Ministry of Commerce was about to operate an export control system to comply with the export restriction agreement with the EEC. This ill-considered policy demonstrated the lack of co-ordination between production and marketing authorities.

347. If the Government foresaw danger in the expansion of cultivation, it should have warned farmers of the possibility of EEC import restrictions and over-supply with the consequence of falling prices instead of using an administrative device without any means of ensuring its effectiveness. Farmers are very responsive to the price mechanism, a fact well exemplified by the case of cassava itself. What the Government should attempt to do, if its objective is to improve farmers' income, is to make sure that they are not exploited through a lack of information

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127/ These are Nakhon Ratchasima and Chiya Phum in the north-east and Chachoengsao, Chonburi, Prachin Buri and Rayong in the east.

and understanding of the marketing channels and mechanisms. Much of this can be achieved by a very simple information system operating through district agricultural extension and commerce officers. Cheating of farmers by chippers can also be reduced if standardization and grading of pellets are strictly enforced and a premium is given for the better quality products (see section C).

2. Processing of cassava products

348. Since standardization and grading of cassava products (flour/starch and pellets) were found to have a great impact on root prices, this may be an area where Government intervention can be useful.

(a) Starch

349. Starch mills are stricter on root quality than pelletizers. Prices are paid on the basis of the starch content of fresh roots and there is a 10 per cent reduction on weight to allow for soil and sand. A simple gauging device based on the principle of specific gravity is used to measure the starch content of roots, which is an improvement over visual inspection.

350. There is, however, room for improvement. It is quite easy to cheat farmers by using saline water instead of pure water to weigh the roots and to establish the starch content. Perhaps when a central market for roots is developed, the market authority will be given a license to operate the device. Sand or soil content can be estimated before roots are delivered to chippers or starch millers. The standard 10 per cent reduction on weight can be abolished and a sliding scale system can be used to encourage farmers to clean roots before delivery.

(b) Pellets

351. On the question of binding agents, it rests with EEC customs officials to classify the pellets composed of these agents - under BTN 0706 or under another tariff heading as compound animal feed. According to EEC regulations, the use of bran oil and molasses could cause cassava pellets to be classified as a "mixed animal feed" which is subject to a much higher import levy than cassava. A reclassification would in fact end Thai exports to the EEC. Following negotiations to convince the EEC to forgive a limited content of molasses and bran, an agreement was reached between the Thai Government and the EEC that Thailand would assure quality by imposing on the exporter a 400 baht deposit fee per ton of pellets. The exporter loses the deposit if the quality does not conform with agreed specifications. This has proven quite effective. Technical progress has also taken place in the pelletizing process: several pelletizers no longer use molasses or rice bran as binding agents and prefer vegetable oil which is much cheaper than molasses.

352. The Government is anxious to see the dust problem solved. Delay in finding a solution can only lead to a threat of import restriction. Research findings suggest that conversion from "native" to "hard" pellet can be carried out within a few weeks and the Ministry of Industry has been trying to encourage conversion. The fact remains, however, that there is a cost difference between hard and native pellets. In the final analysis, it is European pressure and the demand for hard pellets which will stimulate the conversion.

3. Export policy

353. The relative lack of Government intervention in the cassava trade is in great contrast to the history of rice. It was not until 1978 in response to pressure from the EEC that permission was required from the Department of Foreign Trade (FTD), Ministry of Commerce to export cassava products. In 1980, a minimum export price was fixed and reviewed periodically. Exporters were required to pay a 400 baht deposit for a ton of pellets exported as a quality guarantee. Stock holding was also required, the amount of which was fixed by the FTD. Government intervention to limit the number of processing plants has already been noted.

354. Being an almost totally export-oriented crop, it is perhaps not surprising that the Government has never attempted to interfere substantively with cassava. There is no domestic consumer interest. The national livestock industry does not use cassava as a feed ingredient because cassava is too expensive compared with other ingredients.

355. Unrestricted trade has allowed the shipper to take advantage of economies of bulk transport. The marketing costs of the shippers and exporters have been kept low, allowing farmers to get a higher f.o.b. price.

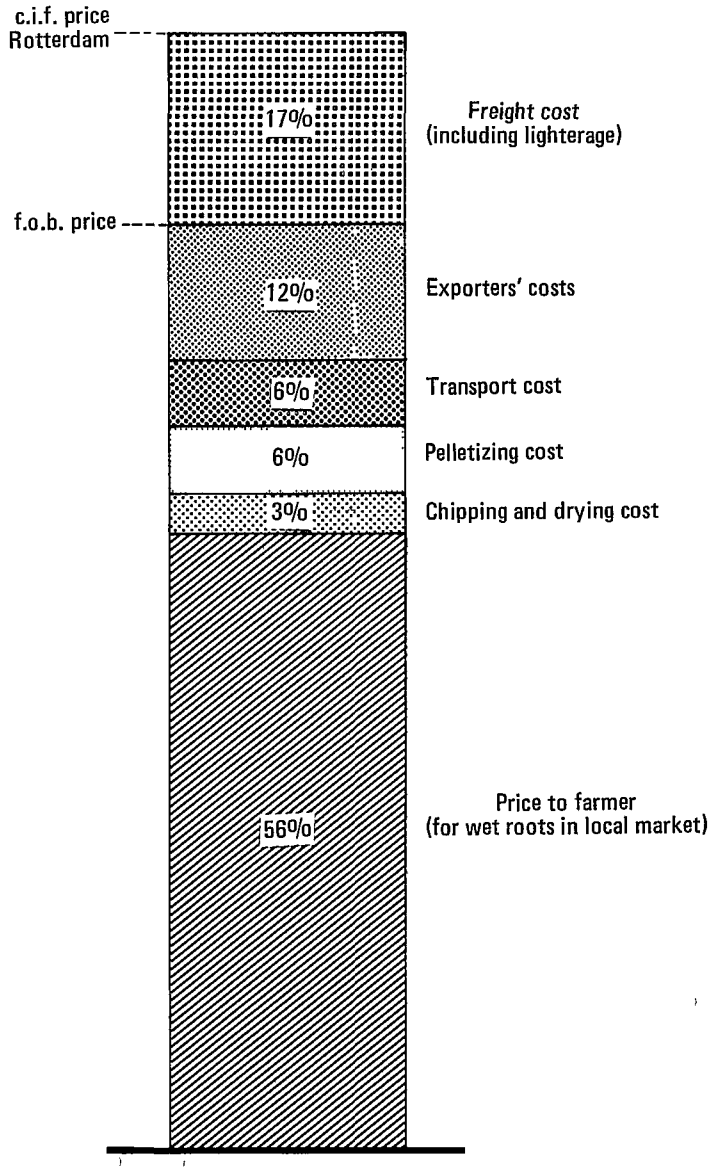
356. Figure 7 gives an approximate estimate of the percentages of the c.i.f. and f.o.b. prices attributable to the various participants in the cassava industry. Just over 80 per cent of the c.i.f. price Rotterdam remains in Thailand. This is very high in comparison to the share retained by most processing industries in developing countries. Well over half the c.i.f. price accrues to the farmer, which is also remarkable and is no doubt the key factor responsible for the increase in cassava production.

357. Government intervention came in the wake of pressure from the EEC to restrict the export of pellets from Thailand into the EEC. 128/ The Ministry of Commerce felt that export control was needed to conform to the agreement and the Department of Foreign Trade was authorized to regulate and control the export flow to the EEC. In December 1980, the FTD announced that as from 1 January 1981 a quota system would be imposed on exporters under which: (i) every exporter would receive a percentage of quota based on its average exports over the previous three years and (ii) allocation would be made on a quarterly basis.

358. In all fairness, if there had to be a ceiling on export, some form of quota allocation had to be arranged. If the quota system was introduced with the intention to prevent exports exceeding the agreed limit then control measures should and could have been instituted during the last quarter of 1980 and not in the middle of the harvest season when farm prices were most vulnerable. The quota system effectively controlled supply of pellets since European buyers could not buy from May onward as quotas were not yet issued. This resulted in an almost immediate decline of root prices since the farmers had to sell in a market where control (the quota system) had substantially removed the demand that supported the market during a normally soft period.

128/ In 1980, Thailand initialled a gentlemen's agreement with the EEC, to limit Thai exports to 5 million tons each for the years 1981 and 1982, 4.5 million tons each for the years 1983 and 1984, and possibly a further reduction thereafter. This agreement was, at the time of writing, not formalized and had no legal force in the EEC.

Figure 7
BREAKDOWN OF C.I.F. ROTTERDAM PRICES FOR CASSAVA PELLETS FROM THAILAND



Note : These figures apply to c.i.f. Rotterdam price of DM 300/ton and are calculated on the basis of 14 per cent moisture throughout.

Source . UNCTAD/GATT International Trade Centre, Cassava export potencial and market requirement, Geneva, 1977, p. 53.

359. It is now widely believed that the quota system was introduced to reduce the monopoly power of foreign companies in the pellet trade and to facilitate the creation and operation of a local company, Eurasia, which was set up immediately after the introduction of the quota system. The group is a consortium of 24 Thai exporters who together controlled 62 per cent of the quota. However, since exporter is defined as one who sells f.o.b. and is paid in foreign exchange, some 80 per cent of pellets exported have always been controlled by Thai companies. The four multinationals which control 90 per cent of the shipping of pellets do not qualify as exporters while their total purchases within Thailand, including their own pellet production do not exceed 20 per cent of all f.o.b. sales. The quota allocation system is therefore biased against them.

360. Trade uncertainty increased costs for exporters and shippers in addition to the cost of the stockholding requirement and a 10 baht per ton contribution requirement to the Cassava Price Stabilization Fund. Although these regulations were applied at the export level, repercussions were felt throughout the market system. Farm prices were recorded at 50 per cent lower than in the previous year.

361. It remains too early to see how much the structure of the marketing and distribution system was affected by the quota system. Multinationals have an advantage over Thai exporters due to their control over the shipping of pellets from Thailand to Europe and their connection with European consumers. Given time, Thai exporters may be able to develop their network and shipping ability which would help to increase competition in the cassava trade at the export level. Export regulation on its own and the quota system in particular are not sufficient to meet this objective of economic nationalism.

362. If export has to be discouraged, either because of EEC pressure for restriction or the Government policy to limit production, some system of export tax could be devised to stabilize the level of exports which would have a depressing effect on local prices.

Appendix 1

Pellet traders, 1980

Buyers/Exporters	Krohn & Co.	Tradax Ltd.	Peter Cremer	Alfred C. Toepfer	Trakulkam Feed	Other	Total (tons)
Chaiyong (1970) Co.Ltd.		83 359.8	49 798				133 157.8
Sahaphan Plant Product Co.,Ltd.	211 845						211 845
Tai Long Ltd.Part.	162 680						162 680
Thai Farmer Ltd.,Part.	89 615						89 615
Bangkok Grain Ltd.		7 000	19 854	64 623.4	10 500		101 977.4
Thai Bamrung Thai Ltd.Part.	3 700			23 902	81 799.9		109 401.9
Lo Chin Seng Co.,Ltd.	2 000			48 490	58 640		109 130
Sahathai Trading Co.,Ltd.	72 975						72 975
Sahaphan Marketing Company		2 000	22 140.3	44 200		70 328.9	68 340.3
Granaria (Thailand)							70 328.9
Thai Hong Export Import Ltd.Part.	107 589						107 589
Belam (Thailand)						52 500	52 500
A.R.K.Co.,Ltd.	62 520						62 520
Siam Tapioca and Produce Co.		27 000	37 465.6				64 465.6
Sang Petch Import-Export	42 260	2 000	2 000				46 260
Trakulkam Feed Manu.Co.,Ltd.						47 154.7	47 154.7
Keng Seng Co.,Ltd.	16 800		4 200	24 415	2 000	6 860	54 275
Thai General Tapioca Co.,Ltd.	50 539.8						50 539.8
Chai Charoen Exproduce Ltd.Part.	59 233			5 700			64 933
Trakulkam Co.,Ltd.						30 085.8	30 085.8
N.S.P.Thai Tapioca Co.,Ltd.	44 570						44 570
F.C.T.Brothers Co.,Ltd.		3 000				22 274.1	25 274.1
Cassava Industrial	14 310	5 000	1 995.8	20 600			41 905.8
U.E.P.Ex & Im				33 930			33 930
Thai Starch						11 105	11 105
Rachatavanich			3 702.3		6 000		9 702.3
Muang Thai Tapioca	16 800						16 800
Song Kij Thai Trading Co.Ltd.	3 700						3 700
Siam Kiti						2 500	2 500
Kitcharoen		5 000					5 000
Common Enterprise				1 000			1 000
Mah & Boonkrong		500					500
Thai Anant						7 670	7 670
Tapioca Product			5 000				5 000
Total	1 509 988.7	590 014.8	623 370.2	924 797.4	22 760	636 406	4 307 337.1
Percentage share:	35.1	13.7	14.4	21.5	0.5	14.8	100.0

Source: Calculated from sources at the Office of Commodity Standards, Bangkok.

Chapter IV

Appendix 2

Output, cost and average root price, 1974 to 1980

Year	Output (ton/rai)	Cost Variable (baht/rai)	Cost Fixed (baht/rai)	Total Baht/rai	baht/ton	Price baht/ton
1974	2.08	425.3	78.8	504.1	240	450
1975	2.20	465.1	99.4	562.5	260	490
1976	2.32	528.7	125.9	654.6	320	510
1977	2.07	527.2	82.7	609.9	290	360
1978	2.23	576.6	97.1	673.7	300	770
1979	1.71	602.4	111.6	714.0	420	750
1980	1.80	939.7	126.3	1 066.0	590	452

Source: Thailand Ministry of Agriculture, Office of Agricultural Economics.

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