



**Production and Marketing of  
Mungbean in Thailand:  
the Role of Private Sector**

**Boonjit Titapiwatanakun, Ph.D**

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## Foreword

The author has compiled recent information on production, use, marketing and trade of mungbean and black matpe in Thailand. He treats the role of the private sector in detail, giving special attention to rural and the terminal marketing and trade. It is concluded that Thailand has a competitive marketing mechanism in operation, due to the government's free enterprise policy. This has enabled the private sector to set up an efficient market system with provision of imports, credit and trade as well. It is suggested that more diversification of exports, imports, and utilization is necessary as a strategic precondition for continued progress of mungbean and black matpe.

I hope that Dr. Titapiwatanakun's excellent study will contribute to a better understanding of the role the private sector in development and that similar case studies will benefit from example.

Seiji Shindo  
Director  
ESCAP CGPRT Centre



## Introduction

### Background

The agricultural sector of Thailand has significantly contributed to the economic growth and development of the country in the past three decades. These contributions have been made possible through the endeavors of all parties concerned in the economy, to transmit the dynamic market demand for agricultural commodities to the production units at the farm level along with promotion of production and necessary extension and marketing services. Consequently, Thai agricultural production and export have been increasing in both volume and the number of commodities which have been substituting for each other.

Among these commodities, a production cycle of an individual commodity or the so-called "commodity boom" has occurred consecutively, particularly in case crops such as jute and kenaf, maize, cassava and beans. Although the development process of the case crops has shared some common factors and infrastructure, individual cash crops have revealed rather unique characteristics in terms of public and private sector involvement and in the production and utilization phenomenon.

The development of Thai mungbean\* and black matpe\*\* production and trade has been rather successful in terms of their volume and value of exports. However, the information relating to the role of private sector has not been adequately analyzed. In addition, in line with the development, the production, marketing and utilization aspects of mungbean and black matpe have yet to be studied. All of this information should prove useful for the interested parties of developing countries, by providing them with ideas on the applicability of the strategic adopted in Thailand to their countries, for mungbean development as well as other upland crops grown under rain fed conditions. To this end, the objectives of this study are : (a) to assess production, utilization, marketing and export markets of mungbean in Thailand; (b) to identify the role of the private sector in the development of mungbean in Thailand; and (c) to suggest further research.

Several approaches were employed in this study. The simple descriptive statistical approach was used in the analysis of production, utilization and exports, by collecting secondary information and data from various official sources. The behavior and functional approaches as well as case study method were employed in identifying and describing the role of the private sector for the development of mungbean and black matpe. With these approaches, the primary data were gathered by several informal interviews with rural and terminal market participant in the mungbean producing areas and major mungbean markets such as Sawankhalok, Phetchabon and Bangkok during June-August 1987.

---

\* Phaseolus Aureus

\*\* Phaseolus Mungo



## Brief Historical Background

It has not been recorded when mungbean was first grown in Thailand, although it is believed that Thai people have grown and consumed mungbean for a long time. However, as far as the history of black matpe is concerned, there are two sources of information. The first source was the narrative of a local merchant in Sawankhalok. He states that black matpe was introduced into Sawankhalok about 30 years ago by a Thai-Indian merchant who obtained seeds from India. The second source, which was documented in an official publication, relates that in 1962, a Japanese businessman brought black matpe from Burma into Thailand and it was firstly grown in Saraburi province, before spreading into the provinces in the lower part of the northern region<sup>1</sup>. Regardless of which source one accepts, Thai export of black matpe was officially recorded in 1965 at 6,122 tons.

During 1950 to 1985, the official statistics of production and area planted, included black matpe, reveal 3 interesting periods separated by a sudden jump in production area planted (see figure 1). These three periods as regards the development of mungbean and black matpe, can be identified and explained as: (1) the period preceding the introduction of black matpe, in 1963; (2) the initial stage of black matpe between 1963 to 1978; and (3) the settlement of the export market, starting in 1979.

The first phase before 1963, preceded the introduction of black matpe by the Japanese businessman. In the period, the majority of mungbean production was in the provinces within the central plain, so it is possible that a small amount of black matpe was planted in the Sawankhalok area using seeds obtained from India as was claimed by the merchant. At any rate, the production increased from 31.7 thousand tons in 1950 to 53.7 thousand tons in 1962, an increase of 69%. In the period, more than 15 thousand tons of mungbean was exported annually to the major markets such as Japan, Malaysia, Singapore and Taiwan.

The second phase started in 1963, also the initial stage of black matpe, Figure 1 shows that there was a sudden increase in production and area planted, from 53.7 thousand tons of production and 310 thousand rai of area planted in 1962, to 116 thousand tons and 630 thousand rai in 1963. The increase was almost double. This reveals that the production of mungbean and black matpe has been enormously expanded, particularly black matpe, and it therefore follows that somebody has performed a successful and effective role in the promotion of black matpe production. It was recorded that in 1964, a significant role was played by the representative of the Japan Bean Sprout Importers Association in the promotion and production of black matpe through the contribution of 2 tons of black matpe seeds from Burma to the Department of Foreign Trade<sup>2</sup>. These seeds were further distributed to the agencies involved in the promotion of agricultural production. Moreover, in order to further promote the production of mungbean, the import of vermicelli was temporarily banned by the Ministry of Commerce of Thailand<sup>3</sup>.

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<sup>1</sup> Office of Agricultural Economics 1986. Production and Marketing of Mungbean in Crop Year 1984/1985, No. 28/2529 March. Ministry of Agriculture and Co-operatives, Bangkok (in Thai) 4 p.

<sup>2</sup> Rungsaritkul Pradit 1973. Production and Trading of Mungbean Department of Business Economics, Ministry of Commerce, Bangkok (in Thai) 33 p.

<sup>3</sup> Ibid., 34 p.

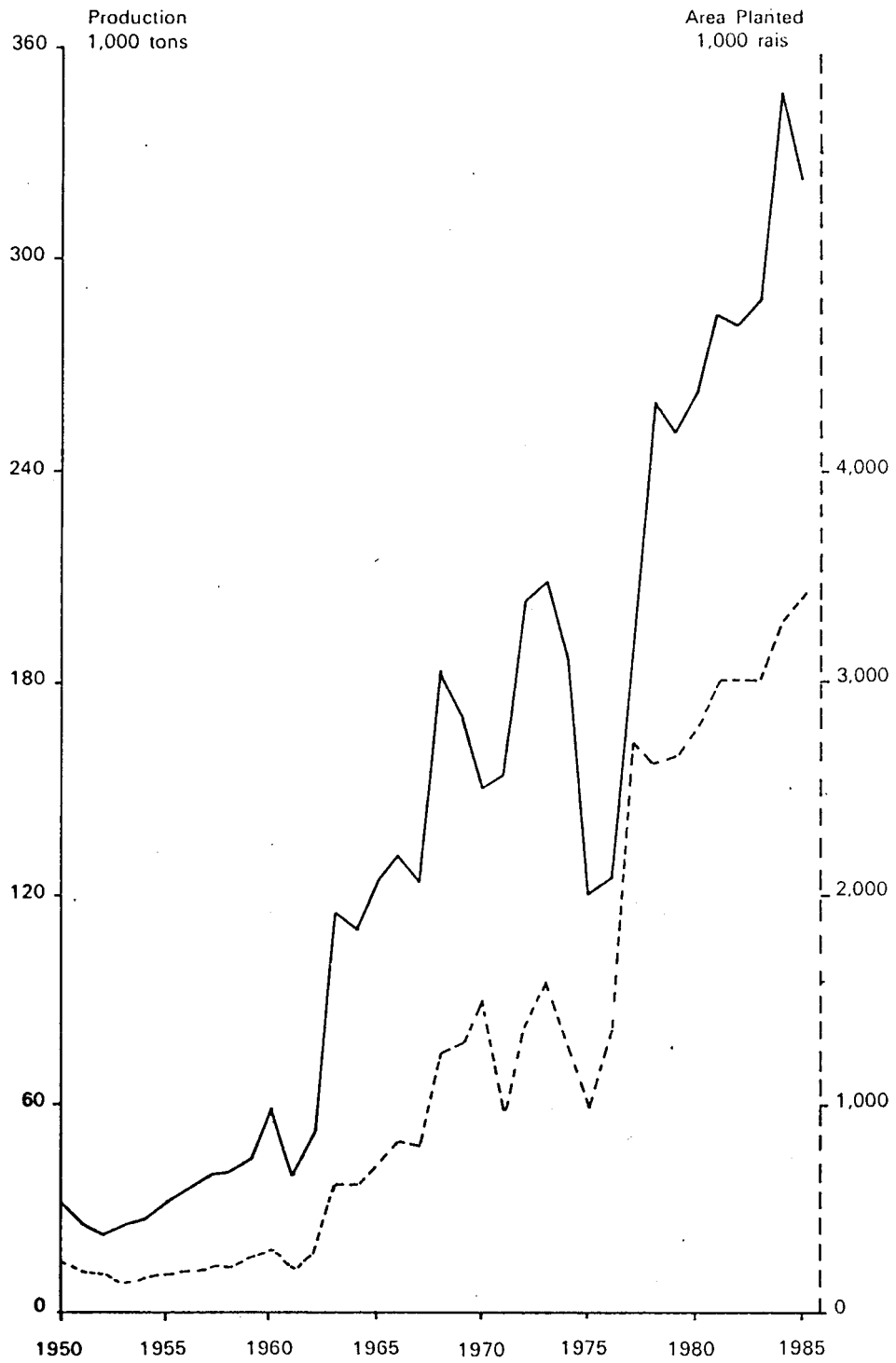


Figure 1 Production and Area Planted with Mungbean and Black Matpe in Thailand, 1950-1985  
Note 1 rai is equivalent to 0.16 hectare or 0.395 acre

The third phase per se, started with another twofold increase in both production and area planted from 1976 to 1977. This marked the second round of an abrupt expansion of mungbean and black matpe and it caused problems in trade, especially in their export. Nevertheless, most of the trade problems were settled by close co-operation between the trader's association and the government agencies concerned, such as the Thai Maize and Produce Traders Association, the Japan Bean Sprout Importers Association and the Department of Foreign Trade under the Ministry of Commerce of Thailand. There has also been a co-operative effort among Thai exporters in exploring new export markets and making collective sales to importing countries such as the People's Republic of China. Thus in this phase, the production and trade of mungbean and black matpe has become more organized, with some government intervention when necessary.

## Production and Utilization

In this chapter the discussion will cover the production and utilization aspects of mungbean and black matpe. In addition, attempts will be made to assess domestic demand and supply as well as export demand for these two products in the principal markets. Eventually, the scenarios of production and utilization of mungbean and black matpe will be constructed.

### Production

The salient points of cultural practices of mungbean are discussed first, followed by a discussion of the whole country by regions: are planted, production, and yield. Finally, the cost of production and return on mungbean and other cash crops are discussed.

### Cultural Practices

#### Cropping System

In general, mungbean, green bean, and black matpe are grown in three distinct seasons as follows:

- (1) Early rainy season planting is undertaken between April and May, while the time for harvesting is around July. The total harvest is about 10-15% of total yearly production. Most of the planted area is in the provinces of the upper Central Plain and lower northern region, such as Lopburi, Saraburi, Uthai Thani and Nakhonsawan.
- (2) Late rainy season – planting is carried out in August through to the middle of September, with the harvest in November, which marks the end of the rainy season. The harvest in this season accounts for more than 60% of the total yearly production. The major producing areas are in the lower northern region.
- (3) Dry season – beans are mostly planted in the paddy fields between January and February after the rice harvest. This crop will be harvested in April and May. Planting in this period is observed in both irrigated and rain fed areas, and the harvest is roughly 15-20% of total yearly production.

The cropping system under the rainfed condition recommended by the Department of Agricultural are :

- (1) Mungbean – Paddy – Mungbean;
- (2) Mungbean – Maize or Sorghum – Mungbean; and
- (3) Mungbean - Cotton

In most cases mungbean is grown as a monocrop. In some areas however, intercropping of mungbean with cotton, cassava or sugar cane is adopted by the farmers.

## Production Technology

**Land preparation and planting:** Mungbean are grown on both upland areas and paddy fields. In upland areas, farmers generally plough and harrow their land once before planting. However, in some upland areas, where mungbean is planted in the early rainy season on the maize or sorghum fields, seeds are simply sown among the stems of maize or sorghum. As for the paddy fields, farmers plough their land with 7-inch-wide ploughshares, and immediately broadcast the seeds while the moisture content of the land is still sufficient.

Farmers use three planting methods. The most popular is broadcasting, and the officially recommended amount of seeds under this method is 5-6 kg/rai, which should be evenly spread. The second method is row planting with a recommended spacing of 50 cm. In every metre of each planting row, about 20 plants are sown consuming 3-4 kilograms of seeds per rai. The third method is very labour intensive, with the mungbean planted in an equidistant spacing of 50 x 20 cms.

Of the three planting methods, broadcasting is the easiest and cheapest way of planting though it has the highest seed consumption per rai. Experiments by the Department of Agriculture using these 3 planting methods under good land preparation with proper crop care, show a comparable yield.

**Varieties:** The two most popular varieties of mungbean are the native variety and Uthong 1 variety, named in honor of the Uthong Agricultural Experimental Station. With black matpe, the Uthong 2 variety is prevalently used. The Uthong 1 variety of mungbean is not resistant to cercospora leaf spot and powdery mildew, but it is a consistent high yielding variety. However, it is expected that some new varieties will be released by the Department of Agriculture, which has closely co-operated with both international and national institutions is carrying out the experiments on variety improvement of mungbean.

**Crop Care:** Weed control is one crucial factor among others, that effects the yield of mungbean. After planting, weeding is required once twice every 15 days, either by ploughing or chemicals. It was observed that most farmers in the northern region sprayed herbicide for weed control 15 days after planting at an amount of one litre for 2-3 rais. Liquid fertilizer is often applied in producing mungbean. In many cases, fertilizer is mixed with pesticide and sprayed on the foliage. The officially recommended fertilizer is formula 3-9-6 or 3-6-6 (N, P, K) at rate of one kilogram per rai.

**Harvesting:** The maturity of mungbean and green bean pods on each plant is different, therefore, harvesting of these beans by hand has to be done 3-4 times within the period of 60-90 days after planting. Consequently, the harvesting of mungbean and green bean is a very consuming and labour intensive activity. Moreover, matured pods break off and often the beans fall on the ground, thus reducing the yield.

The harvesting of black matpe, however, is comparatively easier than that of mungbean, because the matured pods do not break off when they are still on the plant, so harvesting can be done reaping the whole plant. During the last 3 years, almost all the mungbean was harvested by using the same method.

After harvesting, the pods are dried in the sun. The well-dried pods are then threshed by various methods depending upon the quantity harvested. For a small amount of mungbean the grain is threshed out by beating the dried pods with a bamboo stick<sup>4</sup>. For a large amount of mungbean or black matpe, threshing is done by trampling of draft animals, or tractors, and by using locally made threshing machines. At present, the majority of mungbean and black matpe grain is threshed by machine. In some areas, threshing machines are not properly used creating some post-harvest loss.

## **Area Planted, Production and Yield**

### **Whole Country**

As mentioned above the official statistics are not classified by variety of beans. Available data are on all kinds of mungbean which includes green bean and black matpe, particularly those data on area planted and harvested, production, yield and cost of production. Therefore, the following discussions cover all varieties of mungbean.

During the period of 1971/1972 to 1986/1987, the total area planted with mungbean increased tremendously, from 984 thousand rais in 1971/1972 to 3,313 thousand rais in 1986/1987 or a more than threefold increase (see Table 1). However, for the last five years (1982/1983 to 1986/1987, the area planted has fluctuated between 3,022 to 3,426 thousand rais with an average annual rate of change of about one percent. The total yield over the last 16 years (1971/1972 to 1986/1987) increased slightly more than twofold, from 153 thousand tons in 1971/1972 to 325 thousand tons in 1986/1987. Nevertheless, in the last 5 years (1982/1983 to 1986/1987), the total yield increased at an average of about 4 percent. This increase is more or less due to the fluctuation of the average yield, which ranges from 98 to 117 kg/rai.

The official statistics on average yield per rai show a wide range of fluctuation, the lowest being 88 kg/rai in 1977/1978 and the highest at 156 kg/rai in 1971/1972 (see Table 1). The low yield in 1977/1978 was affected by unfavorable weather conditions in that particular crop year, with a drought in the early rainy season followed by a flood in the late rainy season. The high yielding year in 1971/1972 could be partly explained however, by the fact that the average yield is simply computed by dividing the total production by the total area planted (see Table 1). A decreasing trend of average can be observed for the period of 1971/1972 to 1986/1987 and the period of 1982/1983 to 1986/1987 (the last five years)

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<sup>4</sup> Asian Productivity Organization 1982. Grain Legumes production in Asia. Asian Productivity Organization, Tokyo 226 p.

**Table 1** Area, Production., Yield, Farm Price, Farm Value and Average Cost of Production of Mungbean : 1971/1972 to 1986/1987

Crop Year beginning April	Planted Area 1.000 rai	Harvested Area 1.000 rai	Production 1.000 ton	Yield per rai Kg/rai	Farm Price Baht/Kg.	Farm Value Million B	Av. Cost of Production Baht/Kg
1971/1972	984	n.a	153	156	2.24	343.6	n.a
1972/1973	1.418	n.a	204	144	2.57	524.8	n.a
1973/1974	1.596	n.a	209	131	2.68	560.9	n.a
1974/1975	1.293	1.192	188	145	3.54	665.2	n.a
1975/1976	1.022	920	121	118	3.74	451.0	n.a
1976/1977	1.392	1.298	125	96	4.98	621.4	5.04
1977/1978	2.720	2.362	207	88	5.67	1,173.3	4.27
1978/1979	2.638	2.340	259	111	5.00	1,294.9	4.31
1979/1980	2.652	2.216	251	113	4.77	1,195.8	5.31
1980/1981	2.796	2.469	261	106	5.85	1,527.1	6.2
1981/1982	3.040	2.861	284	99	6.56	1,860.7	5.84
1982/1983	3.034	2.775	281	101	7.01	1,971.6	6
1983/1984	3.022	2.803	288	103	7.07	2,038.5	5.66
1984/1985	3.280	3.017	352	117	6.44	2,269.2	5.25
1985/1986	3.426	3.307	323	98	6.6	2,134.5	6.06
1986/1987 (P)	3.313	n.a	325	98	5.89	1,914.2	n.a

Note : One rai is equivalent to 0.16 hectare or 0.395 acre

Source : "Agricultural Statistics of Thailand Crop Year 1980/1981, 1983/1984, 1985/1986"

(P) - Preliminary data from "Agricultural Statistics in Brief Crop Year 1986/1987"

Office of Agricultural Economics, Ministry of Agricultural and Co-operatives

## Mungbean

The statistics oil area planted and yield of mungbean, include a small amount of green bean and are available from 1978/1979 onwards as shown in Table 2. The total area planted with mungbean increased almost every year except in 1980/1981, from 1,445 thousand rai to 2,748 thousand rai in 1978/1979 and 1985/1986 respectively (for the area planted in each province ill crop year 1985/1986, see Figure 1 in the Appendix). On the average, the total area for the whole country planted during, 1982 1983 to 1985/1986 is 2,450 thousand rai which comprises 1,838 thousand rai in the northern region (75% of the total), 387 thousand rai in the central region (16% of the total), 206 thousand rai in the northeastern region (8% of the total), and only 18 thousand rai in the southern region. Among these regions, the area planted in the northeast increased most rapidly by 5.5 times from 57 thousand rai in 1978/1979 to 315 thousand rai in 1985/1986, while in the northern region it approximately doubled. The area planted in the central region fluctuated between 278 to 608 thousand rai whilst that in the southern region decreased from 43 thousand rai in 1978/1979 to 29 thousand rai in 1985/1986.

During the period of 1978/1979 to 1985/1986, the total production of mungbean for the whole country increased from 121 thousand tons in 1978/1979 to 248 thousand tons in 1985/1986, an increase of 105% which was slightly higher (about 15%) than the increase in area planted (see Table 2). This may be due to an increase in the average yield for the whole country, from 84 to 90 kg/rai in 1978/1979 and 1985/1986 respectively. Taking a mean average between 1981/1983 and 1985/1986, production in the northern and central regions accounts for 77% of the total, or 181 thousand tons and 35 thousand tons respectively, whereas the northeastern region 15% of the total or 19 thousand tons, and the southern region produces only 1.4 thousand tons.

**Table 2 Area Planted, Production and Yield of Mungbean: Dhole Country and by Region: Crop Year 1978/1979 - 1985/1986**

	1978/1979	1979/1980	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	1985/1986	Average 1978/1979- 1981/1982	Average 1982/1983- 1985/1986
<b>Area Planted (rai)</b>										
Northern	1,066,490 (74)	1,304,457 (75)	1,158,267 (71)	1,366,589 (65)	1,740,246 (79)	1,644,451 (73)	1,951,905 (74)	2,017,524 (73)	1,223,951 (71)	1,838,532 (75)
Central	278,150 (19)	360,419 (21)	383,550 (24)	607,686 (29)	341,927 (16)	452,988 (20)	369,639 (14)	387,081 (14)	407,451 (24)	387,909 (16)
North-Eastern	57,342 (4)	50,550 (3)	81,589 (5)	95,661 (5)	108,617 (5)	138,597 (6)	262,075 (10)	315,261 (12)	71,286 (4)	206,138 (8)
Southern	43,159	23,661	3,013	15,674	1,493	6,839	36,000	28,682	21,377	18,254
Whole Country	1,445,141	1,739,087	1,626,419	2,085,610	2,190,283	2,242,875	2,619,619	2,748,548	1,724,065	2,087,197.5
<b>Production (tons)</b>										
Northern	90,353 (74)	108,002 (74)	116,283 (77)	140,751 (70)	163,847 (81)	162,952 (75)	213,620 (77)	184,259 (74)	113,847 (74)	181,170 (77)
Central	21,365 (18)	30,364 (21)	24,567 (17)	48,802 (24)	27,310 (14)	42,100 (20)	35,726 (13)	33,499 (14)	31,275 (20)	34,659 (15)
North-Eastern	6,480 (5)	5,408 (4)	9,406 (6)	9,385 (5)	10,774 (5)	11,440 (5)	24,662 (9)	28,388 (11)	7,670 (5)	18,816 (8)
Southern	3,165	2,214	227	1,005	88	420	2,946	2,359	1,653	1,453
Whole Country	121,354	145,988	150,483	199,943	202,019	216,912	276,954	248,505	154,442	236,098
<b>Yield (kg/rai)</b>										
Northern	85	83	100	103	94	92	109	91	93	97
Central	77	84	64	80	80	85	97	87	76	87
North-Eastern	113	107	115	98	99	81	94	90	108	91
Southern	73	94	75	64	59	60	82	82	77	71
Whole Country	84	84	93	96	92	90	106	90	89	95

Note : The figures in parenthesis are the percentage for the whole country

Source : 1978/1979 to 1983/1984 from "Production and Marketing of Mungbean Crop Year 1984/1985" Office of Agricultural Economics (OAE) Ministry of Agriculture and Co-operatives, (MOAC), Bangkok, Thailand, 1984/1985 to 1985/1986 from Agricultural Statistics Centre, OAE, MOAC, Bangkok, Thailand.



The average yield in the northern and central regions shares the slightly upward trend with the whole country's average. However, a decreasing trend was observed for the average yield in the northeastern region. Taking a mean average between 1982/1983 and 1985/1986, the yield in the northern region is the highest at 97 kg/rai, followed by the northeastern at 95 kg/rai, the central region at 87 kg/rai and the southern region at 71 kg/rai.

### Black matpe

The available statistics on area, production, and yield of black matpe are shown in Table 3. During the period of 1978/1979 to 1985/1986, the total area planted in Thailand decreased from 1.192 thousand rai in 1978/1979 to 677 thousand rai in 1985/1986 and a downward trend was also observed for the area planted in each province in crop year 1985/1986 (for the Appendix). This was due mainly to the decrease in area planted in the northern and central regions which accounted for, based on the mean average between 1982/1983 and 1985/1986, 90% of the total or 624 thousand rai and 9% of the total or 59 thousand rai respectively. In the same period, the total production for the whole country also decreased at more or less the same rate as the area planted. During the period of 1982/1983 to 1985/1986, the average production for the whole country was 75 thousand tons per crop year, comprising 69 thousand tons and 5 thousand tons produced by the northern and central regions respectively, while the northeastern region produced about one thousand tons. The average yield of the whole country and the northern region fluctuated in the pattern between 86 to 118 kg/rai with an annual mean average (1982/1983 to 1985/1986) of 109 kg/rai and 111 kg/rai respectively.

During the period of 1978/1979 to 1985/1986, the comparison between mungbean and black matpe with regard to their area planted, production and yield, showed at least two interesting results. Firstly, there are the reverse trends of the total whole country area planted: an upward trend for mungbean and a downward trend for black matpe. However, the increase in mungbean area planted has been much greater than the decrease in that of black matpe, therefore, the total area planted of these two products increased as mentioned before, which also held true for the production of these products. Secondly, the average yield of black matpe either nationally or by region is about 15% higher than that of mungbean. This may be a reflection of the comparatively easier harvesting of black matpe which is not constrained by the different maturity of the pods. Both mungbean and black matpe are concentrated in the northern region which produces more than 70% (mungbean) and 85% (black matpe) of the national production.

**Table 3 Area Planted, Production and Yield of Black Matpe: Whole Country and by Region : Crop Years 1978/1979 - 1985/1986**

	1978/1979	1979/1980	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	1985/1986	Average 1978/1979- 1981/1982	Average 1982/1983- 1985/1986
<b>Area Planted (rai)</b>										
Northern	952,277 (80)	801,990 (88)	1,059,111 (90)	907,085 (96)	659,318 (78)	599,196 (98)	609,288 (93)	629,752 (93)	930,116 (88)	624,389 (90)
Central	224,769 (19)	86,464 (9)	79,546 (7)	25,692 (3)	167,293 (20)	2,353 (-)	29,560 (4)	39,411 (6)	104,118 (10)	59,654 (9)
North-Eastern	15,586 (1)	24,720 (3)	5,985 (1)	11,365 (1)	4,260 (1)	9,844 (2)	18,912 (3)	8,272 (1)	14,414 (1)	10,322 (1)
Southern	309	-	24,968	733	10,894	77	-	-	6,503	2,743
Whole Country	1,192,941	913,174	1,169,610	944,875	841,765	611,470	657,760	677,435	1,055,150	697,108.0
<b>Production (tons)</b>										
Northern	111,219 (81)	94,826 (90)	101,579 (92)	78,107 (95)	65,471 (83)	70,429 (99)	70,833 (94)	69,225 (92)	96,433 (89)	68,990 (92)
Central	24,664 (18)	7,316 (7)	6,747 (6)	3,254 (4)	12,529 (16)	273 (-)	2,586 (3)	4,900 (7)	10,495 (10)	5,072 (7)
North-Eastern	1,705 (1)	2,552 (3)	478 (1)	1,162 (1)	424 (1)	716 (1)	1,981 (3)	772 (1)	1,474 (1)	973 (1)
Southern	30	-	1,754	87	813	7	-	-	468	205
Whole Country	137,618	104,694	110,558	82,610	79,237	71,425	75,400	74,897	108,870	75,240
<b>Yield (kg/rai)</b>										
Northern	117	118	96	86	99	118	116	110	104	111
Central	110	85	85	127	75	116	81	124	102	99
North-Eastern	109	103	80	102	100	73	105	93	99	93
Southern	79	-	70	119	75	91	-	-	95	83
Whole Country	115	115	95	87	94	117	115	111	103	109

Note : The figures in parenthesis are the percentage for the whole country

Source : 1978/1979 to 1983/1984 from "Production and Marketing of Mungbean Crop Year 1984/1985" Office of Agricultural Economics (OAE) No. 28/2529, Ministry of Agriculture and Co-operatives, (MOAC), Bangkok, Thailand, 1984/1985 to 1985/1986 from Agricultural Statistics Centre, OAE, MOAC, Bangkok, Thailand.

### **Cost of Production and Return**

Officially, only the cost of production of mungbean is available from the Office of Agricultural Economics. However, these available statistics on mungbean production cost may be regarded as the production cost of black matpe and green bean, because the production technology of these beans is almost the same. Therefore, the cost of production of mungbean will be used as the average cost of production of black matpe and green beans.

#### **Cost of Production**

The average national production cost of mungbean classified by cash and non-cash cost for crop years 1978/1979 to 1985/1986 is shown in Table 4. During this period, the total cost fluctuated between the lowest of 422.40 baht/rai in 1978 / /1979 and the highest of 588.20 baht/rai in 1983/1984. However, the total cost on the mean average between 1981/1982 and 1985/1986 (5 crop years) was 557.90 baht/rai with an average yield of 97.00 kg/rai giving an average cost per kilogram of 5.67 baht. This average total cost is composed of 81% or 450.60 baht/rai as variable cost and the rest 19% or 107.30 baht/rai as fixed cost which is more or less in line with the cost structure of other cash crops.

Once the cost structure is further classified into cash and non-cash cost, then the total cost comprises 54% or 303.74 baht/rai as non-cash cost and 46% or 254.16 baht/rai as cash cost. In fact, most of the cash costs are under the variable cost category, with a very small amount of cash cost under fixed cost category (see Table 4).

Table 5 shows the details of itemized average cost of production of mungbean both for the whole country and northern region in crop year 1985/1986. Among the variable cost items of the national cost of production, the harvesting cost is the highest at 97.59 baht/rai followed by the land preparation cost at 88.93 baht/rai, seed cost at 65.59 baht/rai, threshing cost at 33.2 baht/rai and weeding cost at 29.99 baht/rai. All these listed costs of threshing, land preparation, seed and harvesting have a rather high percentage of cash cost component at 78%, 75%, 58% and 55% respectively. This would imply that farmers use cash or credit for purchasing these production services and inputs.

The cost of pesticide in liquid and powder form is at 14.80 baht/rai which is 3.5 times more than the cost of fertilizer (4.23 baht/rai). This reflects the disease problems faced by the mungbean growers, and the problem of low fertilizer application rates which in turn affects the yield per rai.

**Table 4 The Whole Country average Production Cost of Mungbean Classified by Cash and Non-cash Cost: Crop Years 1978/1979 - 1985/1986**

	Unit : Baht per Rai								
	1978/1979	1979/1980	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	1985/1986	Average 1981/1982 to 1985/1986
Variable Cost : Cash	122.74	295.77	270.67	268.70	243.61	234.80	252.14	244.77	247.00
	(29)	(59)	(47)	(49)	(44)	(40)	(45)	(45)	(44)
Non-cash	250.35	132.89	225.66	224.02	201.75	229.24	189.98	173.02	203.60
	(59)	(27)	(39)	(41)	(36)	(39)	(34)	(32)	(37)
Total	373.09	428.66	496.33	492.72	445.36	464.04	442.12	417.79	450.60
	(88)	(86)	(86)	(90)	(80)	(79)	(79)	(77)	(81)
Fixed Cost : Cash	2.18	2.88	12.02	12.02	3.66	4.03	8.53	7.58	7.16
	(1)	(1)	(2)	(2)	(1)	(1)	(1)	(1)	(1)
Non-cash	47.13	67.65	68.59	44.46	109.15	120.13	111.62	115.37	100.14
	(11)	(13)	(12)	(8)	(19)	(20)	(20)	(21)	(18)
Total	49.31	70.53	80.61	56.48	112.81	124.16	120.15	122.93	107.30
	(12)	(14)	(14)	(10)	(20)	(21)	(21)	(23)	(19)
Total Cost : Cash	124.92	298.65	282.62	272.12	247.27	238.83	260.67	252.35	254.16
	(30)	(60)	(49)	(50)	(44)	(41)	(46)	(47)	(46)
Non-cash	297.48	200.54	294.25	278.07	310.90	349.37	301.60	288.37	303.74
	(70)	(40)	(51)	(50)	(56)	(59)	(54)	(53)	(54)
Total	422.40	499.19	576.87	549.19	558.17	588.20	562.27	540.72	557.90
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Yield (kg/rai)	98.00	94.00	93.00	94.00	93.00	104.00	107.00	94.00	98.40

Note : The figures in parenthesis are the percentage for the whole country.

Source : Agricultural Research Division, Office of Agricultural Economics, Ministry of Agriculture and Co-operatives.

Table 5 Cost of Production of Mungbean Whole Country and Northern Region : Crop Year 1985/1986

Unit : Baht per Rai

Cost Item	Whole Country			Northern Region		
	Cash	Non Cash	Total	Cash	Non Cash	Total
Variable Cost :	244.77	173.02	417.79	248.18	169.10	417.28
1. Total labour cost	178.17	133.37	311.54	187.21	125.41	312.62
1.1 Labour cost in planting	89.81	69.15	158.96	96.45	65.72	162.17
Land preparation : labour	3.66	11.82	15.48	4.44	12.93	17.37
machine	63.23	10.22	73.45	66.84	3.61	70.45
Planting : labour	51.16	13.02	64.18	5.19	13.15	18.34
Weeding : labour	10.56	19.43	29.99	12.55	19.00	31.55
Pesticide and fertilizer application : labour	6.69	12.64	19.33	7.33	13.61	20.94
machine	0.46	0.21	0.67	0.04	1.01	1.05
1.1 Labour cost in harvesting	88.36	64.22	152.58	90.76	59.69	150.45
Harvesting labour	53.54	44.05	97.59	53.97	40.04	94.01
Threshing : labour	1.30	6.11	7.41	1.35	6.08	7.43
machine	24.76	1.03	25.79	25.57	0.43	26.00
Loading and transporting machine	2.17	6.48	8.65	2.42	6.57	8.99
machine	6.58	2.72	9.30	7.45	2.64	10.09
Drying : labour	-	2.57	2.57	-	2.66	2.66
Packing : labour	0.01	1.26	1.27	-	1.27	1.27
2. Cost of materials	65.74	27.48	93.22	60.19	31.54	91.73
Seed	38.14	27.45	65.59	32.96	31.54	64.50
Fertilizer : solid	2.07	-	2.07	1.71	-	1.71
liquid	2.14	-	2.14	2.21	-	2.21
Pesticide : solid	10.10	-	10.01	8.91	-	8.91
powder	3.76	0.03	3.79	4.88	-	4.88
Equipment	9.62	-	9.62	9.43	-	9.43
3. Others	0.86	12.17	13.03	0.87	12.15	13.02
Maintenance of equipments	0.86	-	0.86	0.87	-	0.87
Opportunity cost of	-	12.17	12.17	-	12.15	12.15
Fixed costs	7.58	115.35	122.93	7.30	118.39	125.69
1. land use	7.58	114.11	121.69	7.30	117.17	124.47
2. depreciation of equipment	-	1.24	1.24	-	117.17	124.47
Total cost per rai	252.35	288.37	540.72	255.48	287.49	542.97
Yield per rai : kg/rai	-	-	94.00	-	-	96.00
Cost per kilogram : baht/kg	-	-	5.75	-	-	5.66

Source : Agricultural Research Division, Office of Agricultural Economics, Ministry of Agriculture and Co-operatives.

## **Net Returns**

The average national net returns per rai on producing mungbean were computed by using the data on national average yield, farm price and total cost per rai, to calculate the difference between gross returns per rai (yield per rai times farm price) and the total cost per rai. The results are shown in Table 6. During the period of 1976/1977 to 1985/1986 the net returns fluctuated between 43.14 baht/rai and 191.21 baht/rai. However, the comparison of net returns between the average of 1976/1977 to 1980/1981 and the average of 1981/1982 to 1985/1986 shows that the latter is about 36% higher than the former. Thus the net returns for the last five years were better than the previous five years, as the average total cost in these two periods increased at 27.0%, whereas the average price increased at 28.4% and the average yield also increased at about 0.8%.

## **Comparison of Net Returns**

Employing the same method as the computation of net returns per rai on producing mungbean the net returns per rai on growing the other cash crops, such as soybean maize and cassava as well as the second crop of rice, were computed and the results are in Table 6. Note that during 1976/1977 to 1985/1986, only the net returns, of mungbean and maize were positive, and the highest net returns went to cassava at 1,182.18 baht/rai in 1982/1983. The second crop of rice suffered the lowest net returns at -371.84 baht/rai in 1985/1986. Nevertheless, among the cash crops, the average net returns per rai for the period of 1976/1977 to 1985/1986 show that the net returns of mungbean were the lowest at 113.79 baht/rai followed by maize at 161.11 baht/rai soybean at 197.93 baht/rai and cassava at 582.52 baht/rai.

During the period of 1976/1977 to 1985/1986, despite the comparatively low net returns per rai of mungbean among the cash crops mentioned above, the production of mungbean has been increasing. Two factors play a major role. Firstly, the majority of mungbean has been grown in the provinces within the northern region while cassava has been mostly produced in the northeastern region. This was due to the regional concentration of agricultural commodities, which was more or less created by the investment in infrastructures, such as processing plant in each region, and to some extent was influenced by government policies. Secondly, local merchants had some influence in promoting the production of mungbean, which in turn created a ready local market for farmers to sell their mungbean and to acquire some necessary inputs and services for their production.

**Table 6 Yield, Total Cost, Farm Price and Net Returns of Mungbean, Soybean, Maize, Cassava and Second Rice Crop : 1976/1977 to 1985/1986**

	1976/1977	1977/1978	1978/1979	1979/1980	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	1985/1986	Average 1976/1977- 1980/1981	Average 1981/1982 - 1985/1986
<b>Yield (kg/rai)</b>												
Mungbean	96	88	111	113	106	99	101	103	117	98	102.80	103.60
Soybean	193	118	175	163	152	168	180	184	204	206	160.20	188.40
Maize	382	275	340	322	357	377	368	363	389	412	335.20	381.80
Cassava	2,281	2,482	2,235	2,360	2,284	2,618	2,985	2,395	2,239	2,026	2,328.40	2,452.60
Rice Sec. Crop	0.516	551	579	566	613	568	539	591	596	586	565.00	576.00
<b>Total Cost (B/rai)</b>												
Mungbean	371.73	341.56	422.40	499.19	576.96	549.19	558.17	557.20	562.27	572.56	442.37	566.08
Soybean	652.28	490.79	562.01	675.63	843.64	913.30	931.20	977.06	953.13	990.74	652.87	953.09
Maize	469.09	397.53	483.27	524.27	585.18	608.35	592.47	641.74	679.51	704.70	491.87	645.35
Cassava	654.59	609.87	673.71	779.41	939.34	966.56	1,026.72	986.48	1,041.97	988.90	731.38	
Rice Sec. Crop	790.93	801.43	1,084.38	1,432.65	1,425.19	1,497.20	1,570.28	1,445.45	1,500.81	1,462.39		
<b>Farm Price (B/kg)</b>												
Mungbean	4.98	5.67	5.00	4.77	5.85	6.56	7.01	7.07	6.44	6.60	5.25	6.74
Soybean	4.70	5.61	5.39	5.26	5.78	6.81	5.12	6.07	6.00	6.38	5.35	6.08
Maize	1.67	1.64	1.61	2.09	2.43	2.18	2.04	2.49	2.33	1.79	1.89	2.17
Cassava	0.47	0.37	0.77	0.75	0.46	0.51	0.74	0.66	0.40	0.78		
Rice Sec. Crop (Baht/rai)	1,897.53	2,143.71	2,163.76	2,543.84	3,194.80	2,859.28	2,903.00	2,903.00	2,499.00	1,861.00		
<b>Net Returns (B/rai)</b>												
Mungbean	106.35	157.40	135.60	39.82	43.14	100.25	149.84	140.01	191.21	74.24	94.46	131.11
Soybean	254.82	171.19	381.24	181.75	34.92	230.78	(9.60)	139.82	270.87	323.54	204.78	191.08
Maize	168.85	53.47	64.13	148.71	282.33	213.51	158.25	262.13	226.86	32.78	143.50	178.71
Cassava	417.48	308.47	1,047.24	990.59	111.30	368.62	1,182.18	594.22	(146.37)	591.38	575.02	590.01
Rice Sec. Crop	188.20	379.75	1,684.438	7.16	533.22	126.87	(5.56)	309.82	(11.41)	(371.84)	255.35	9.58

Note : a Computed by (yield per rai x farm price - total cost per rai)

Source : For yield and farm price obtained from "Agricultural Statistics of Thailand Crop of Thailand Crop Year 1985/1986" Agricultural Statistic No. 32: Ministry of Agriculture & Co-operatives (MOAC). For total cost obtained from "Selected Economic Indicators Relating to Agriculture, No. 84 (5), 1981.

## Domestic Utilization

### Overall Utilization

The overall domestic utilization of mungbean as well as black matpe was estimated by a simple balance-sheet approach. In doing so, the total annual production of each commodity was regarded as the total available supply of that year. Assuming zero stock carried over, the annual domestic utilization of each commodity was calculated by subtracting the total export from the total production in that year. The results of this estimation are shown in Table 7.

Table 7 shows that from 1978 to 1985, the average domestic utilization of both mungbean and black matpe was 106.99 thousand tons or 37% of the total production. However, the average individual commodity's domestic utilization is quite different. Domestic utilization of mungbean was 87.39 thousand tons or 47% of its total production, while that of black matpe was 19.60 thousands tons or 21% of its total production. In other words, the domestic utilization of mungbean is two times higher than that of black matpe. Furthermore, the percentage of annual domestic utilization of mungbean fluctuated between 16% in 1978 and 61% in 1983, and that of black matpe was between the below zero percentage in the years 1980, 1983, and 1985, to as high as 57% in 1978. This shows that the estimated figure of domestic utilization of black matpe does not reflect positive evidence of steady domestic consumption of black matpe. On the contrary, the estimated domestic utilization of mungbean revealed that a certain amount of mungbean has been consumed annually through direct human consumption and processing.

**Table 7 Production, Export and Domestic Utilization of Mungbean and Black Matpe: 1978-1985**

	1978	1979	1980	1981	1982	1983	1984	1985	Average 1978-1985
Unit 1,000 tons									
<b>Mungbean</b>									
Production	121.35	145.99	150.48	199.94	202.02	216.91	276.95	248.51	195.27
Export	100.90	108.41	65.82	109.53	130.59	84.80	118.47	144.55	107.88
Domestic Utilization	20.45	37.58	84.66	90.41	71.43	132.11	158.48	103.96	87.39
<b>Black Matpe</b>									
Production	137.62	104.69	110.56	82.61	79.24	71.43	75.40	74.90	92.06
Export	59.71	69.15	113.53	62.64	59.64	72.06	53.96	88.97	72.46
Domestic Utilization	77.91	35.54	-2.97	19.97	19.60	-0.63	21.44	-14.07	19.60
<b>Total Mungbean and Black Matpe</b>									
Production	258.97	250.68	261.04	282.55	281.26	288.34	352.35	323.41	287.33
Export	160.61	177.56	179.35	172.17	190.23	156.86	172.43	233.52	180.34
Domestic Utilization	98.36	73.12	81.69	110.38	91.03	131.48	179.92	89.89	106.99

Note: The domestic utilization is simply the difference between production and export.

Source: The production and export data are obtained from the Agricultural Research Division, Office of Agricultural Economics, Ministry of Agriculture and Co-operatives.



## Domestic Utilization

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The overall domestic utilization of mungbean as well as black matpe was estimated by a simple balance-sheet approach. In doing so, the total annual production of each commodity was regarded as the total available supply of that year. Assuming zero stock carried over, the annual domestic utilization of each commodity was calculated by subtracting the total export from the total production in that year. The results of this estimation are shown in Table 7.

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Export	100.90	108.41	65.82	109.53	130.59	84.80	118.47	144.55	107.88
Domestic Utilization	20.45	37.58	84.66	90.41	71.43	132.11	158.48	103.96	87.39
<b>Black Matpe</b>									
Production	137.62	104.69	110.56	82.61	79.24	71.43	75.40	74.90	92.06
Export	59.71	69.15	113.53	62.64	59.64	72.06	53.96	88.97	72.46
Domestic Utilization	77.91	35.54	(2.97)	19.97	19.60	(0.63)	21.44	(14.07)	19.60
<b>Total Mungbean and Black Matpe</b>									
Production	258.97	250.68	261.04	282.55	281.26	288.34	352.35	323.41	287.33
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Note : The domestic utilization is simply the difference between production and export

Source : The production and export data are obtained from the Agricultural Research Division, Office of agricultural

Economics, Ministry of agriculture and Co-operatives

## **Human Consumption**

Most human consumption of mungbean is in the form of bean sprout, which is popular in many typical Thai dishes. It was estimated by the traders that the annual per capita consumption of bean sprout was about 0.7 to 1.0 kg. This would mean that in 1987, the total of mungbean consumed in the form of bean sprout was about 37.0 -52.9 thousand tons.

Mungbean is also consumed as a dessert by either boiling the whole bean or boiling the dehulled half-bean with sugar. Although figures for the amount of mungbean consumed as a dessert were not available, the estimation made by the Department of Agricultural Extension on other usage of mungbean at 10 thousand tons per year, might be regarded as an approximation of annual mungbean consumption as dessert.

## **Processing**

The processing of mungbean can be classified into two categories: (1) mungbean starch and transparent noodles, and (2) mungbean flour.

### **Mungbean Starch and Vermicelli**

Mungbean starch is used as an ingredient in many food products, and a trader reported that some of the mungbean starch was exported to neighbouring countries. Mungbean starch processing is more or less an integrated food manufacturing industry engaged in the production of vermicelli or transparent noodles. The manufacture of vermicelli was started in 1947, by Chinese immigrants adopting Chinese technology. At first, production was geared to act as a substitute for transparent noodles, mostly imported from China. Nowadays, transparent noodles are also exported to Europe and the Middle East, which imported 115 and 252 tons in 1982/1986 respectively.

A study by the Thailand Institute of Scientific and Technological Research (TISTR), reported that in 1984 the total production of vermicelli was about 12,000 tons per year with an annual growth rate ranging from 2 to 7%, while estimated domestic demand was between 7,800 to 9,400 tons per year. The total production of vermicelli was dominated by two big factories out of a total of 23 factories.

The proportion of mungbean starch used in the production of vermicelli, however, varies with the quality or grade of the final products of vermicelli. For instance, the first grade product used 100% mungbean starch, whereas the lower grade used about 50 to 80% of mungbean starch mixed with other starch such as potato and tapioca. This usage makes the estimation of total annual consumption of mungbean in the processing of vermicelli quite complicated.

### **Mungbean Flour**

Mungbean flour is produced by grinding or crushing mungbean into flour. The flour has various usages in food processing and daily food preparation as well. A certain proportion of mungbean flour is used in bakery products such as cookies or biscuits. The total production, as well as annual consumption of mungbean flour is still unknown, although traders estimated that the current annual consumption is around 10,000 tons/year.

## Estimated Annual Domestic Consumption

Although detailed information on domestic utilization of mungbean was not available, an attempt was made to estimate the annual consumption by using all the available information discussed above. The result is shown in Table 8. The estimated total annual mungbean consumption ranged from 106,030 to 149,900 tons in 1987, the two major mungbean utilizations being vermicelli or transparent noodles and bean sprout, at 40,000 to 60,000 tons and 37,030 to 52,900 tons per year respectively. These two usages account for more than 70% of the total annual domestic consumption.

As the utilization of mungbean in the production of vermicelli is faced with at least two competitive commodities: potato and tapioca starch, the annual consumption of mungbean is expected to fluctuate. In addition, the technological breakthrough in the modified starch industry will enable low-priced starch to substitute for high-priced starch in the food processing industries. Therefore, one may expect more fluctuation on mungbean consumption in the vermicelli or transparent noodles industries.

**Table 8 Estimated Domestic Utilization of Mungbean: 1987**

Item	Unit/tons/year	
	Range	
	Min.	Max.
Vermicelli made from mungbean or transparent noodles (1)	40,000	60,000
Bean sprout (2)	37,030	52,900
Mungbean flour	10,000	12,000
Seed (3)	12,000	15,000
Others : dessert dehulled half-bean	7,000	10,000
Total	106,030	149,900

Note : (1) Using the Department of agricultural Extension's estimate as the minimum and the Thailand Institute of Scientific and Technological Research's estimate as the maximum

(2) Using annual per capita consumption of bean sprout at 0.7-1.0 kg multiplying with the population in 1987 at 52.9 million

(3) Assuming total area planted for mungbean at one million rai and using seed at 12-15 kg/rai

## Export

### Overall Export Trend

Thailand has been exporting mungbean for more than 40 years. In 1957, the official record of mungbean exports was 10,452 tons totalling 3.3 million bath. Exports increased more than threefold to 33,375 tons worth 84 million baht in 1964. During this period (1957 to 1964), most of the mungbean was exported to Malaysia, Singapore, Hong Kong and Taiwan, with a small amount to Japan and Sri Lanka (for detailed statistics see Table 1 in the Appendix). There was no official record of the exports of black matpe before 1964.

The total export volume of mungbean and black matpe as well as the individual commodity is shown in Figure 2 (for detailed data see Table 2 in the Appendix). During the period of 1965 to 1986, the total volume of export revealed a similar pattern of fluctuation as that of mungbean, except in the years of 1970 and 1980, while the fluctuation of black matpe was slightly different. This difference was due to the fact that the average mungbean export accounted for more than 60% of the total; and in only 4 years (1967, 1971, 1972 and 1980) out of the total 22 years, was the export volume of black matpe greater than mungbean.

From 1965 to 1986, at least two separate increasing trends can be identified. The first trend was during the period of 1965 to 1976, in which the total volume of exports were less than 96 thousand tons, and the range of fluctuation was between 47 to 95 thousand tons. The second trend started from 1977 to 1986, when the volume of export exceeded 100 thousands tons. This revealed a comparatively steeper upward trend with wider fluctuation ranging from 108 to 233 thousand tons. The reason behind these two separate trends may be explained partly by the period of production expansion as mentioned in chapter one and partly by the development of export markets.

It is interesting to observe that from 1967 to 1980, the volume of export of mungbean depicted, on the average, a 5-years' time span cyclical movement. From 1980 to 1986, two clear 4-year durations of cyclical movements were observed: from 1980 to 1983, and from 1983 to 1986. There was no clear cyclical movement of the volume of export of black matpe

### **Export of Mungbean to Major Countries**

The export volume and value of mungbean to major countries during 1981 to 1986 is shown in Table 9. For the period of 1982 to 1986, the average annual export of mungbean was 111.4 thousand tons, with PR China receiving 36.5%, Taiwan 13.6%, India 12.7%, Hong Kong 4.9%, Singapore 3.8%, USA 3.1% and other countries 23.2%. However, the annual export volume to each major country fluctuated widely, for example, the quantity exported to PR China in 1981 was 21 thousand tons, increased to 53 thousand tons in 1982, then decreased to 39 and 32 thousand tons in 1985 and 1986 respectively; while, export to India was 8 thousand tons in 1981, decreased to 0.3 thousand tons in 1982, then increased to 56 thousand tons in 1985, followed by a sharp decrease to 3 thousand tons in 1986. Such severe fluctuation was due primarily to the fluctuation of the domestic supply in each of the mentioned countries as well as the available supply on the world market.

### **The People's Republic of China**

For the last five years, PR China has been the most important market for Thai mungbean. However, the annual quantity exported to PR China has been influenced by two main factors. The first factor is the mungbean production in PR China especially its production in the southern region. The second factor is the negotiation of the protocol between PR China and the Thai authorities, for the quantity of mungbean to be imported by PR China. In annual negotiations between the two countries, the Thai Maize and Produce Trader Association and its members (exporters), are active involved in the preparation of negotiations as well as the eventual signing of a trade agreement.

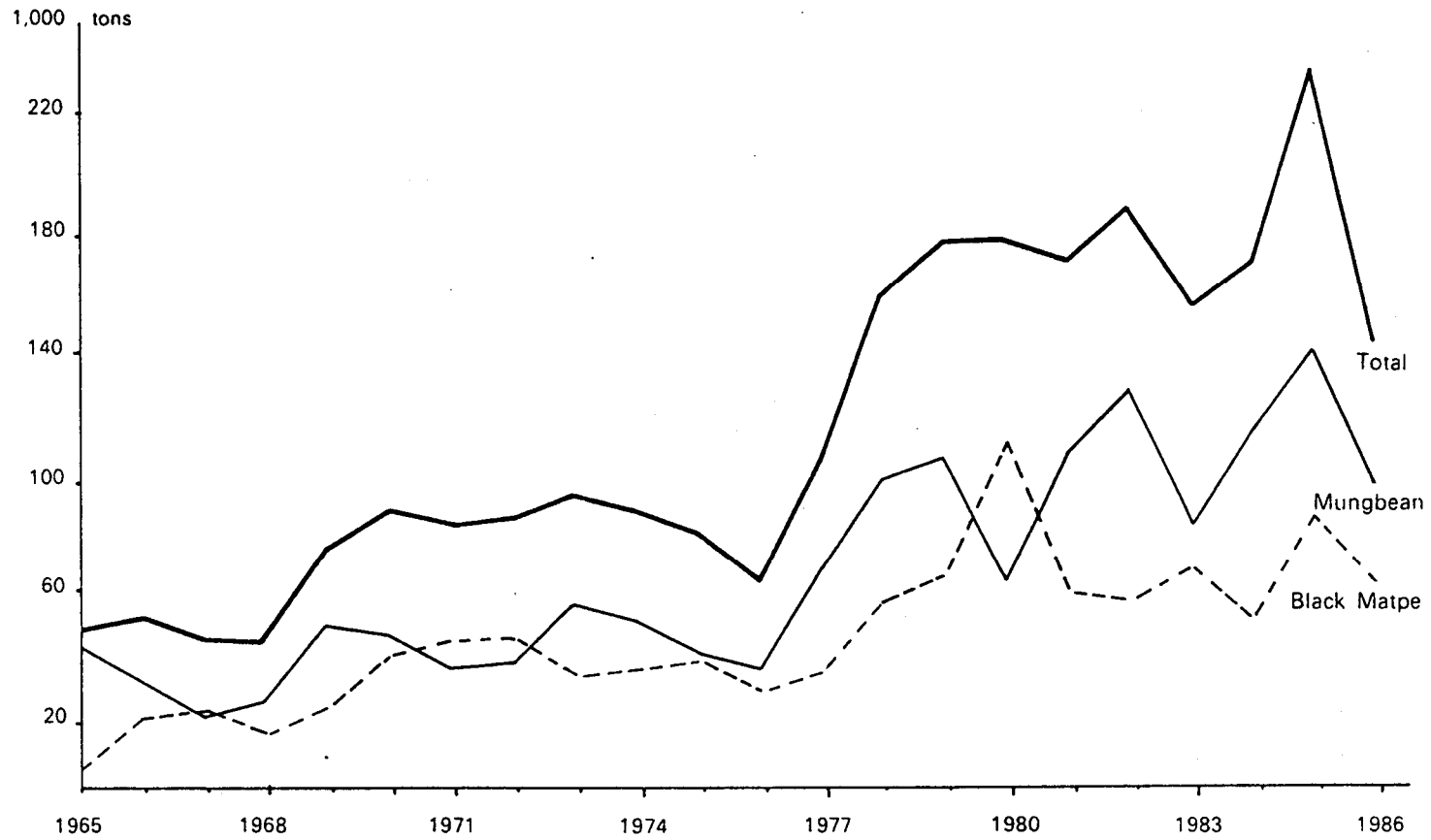


Figure 2 Annual Export Volume of Mungbean, Black Matpe and Total: 1965 to 1986

It should be noted that PR China imports and exports mungbean, and has been exporting its mungbean to those countries that were importing mungbean from Thailand. Traders report that the primary reason for this is due to China's domestic transportation problems in moving mungbean from the surplus to the deficit areas.

Information on the utilization of mungbean in PR China is not available. Thai mungbean exporters believe that mungbean imported by PR China is used for human consumption with a small amount processed into vermicelli. Under the current mungbean trading arrangement between PR China and Thailand, the traders have a rather optimistic view that PR China will continue to import annually about 30 thousand tons of mungbean from Thailand for the next few years. However, the actual amount of mungbean imported by PR China from Thailand each year is thought to be higher than the official record, because some of the mungbean was imported into PR China through Hong Kong. This indirect import of mungbean has a strong effect on the Thai domestic market, especially on its price fluctuation.

### **Taiwan**

Taiwan used to import the most mungbean from Thailand. During the last six years, the quantity imported from Thailand has decreased almost every year from 24 thousand tons in 1981 to 11 thousand tons in 1986. There are two major reasons for this. Firstly, there was an increase in import duty on mungbean, from roughly 20% to 40%, thus making it unprofitable to use mungbean in some processing industries. Secondly, some of the vermicelli producers have substituted mungbean with cheaper pulses from the USA.

Nevertheless, Taiwan is still expected to import mungbean from Thailand for an consumption, especially for direct consumption and bean sprout. It was estimated that for the next few years, Taiwan will import yearly about 15 to 20 thousand tons of mungbean from Thailand.

### **Hong Kong and Singapore**

The importation of mungbean by Hong Kong and Singapore shared the same feature. Only a certain amount of their import is for domestic human consumption and the rest is re-exported to other countries. For instance, Hong Kong re-exported to PR China, and Singapore re-exported to Brunei as well as Indonesia. The quantity of mungbean imported by Hong Kong from Thailand depends greatly upon the supply condition of PR China and the relative price. Thai exporters expect that Hong Kong will continue to import about 2 thousand tons of mungbean from Thailand per year, while Singapore will import in the range of 3 to 4 thousand tons.

### **India**

India has been a major market for Thai mungbean and black matpe. The quantity of mungbean imported from Thailand has fluctuated highly, ranging from as low as 0.8 thousand tons or 9.2% of the total Thai mungbean export in 1983, to a high at 55.6 thousand tons in 1985. This was due primarily to the fact that India imports mungbean and other pulses from many countries besides Thailand, such as PR China and Australia, so the available supply of pulses and their relative prices determine to a great degree, the quantity of mungbean to be imported from Thailand.

Moreover, since India suffers from insufficient foreign exchange, only the exporting countries who can offer longer credit terms, or are able to trade mungbean and other pulses in exchange for exportable Indian commodities, are in a strong position to conclude export arrangements with India. In early 1986, India imposed a 25% import duty on mungbean and other kind of beans. This caused all mungbean and black matpe trade between India and Thailand to almost vanish. Fortunately, trading recovered when the Thai authorities concerned were able to negotiate a 10% decrease in the import duty for mungbean with Indian authorities.

Although India is regarded as a potential market for Thai mungbean and black matpe, the previous fluctuation of quantity of mungbean imported by India, plus the uncertainty of pulse supply in the world market and the domestic production in India, make it rather difficult to estimate the annual export of mungbean to India. However under normal conditions with its competitive price level, Thailand should be able to export about 15-20 thousand tons of mungbean to India.

### **Other Countries**

The USA has been a continuous mungbean importer from Thailand for the last decade. Mungbean export to the USA, however has faced quality problems with the Food and Drug Authority (FDA) of the USA due to insecticide residues in the imported Thai mungbean being higher than the permitted level. Therefore the quantity of mungbean imported by the USA has decreased to an average (1982 to 1986) of 3.5 thousand tons per year. This quantity is expected to remain stable.

Other continuous buyers of Thai mungbean are countries in the Middle East: Saudi Arabia and the United Arab Emirates; and countries in Europe: France, the UK, and West Germany. These countries imported about one thousand ton of mungbean per year for domestic human consumption. In addition, there were some periodical buyers of Thai mungbean such as Indonesia, that would import mungbean from Thailand in the event of a domestic shortage. All these countries collectively imported about 26 thousand tons of mungbean from Thailand on an annual average between 1982 and 1986.

### **Export of Black Matpe to 'Major Countries**

Table 10 shows the export volume and value of black matpe to major countries from 1981 to 1986. During this period, the annual export quantity fluctuated between 54 thousand tons and 89 thousand tons. Taking the mean average from 1982 to 1986, the total export of black matpe was 68.3 thousand tons per year worth 647.7 million bath, of which 48.8% or 33.3 thousand tons were exported to Japan, and 34.6% or 23.7 thousand tons to India. Only 3.5% or 2.4 thousand tons and 3.0% or 2 thousand tons were exported to Malaysia and Singapore respectively.

The export of mungbean is similar to the export of black matpe, as it has been concentrated in two principal markets: Japan and India, and in a few continuously importing countries which import a comparatively small amount each year. These two major markets are discussed as follows:

Table 9 Export of Black Matpe to Major Countries 1981 to 1986

	Quantity (Q): Metric tons, Value (V): Million Baht													
	1981		1982		1983		1984		1985		1986		Av. 1982-1986	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
Japan	22,568.0 (36.0)	252.2	33,959.0 (56.9)	396.5	31,357.0 43.5	394.3	29,518.0 (54.7)	361.3	38,440.0 (43.2)	389.0	33,437.0 (49.9)	415.4	33,342.0 (48.8)	358.7
India	7,666.0 12.2	51.0	10,201.0 (17.1)	73.4	33,505.0 (46.5)	214.0	13,397.0 (24.8)	112.3	41,999.0 (47.2)	335.9	19,310.0 (28.8)	145.6	23,682.0 (34.6)	157.3
Malaysia	2,971.0 (4.7)	23.2	1,576.0 (2.6)	14.3	2,330.0 (3.2)	22.4	2,441.0 (4.5)	23.4	2,771.0 (3.1)	26.9	2,760.0 (4.1)	29.4	2,376.0 (3.5)	22.0
United arab Emirates	829.0 (1.3)	7.9	925.0 (1.6)	9.5	646.0 (0.9)	6.9	934.0 (1.7)	11.9	665.0 (0.7)	7.9	942.0 (1.4)	9.9	822.0 (1.2)	19.8
Hong Kong	1,087.0 (1.7)	11.2	530.0 (0.9)	1.3	125.0 (0.2)	1.1	105.0 (0.2)	0.6	30.0 -	0.3	23.0 -	0.3	163.0 (0.2)	2.9
Others	24,418.0 (39.0)	186.3	10,417.0 (17.5)	82.2	2,250.0 (3.1)	23.2	5,404.0 (10.0)	52.4	2,844.0 (3.2)	26.8	8,659.0 (12.9)	66.7	5,915.0 (8.6)	74.2
Total	62,642.0	560.3	59,643.0	600.0	72,056.0	683.0	53,960.0	585.9	88,976.0	809.3	67,061.0	693.5	68,339.0	647.7

Note : Figures in parenthesis are the percentage of the total

Source : Customs Department



Table 9 Export of Mungbean to Major Countries; 1981 to 1986

Quantity (Q): Metric tons, Value (V): Million Baht

	1981		1982		1983		1984		1985		1986		Av. 1982-1986	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
PR China	21,013 (19.2)	189.7 (16.7)	52,914 (40.5)	537.5 (40.9)	30,566 (36.0)	297.7	48,532 (41.0)	479.2	39,226 (27.1)	430.9	32,116 (40.8)	306.9	40,671 (36.5)	387.0
Taiwan	23,904 (21.8)	230.6 (20.3)	17,770 (13.6)	159.6 (12.1)	16,031 (18.9)	150.6	14,529 (12.3)	132.7	15,836 (11.0)	145.2	11,436 (14.5)	99.9	15,120 (13.6)	163.7
India	8,051 (7.3)	90.3 (7.9)	346 (2.6)	2.5 (0.2)	779 (9.2)	7.2	11,322 (9.6)	106.1	55,621 (38.5)	517.9	2,760 (3.5)	23.7	14,166 (12.7)	144.8
Hong Kong	12,182 (11.1)	123.6 (10.9)	10,067 (7.7)	86.6 (6.6)	5,453 (6.4)	54.9	5,046 (4.3)	50.0	4,019 (2.8)	44.2	2,662 (3.4)	28.5	5,449 (4.9)	71.9
Singapore	4,315 (3.9)	52.7 (4.6)	6,931 (5.3)	78.1 (5.9)	3,847 (4.5)	43.9	4,174 (3.5)	45.6	3,562 (2.5)	38.2	2,741 (3.5)	27.4	4,251 (3.8)	51.7
United Arab Emirates	2,393 (2.2)	30.8 (2.7)	2,928 (2.2)	34.3 (2.6)	3,173 (3.7)	34.3	3,624 (3.1)	39.4	2,934 (2.0)	30.1	3,146 (4.0)	26.4	3,161 (2.8)	33.8
Others	28,175 (25.7)	332.3 (29.2)	38,183 (29.2)	396.6 (30.2)	22,357 (26.4)	246.5	25,421 (21.5)	269.2	18,214 (12.6)	203.8	9,077 (11.5)	212.8	22,651 (20.3)	289.7
Total	109,534 (100)	1,138.1 (100)	130,587 (100)	1,314.9 (100)	84,804 (100)	869.1	118,465 (100)	1,192.3	144,548 (100)	1,476.2	78,787 (100)	769.2	111,438	1,198.1

Note: Figures in parenthesis are the percentage of the total  
Source: Customs Department

## **Japan**

As mentioned earlier, Japanese businessmen have played a significant role in the institution and development of black matpe production in Thailand. In other words, the production of Thai black matpe was started at their instigation, for the Japanese market. The production of mungbean has been further developed and its export has been expanded to other markets. However for the last 21 years, Japan has been the principal market for Thai black matpe and should remain so for at least the next few years.

Virtually, all the black matpe imported by Japan is made into bean sprout. Traders have reported that annual consumption of black matpe in Japan is about 50 thousand tons, mainly imported from Thailand and Burma. In recent years, some mungbean from PR China has been imported by Japan for making bean sprout, so a portion of the market for bean sprout has been taken by PR China. Quality problems of black matpe and its annual fluctuation of production may have induced the Japan Beans Sprouts Importers Association to seek a source of supply. The Thai market share of black matpe in Japan has therefore decreased and it could be facing increased competition from both Burma and PR China in the future.

Although an agreement on the quality of black matpe between Thai exporters and Japanese importers was initiated in 1972 with both parties concentrating on quality improvement, the quality problems of Thai black matpe imported by Japan have not yet been solved (for detail of the Agreement see Appendix 3). A solution would require continuous efforts by both parties using extension services to improve production and post harvest handling technologies. A marketing scheme, which includes a favourable price difference incentive to compensate for increased cost and to induce better quality production, has yet to be initiated. Nevertheless, under the current situation, Thai exporters anticipate that Japan will import about 25 to 35 thousand tons of black matpe per year for the next few years.

## **India**

As mentioned earlier, India is a major pulse importing country and a potential market for Thai mungbean and black matpe. In terms of the annual quantity export of Thai black matpe to India, there were three successive years of increase, from 7.7 thousand tons in 1981 to 33 thousand tons in 1983. It then decreased to 19.3 thousand tons in 1986 (see Table 10). When this trend is compared with the widely fluctuating upward trend of the annual quantity of Thai mungbean exported to India, it gives the impression that Thai black matpe has better prospects for the India market than mungbean (see Table 9 and 10).

On the mean average between 1982 and 1986, the annual quantity export of Thai black matpe to India was 23.7 thousand tons, 67% greater than that of mungbean (see Table 9 and 10), but in terms of average price of f.o.b. Bangkok, black matpe registered 6,642.18 baht/ton which was 54% lower than that of mungbean. This implies that price is a crucial factor in the Indian market with a certain narrow price range for these two commodities, which is acceptable to this market. Based on the 1981 to 1986 statistics, it can be projected that India will import 20 to 35 thousand tons of black matpe from Thailand per year, over the next few years.

### Malaysia and Singapore

Malaysia and Singapore are two neighbouring countries. They continuously import more than 2 thousand tons of black matpe from Thailand per year. Most of the imported quantity is used for human consumption, especially by the Indian community of these countries. A certain amount of black matpe and mungbean is imported into Malaysia through the southern province of Thailand. These figures may not be officially recorded. The black matpe exported to these two countries is of a comparatively higher quality and price as well.

As long as there is no new kind of bean that can closely substitute black matpe and the taste of consumers remains unchanged, the quantity of black matpe imported by Malaysia and Singapore is expected to increase in line with their population growth. Therefore, for the next few years, the quantity of Thai black matpe imported by Malaysia and Singapore should be 2.5 to 3 thousand tons and 2 to 2.5 thousand tons, respectively.

### Estimated Annual Export of Mungbean and Black Matpe to the Major Markets

The estimation of annual export of mungbean and black matpe to major markets based on the above information. The estimated annual export of mungbean and black matpe to the major countries for 1988 to 1990 is shown in Table 11. For mungbean, the estimated export ranges from 65 to 87 thousand tons, more than 90% of which is projected for the three leading markets: PR China, Taiwan, and India. For black matpe the estimated minimum (eve) of export is 49 thousand tons and the maximum is 76 thousand tons, with more than 90% of the estimated export going to the two principal markets: Japan and India.

These estimations indicate a very fundamental feature of these two commodities. here is a strong export concentration in only two to three markets. This creates domestic market problems, especially in price fluctuation, which causes not only a variation of supply in each crop year, but also hinders quality improvement at the farm level and in rural markets.

**Table 11 Estimated annual Export of Mungbean and Black Matpe to the Major Markets: 1988 to 1990**

Item	Unit: 1,000 tons			
	Mungbean		Black Matpe	
	Min.	Max.	Min.	Max.
PR China	30	40	-	-
Taiwan	15	20	-	-
India	15	20	20	35
Hong Kong	2	3	-	-
Singapore	3	4	2	3
Japan	-	-	25	35
Malaysia	-	-	2	3
Total	65	87	49	76

Source : Interview

### Scenarios of Production and Utilization

The scenarios of production and utilization of mungbean and black matpe were constructed by summarizing the estimated domestic utilization, plus export and current production, so as to give a general view of the surplus and deficit position of both mungbean and black matpe for 1988 to 1990. To simplify, the minimum production of mungbean is projected to be 154 thousand tons which is the average production of 1978/1979 to 1981/1982, with the maximum at 236 thousand tons, which is the average from 1982/1983 to 1985/1986 (see Table 2). The average production of black matpe during 1982/1983 to 1985/1986 at 75 thousand tons is used as the minimum projection, while the average of 1978/1979 to 1981/1982 at 109 tons is used as the maximum (see Table 3). The result is shown in Table 12.

The scenarios of production and utilization of mungbean and black matpe for 1988 to 1990 reveal that there will be a deficit of mungbean in the range of 17 thousand tons in the minimum situation and one thousand tons in the maximum situation. Conversely, there would be surplus of black matpe under both minimum and maximum situations. Based on these scenarios, in order to avoid a deficit or surplus situation, mungbean and black matpe production levels of 1985/1986 should be maintained (see Table 2 and 3).

**Table 12 Scenario of Production and Utilization of Mungbean and Black Matpe 1988 to 1990**

Item	Mungbean		Black Matpe	
	Min.	Max.	Min.	Max.
Production	154	236	75	109
Utilization				
Domestic utilization	106	150	-	-
Export	65	87	49	76
Total utilization	171	237	49	76
Balance of Production and Utilization	(17)	(1)	26	33

Source : From Table 2,3,8 and 11

## Marketing

This chapter will emphasize the market institutions or participants and the physical aspect of marketing channels that handle the flow of mungbean. The pricing and grading of mungbean and black matpe as well as the major marketing costs and margin are also discussed.

### **Market Participants**

Marketing of mungbean and black matpe, like other cash crops, has been handled by the private sector. In most cases, marketing of mungbean and black matpe is handled by those market participants dealing with cash crops. These market participants could be classified according to their physical location whether in the rural or terminal (urban) markets. The following discussion will identify the market participants at these two market levels, by focusing on who they are rather than what they do.

### **Rural Market Participants**

The rural market participants are those merchants having their business in the trade of mungbean and black matpe at the district or provincial level. These merchants can be further classified according to their business location.

#### District Merchants

The district merchants are those who have their shop or buying post at the district level near the producing areas. In general, the district merchants are those merchants who sell agricultural inputs, groceries, hardware and agricultural machinery. In most cases, these district merchants sell their goods and services to farmers on credit and the debts are to be cleared when the farmers' products are harvested. However, there are a certain number of district merchants who run their business only in buying agricultural products and operate only during the harvesting season.

Another category of the so-called district merchants is the district middleman. These middlemen are generally called truckers. They have a pick-up truck and buy all kinds of agricultural products from farmers at the farmgate. The common characteristic of the middlemen is that they are temporary market participants having neither shop nor permanent address. Unlike district merchants, they have somewhat permanently settled in their respective districts. Most of them have storage and transport facilities.

The income earned by the district merchants and the district middlemen from their operations are different. The district merchants obtain their gross profit from at least two sources: (1) income from selling their goods and services to the farmers; and (2) income from buying and selling farmers' products. The district middlemen, however,

have two alternative means of getting their income or gross profit, depending upon the kind of arrangement between the middlemen and the merchants. In the first alternative, the middleman assumes his role as a merchant to make his gross profit from the buying and selling of agricultural products. In the second alternative, he assumes the role of middleman between farmers and a pre-arranged district merchant. All the agricultural products bought by tile middleman are sold to the district merchant at a fixed price and the middleman makes a commission of about 5 baht per bag on mungbean or black matpe

#### Provincial Merchants

The provincial merchants are well-established shed merchants at the provincial level where many routes and various means of transport are accessible. Most of them are experienced-businessmen in agricultural products and have a comparatively large amount of working capital plus investment in storage capacity and equipment. These merchants generally provide financial supports to farmers directly or through the district merchants. The provincial merchants have three sources of income from three business operations: (1) buying and selling operations; (2) storage operations; and (3) financial supports to farmers or farm credits operations.

#### Terminal Market Participants

For the purpose of discussion, the terminal market participants include those agribusiness firms who are far away from the farmers but near to the consumers, such as Bangkok middlemen, exporters, wholesalers, processors and retailers. The details of these market participants are discussed as follows:

##### Bangkok Middlemen

Between the rural market participants and the terminal market participants there exists the middlemen called Bangkok middlemen. These middlemen have their business operation base in Bangkok and operate as representatives of their customers such as district and provincial merchants. They act as local merchants in the physical handling of agricultural products, arranging the terms of sale and collecting payment.

There are more than 200 Bangkok middlemen dealing in agricultural products. Among these middlemen, there are about 15 active middlemen handling more than 80% of the total trade of mungbean and black matpe passing through Bangkok. These middlemen are very experienced agricultural marketing agents, who have good marketing knowledge in mungbean and black matpe and have good connections with both buyers and sellers in the market. Moreover, they have the know-how of bringing the buyers and sellers together. In fact, these middlemen are selling services to their customer (local merchants) at a fee of one percent of the total value of the transaction.

##### Exporters

Almost all mungbean and black matpe exporters have their off-ices in Bangkok and either rent or own a warehouse along the bank of Chao Phya River. They run private companies which are registered and granted a permit for exporting agricultural products, from the Ministry of Commerce of Thailand. At present, there are at least 6 active exporters of mungbean and black matpe handling all the exports of both commodities.

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Note that these exporters are buying grain of mungbean and black matpe, which is then dried (when it is needed), cleaned, graded and packed in different sizes of mungbean and black matpe seeds. Afterwards, these grains are stored and eventually exported. Therefore, the gross profit of exporters may also derive from the pre-export processing operation and the exporting business.

#### Wholesalers

Mungbean for domestic human consumption is handled by the wholesalers. These wholesalers are rather numerous around Bangkok. In general, the wholesalers' business operation is involved in food and beverage distribution. The wholesalers buy mungbean in gunny bags from the Bangkok middlemen. Only some of them clean the beans before packing them into small plastic bags for distribution to the retailers of food and beverage. These retailers are again very numerous and vary from a small grocery shop to a big supermarket.

#### Processors

The mungbean processors can be classified into 3 categories. The first category consists of those who process mungbean into sprouts. The second consists of those who process mungbean into flour and the third consists of processors of mungbean and mungbean flour into vermicelli. The information with respect to these processors is very limited, especially information on number, size, capacity and annual production of each category of processor.

#### **Marketing Channels**

The marketing channels of mungbean are simplified and shown in Figure 3. More than 95% of the farmers' mungbean production or marketable quantity is sold directly to the local merchants, while the rest is sold through the local middlemen or truckers. In fact, the so-called local merchants are those rural market participants mentioned earlier, the district merchants and provincial merchants.

The local merchants have three channels for selling mungbean. In general, at least 85% of mungbean is sold to the Bangkok middlemen, about 10% is directly sold to the processor and consumers, and the remaining 5% is purchased by exporters. The total volume of mungbean which passed through the Bangkok middlemen was 85% of the total production. It is then delivered to exporters, processors and wholesalers at 60%, 17% and 8% respectively. The mungbean processors make various kinds of final and semi-final products such as vermicelli and mungbean starch which are further distributed through each product's marketing channel to the ultimate consumers<sup>5</sup>.

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<sup>5</sup> The percentage of mungbean production passed through the mentioned marketing channels was obtained from a survey conducted in 1985 by the Agricultural Research Division, Office of Agricultural Economics, Ministry of Agricultural and Cooperation, and this percentage was modified by interviews with market participants during June-August, 1987, conducted by the author.

The marketing channels of black matpe are more or less the same as those of mungbean, except that the percentage of trade volume, which is handled by each market participant, is different from mungbean. The major differences are that the volume of black matpe purchased directly by exporters from the local merchant is much higher, roughly 20%, and virtually all the black matpe production is exported to two major countries: Japan and India. Therefore, the marketing of black matpe is to a great extent a backward integrated system controlled by some exporters.

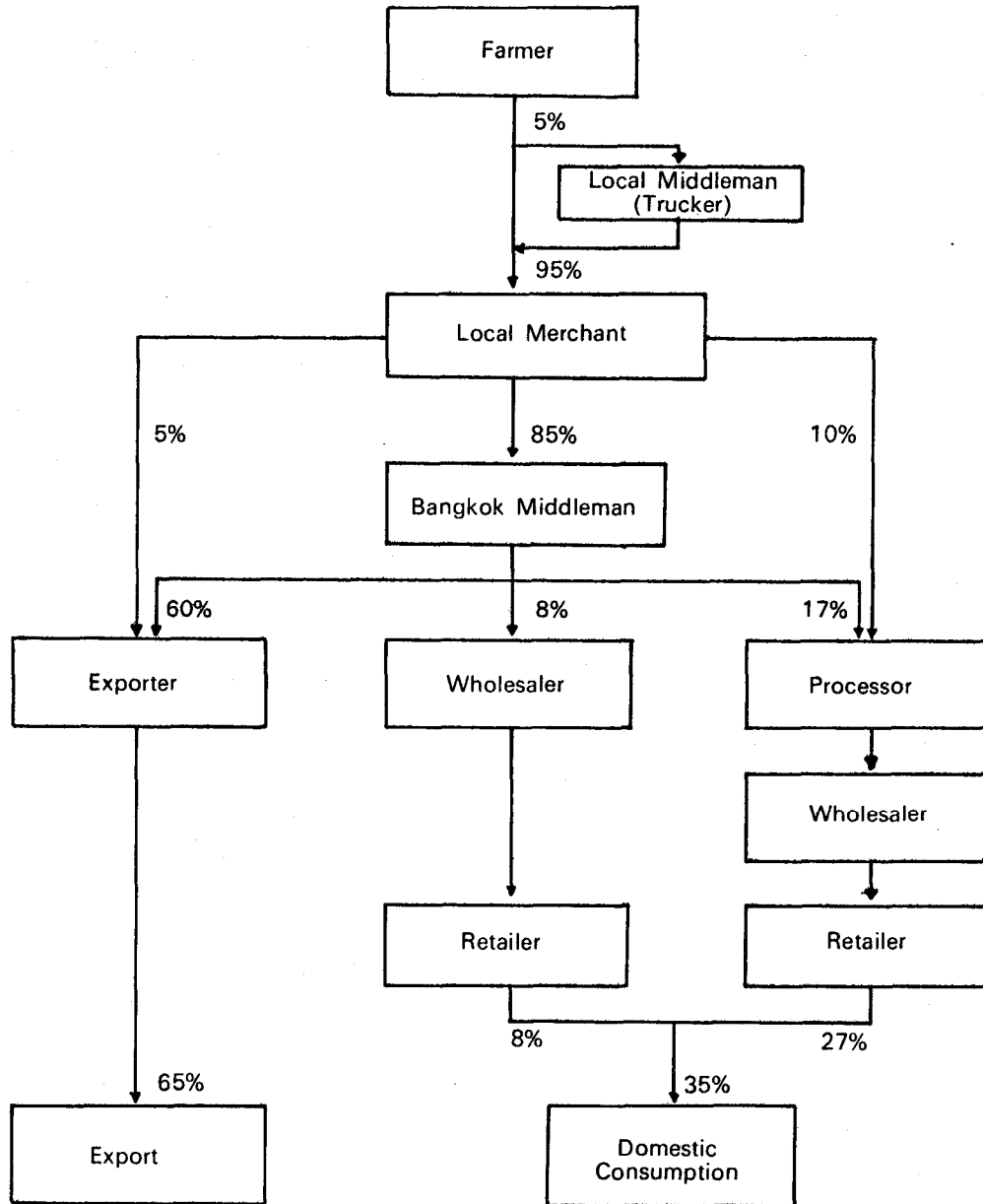


Figure 3 Marketing Channels of Mungbean in Thailand



## Price and Grading

### Price Formation

If the mungbean or black matpe farmers are asked, "Whodetermines the price of mungbean or black matpe?" their answer will always be "thedistrict merchants or provincial merchants" to whom the farmers sold their beans. Once the district merchants or provincial merchants are asked the same question, they will reply "Bangkok middlemen and exporters". Nevertheless, the answer from the Bangkok middlemen and exporters to the same question will be somewhat different and most of them will say, "the market itself determines the price". This means that the supply and demand for mungbean and black matpe in the market determine the market price or the day-to-day buying and selling price at each market level.

The market mechanism that determines the market price of mungbean and black matpe may be too abstract for farmers as well as some district merchants to understand. They are normally familiar with the price paid by the provincial merchants or Bangkok exporters. Most of the merchants and the middlemen at the district level are rather competitive, and it is not possible for any merchant to have a monopoly in determining a market price lower than the market price at the nearby markets.

In fact, the price formation of mungbean and black matpe can be regarded as a continuous process of trial and error in which all the concerned market participants are adjusting their decisions on buying or selling price based on their judgement and interpretation of the available market information. Eventually, the price at each market level is interrelatively determined. The interrelationship of prices among different market levels is partly explained by the cost of transportation and other handling costs.

### Grading

Grading of mungbean and black matpe is mostly applied at the terminal market rather than at the rural market. The major criteria of quality or grade factor are: moisture content; size, quality, the appearance and colour of the seeds, and; quantity of damaged and fungal seeds. In general, there are 5 grade classifications for mungbean as follows:

- Grade 1 : characteristics: good green shining colour, 14% moisture content, the size of seeds are unequal (small and large seeds mixed together).
- Grade 2 : characteristics: good green shining colour, 14% moisture content, the size of seeds are unequal (small and large seeds mixed together)
- Grade 3 : characteristics: fair green shining colour, 14% moisture content, the size of seeds are unequal, mixed with damaged seeds.
- Grade 4 : characteristics: poor green shining colour and misshapen, more than 14% moisture content, the size of seeds are unequal, mixed with damaged seeds.
- Grade 5 : characteristics: worst green shining colour and misshapen, more than 14% moisture content, the size of seeds are unequal, mixed with damaged seeds<sup>6</sup>

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<sup>6</sup> Office of Agricultural Economics 1986 op. cite., 39 p.

It should be noted that among the grade factors, only the moisture content can be objectively measured, while the rest are subjectively measured. Therefore, the grade boundaries are more or less a zone rather than a clear-cut line. Consequently, the grading practice of most exporters, is quite ambiguous and the strictness of grading depends upon the market situation. Once there is a buyer's market, then the grading will be very strict; conversely, grading in the in seller's market will be quite flexible. This situation causes a lack of relationship between price and quality, which in turn aggravates the existing quality problems. The grading practice for black matpe is similar.

### **Price Movement**

The recorded prices of mungbean and black matpe are available only for certain grades. The mungbean prices received by farmers are recorded for large and small seeds which are further classified into first, second and mixed grades. The prices of black matpe are recorded only for the mixed grade. The Bangkok wholesale prices of mungbean and black matpe are available only for the first grade. The annual price movements of these beans are discussed below.

### **Annual Price Movement of Mungbean**

The annual average price movement for large mungbean at Bangkok wholesale (BW) and farm level (FL) received by farmers from 1977 to 1986, are shown in Figure 4 (for detailed price data see Appendix Table 4). The price movement of the first and second grades at the farm level shares the same pattern, and the differences between these two prices have been rather well maintained. Although the movement of mixed grade has a similar pattern to that of the second grade, the price differences between these two grades have fluctuated widely. In 1980 the mixed grade price was 6.56 baht/kg, which was 0.23 baht/kg higher than the price of the second grade. Such a phenomena could be explained by the poor grading practice at the rural markets an, the unclear grade boundary between the second and mixed grades. In general, th movement of the Bangkok wholesale price of the first grade of large mungbean has been in the same direction as the price at the farm level. Since 1979 however, the price difference between these two markets has fluctuated widely.

Figure 5 shows the annual average price movement of small mungbean at th Bangkok wholesale and farm level during 1977 to 1986 (for detailed price data see Appendix Table 4). These price movements reveal the same pattern as that of large mungbean. However, at least two interesting price movements of the farm prices we observed. Firstly, the price differences between the first and second grades are quite small when the prices go up, but they become larger when the prices go down. Secondly, the price differences of the second and mixed grades are rather large when the prices go tip and vice versa. This observation clearly reflects the poor gradi system adopted at the farm level.

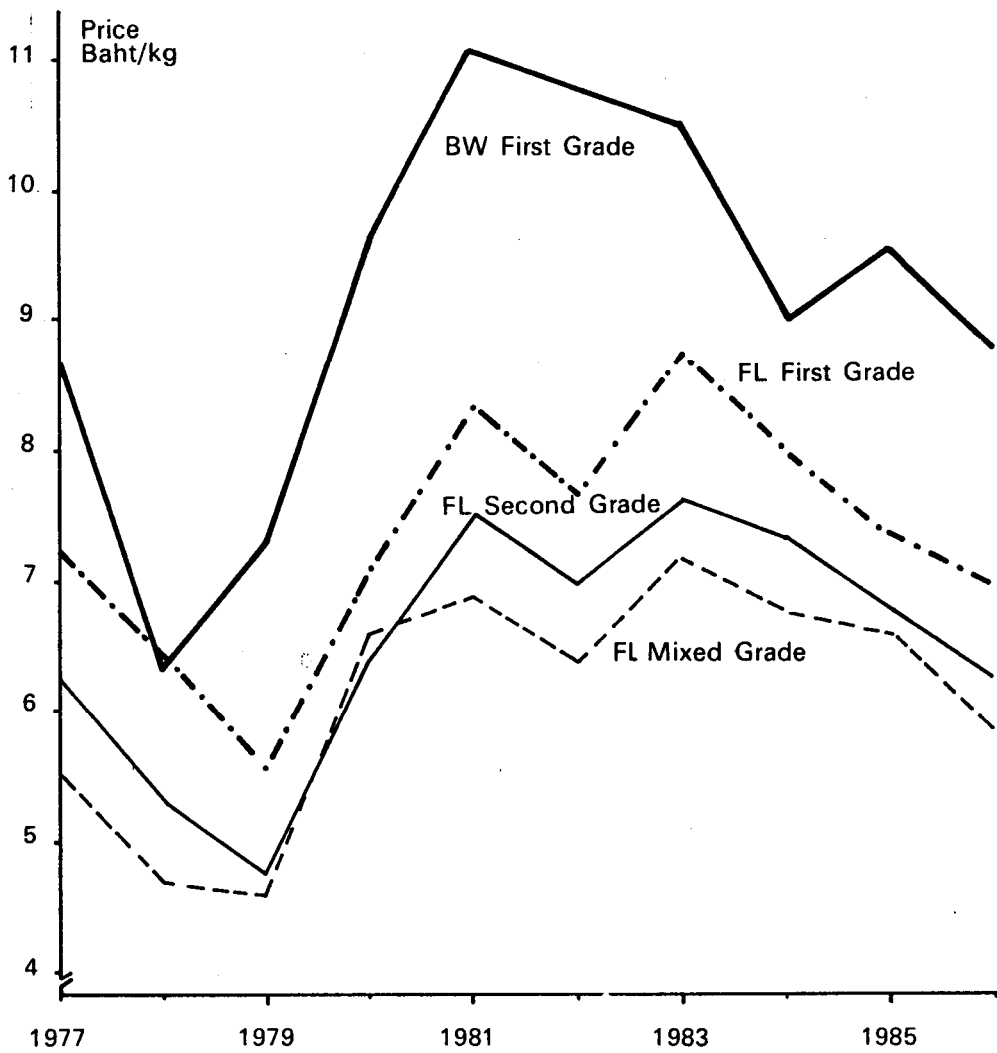


Figure 4 Annual Average Price Movement of Large Mungbean at the Bangkok, Wholesale (BW) and Farm Level  
Annual Price Movement of Black Matpe

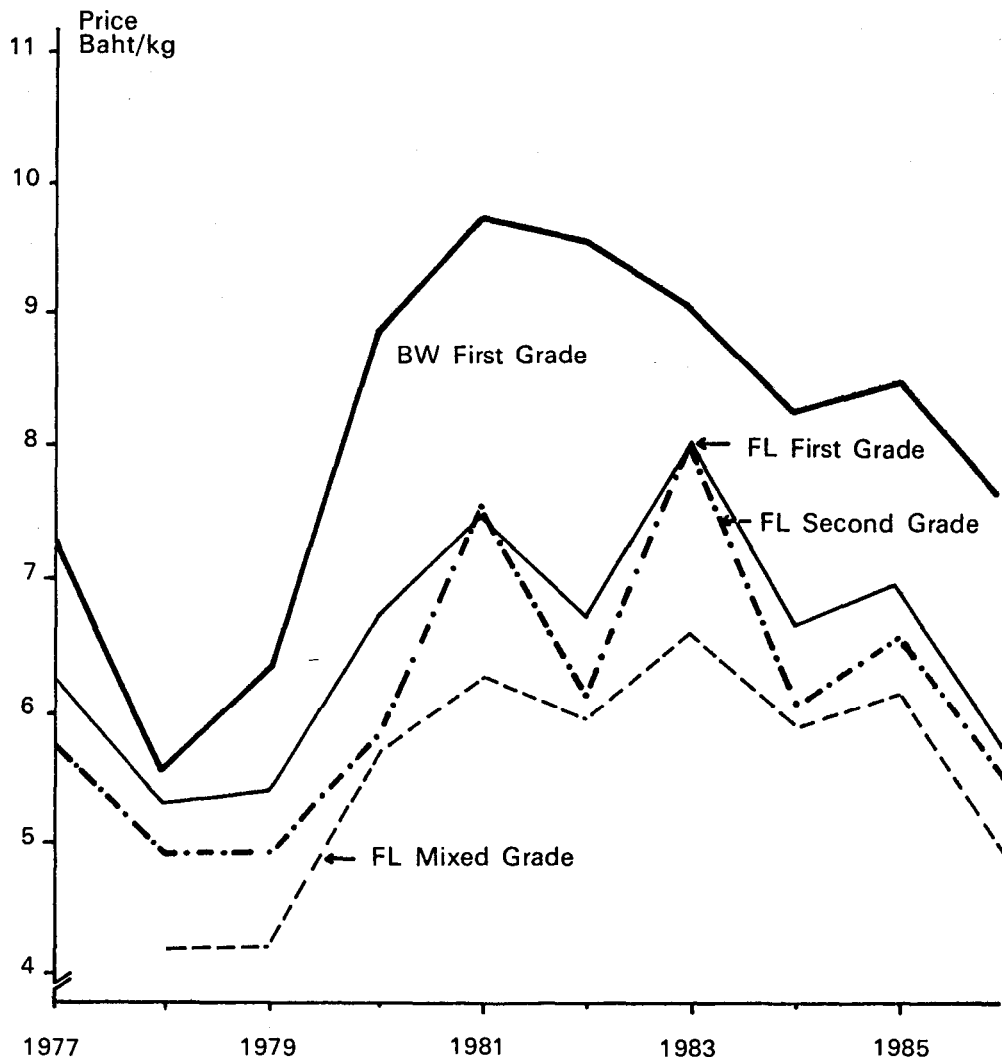


Figure 5 Annual Average Price Movement of Small Mungbean at the Bangkok Wholesale (BW) and Farm Level (FL): 1977 to 1986

#### Annual Price Movement of Black Matpe

Figure 6 shows the annual average price movement of black matpe mixed grade at f.o.b. Bangkok, Bangkok wholesale and farm level, from 1977 to 1986 (for detailed data see Appendix Table 4). Although the overall price movements are in the same direction, the price differences have fluctuated widely, especially between the Bangkok wholesale and farm level. This may be due to the quality problem as there appears to be a high percentage of low-grade bean within each specified grade. This in turn increases the Bangkok exporters' cost of sorting the grain into different grades.



Figure 6 Annual Average Price Movement of Black Matpe Mixed Grade at f.o.b. Bangkok, Wholesale, and Farm Level: 1977 to 1986

## Marketing Cost and Margin

### Major Marketing Cost from Farm-gate to Exporters' Warehouse in Bangkok

The major marketing cost of mungbean from farm-gate to exporters' warehouse in Bangkok during crop year 1985/1986, which can be applied to that of black matpe, is shown in Table 13. These marketing costs can be classified into 6 categories: (1) transportation (2) labour; (3) gunny bags; (4) storage, (5) interest charge; and (6) commission. The total marketing cost per metric ton of mungbean is 688.70 baht, 40.3% of which is for transportation cost, 16.1% for labour cost, 15.9% for commission, 13.7% for gunny bags, 10.9% for interest charge, and 3.1% for storage charge (for one month).

The total transportation cost, which is the highest, can be further divided into 3 parts: (1) from farm to the nearby market at 85.47 baht/ton; (2) from local market to provincial market at 42.73 baht/ton; and (3) from provincial market to Bangkok at 149.57 baht/ton.

The detailed labour costs in Table 13 that reveal the labour costs at the local market, involve the cost of unloading, weighing and storage piling, and loading. Among these labour costs, weighing and piling is the highest at 19.23 baht/ton. However, labour costs at the provincial market are the same as that of the local market. This would imply that at least 50% of the labour cost can be saved, if mungbean is transported from farm-gate to the provincial market without passing through the local market.

**Table 13 Marketing Cost of Mungbean from Farm-gate to Exporters' Warehouse in Bangkok: 1985/1986**

Item	Baht/ton	(%)
1. Transportation Cost		
1.1 Farm-gate to nearby local market	85.47	(12.4)
1.2 Local market to provincial market	42.73	(6.2)
1.3 Provincial market to Bangkok	149.57	(21.7)
1. Labour Cost		
2.1 Loading at farm-gate	12.82	(1.9)
2.2 At local market : Unloading	12.82	(1.9)
Weighing and piling	19.23	(2.8)
Loading	17.09	(2.5)
2.3 At the provincial market ( the same as 2.2 )	49.14	(7.1)
3. Gunny bags	94.02	(13.7)
4. Storage charge (for one month)	21.37	(3.1)
5. Interest charge (14%)	75.04	(10.9)
6. Commission		
6.1 Local middleman	42.73	(6.2)
6.2 Bangkok middleman (1 %)	66.67	(9.7)
Total	688.70	(100.0)

Note : The 1985/1986 average wholesale price of good quality mungbean in Nakhonsawan at 6 baht/kg and in Bangkok at 6.67 baht/kg were used in computing interest charge and commission for Bangkok middleman

Figures in the parenthesis are the percentage of the total

Source : Interview

The third largest marketing cost is commission payments, for both local and Bangkok middlemen. The local middlemen's commission is generally paid in baht per bag, while the Bangkok middlemen's commission is offered at one percent of the value of the transaction. Therefore, the commission of Bangkok middlemen varies with the price of mungbean. Nevertheless, due to the fact that the competition among the Bangkok middlemen is very keen, the one percent commission charge of these middlemen is nominal.

It is worth noting that the marketing cost items in Table 13 can be classified into fixed and variable costs. In most cases, the transportation cost, labour cost, gunny bag cost and the commission for the local middlemen, are fixed marketing costs which total

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525.62 baht/ton or 76.3% of the total marketing costs. Variable marketing costs are storage, interest charge and the Bangkok middlemen's commission that vary with the length of storage and the price of mungbean. Based on one month's storage and the given prices in Table 13 the total variable marketing cost is only 163.08 baht/ton or 23.7% of the total.

#### Grading Cost of Mungbean

The cost of grading the mungbean grain into different grades for export in crop year 1985/1986 is shown in Table 14. At least 4 major costs of grading can be identified: (1) weight loss, (2) labour; (3) electricity; and (4) maintenance. Out of the total grading cost at 414.60 baht/ton, weight loss accounts for 47%, followed by labour cost at 26%, electricity and maintenance at 18% and others at 9%. These grading costs are treated as fixed costs and come to 219.6 baht/ton. The high cost of weight loss is due to the mixture of foreign materials, sand, earth, etc., and this cost varies with the price of mungbean.

**Table 14 Grading Cost of Mungbean: 1985/1986**

Item	Baht/ton	(%)
(1) Weight loss (foreign materials, sand, earth etc.) 3%	195.00	(47)
(2) Labour	108.00	(26)
(3) Electricity and maintenance	75.00	(18)
(4) Others	36.60	(9)
Total	414.60	(100)

Note: In computing weight loss, the average price of mungbean grade one and two in crop years 1985/1985 and 1985/1986 at 6,500 baht/ton, was used

Figures in the parenthesis are the percentage of the total

Source: Interview

The grading cost of black matpe is more or less the same as that of mungbean especially those listed as fixed costs. At any rate, one should bear in mind that the grading cost of mungbean shown in Table 14 excludes the depreciation cost of the grading machine as well as the interest charge of the capital investment in the grading facilities. Moreover, the estimated average weight loss at 3% is based on a rather favourable crop year in which the quality of mungbean grain is rather good. Therefore, the total 414.60 baht/ton grading cost of mungbean is regarded as the minimum cost of grading high quality mungbean as well as black matpe

#### Export Cost of Mungbean

Table 15 shows the export cost of mungbean in crop year 1985/1986. Again, this estimated mungbean export cost is also applicable to that of black matpe. The estimated total export cost is 1,292.87 baht/ton in which the interest charge is the highest at 433.12 baht/ton, followed by the business tax, which is 2.2% of the export value or at 242 baht/ton, while the warehouse rental is at 168.75 baht/ton. It is observable that the interest charge and warehouse rental, which are the cost of inventory, make up 47% of the total cost and vary with the length of storage. This

means that proper storage of stock and inventory management of exporters would substantially reduce the export cost. However, to what extent the exporters could manage their inventory properly will depend very much on the market situation in both export and domestic markets. In short, the trade-off between price risk and inventory cost is extremely high for the exporters.

**Table 15 Export Costs of Mungbean : 1985/1986**

Items	Baht/ton	(%)
Gunny bag : (16 baht/bag)	158.00	(12.2)
Labour : loading and unloading	79.00	(6.1)
Fumigation	12.00	(0.9)
Lighterage : from warehouse to vessel	45.00	(3.5)
Insurance : from warehouse to vessel (0.2%)	22.00	(1.7)
Subscription fee paid to the Thai Maize and Produce Traders Association	5.00	(0.4)
Quality inspection and certificate fee	18.00	(1.4)
Warehouse rental (25-50 baht/ton/month for a period of 3-6 month)	168.75	(13.0)
Interest charge (average 10.5% for 3-6 months)	433.12	(33.5)
Business tax (2.2% of the export value)	242.00	(18.7)
Miscellaneous	110.00	(8.5)
Total	1,297.87	(100)

Note : The calculation is based on the average f.o.b. Bangkok price of good quality mungbean for exporting to Japan, Hong Kong, Singapore and Malaysia in crop years 1984/1985 and 1985/1986 at 11,000 baht/ton. The warehouse is located at Satupradit, Bangkok.

Figures in the parenthesis are the percentage of the total.

Source : Interview.

### Marketing Margin

Theoretically speaking, the marketing margin can be viewed as: (1) the returns to factor (or marketing cost) such as labour wages, interest, rents and profits, or (2) the returns to market (or marketing charges) participants such as local merchants, provincial merchants, middlemen, and exporters. In either case, it is defined as the difference in price at two levels of the marketing system multiplied by the quantity of the product marketed<sup>7</sup>. In line with this definition, the per unit marketing margin of the provincial merchants can be obtained by subtracting the price received by farmers from the Bangkok wholesale price. The per unit marketing margin of the exporters is derived by subtracting the Bangkok wholesale price from the f.o.b. Bangkok price. However, due to the problem of data availability, only the provincial merchants' mungbean marketing margins are computed and shown in Table 16.

<sup>7</sup> Dale C. Dahl and Jerome W. Hammond *\*\*Market and Price Analysis: The Agricultural Industries\*\** McGraw-Hill Inc USA 1977. 139 p.



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**Table 16 Mungbean Marketing Margins of Provincial Merchants : 1977-1986**

Unit: Baht/kg		
Year	Large Seed First Grade	Small Seed First Grade
1977	1.42	1.0
1978	(0.05)	0.3
1979	1.78	1.1
1980	2.54	2.2
1981	2.72	2.3
1982	3.11	2.9
1983	1.74	1.0
1984	1.02	1.6
1985	2.15	1.5
1986	1.81	1.9
Average:		
1977-1981	1.68	1.4
1982-1986	1.97	1.8
1977-1986	1.82	1.6

Note : Computed by subtracting the price received by farmers from the Bangkok Wholesale price of the corresponding grade

Source : Appendix Table 4.

From Table 16, it can be noted that the magnitude of the computed marketing margin of large and small mungbean seeds is quite different, but both of them depict the same pattern of fluctuation. The marketing margin of large seed first grade has fluctuated from as low as -0.05 baht/kg in 1978, to as high as 3.11 baht/kg in 1982. The negative marketing margin in 1978 may be due to the acute decrease in the Bangkok wholesale price, especially during the last quarter of that year. As for the marketing margin of small seed first grade, it has fluctuated from 0.50 baht/kg in 1978, to 2.86 baht/kg in 1982.

On the average of 1982 to 1986, if the marketing margin of large seed first grade is 1.97 baht/kg which is 0.19 baht/kg as shown in Table 13, then it will give an estimated gross profit to the provincial merchants of roughly 1.18 baht/kg. This price does not include deductions for the overhead cost of the merchants. This gross profit is about 14% of the total marketing cost, or 15% of the average 1982 to 1986 price received by farmers, or 12% of the average 1982 to 1986 Bangkok wholesale price. Therefore, it is safe to say that the mungbean gross profit margin of the provincial merchants shows no obvious large profit.



## **Private Sector's' Role in Production**

It would be appropriate at this point to define the so-called private sector so that the discussion could be confined within a certain boundary. For simplicity, the private sector includes all private enterprises which do not belong to, or are not connected with the public sector or government. Realistically, all the private enterprises are to a great extent directly or indirectly related to the agricultural sector. This involves all the production, processing and marketing activities of agricultural products. However, the forthcoming discussion will cover only the private enterprises who are directly involved in the mungbean and black matpe undertakings. Furthermore, the discussion on the private sector's role will focus on the necessary inputs and services in mungbean production and marketing which are performed by the private enterprises.

### **Farm Inputs**

#### **Land and Seed**

Obviously, land is the most crucial factor of agricultural production. In most cases the production of mungbean and black matpe as well as other cash crops is carried out on newly cleared land which farmers seldom have legal title to. Only in some areas, are farmers given a temporary permit to utilize the land. Although land holding problems exist, the production of cash crops goes on year after year.

Seed is the second most important factor of mungbean and black matpe production. Initially it was Japanese businessmen its well its a Japanese association that performed a significant role in bringing black matpe seed into Thailand. However, during the period of production expansion and currently, it is the local merchants who distribute seed to farmers when and where they are needed. Some of these local merchants selected the best quality beans from their stock and kept them for sale to farmers as seed in the following growing season. In case of the shortage of seed which may be due to the expansion of area planted or the failure of the First planting, the local merchants will try to secure seed for farmers through their regular Bangkok middlemen.

Local merchants in the major mungbean and black matpe production areas, as reported, have been actively seeking better variety seed for their farmers. As the local merchants have been involved in providing credits to farmers, both they and the farmers will be mutually benefited from the yield. Up to now, the private commercial seed industry has not become involved in mungbean and black matpe seed production. Only a small amount of these seeds have been produced by government agencies under their seed improvement programmes. Thus tip to the moment and probably for the next few years, the private sector, especially the local merchants have played and will continue to play a major role in providing both mungbean and black matpe seeds to their nearby farmers.

**Credits**

Farmers cannot cultivate cash crops oil a commercial scale using their own resources. They need financial supports or credits for hiring and buying services and other inputs such as fertilizer, insecticides and pesticides. Farm credits are another crucial factor in mungbean and black matpe production and promotion as well.

Having developed into well-recognized export commodities, which have operated for a long time under the free market system, the farmers' production of mungbean and black matpe must have been financially supported by somebody in the agricultural sector. It is reasonable to assume that it was private enterprise, not the government, which has been performing the financial supporting roles, as there exists a mutual benefit and interdependence between the private enterprises and the farmers in undertaking the new prospective venture on crops. Once the private enterprises (the local merchants in this case) are informed of the bright prospects for mungbean and black matpe they should be willing to provide financial supports to the farmers.

In the early days, local merchants obtained some credits from their regular Bangkok middlemen who had to provide at least some credits for their regular customers so as to maintain a certain number of suppliers. As far as the financial sources of the Bangkok middlemen are concerned, the interview with the traders reveals that most of the middlemen secured their funds from three sources, namely: (a) raising funds or the so-called friendship share among their peers; (b) an overdraft provided by a commercial bank; and (c) their own capital.

In recent years, the Bank for Agriculture and Agricultural Co-operative (BAAC), a state enterprise, has been actively expanding and making easier accessibility of credits to the cash crop farmers; still, those credits have reached to only a small number of farmers. The majority of merchants are very pleased to see the BAAC's expansion of production credits to their nearby farmers and would very much like to see the BAAC take over their role in providing credits to farmers. As one of them pointed out, during the past few years, the depressing prices of agricultural commodities, the increasing uncertainty of rainfall and the irregularity of weather has created big losses for all the local merchants, especially those providing credit to farmers. Therefore, at present the local merchants are rather reluctant to provide credit to farmers, and most of them give credit only to those farmers of long-association so as to sustain their relationship.

The financial supports and credits provided by the local merchants covered a wide spectrum of credit terms. The simplest one is short-term credit, either in cash or in farm inputs, while the other extreme is that of a farmer completely supported by the local merchant who may be regarded as the employer of the farmer. It is interesting to note that the financial support arrangement between the local merchants and tile farmers, particularly in the Sawankhalok area, has been developed and adopted as a way of life for both parties. To cite one case as an example, five years ago one of the big merchants in Sawankhalok who has been in the agricultural business and providing credits to farmers for more than 30 years, decided to stop providing credits to more than one thousand farmers under him. He burnt all the records of the farmers' debt and returned all the land title deeds to the farmers. Surprisingly, two years later he found himself involved in supporting the farmers again, because he could not refuse to help those of long-association.

There is a Thai word for this financial support or credit arrangement between the merchants and the farmers, it is called "Toukaey-Loukrai Relationship". This *toukaey - loukrai* relationship is quite prevalent in mungbean black matpe and cash crop

producing areas. This relationship has been playing a vital role in the development and expansion of mungbean and black matpe and other cash crops as well.

### **Other Services**

In the past, most of the local merchants had their own tractors and provided ploughing services for mungbean and cash crop farmers. In general, local merchants were not able to collect their ploughing service charge from farmers in cash, so it was implicitly regarded as another form of credit to the farmer. After some time, some of the local merchants realized that the ploughing service was not a profitable activity among their operations in buying and selling of agricultural products. Because of the seasonality of crops, it was difficult for the merchants to fully utilize the tractors, and maintenance and overhead costs were high. Eventually, some of the merchants, particularly those who were close to the producing areas, kept only 1-2 tractors for towing agricultural products from farm to town.

In early 1979, the major farm machinery dealers launched a sales promotion programme with a long-term instalment plan or hire purchase terms that made it attractive and feasible for the well-to-do farmers to take over the ploughing service operation from almost all of the local merchants. No matter who performed such services, the local merchants or the farmers, it is clear that the private enterprises have been working effectively and performing necessary production services for the mungbean and other cash crop farmers.



## Private Sector's Role in Rural Marketing

In this part, the crucial marketing functions undertaken by the private sector in the trade of mungbean and black matpe at the rural or local markets are discussed. In fact, most marketing functions of these products performed by the local merchants are more or less the same as those of cash crops. In general, the so-called local merchants have their business in almost all kinds of cash crops which are being produced in their areas and those nearby. Only a few local merchants have specialized in handling 2 or 3 agricultural products.

### Marketing Activities Before Sales

Once the mature pods of mungbean and black matpe are harvested, they are dried in the sun. Generally, the beans are threshed by a locally made threshing-machine. The district level merchants usually provide the threshing service to the farmers and charge 60 baht per gunny bag (one gunny bag contains about 115 to 125 kgs). Farmers who produce only a small quantity of mungbean or black matpe thresh their beans by utilizing either a draught animal or tractor.

At least two noticeable marketing services are performed by the district merchants, the threshing service and the provision of gunny bags to pack the beans. The threshing service was introduced by the local agricultural machinery businessmen who modified the locally made maize threshing-machine. This enables the district merchants to cope with an increase in mungbean production. The second marketing service performed by the district merchants is the provision of gunny bags to farmers for packing their beans. The mungbean farmers may obtain these in advance from the district or local merchants to whom they are selling their beans. Once the transaction of mungbean or black matpe is made, the cost of gunny bags will be deducted. Thus the merchants are not only providing gunny bags, but also giving credits to the farmers.

Merchants in Sawankhalok reported that in the harvesting season there were cases of farmers asking the merchants for 20 gunny bags (about 240 baht) to pack their black matpe for sale in one-week's time. The merchants, though they did not know the farmers, gave the bags to them and merely made a note of the name and address of the farmers. This illustrates the easy and quick marketing services provided by the merchants; furthermore, it also shows a mutual trust in doing business.

### Assembling

The assembling of mungbean and black matpe is undertaken by at least two market participants, namely: (1) the trucker or local middleman; and (2) the district or local merchant. The trucker or local middleman is a one-man business operation. He has a pick-up and travels from one mungbean or black matpe producing area to the other to buy small quantities of beans from farmers at the market price. These are accumulated and then sold to the local merchants. The existence of the truckers in

many producing areas was due mainly to the expansion of the feeder roads to the farm level and the comparatively high value per weight of mungbean and black matpe. However, as mentioned in the marketing channel, the trucker handles only 5% of the total trade volume (see Figure 3).

Local merchants become involved in assembling mungbean and black matpe because they were equipped with vehicles and employees to pick up their customers' products. In some cases the local merchants set up temporary assembling spots in the producing areas to keep pace with the local supply and to minimize their cost of transportation. There is a strong reason to believe that the local merchants will be involved in the assembling of mungbean and black matpe particularly those located in the producing areas because the competition among market participants is increasing and they have to handle a substantial volume of trade to survive in the business.

### **Market Information**

Price information of mungbean and black matpe is broadcast by several government agencies' programmes. An official survey conducted in 1985 by the Office of Agricultural Economics revealed that mungbean farmers received price information from the radio, neighbour, and government official, at 10%, 22% and 8% respectively, while the majority or 56% received price information from merchants.

So far, market information on mungbean and black matpe is more or less known by all concerned market participants. However, each individual's interpretation and perception of the available information varies. Consequently, different market opinions are formed, and different market positions and strategies are adopted by the concerned market participants. Conversely there are cases where a group of market participants hold the same market opinion, and adopt the same market position. For example, in 1986 almost all the agricultural merchants in Sawankhalok decided to carry black matpe stock; they started accumulating as much stock as they could, not only from the nearby areas but also from Phetchabun province which is more than 280 kilometers away. This created an unusual marketing flow of black matpe backward to the local market instead of forward to the terminal or Bangkok market for export.

### **Grading and Storage**

The majority of farmers sell their mungbean and black matpe in mixed grades. In some areas mungbean are graded at the farm level into two categories: (1) large seed; and (2) small seed; each category is further divided into good quality or first grade and average quality or second grade. This lack of grading practice at the farm level may be due partly to the quantity of beans produced by each farmer, which is small, and partly to the lack of an economically viable grading device that can be used at the farm level. Grading practice of the local merchants is subjective, based on experience and judgement of colour, size of beans, mixture of foreign material and moisture content. In some areas, a standard moisture measuring instrument is used.

Some big merchants in the rural market, especially in Sawankhalok have grading machines which extract foreign material and dead beans, and separate the beans into 3 or more grades according to their size. By implementing grading practices in the rural market, both local merchants and exporters gain the advantage of vertical integration in the trading of mungbean and black matpe

Almost hand in hand with the expansion of mungbean and black matpe as well as the production of other cash crops, the storage capacity at the rural market was



expanded and modern warehousing facilities and equipments were also adopted. The expansion of local or rural storage capacity came from two major groups of private enterprises. The first group was the local merchants who realized that the increasing competition in trading made it very hard to run their business by a day-to-day buying and selling operation. Therefore, the necessity of the local merchants to hold temporary stock became imperative; consequently, they expanded their storage capacity. In addition, some of the big local merchants have adopted either forward integrated exporting operations or have affiliations with exporters in Bangkok, so their working capital has increased and storage capacity has been expanded as well.

The second group constitutes the local commercial banks and syndicates of local businessmen, who have invested in the public warehouse business. At present, the storage capacity at some local markets is quite sufficient. For example, the estimated total storage capacity in Sawankhalok is about 45,000-55,000 tons.



## Private Sector's Role in Terminal Marketing and Trade

The following discussion is focused on the role of market participants at the terminal or Bangkok market. Among these participants, the role for the Bangkok middleman and exporter is discussed.

### Market Information

The Bangkok market is the centre and initial source for market information on the demand for mungbean and black matpe. There are two areas where most of the traders, particularly middlemen are located, namely: (1) Songwat road; and (2) Mitreejit road. During the trading season, the communication and transmission of market information among the exporters and middlemen is almost instantaneous. Each individual forms his market opinion and decides on his market position based on the available market information and his experience. Then the spot sales as well as short term sale contracts are made between exporter and middleman.

The middlemen, in general, transmit the Bangkok market information to their customers (local merchants) and made spot deals as well as short-term forward purchase with their customers. Conversely, the middlemen are informed of supply conditions in the local markets by their customers. These middlemen transmit the local markets information to their associated exporters, processors and wholesalers as well. Therefore, the supply and demand conditions plus other market information are transmitted to and from the Bangkok market through all the mentioned market participants.

Regarding the efficiency of transmission of price information on mungbean, the observation that the prices at Bangkok wholesale and farm level fluctuated in the same direction in 7 out of the past 10 years could be regarded as a rough indicator of a 70% efficiency of price transmission (see Figure 4 and 5). This indicates that by and large, the transmission of market information performed by all market participants is reasonably efficient.

### Grading, Distribution and Storage

As the majority of mungbean and black matpe is exported to a few principal countries, the grading of beans to satisfy the importers' needs is very important. Therefore, exporters have constantly modified their grading process to meet the requirement of the importing countries. At present, the exporters are technically able to provide as many grades as the available sizes of sieves.

In the past, grading of mungbean and black matpe faced the problems in getting rid of dead beans and foreign materials. Sometimes this required the use of labour before or after sieving. In 1982, these problems were solved with the introduction of

mechanical springing separators imported from Japan, made possible through the cooperative efforts of the Thai exporters and Japanese importers. The improvement in the grading process contributed significantly to the overall market and price efficiency of mungbean and black matpe.

Most top grade beans are exported to high-income countries such as Japan, Singapore, and Taiwan for human consumption. Lower grades are exported either to the lower-income countries for human consumption or to other countries for industrial usage. Only some mungbean is distributed to the domestic users and market outlets such as processors and retailers.

There is ample storage capacity in Bangkok for agricultural products, thus the majority of beans are temporarily stored in Bangkok before export. Occasionally, some speculative stock was held by middlemen and syndicate speculators, especially in years when prices of beans were low and local merchants were hesitant to carry too much stock.

### **Expansion of Demand**

Although in the last two decades the production expansion of mungbean and black matpe had been in response to the increasing demand from the major importing countries, the market participants, especially the exporters have been actively involved in expanding and exploring new markets. Apart from the exporter's individual as well as group efforts in expanding export markets, co-operative efforts between government agencies and exporters have been successful in seeking new markets such as the People's Republic of China. The efforts in expanding export demand for mungbean have been somewhat more successful than for black matpe.

In spite of the lack of reliable data on domestic consumption of mungbean and black matpe it is believed that domestic demand for mungbean has been increasing, especially domestic human consumption of mungbean. Wholesalers in particular have contributed to this situation through the adoption of modern marketing technology. In recent years, mungbean has been packed in plastic bag of various weights for sale in most retail stores. Moreover, mungbean has also been advertised on the mass media.

Although expansion of domestic demand for mungbean and black matpe in the processing industries has not yet been studied, interviews with market participants reveal that demand has increased. It was reported however, that processor's utilization of mungbean was rather sensitive to the comparative prices of other beans.

### **Marketing Co-ordination**

One of the significant roles played by the private sector in contributing to the development and expansion of trade of cash crops, is the establishment of traders' associations, especially the Thai Maize and Produce Traders Association which includes the traders (exporters) of mungbean and black matpe. This association has been functioning as a co-ordinating body, not only between traders and concerned government agencies, but also between traders and importers.

The association has co-ordinated with the government in implementing trade regulations on the eligibility and qualifications of being an exporter of the controlled agricultural commodities. The association has also performed a facilitating function in making collective trading arrangements between its members and the agencies concerned in the importing countries. Co-ordination by the association helped facilitate group efforts of the mungbean and black matpe exporters to expand and explore export markets.

## Summary and Conclusion

Between 1950 and 1985, the development of mungbean production can be identified by three phases, separated by a sudden increase in area planted and production. Namely: (1) the period before the introduction of black matpe, 1963; (2) the initial stage of black matpe between 1963 to 1978; and (3) the establishment of all export market, starting in 1979. The development of black matpe in the early 1960's was initiated by Japanese businessmen and the Japanese traders association. This signified the initial stage of production, through the introduction of seed from Burma. Since then, the Thai private sector has been actively involved in the expansion of production and marketing.

In general, mungbean, green bean, and black matpe are grown in three distinct periods or seasons (1) early rainy season, May - July; (2) late rainy season, August November; and (3) dry season, January - April. During the past decades, the increase in mungbean production has been realized through the expansion of area planted. Production has been concentrated in the northern and central regions of the country. From 1978/1979 to 1985/1986, an upward trend of mungbean production and a downward trend of black matpe production was observed. The increase in mungbean production has been much greater than the decrease in black matpe therefore; the total production of these two products was still upward although the average yield for the whole country decreased. Taking the mean average between 1982/1983 and 1985/1986, the yield of mungbean in the northern region is 97 kg/rai, while that of black matpe is 111 kg/rai. The higher yield per rai of black matpe may be due to its comparatively easier harvesting than mungbean's. During the last five years (1982/1982 to 1985/1986), the average total production cost of mungbean as well as black matpe was 557.90 baht/rai or 5.67 baht/kg, about 16% lower than the average farm price. However, among the cash crops, the net returns per rai of mungbean registered the lowest.

At present, most of the domestic beans utilized are mungbean and the estimated total annual consumption ranged from 106 to 150 thousand tons in 1987. Two major mungbean utilizations are vermicelli and bean sprout, which account for more than 70% of the total annual domestic consumption. Taking the mean average between 1978 and 1985, more than 55% of mungbean production and 78% of black matpe production were exported to a few major markets such as Japan, the People's Republic of China, and India. The estimated annual export of mungbean and black matpe to the major markets for 1988 to 1990 are: (a) mungbean export ranges from 65 to 87 thousand tons more than 90% of which is exported to PR China, Taiwan, and India; and (b) black matpe export is estimated at 49 to 76 thousand tons with more than 90% of this going to Japan and India. The scenarios of production and utilization of mungbean and black matpe for 1988 to 1990 reveal that there will be a mungbean deficit ranging from 17 thousand tons minimum, to one thousand tons maximum, but there will be a surplus of black matpe under both minimum and maximum situations.

In general, mungbean and black matpe are handled by those market participants dealing with cash crops. These market participants can be classified into two categories: rural market participants and terminal market participants. The district middlemen, district merchants and provincial merchants are the three major rural market participants who perform essential marketing functions such as exchange, assembling, storage, transportation, financing and information. The terminal market participants can be broadly defined as those marketing agents and agribusiness firms who are located at the terminal markets near the consumers. These include the Bangkok middlemen, exporters, wholesalers, processors and retailers. In 1987, along the marketing channel, 95% of the farmers' production was handled by the local merchants (the district and provincial merchants), and 89% was passed through the Bangkok middlemen who further delivered 60% of the goods to exporters, and the rest to wholesalers and processors at 8% and 17% respectively.

The price of mungbean and black matpe at each market level is determined by a rather competitive market mechanism. The annual price movement of the different grades of mungbean at each market level depicts a similar pattern. The 5-grade classifications are quite difficult to measure objectively, as the grading practice varies with the market situation and the subjective measuring of the buyers, particularly provincial merchants and exporters.

Transportation cost is the highest marketing cost, from the farmgate to the exporters' warehouse in Bangkok, at 277.77 baht/ton for mungbean well as black matpe which accounts for 40.3% of the total marketing cost (688.70 baht/ton) At least 76.3% of this total cost can be treated as Fixed cost. Weight loss stands out clearly as the highest cost item in grading the mungbean at 414.60 baht/ton or 47% of the total. The export cost in 1985/1986 was estimated at 1,292.87 baht/ton, this cost varied with the length of storage. Only the provincial merchants' marketing margin can be estimated from the price difference between the farmgate and Bangkok wholesale price for mungbean large seed first grade, as well as small seed first grade. Taking the mean average between 1982 and 1986, marketing margins of these two grades were 1187 baht/kg giving an estimated gross profit to the provincial merchants of 1.18 baht/kg or roughly 15% of the average price received by farmers in the same period.

### **Significant Factors in the Development of Mungbean**

Above all, it should be pointed out that the most significant factor in the development of mungbean as well as other cash crops in Thailand is the free enterprise policy of the Thai government. This policy to a great extent provides the basis for active private sector involvement in the economy, which in turn, through the competition in the market economy, generates a well-developed agricultural marketing system in both rural and terminal markets. The second significant factor in the development of mungbean is the private sectors' role in the development process.

The significant private sector's role in the development of mungbean can be divided into three categories. The First is the provision of farm inputs. Among these, the most significant one is farm credits or financial supports which include many kinds of arrangements. The financial supports provided by the local merchants to the farmers under the so-called "Toukaey-Loukrai Relationship" have played a key role of the expansion of mungbean and black matpe production. In addition, under this relationship a mutual benefit and interdependency between the merchants and farmers in some areas has also been developed, more or less into a way of life.

The second category is the performing of marketing functions, especially in assembling, market information, grading and storage. The competition among the market participants creates efficiency as every one tries his best to be cost-effective and competitive by adopting new technology. In addition, individual merchants adjust their operation by performing more marketing functions such as setting up temporary assembling spots and improving their market position by expanding storage capacity. All these operations make it possible for the merchants to perform their marketing functions at a lower cost which results in a higher price being given for farmer's produce.

The third category is trading and co-ordinating with concerned agencies. The roles of all concerned trading parties, especially exporters and importers, are to provide the ultimate consumers in the importing countries with the right quality of mungbean and black matpe at the right time and the right price; otherwise, there will be no trade and export will decrease. In addition, the exporters have been adopting new technology in the grading and handling of beans, and have also actively explored and expanded the export markets for beans. This trading has been facilitated to a great extent by the co-ordinating role of the well established trade association, the Thai Mai and Produce Traders' Association. This association is indeed a key institution in strengthening the co-ordination and linkages between the private sector and the concerned government agencies.

### **Existing Problems**

At least four problems can be identified. Firstly, the domestic utilization of mungbean in the production of vermicelli has been facing at least two competitive commodities: potato and tapioca starch which are relatively cheaper. In addition, the technological breakthrough in the modified starch industry will enable other low-priced starches to substitute those high-priced starches like mungbean in the food processing industries. Therefore, it is likely that the utilization of mungbean in the processing industries may decrease in the years to come. If this is the case, then the scenario of a mungbean deficit could be internally solved by itself, but it would put a downward pressure on mungbean price at each market level.

The second problem is the quality problems, which exist not only in the domestic market but also in major export markets. Obviously, there are many uncontrollable factors having a significant effect on the quality of beans each year, such as weather conditions. However, the existing, rather subjective grading system, to a great extent hinders the quality improvement at the rural markets, because in most cases it requires an additional cost for quality improvement both at farm and rural market level.

The third problem is the scenario based on a surplus of black matpe in the near future. This is due mainly to the fact that black matpe is exported to only two principal countries: Japan and India, while domestic consumption is almost nil. The final problem is the low average yield of mungbean and black matpe obtained by the farmers. In other words, farmers are still getting a comparatively low yield compared to potential yields.

### **Recommendations**

This study advocates the following recommendations which are divided into policy issues and research issues.

For policy issues, the government policy on the production of mungbean and black matpe should be consistently reviewed so as to keep up with the dynamic supply and utilization situations. Moreover, extension efforts should be focused on increasing yield as well as quality improvement through the proper use of farm input and post harvest handling.

As for research issues, the recommendations for future researchers are as follow:

- (a) studies should be undertaken along the line of assessing the utilization and demand prospects in the producing as well as consuming countries;
- (b) a socio-economic comparative study should be carried out between selected areas in Thailand, on the establishment and the role of the private sector in the development of mungbean. This would provide more specific knowledge on where and how the private sector contributes to mungbean development in the different socio-economic environments; and
- (c) a cross-commodity comparative study on the role of the private sector and the market mechanism should also be explored. The results of this study would give a transparent view of the differences among the commodities that are competing for resource utilization, and the findings will be useful for those concerned in policy making as well as planning.



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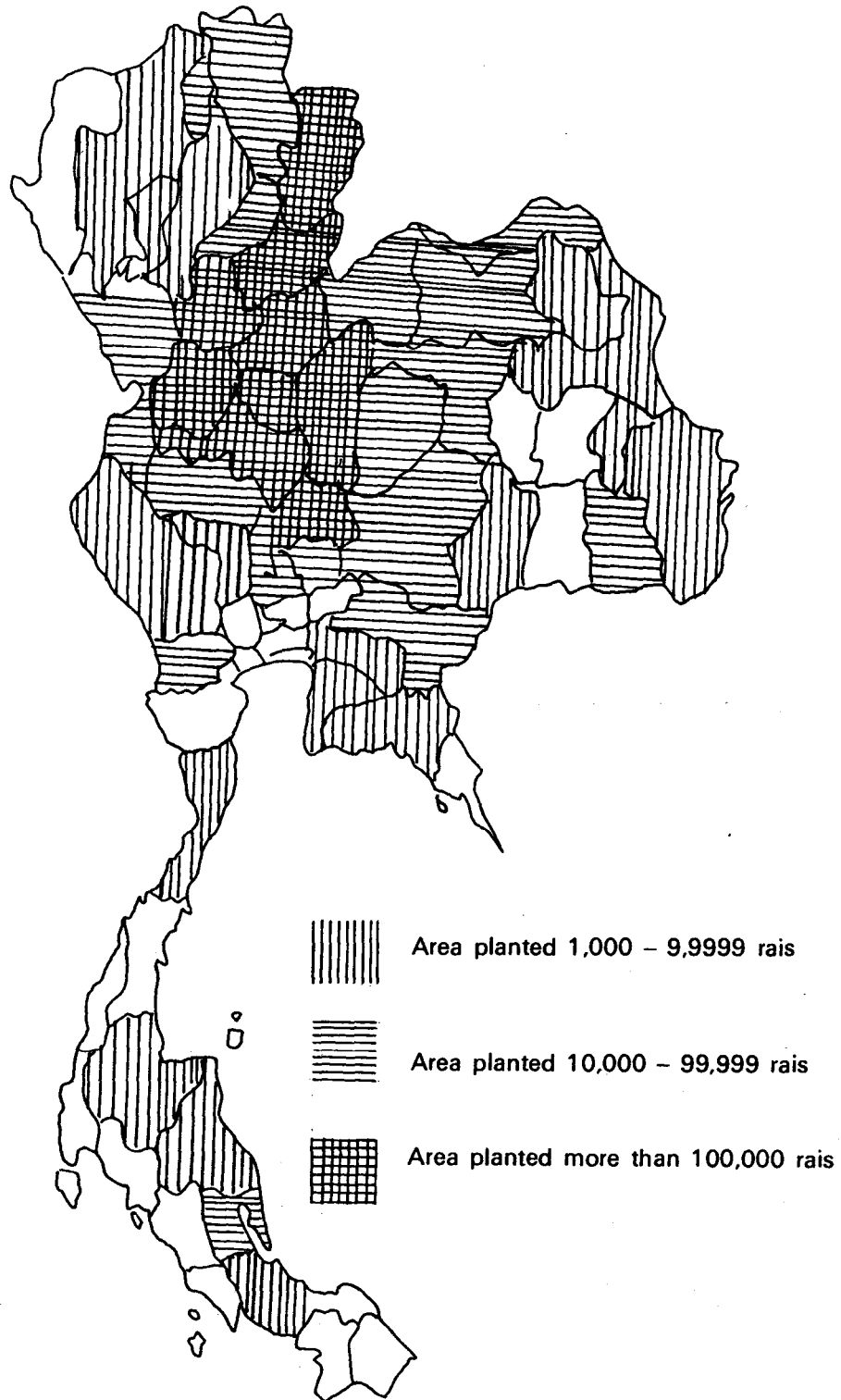
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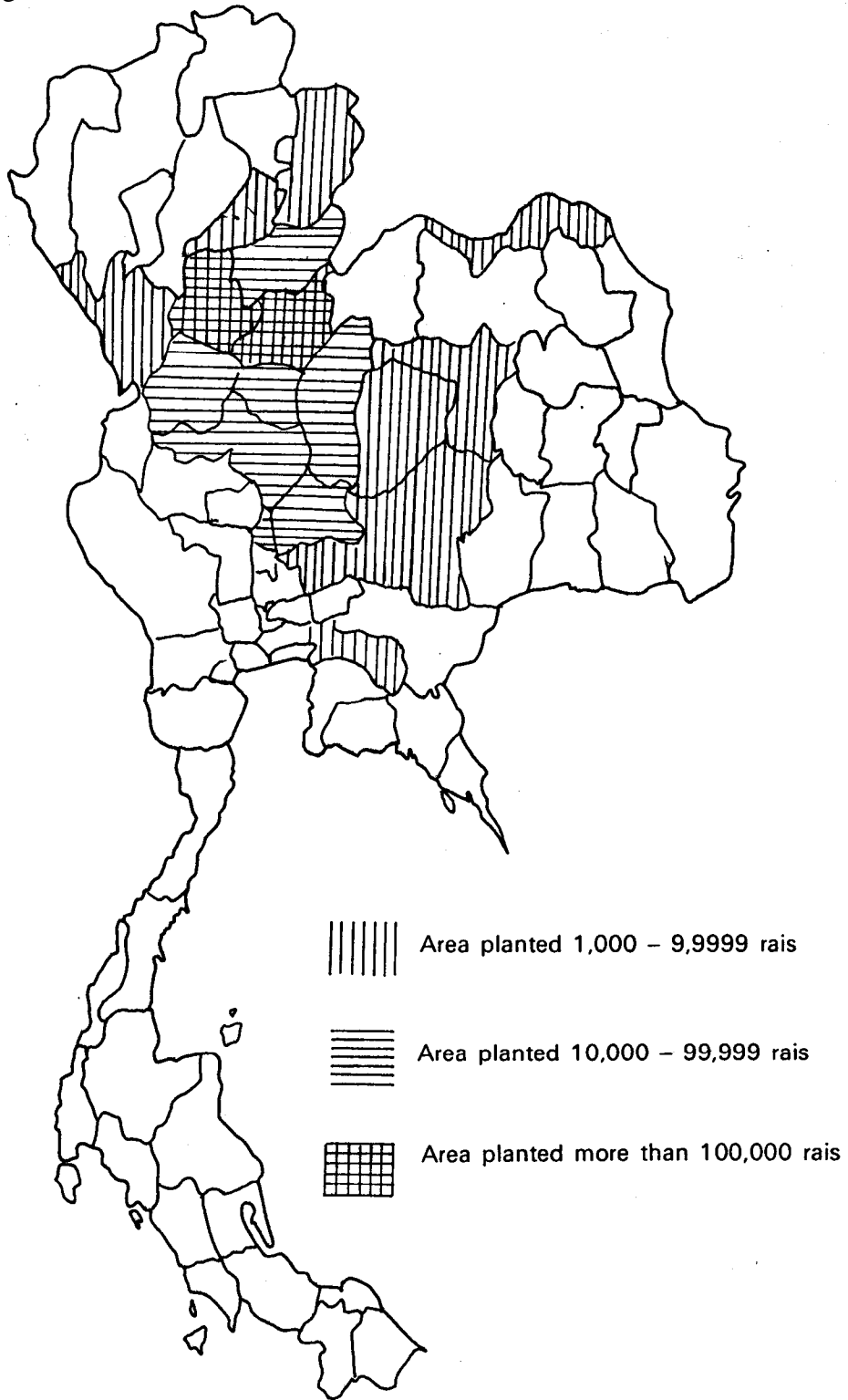
# Appendices



Figure



Figure



**Table 1 Export of Mungbean to Major Countries: 1957 to 1964**

Q : Quantity in metric tons  
V : Value in million of Baht

	Malaysia		Hong Kong		Singapore		Sri Lanka		Japan		Taiwan		Others		Total	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
1957	4,530	14	1,957	6	3,104	10	70	-	489	2	93	-	209	1	10,452	33
1958	3,535	12	1,075	4	2,171	70	-	-	212	1	100	-	129	-	7,222	24
1959	5,310	14	4,274	10	4,237	10	75	-	443	1	183	-	878	2	15,400	37
1960	8,769	19	7,001	14	4,342	9	41	-	538	1	2,073	4	269	1	23,033	48
1961	8,623	20	7,023	15	4,681	11	777	2	599	2	4,165	9	579	1	26,447	60
1962	7,475	23	3,466	9	4,836	15	796	2	1,466	5	2,391	7	595	1	21,025	62
1963	6,981	20	3,881	11	4,078	12	927	3	765	2	3,604	10	499	1	20,685	59
1964	10,725	27	7,442	18	5,940	15	2,046	5	1,943	4	4,660	12	619	3	33,375	84

Source : Customs Department, Thailand

**Table 2 Total Volume and Value of Exports of Mungbean and Black Matpe : 1965 to 1986**

	Mungbean		Black Matpe		Total	
	Tons	1,000 Baht	Tons	1,000 Baht	Tons	1,000 Baht
1965	44,573	100,616	6,115	87,384	50,688	188,000
1966	33,071	80,276	22,220	50,291	55,291	131,000
1967	22,994	67,485	23,993	54,515	46,897	122,000
1968	27,323	77,086	19,377	54,914	46,700	132,000
1969	51,670	135,517	25,101	79,483	76,771	215,000
1970	48,781	130,975	41,037	124,025	89,818	255,000
1971	38,299	134,170	47,297	120,830	85,596	255,000
1972	40,463	144,604	47,853	132,396	88,316	277,000
1973	59,151	209,377	36,241	164,677	95,392	374,054
1974	53,149	266,168	37,158	187,436	90,307	453,604
1975	42,406	237,527	40,817	227,486	83,223	465,013
1976	37,253	521,276	30,824	424,555	68,077	945,831
1977	70,808	528,501	36,969	530,204	107,777	1,058,705
1978	100,897	651,753	59,712	508,990	170,609	1,160,743
1979	108,407	819,819	69,147	555,386	177,554	1,375,205
1980	65,824	611,968	113,527	836,301	179,351	1,448,269
1981	109,534	1,133,060	62,642	560,298	172,176	1,693,358
1982	130,587	1,314,870	59,643	600,020	190,230	1,914,890
1983	84,804	869,139	72,056	683,028	156,860	1,552,167
1984	118,465	1,192,291	53,960	585,946	172,425	1,778,237
1985	144,548	1,476,237	88,976	809,260	233,524	2,285,497
1986	78,787	769,200	67,061	693,500	145,848	1,462,700

Source : (1) "Agricultural Statistics of Thailand". Crop Year 1972/1973, 1977/1978, 1980/1981, 1985/1986. Office of Agricultural Economics, Ministry of Agriculture and Co-operatives.

(2) Total value of export from 1965 to 1972 was obtained from "Bank of Thailand Monthly Bulletin : December 1974

**Agreement on Black Matpe Form  
Between  
The Japan Bean Sprout Importers Association  
and the Thai Maize & Produce Traders Association**

The Japan Black Matpe Trade Delegation headed by Mr. Y Ishikawa, and the representatives of the Thai Maize & Produce Traders Association headed by Mr. Kamchai Iamsuri, being mutually desirous of improving and strengthening the Black Matpe Trade Between Japan and Thailand by a uniform Black Matpe contract to be adopted by member of both Associations, held a meeting in Bangkok on September 23, 1972.

The meeting was conducted in the spirit of mutual co-operation and understanding and culminated in the following contract form.

1. Commodity : Thailand Black Matpe Crop, Fair Average Quality
2. Quality and Specification : 1. The quality to be according to fair average quality, but following specifications shall apply to the crop unless otherwise stated:  
Admixture seeds not to exceed 1.0% by weight  
Damaged seeds not to exceed  
Immature seeds not to exceed 2.5% by weight  
Broken seeds not to exceed  
Other seeds not to exceed  
(\*Damaged seeds should not exceed 1.0%)  
Weevilled seeds not to exceed 0.2%/0.5% by weight Small seeds (passing through seive No. 10) not to exceed 6.% by weight  
Brown seed not to exceed 3.0% by weight  
2. To commingle Black Matpes of different crop year shall not be permitted.
3. Inspection : The goods shall be inspected at the time and place of shipment by either Overseas Merchandise Inspection Co., Ltd. or Fareast Superintendence Co., Ltd., appointed by..... and Their certificates for both quality and weight shall be final at loading point.
4. Fumigation : Fumigation shall be effected by the appointed inspectors within one week before loading for forty-eight (48) hours by Methyl Bromide.
5. Price : In US \$/Pounds Sterling .....  
(.....) per metric ton of 1,000 kilograms F.O.B. Stowed Bangkok/C and F Japanese main ports net shipped weight. Price also to include fumigation and Survey fees. Supervision, if any, shall be for Buyers' account.



6. Quantity : .....Metric tons (.....)  
5% more-or-less at Sellers' option.
7. Shipment : From Bangkok as per ocean vessel's Bill (s) of lading dated or to be dated during the month (s) of ..... in case of non-shipment or failure of shipment by Sellers, Buyers reserve the right to cancel the contract and Sellers shall indemnify Buyer of the loss, if any. Partial shipment is allowed/not allowed.
8. Packing : In new single gunny bags or jute bags each containing 80 kilograms net. In case 50 kilograms bags are required additional charge of US \$ 2.00 per metric ton is to be added to the price. The mouth of bags shall be sewn perfectly with two jute twines in a double way.
9. Insurance : To be covered by Buyers. Any insurance surcharge incurred to shipment made by overaged vessel (any vessel older 15 years) will be for Sellers' account.
10. Payment : In case shipment to be effected within 30 days after signing contract, confirmed irrevocable without recourse at sight letter of credit shall be established in good order, by cable, through a prime bank in favour of Seller in amount of 100% of the contracted value, within 7 days after the conclusion of the contract, failing which Sellers reserve the right to cancel the contract and Buyers indemnify Sellers of the loss, if any. In case shipment to be affected more than 30 days, then the aforementioned letter of credit shall be established within 15 days after the conclusion of the contract, failing which Sellers reserve the right to cancel the contract and buyers indemnify Sellers of the loss, if any.
11. Arbitration : In the event of any dispute arising out of this contract and Failing to be settled between Sellers and Buyers, shall be referred to arbitration, unless otherwise agreed upon, within 30 days after each case to arise. In the event of arbitration, representative having no direct interest in the dispute shall be appointed as arbitrators who shall decide on the dispute in conformity with international trade customs.
12. Validity of Agreement :  
The agreement shall be valid from the date of its signing to September 30, 1973 but the period of validity may be extended with mutual consent of both parties. In case either Sellers or Buyers wish to amend part(s) of the agreement or cancel it, the party who wishes to do so shall tender to the other party by written notice three months in advance.

13. Other Terms:
- A. Force Majeure non-delivery of part or all of the goods caused by acts of government, riots, revolution, dockstrike, or any other cause beyond Sellers' control shall be deemed as cancellation of his contract to the extent of such nondelivery, and vice versa as in the case of Buyers.
  - B. Alternation in export duty and export premium, if any, after date of contract shall be for Sellers' access.
  - C. Alternation in import duty and import procedures, if any, after Date of the contract shall be for Buyers' account.

---

(Mr. Y Ishikawa)  
 Chairman  
 The Japan Bean Sprout Importers  
 Association

---

(Mr. Tan Jacknges )  
 Vice Chairman  
 The ThaiMaize and Produce  
 Traders Association.

---

(Mr. H. Ishii)  
 Witness

---

(Mr. Teera Srichiraratana)  
 Witness

---

(Mr. J Oda )  
 Witness

---

(Mr. Kangvan Tantiponganan)  
 Witness

Done on September 30, 1972, Bangkok

**Exchange Rate : Thai Baht/US Dollar, 1971-1987**

Source : FAO

Country : Thailand

Year : Exchange

Rates

( Loc.Curr/US\$)

---

1964	0.000
1965	0.000
1966	0.000
1967	0.000
1968	0.000
1969	0.000
1970	20.800
1971	20.800
1972	20.800
1973	20.616
1974	20.375
1975	20.379
1976	20.400
1977	20.400
1978	20.333
1979	20.419
1980	20.476
1981	21.768
1982	23.000
1983	23.000
1984	23.561
1985	27.149
1986	26.290
1987	25.733

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Note :

FAO : Food and agriculture Organization

**Table 4 Price Received by Farmer, Bangkok Wholesale Price and Export Price (f.o.b. Bangkok) of Various Grades of Mungbean and Black Matpe : 1977 to 1986**

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Price Received by Farmer										
Mungbean Large Seed 1st Grade	7.22	6.41	5.52	7.02	8.30	7.64	8.71	7.93	7.35	6.95
2nd Grade	6.25	5.28	4.70	6.39	7.50	6.94	7.59	7.29	6.72	6.20
Mixed Grade	5.50	4.66	4.53	6.56	6.84	6.33	7.13	6.73	6.56	5.83
Small seed 1st Grade	6.23	5.29	5.39	6.72	7.47	6.70	8.01	6.64	6.93	5.66
2nd Grade	5.70	4.93	4.70	5.77	7.50	6.15	7.97	6.02	6.56	5.51
Mixed Grade	n.a	4.21	4.23	5.67	6.26	5.95	6.60	5.87	6.11	4.92
Black Matpe Mixed Grade	6.77	5.52	5.69	5.10	6.50	6.33	7.09	6.73	5.65	6.77
Bangkok Wholesale Price										
Mungbean Large Seed 1st Grade	8.64	6.36	7.30	9.56	11.02	10.75	10.45	8.95	9.50	8.76
Mungbean Small seed 1st Grade	7.20	5.59	6.53	8.87	9.73	9.56	9.04	8.23	8.46	7.55
Black Matpe 1st Grade	n.a	7.89	6.55	5.29	8.45	9.13	9.18	8.52	7.58	8.97
Export Price (f.o.b.)										
Mungbean	7.46	6.46	7.56	9.30	10.34	10.07	10.25	10.06	10.21	n.a
Black Matpe	n.a	8.52	8.03	7.37	8.94	10.06	9.48	10.86	9.10	n.a

Source : Agricultural Research Division, Office of Agricultural Economics, Ministry of Agriculture and Co-operatives.

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