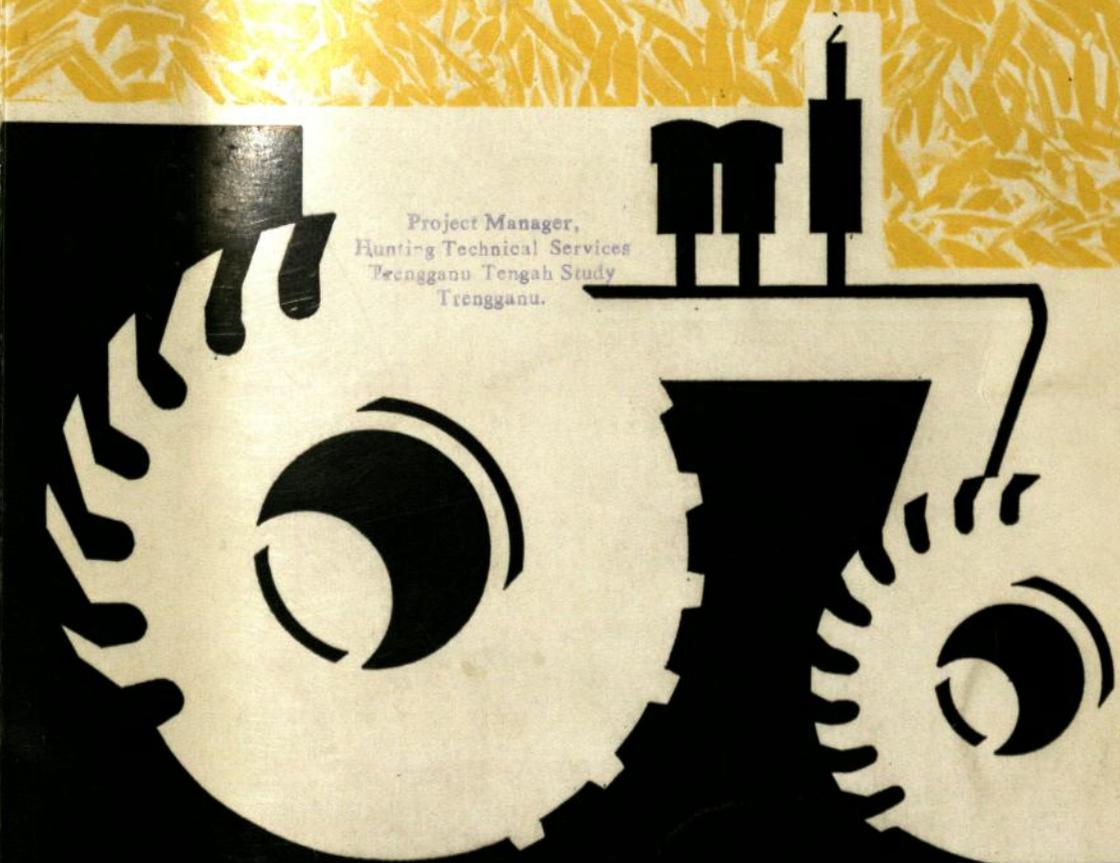


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PADI FARMING in WEST MALAYSIA

by S. Selvadurai
Agricultural Economist



Project Manager,
Hunting Technical Services
Trecanganu Tengah Study
Trengganu.

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MALAYSIA
1972

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CONVERSION FACTORS

1 gantang	=	1 gallon
1 gantang padi	=	5.6 lbs padi
400 gantangs padi	=	1 ton padi
1 gantang rice	=	8 lbs rice (approx.)
1 kati	=	1 1/3 lbs

The *conversion* of padi to rice is based on a 65% recovery rate.

615 gantangs padi	=	1 ton rice
10 lbs padi	=	6.5 lbs rice
1 gantang padi	=	3.64 lbs rice

EXCHANGE RATES

\$2.776 (Malaysian)	=	\$1 U.S.
\$6.7910 (Malaysian)	=	£ sterling

Aids to Padi Farming

Until very recently padi farmers have amongst the poorest sectors of the community but the situation has improved to some extent in the last 10 years mainly due to Government programmes aimed at expanding padi production and providing higher incomes to padi farmers. Traditional padi cultivation in which only a single crop is grown within the year provides a very low level of income to the farmers. This has been realised for a very long time and a number of measures have been taken at various times by Government to improve the economic position of the padi farmers. These measures include:

- (i) provision of irrigation facilities - particularly for double-cropping;
- (ii) subsidies for fertilizers and irrigation rates;
- (iii) a price support or guaranteed minimum price for padi;
- (iv) distribution of high yielding seeds to padi farmers;
- (v) Government institutions, establishment of various rural institutions such as Agricultural Bank, Cooperatives and Farmers' Associations to provide credit; Federal Agricultural Marketing Authority and the Padi and Rice Marketing Board to improve marketing; a Government Department to implement and enforce the Act processing guaranty of tenure to tenant farmers and controlling

CHAPTER I

RICE POLICY

Agriculture and National Development Policy

Government policy on padi and rice is an integral part of the overall national policy. Malaysian national development policy among other objectives aims at solving two major problems of the economy—the low incomes in certain sectors and the rate of underemployment and unemployment that pervades the whole economy.

Agriculture has an important role to play in both the economic and social development of the country. This stems from the fact that in West Malaysia about 55 per cent of the working population is employed within the agricultural sector; furthermore agriculture accounts for around 30 per cent of the gross domestic product and provides 60 per cent of country's foreign exchange earnings. Thus, a vigorous agricultural sector is essential for the economic development of the country: to provide export earnings, additional employment for the expanding labour force and for maintaining or increasing the annual growth of output.

The agricultural sector is in a key position to implement the national policy of raising productivity and redressing imbalances in incomes. Agricultural incomes are low when compared to those in the non-agricultural sector. Padi farming has special significance when implementing the national economic and social policy. Firstly, padi comes next in importance to rubber in the land use pattern of the country as nearly 1 million acres is under this crop. Furthermore, padi farmers generally have very low incomes and this is partly because of the very small size of their farms, which average 3 to 4 acres. These small farms are the main source of livelihood for about one-fifth of the total population in West Malaysia. Another significant fact is that nearly all padi farmers (97 per cent of them) are Malays. There are about 300,000 families dependent on padi farming which under traditional conditions provide relatively low returns. The low incomes of padi farmers is shown by the fact that while 20 per cent of the working population is engaged in padi cultivation, the contribution of this sector to the gross domestic product is no more than 5 per cent. It is mainly for these reasons that Government has had various programmes to improve the incomes and welfare of padi farmers.

Aids to Padi Farming

Until very recently padi farmers were amongst the poorest sectors of the community but the situation has improved to some extent in the last 10 years mainly due to Government programmes aimed at expanding padi production and providing higher incomes to padi farmers. Traditional padi cultivation in which only a single crop is grown within the year provides a very low level of income to the farmers. This has been realised for a very long time and a number of measures have been taken at various times by Government to improve the economic position of the padi farmers. These measures includes:

- (i) provision of irrigation facilities particularly for double-cropping;
- (ii) subsidies for fertilizers and irrigation rates;
- (iii) a price support or guaranteed minimum price for padi;
- (iv) distribution of high yielding seeds to padi farmers;
- (v) Government institutions: establishment of various rural institutions such as Agricultural Bank, Co-operatives and Farmers' Associations to provide credit; Federal Agricultural Marketing Authority and the Padi and Rice Marketing Board to improve marketing; a Government Department to implement and enforce the Act providing security of tenure to tenant farmers and controlling

the level of rents that can be levied on padi lands; establishment of a single authority, National Padi and Rice Authority, which will be responsible for the whole spectrum of operations affecting the development of the rice industry;

- (vi) an expanded rice research programme and the establishment of a specialized research institute—the Malaysian Agricultural Research and Development Institute;
- (vii) effective extension work through the establishment of a network of Farmers' Associations in all the important padi producing areas and the establishment of rural training centres to provide training for farmers in modern technology of padi farming.

Past Policy on Rice

In the past, rice policy in West Malaysia had three general objectives namely,

- (i) to support farm incomes;
- (ii) to promote rice production;
- (iii) ensure consumers of quality rice at reasonable prices and at minimum cost to government.

These objectives were reasonably achieved for there has been a steady increase in rice production mainly due to growing two crops of padi in place of the traditional single crop; double cropping ensures higher incomes to padi farmers. The increase in rice production in the last decade has resulted in the diminishing of imports and it is expected that the country will be self-sufficient in rice some time during the Second Malaysia Plan when the large irrigation works of Muda, Kemubu and Besut are fully operational.

The past policy resulting in increased production of padi has often been described as a concerted attempt to reach self-sufficiency in rice, the basic food. But this view conceals the real motive of increasing rice production which is primarily to improve the living standards of the padi growing population. It must be pointed out that increasing rice production is closely linked with economic development and enhancing the incomes of the padi farmers who constitute a very large and important rural sector. Increased padi production has been achieved through higher productivity resulting from the growing of two rice crops per year instead of a single crop; thus incomes of padi farmers in the double cropping areas have more than doubled. Padi farming used to be one of the most depressed sectors of the country but the economic position of padi farmers has improved considerably over the last decade where Government has implemented several programmes as mentioned earlier in paragraph 4.

The emphasis on increasing local rice production must also be viewed against the hardships endured during the Second World War when imports of rice were not possible. Furthermore, with the secular decline in rubber prices, there has always been the urgent need to diversify the economy. The possibilities of diversification through export crops are at present severely limited to a few crops. But part of the strategy of diversification has also been to increase production to replace imports for the home market. The development of import substitution industries has been employed in both agriculture and manufacture. As West Malaysia imported a large part of her rice requirements, there has always been a relatively large domestic market and full advantage was taken of this. It is against this background of exploiting import substitution industries which at the same time enhance the incomes of the padi farmers that the policy of expanding rice production to the point of self-sufficiency has been implemented in the past.

Revised Rice Policy

More recently in 1970, as part of the planning for the Second Malaysia Plan, the Government undertook a thorough review of several aspects of rice policy. With the steady increase in padi production, there were many problem areas which required careful examination. The basic policy objectives remain unchanged—to support farm incomes, to promote rice production in line with local requirements, and to assure consumers of regular rice supplies at fair prices and at minimum cost to the government.

But there have been important changes in priorities mainly because the aims of our earlier programmes to reach self-sufficiency in rice are almost being achieved and also because of the sharp decline in world rice prices in recent years. The main emphasis in the revised rice policy is to enhance the incomes of the padi farmers.

The rice policy issues that were recently reviewed included the following:

- (i) production targets for padi;
- (ii) future investment in irrigation;
- (iii) problem of padi farmers outside the rice bowl areas;
- (iv) price support and other assistance to padi farmers;
- (v) co-ordination among Government agencies dealing with padi and rice.

Production Targets

Now that West Malaysia, a relatively high cost rice producing country, will produce enough rice for her requirements and perhaps have a surplus for export, the long term rice production targets have to be clearly stated. There are two alternatives: either produce only sufficient rice for the domestic requirements or, lower production costs so that surpluses can be sold in the world market. The Government has decided that in the first instance, the production target for rice be revised from that of self-sufficiency to meeting 80 to 90 per cent of the country's requirements. This change in rice policy stems from the fact that the country is, and will remain for some time, a relatively high cost producer of rice and Malaysia cannot compete in the world rice markets; furthermore, world rice prices are falling as increasing supplies are being made available by several countries outside the traditional rice growing areas of South-East Asia. Any production by Malaysia in excess of domestic requirements cannot be disposed off in the world markets without making losses. In the revised rice policy, emphasis is now altered from one of self-sufficiency to enhancing the incomes and welfare of padi farmers through programmes to increase the yields per acre and reduce the costs of production. Higher yields per unit area of land will generally lower the unit cost of production and this is an essential element for any future downward adjustment of the guaranteed minimum price of padi so that Malaysian rice will in future be able to compete in the world markets. A vigorous research and extension programme is necessary so that higher yields per unit area will more easily be achieved. Padi seed improvement and selection research is being intensified so as to ensure continuing increases in yields. Thus, in padi production, the main emphasis is to obtain higher yields per unit area of land so as to lower the cost of production of padi.

In order to maintain local supplies of rice at 80 to 90 per cent of domestic requirements and to increase the incomes of padi farmers, rice production will be concentrated in selected "rice bowls" where two (or more) crops per year will be cultivated. Farmers in these areas are being provided with a network of services to help them to increase their rice production and enhance their incomes and welfare; farmers living outside the designated rice bowl areas will be discouraged from growing rice but steps will be taken to safeguard their welfare and also assure them of higher incomes.

However, it might be added that it is no easy task to regulate padi production to a required level. Changes in weather can easily bring about a 15 per cent increase or decrease in supplies. Apart from weather, it must be realised that there are 300,000 padi farmers in the country and it would be very difficult to make them alter their traditional padi production plan. To many of these farmers, the cultivation of padi is undertaken to meet the domestic requirements of their staple food and they will continue to plant padi irrespective of what government policy is.

Policy on Investment in Irrigation

In order not to increase local production of rice beyond 80 to 90 per cent of domestic requirements, it has been decided that no new padi lands will be opened up through Government investment in irrigation facilities. Apart from completion of irrigation projects where work has commenced, future investment in irrigation facilities for

padi lands, will take into consideration the possibilities of growing other crops such as maize and sorghum in rotation with padi. Work on improvement of existing irrigation facilities in both single and double cropping padi areas will be continued, as proper water control in the rice fields is one of the essential pre-requisites for higher yields.

Problem of Padi Farmers outside the Rice Bowl Areas

Some padi farmers have benefited greatly as a result of Government investment in irrigation facilities. Their benefits will increase further in the near future when programmes such as research on new varieties, provision of credit, better marketing facilities etc., are intensified. However, there are still large numbers of padi farmers who are not served with irrigation facilities and therefore they do not benefit from Government irrigation programmes. At present only about 35 per cent of the padi areas are growing two crops, and even in 1975 there will still be about 40 per cent of the padi areas, or almost 400,000 acres, where only a single crop of padi will be cultivated. Government has recommended that future rice production be confined and concentrated in the double cropping rice bowl areas. It has also been recommended that farmers cultivating padi outside the rice bowl should be encouraged to grow other crops such as feed grains in rotation with their padi and have supplementary enterprises such as livestock or poultry-keeping, or they should be assisted to move out of the padi areas altogether to more remunerative occupations. These farmers living outside the rice-bowl areas (who might be termed marginal padi farmers) will be assisted by Government programmes to improve their standards of living and move into the modern sector.

However, it must be realised that the change-over from padi to other crops is not easy. Padi farming has been a traditional occupation to supply the family with the basic food requirements. In many of these single-cropping areas, because of the swampy nature of the ground, padi is about the only crop that can be cultivated. Such lands under existing circumstances have hardly any other alternative use. It is a formidable task to find new crops to replace padi and which are also more remunerative. The solving of the problems of the padi farmers living outside the rice bowl, of trying to change from padi to some other crop, requires great efforts on the part of the Government in not only research but also in providing credit and marketing facilities and large investments in improving the drainage of these soils. Without appropriate and timely Government action along these lines, the living standards of these padi farmers will deteriorate when compared to farmers in the double cropping areas. The Ministry of Agriculture and Fisheries has formed a Committee to identify the problems and recommend and implement measures to enhance the incomes and welfare of these farmers outside the designated rice bowl areas; this is one of the priority projects for the Second Malaysia Plan. As a first step, these farmers will be encouraged to grow maize and sorghum after their main padi crop; production and marketing facilities will be provided to ensure the success of these crops.

Price Support and Other Measures to Padi Farmers

When considering price support and other assistance to padi farmers, it might be added that the social and welfare aspects are equally important as economic considerations. Some reasons why the price support (or guaranteed minimum price for padi) offered to Malaysian farmers is high when compared to the neighbouring countries, is that there is the need to raise the income levels of padi farmers when compared to other farming operations, and encourage the cultivation of food for this is part of the agricultural diversification programme. With increasing areas that are double-cropped, the padi farmers in these areas have benefited considerably as their incomes have more than doubled. Under these circumstances, it is often argued that it might be possible to reduce the guaranteed minimum price for padi and still provide the necessary incentives for higher production. While this will be true for some of the higher yielding double cropping areas, it must also be realised that two-thirds of the padi lands of West Malaysia at present produce only a single crop; incomes of padi planters are generally low when compared to FELDA settlers or industrial workers. Therefore, it has been agreed as a matter of policy, that the guaranteed minimum price for padi be continued under the Second Malaysia Plan but the level of the support price will be subject to annual review.

Marketing Improvements

While there exists a guaranteed minimum price for padi, the method of its implementation is such that it does not ensure that farmers are paid this minimum price. This situation arises because only a negligible number of farmers sell their padi direct to the small number of Government rice mills which are always prepared to purchase padi at the guaranteed price. In practice, the GMP is implemented indirectly; Government for their Rice Stockpile purposes, undertakes to buy rice from millers provided that the millers certify that such rice had been milled from padi purchased at the ruling G.M.P. In spite of such certification by millers, there is little evidence that farmers get the maximum benefits from the support price. But the situation changes and farmers get better prices where the Padi and Rice Marketing Board (now National Padi and Rice Authority) has introduced Trading Schemes as in Tanjong Karang, Perlis and Kedah, where the Board's purchasing agents buy padi at the farm level. To ensure maximum and fair prices to farmers, Government has recommended under the Revised Rice Policy that Trading Schemes be extended to other areas; or the Supplies Division of the Ministry of Commerce and Industry sends out more mobile padi purchasing teams particularly to areas where prices received by farmers are depressed. It is necessary to make the support price an effective one for this will ensure fairer prices and higher incomes to padi farmers.

Co-ordination between Government Agencies dealing with Padi and Rice

The marketing of padi and rice in this country is made more complex (and also more inefficient) because the responsibilities for marketing are divided between several Government Departments. It is clear that for greater efficiency a single authority should be responsible for the whole spectrum of operations affecting the development of the rice industry. Therefore an integrated body has been established—National Padi and Rice Authority (more details of the Authority are given in page 74-75).

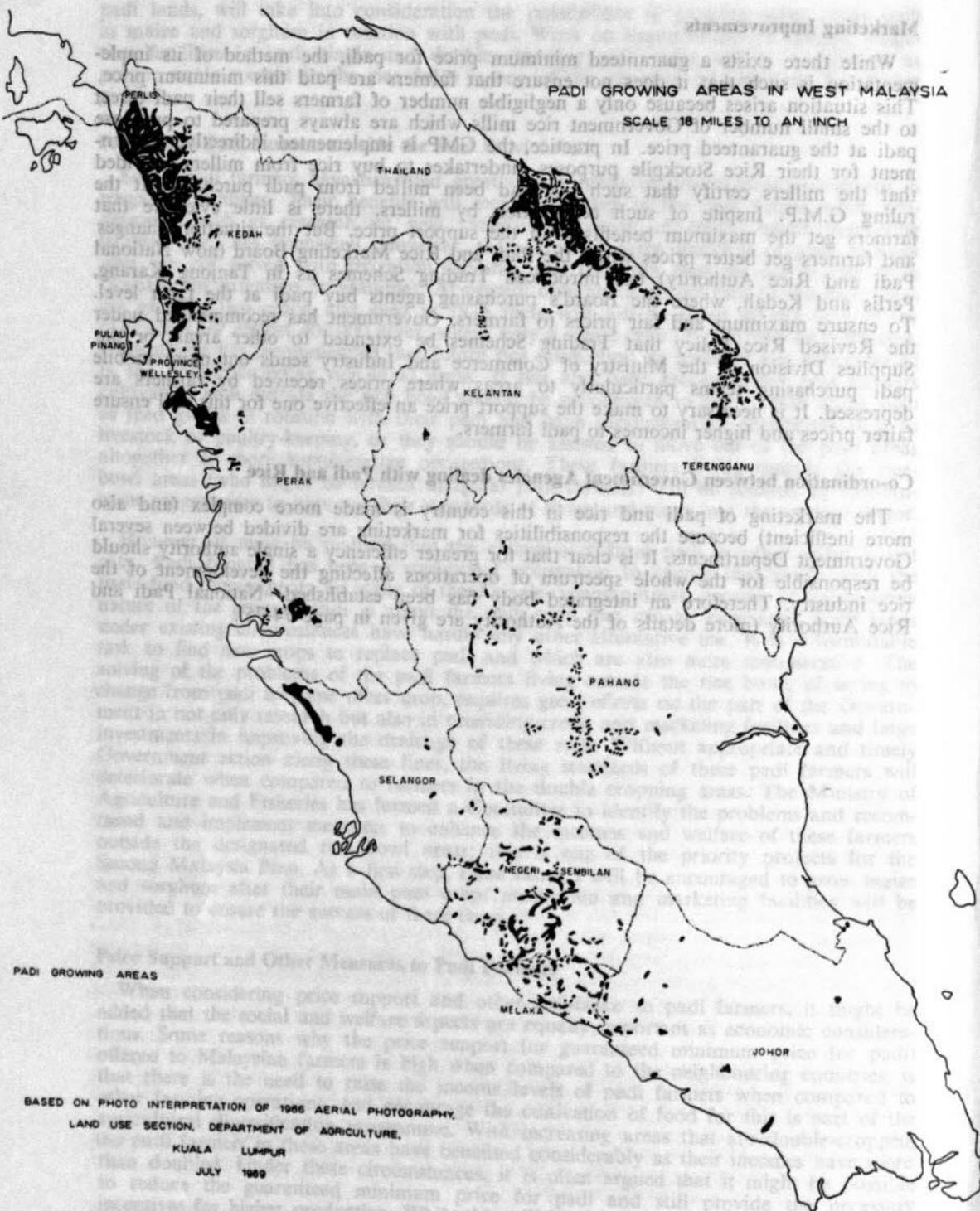
There are two main types of padi cultivation: wet padi and dry padi. Wet padi is cultivated in flooded fields where water is retained from the time of transplanting up to harvest mainly through the use of bunds. Broadcasting of padi seeds is not practised and all wet padi is transplanted. On the other hand, dry padi is grown on dry ground like any other crop, the seeds are sown in the soil. In West Malaysia and in the main rice producing countries, dry padi cultivation is of little significance both in terms of area harvested and production. Out of a total acreage of nearly a million acres, only about 50,000 acres is under dry padi and the average yields from these areas are also low. Because of the poor and wasteful yields, Government policy is not to encourage dry padi production. In wet padi areas, growing two padi crops per season is possible with proper irrigation. At present only one-third of the padi areas, double-cropping is undertaken. In the next few years, with the completion of some major irrigation schemes, the areas where double-cropping would be possible will increase to about two-thirds of all the wet padi areas. This is the target for the Second Malaysia

62824

Area under Padi

Table 2.1 shows the areas planted and harvested since 1951. The acreage harvested is smaller than the planted area because of damage to the crops caused by floods, drought, pest attacks, late planting, etc. Actual losses are shown in Table 2.1 for the small losses in parts of individual padi fields and the losses in these areas because of the difficulty of estimating them.

From Table 2.1 it is seen that the area planted each year for the main season crop shows only a small increase from year to year. The average annual rate of increase of the planted area is around one per cent. The main reasons for the slow increase is that water supply and suitable flat lands are limiting factors. Annual changes in the area planted for the main season crop varies to some extent on the relative prices of rubber and padi. When rubber prices are good, there is greater interest in the tapping of rubber by farmers who have both padi and rubber lands and this results in a drop in the planted area of padi for that particular year. For example, in 1952 and 1953,



PADI GROWING AREAS IN WEST MALAYSIA
SCALE 10 MILES TO AN INCH

PADI GROWING AREAS

BASED ON PHOTO INTERPRETATION OF 1966 AERIAL PHOTOGRAPHY,
 LAND USE SECTION, DEPARTMENT OF AGRICULTURE,
 KUALA LUMPUR
 JULY 1969

CHAPTER 2

AREA, YIELD AND PRODUCTION

General

In West Malaysia there are nearly a million acres under padi and this crop comes next in importance to rubber in the land-use pattern of the country and also in terms of labour utilization. About 20 per cent of the economically active population of the country is in the padi growing sector. Padi occupies 14 per cent of the total cultivated land and the crop is grown in all the eleven States. However, the bulk of the padi lands are found in the north-west and north-east coastal plains where climatic and physical conditions, though not of optimum, are more favourable for the cultivation of the crop. Apart from the coastal plains, padi is also cultivated in the bottoms of inland valleys but these areas are relatively small and padi cultivation is mainly for subsistence. Padi cultivation is exclusively carried out in smallholdings averaging 3 to 4 acres. While Malaysia is one of the world's largest producers of rubber and palm oil, its importance as a rice producing country is rather insignificant. In the past, West Malaysia used to import about 40 per cent of her rice requirements at an annual cost of about \$150 million but the picture is rapidly changing as more and more rice is being locally produced and imports are fast declining.

Wet and Dry Padi

There are two main types of padi cultivation: wet padi and dry padi. Wet padi is cultivated in flooded fields where water is retained from the time of transplanting up to harvest mainly through the use of bunds. Broadcasting of padi seeds is not practised and all wet padi is transplanted. Dry padi, on the other hand, is grown on dry ground like any other crop, the seeds being dibbled in. In West Malaysia and in the main rice producing countries, dry padi cultivation is of little significance both in terms of area cultivated and production. Out of a total acreage of nearly a million acres, only about 50,000 acres is under dry padi and the average yields from these areas are also low. Because of the poor and uncertain returns, Government policy is not to encourage dry padi production. In wet padi cultivation, the growing of two padi crops per annum is possible with proper irrigation and in about one-third of the padi areas, double-cropping is undertaken. In the next few years, with the completion of some major irrigation schemes, the areas where double-cropping would be possible will increase to about two-thirds of all the wet padi lands. This is the target for the Second Malaysia Plan.

Area under Padi

Table 2.1 shows the acreages planted and harvested since 1951. The acreage harvested is smaller than the planted areas because of damages to the crops caused by floods, droughts, pest attacks, late planting etc. Actual losses are larger than what is indicated in Table 2.1 for small losses in parts of individual padi fields are not shown in these figures because of the difficulty of estimating them.

From Table 2.1 it is seen that the area planted each year for the main season crop shows only a small increase from year to year. The average annual rate of increase of the planted area is around one per cent. The main reasons for the slow increase is that water supply and suitable flat lands are limiting factors. Annual changes in the area planted for the main season crop varies to some extent on the relative prices of rubber and padi. When rubber prices are good, there is greater interest in the tapping of rubber by farmers who have both padi and rubber lands and this results in a drop in the planted area of padi for that particular year, for example, in 1952 and 1953.

TABLE 2.1
TOTAL PADI PLANTED AND HARVESTED AREAS BY TYPES OF PADI

Year	Main Season			Off-Season			Total			WET PADI			DRY PADI			TOTAL
	Acreage Planted	Acreage Harvested		Planted	Harvested		Planted	Harvested		Acreage Planted	Acreage Harvested		Acreage Planted	Acreage Harvested		
1951	820,490	810,290		5,970	5,950		826,460	816,240		46,390	45,910		872,850	862,150		
1952	784,140	752,660		4,230	4,220		788,370	756,880		40,680	40,550		829,050	797,430		
1953	785,610	776,730		7,550	7,470		793,160	784,200		43,740	43,650		836,900	827,850		
1954	801,210	777,940		10,410	10,250		811,620	788,190		37,190	36,980		848,810	825,170		
1955	832,580	809,080		6,360	6,120		838,940	815,200		47,310	46,990		886,250	862,190		
1956	818,850	803,790		9,010	8,950		827,860	812,740		50,530	50,180		878,390	862,920		
1957	832,380	825,310		7,290	7,230		839,670	832,540		55,120	54,290		894,790	886,830		
1958	850,170	842,970		7,920	7,910		858,090	850,880		51,130	50,710		909,220	901,590		
1959	859,850	817,990		11,640	11,610		871,490	829,600		56,460	55,340		927,950	884,940		
1960	868,420	863,440		20,890	20,890		889,310	884,330		60,850	59,480		950,160	943,810		
1961	879,300	875,170		35,570	35,370		914,870	910,540		52,920	52,650		967,790	963,190		
1962	872,730	868,440		46,520	45,910		919,250	914,350		58,040	57,690		977,290	972,040		
1963	886,170	880,760		49,110	47,880		935,280	928,640		55,450	55,090		990,730	983,730		
1964	879,890	841,020		58,420	56,960		938,310	897,980		52,340	52,160		990,650	950,140		
1965	896,700	875,090		89,840	89,720		986,540	964,810		53,440	52,790		1,039,980	1,017,600		
1966	896,060	851,960		104,450	103,340		1,000,510	955,300		52,870	50,170		1,053,380	1,005,470		
1967	878,910	771,440		156,940	154,970		1,035,850	926,410		51,500	44,830		1,087,350	971,240		
1968	906,590	862,610		224,660	224,170		1,131,250	1,086,780		51,250	50,080		1,182,500	1,136,860		
1969	945,970	940,190		238,130	237,330		1,184,100	1,177,520		57,180	56,520		1,241,280	1,234,040		
1970	938,010	919,870		325,930	324,840		1,263,940	1,244,710		53,580	51,980		1,317,520	1,296,690		
1971	921,840	875,740		393,760	392,710		1,315,600	1,268,450		49,510	45,860		1,365,110	1,314,310		

If no new padi areas are opened up in the next few years, there will be little change in the area planted with the main season crop. There are no plans, and it is not Government's policy, to open up any large new padi lands in West Malaysia during the Second Malaysia Plan; therefore the wet padi areas will not exceed 950,000 acres in the next few years.

Off-Season Cropping

Table 2.1 shows that the area under the off-season padi crop has shown a rapid increase particularly after 1960. This increase in the area will continue to about 1975 as major irrigation schemes are completed and brought into full use. It might also be pointed out that off-season padi cultivation was introduced during the Japanese occupation of 1942-1945. Double-cropping was made possible by the introduction of a number of short-maturing varieties of padi from Taiwan. In the early years, the growing of two padi crops annually was mainly confined to Province Wellesley. With the development of short-term varieties of padi suited for local conditions such as Malinja in 1964, Mahsuri in 1965 and Bahagia in 1968, and the implementation of irrigation works, off-season cultivation has increased rapidly in the last decade and the harvesting of two padi crops within the year is now to be found to a greater or lesser extent in all States. In 1970 about one-third of the padi lands of West Malaysia were growing two crops per year but by the end of the Second Malaysia Plan period of 1975 about two-third of the padi farmers will be harvesting two crops annually. Increases in rice production to the level of self-sufficiency will depend mainly on the full utilization of these newly irrigated areas. It is Government's policy to assist padi farmers to cultivate two padi crops per year so as to increase their incomes. With off-season cropping, the land and labour resources of the farmer are more fully utilised.

In areas where irrigation facilities are not available for the growing of two padi crops, the more enterprising farmers have planted other crops after the main padi season. These crops include tobacco, groundnuts, vegetables, maize and sorghum. However, up till now only a small fraction of the non-irrigated padi areas are thus fully utilised during the off-season for the growing of crops other than padi.

Dry padi: Dry padi cultivation is relatively insignificant both in terms of the area planted and production. The area under this type of padi is around 50,000 acres. This padi is cultivated on both low areas and on high grounds mainly in the East Coast States of Kelantan and Trengganu. Some of the areas under dry padi are newly cleared forest land; the padi is cultivated as a transitional crop occupying the ground between the time of clearing the forest and its utilization for the planting of some perennial crop such as oil palm or rubber.

State-Wise Distribution of Padi Areas

Padi is grown in all the 11 States of West Malaysia but is more important in the northern States (Table 2.2) for climatic and physical conditions are more favourable for the growing of this crop. Taking West Malaysia as a whole, 14 per cent of the cultivated land is under padi but the importance of padi cultivation varies in the different States. This is shown in Table 2.2; in Perlis, 75 per cent of the cultivated land is under padi, and in Kelantan and Kedah the corresponding percentages are 35 and 36 per cent respectively. The 3 States of Kedah, Kelantan and Perlis account for 55 per cent of the padi lands of West Malaysia. In Johore, there are only small patches of padi and around 1 per cent of the cultivated area in the State is under this crop; Johore has the smallest area under padi among the States of West Malaysia.

Variation in Planted Area in Different States 1961-1970

Tables 2.1 and 2.3 show that taking West Malaysia as a whole there has been only a small increase in the last ten years in the area planted with both the main season and dry padi crop; there have however been fluctuations in the planted areas in individual States (Table 2.3) for various reasons. However, with the *off-season crop*, a steady increase has been recorded in the area planted and this increase will be continued under the Second Malaysia Plan with the completion and utilization of the large irrigation works of Muda in Kedah and Perlis, Kemubu in Kelantan and Besut in Trengganu.

TABLE 2.2
PERCENTAGE OF CULTIVATED LAND UNDER PADI 1969

State	Area Under All Crops: (1,000 Acres)	Area Under Padi (1): (1,000 Acres)	%
Johore	1,742	24	1
Kedah	823	293	36
Kelantan	538	189	35
Malacca	209	32	15
Negeri Sembilan	614	32	5
Pahang	740	57	8
Penang and P. W.	165	40	24
Perak	1,053	130	12
Perlis	88	66	75
Selangor	745	52	7
Trengganu	345	88	26
TOTAL	7,062	1,003	14

¹ Includes areas planted with both wet and dry padi.

TABLE 2.3
ACREAGE PLANTED WITH MAIN SEASON, OFF-SEASON AND DRY PADI BY STATES, 1962-1970

MAIN SEASON

States	1962	1964	1966	1968	1970
Johore	6,180	10,220	9,890	11,690	11,190
Kedah	283,070	284,840	285,930	288,840	290,710
Kelantan	161,790	167,700	167,910	170,520	171,300
Malacca	29,620	26,440	30,340	31,090	30,630
Negeri Sembilan	30,690	28,210	32,010	27,700	31,830
Pahang	42,080	31,280	40,990	48,120	53,600
Penang and P.W.	39,270	39,360	39,340	39,240	40,310
Perak	118,790	122,360	122,200	118,720	120,680
Perlis	63,130	62,980	63,130	65,630	65,630
Selangor	49,880	52,510	49,510	48,060	49,150
Trengganu	48,310	53,990	54,810	56,980	72,980
TOTAL	872,730	879,890	896,060	906,590	938,010

OFF-SEASON

Johore	620	300	300	7,610	5,840
Kedah	2,240	6,690	13,140	21,530	87,040
Kelantan	5,670	6,680	7,660	14,160	26,320
Malacca	590	460	470	2,050	4,140
Negeri Sembilan	—	200	2,560	6,390	10,490
Pahang	260	—	810	4,870	5,050
Penang and P.W.	26,810	29,660	33,090	36,020	37,520
Perak	3,290	2,510	11,280	70,130	79,970
Perlis	3,140	250	820	13,600	27,500
Selangor	1,760	10,060	32,000	43,060	32,630
Trengganu	2,140	1,610	2,320	5,240	9,430
TOTAL	46,520	58,420	104,450	224,660	325,930

DRY PADI

Johore	100	650	1,320	1,900	—
Kedah	7,030	4,620	5,250	4,720	4,380
Kelantan	27,070	20,810	17,200	17,290	17,570
Malacca	—	—	—	—	—
Negeri Sembilan	30	—	—	—	—
Pahang	3,080	4,900	4,240	5,500	6,340
Penang and P. W.	50	—	—	—	—
Perak	4,070	5,200	6,610	6,560	5,690
Perlis	710	1,420	1,420	410	150
Selangor	70	—	—	300	—
Trengganu	15,830	14,740	16,730	14,570	19,450
TOTAL	58,040	52,340	52,870	51,250	53,580

Projections of Double-Cropping Areas

It has been stated earlier that little change has taken place and will take place in the physical area under wet padi for it is not the policy of the Government to open up fresh areas for padi cultivation as the country will soon be self-sufficient in rice. The objective of West Malaysian padi policy is to increase the incomes of farmers mainly through more intensive cultivation particularly by the growing of two padi crops per year. Because of the importance of double-cropping in providing higher incomes and in increasing local rice production, it might be useful to make an estimate of the double-cropping areas for the next five years (Table 2.4).

TABLE 2.4

PROJECTED DOUBLE-CROPPING AREAS, WEST MALAYSIA, 1971-1975

Year	Total Wet Padi Area: Acres	Double-Crop Area: Acres	%
1971	922,000	394,000	42
1972	950,000	470,000	50
1973	950,000	530,000	55
1974	950,000	570,000	60
1975	950,000	662,000	70

Yields Per Acre

Padi yields in West Malaysia are higher than that of neighbouring countries but are not comparable to South Korea, Taiwan or Japan, among countries in Asia. Output per acre in the warm temperate regions are about twice that of West Malaysia and disparities in yields between padi growing areas in South East Asia and in the warm temperate countries are due to several reasons. The level of output per acre depends on a combination of technical, economic and ecological factors such as soils, climate, irrigation facilities, the supply of better seeds, use of fertilizers, pesticides and perhaps the most important of all, the provision of adequate incentives to farmers so as to ensure the adoption of improved cultivation practices. At present more than half the padi lands in West Malaysia are not irrigated and under such conditions, yields are lower than the average. In contrast, in the warm temperate countries, padi cultivation is dependent on irrigation and crop rotation is the usual practice. Furthermore, in countries like Japan, padi cultivation receives good support from Government in the form of high price guarantees. Taking all these factors into consideration, we find that there is considerable scope for increasing the yields of existing padi lands of West Malaysia.

Yields per acre in West Malaysia are estimated on the basis of the area planted while in some countries yields are reckoned on area harvested. Yields expressed in terms of area planted will be lower than those based on area harvested because part of the planted area may be destroyed by floods, droughts, etc. The average yields for the years 1952 to 1970 is given in Table 2.5.

TABLE 2.5
WEST MALAYSIA: AVERAGE PADI YIELDS PER ACRE
(IN GANTANGS AND POUNDS OF PADI) 1952 TO 1970

Year	WET PADI				DRY PADI		ALL TYPES OF PADI	
	Main Season		Off-Season		Gantangs	Lbs	Gantangs	Lbs
	Gantangs	Lbs	Gantangs	Lbs				
1952	288	1,613	274	1,534	135	756	281	1,574
1953	360	2,016	292	1,635	130	728	347	1,943
1954	338	1,893	308	1,725	114	638	327	1,831
1955	316	1,770	239	1,338	147	823	305	1,708
1956	328	1,837	337	1,887	174	974	319	1,786
1957	365	2,044	369	2,066	266	1,490	358	2,005
1958	362	2,027	397	2,223	194	1,086	354	1,982
1959	331	1,854	419	2,346	214	1,198	325	1,820
1960	399	2,234	443	2,481	219	1,226	389	2,178
1961	427	2,391	378	2,117	217	1,215	414	2,318
1962	392	2,195	413	2,313	194	1,086	381	2,134
1963	411	2,302	436	2,442	225	1,260	402	2,251
1964	372	2,083	428	2,397	213	1,193	367	2,055
1965	408	2,285	447	2,503	197	1,103	401	2,246
1966	408	2,285	456	2,554	190	1,064	389	2,178
1967	389	2,178	438	2,453	171	958	373	2,089
1968	415	2,324	455	2,548	189	1,058	406	2,274
1969	431	2,414	481	2,694	186	1,042	429	2,402
1970	427	2,391	464	2,598	205	1,148	427	2,391
1971	445	2,492	506	2,834	202	1,131	446	2,498
Average Annual Rate of Increase in Yields between 1952-1970	1.6 per cent or 6.2 gtg. or 34.7 lbs per acre		2.9 per cent or 11.3 gtg. or 63.3 lbs per acre		1.5 per cent or 2.8 gtg. or 15.7 lbs per acre		1.7 per cent or 6.4 gtg. or 35.8 lbs per acre	

1 gantang padi = 5.6 lbs padi
400 gantangs padi = 1 ton padi
615 gantangs padi = 1 ton rice

The yield, or productivity of padi lands, has been showing a modest increase over the years and this is seen in Table 2.5. The average rate of increase of the main season padi yield is 1.6 per cent or 6.2 gantangs per annum and this is to be compared with the off-season increase of 2.9 per cent (11.3 gantangs). Dry padi yields also show a small annual rise of 1.5 per cent or 2.8 gantangs. The annual average increase in yields per acre for all types of padi was 1.7 per cent or 6.4 gantangs of padi.

It is not difficult to give an explanation for the higher rate of increase of the off-season yields when compared to the main season. Firstly, in the early years, the off-season crop was cultivated in relatively small areas scattered in many places and there was much damage by birds, rats and other pests and therefore yields were relatively low. But as the planted acreage under the off-season crop expanded, the damages caused by birds and rats were spread over wider areas, and the yields per acre gradually increased. Secondly, almost all off-season padi is grown in selected areas where the irrigation facilities enable a certain amount of control of the water-level in the fields; the Department of Agriculture in the various States make special efforts to ensure the success of double cropping particularly if the crop is cultivated in an area for the first time; the extension staff fully realise that failure of the crop will seriously prejudice any future attempts at double-cropping. Furthermore, generally the off-season or second crop yield is higher than that of the first crop because of the more favourable weather condition.

The yields per acre differ from State to State (Table 2.6). The yields are higher in Selangor, Kedah, Perlis and Province Wellesley where the greater part of the crop is grown under irrigation, and fertilizers are used by nearly all farmers; in these States the yields per acre from a single crop are around 500 gantangs or 1.25 tons padi. Yields are particularly poor in Trengganu and Pahang where techniques of padi production have not changed to any appreciable extent over the years. The differences in yields in the various States can be attributed to a number of factors which are inter-related, and of these, probably the most important are the quantity of agricultural inputs utilised, the quality of seed used and the extent of field and water management.

Table 2.6 shows that the yield per acre in the last 9 years (1962-1970) average 404 gantangs padi for the main season crop and 454 gantangs for the off-season. This is a little more than one ton of padi per acre (400 gantangs padi weigh 1 ton). Dry padi yields are very low being only 198 gantangs padi. However, there is considerable annual variation in the yields per acre due mainly to weather conditions. For the main season wet padi crop, the annual variation in yields over the last 20 years for West Malaysia was found to be 11 per cent and for the off-season crop the variation was even higher, being 18 per cent.

Padi Production

Padi production has shown a steady increase in the past years mainly because:

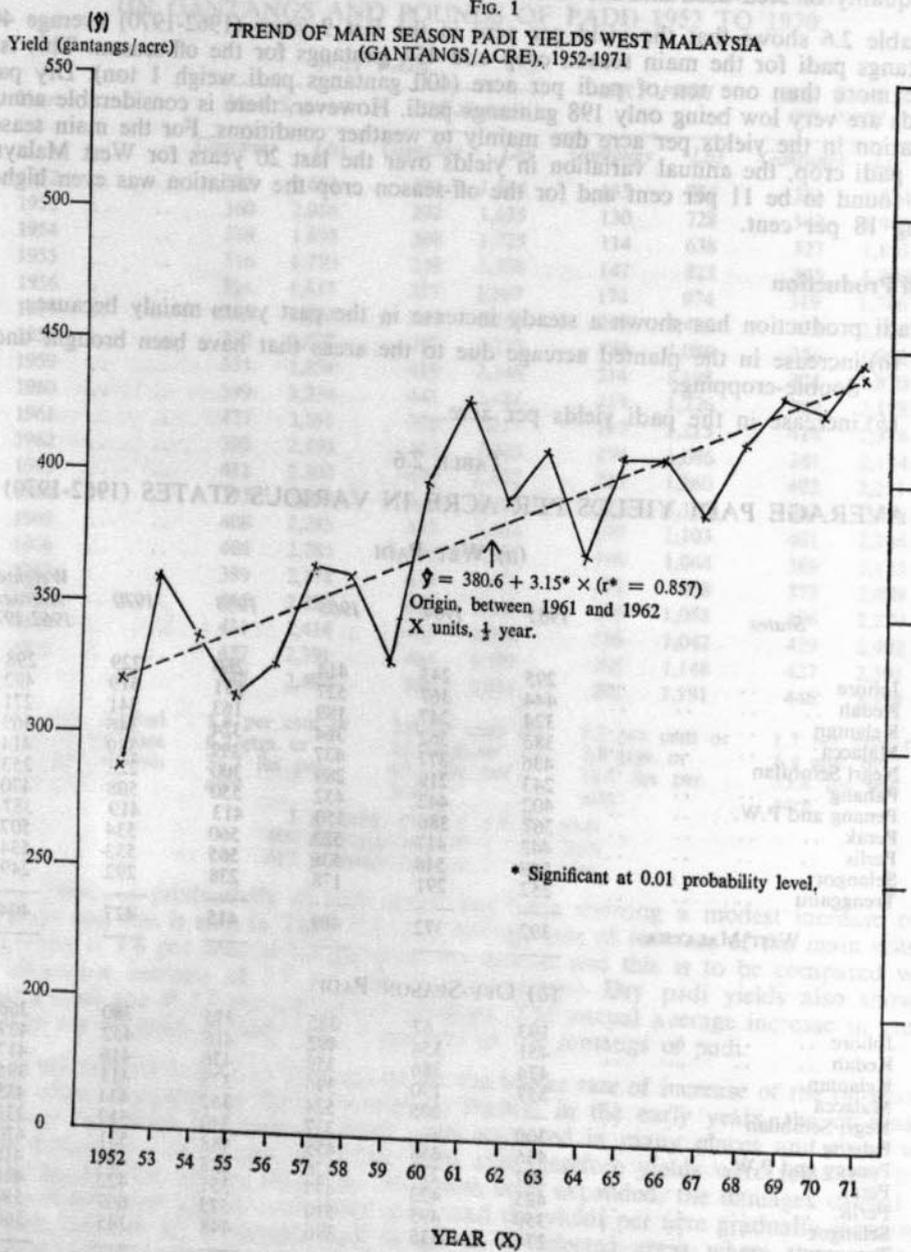
- (a) increase in the planted acreage due to the areas that have been brought under double-cropping;
- (b) increase in the padi yields per acre.

TABLE 2.6

AVERAGE PADI YIELDS PER ACRE IN VARIOUS STATES (1962-1970)

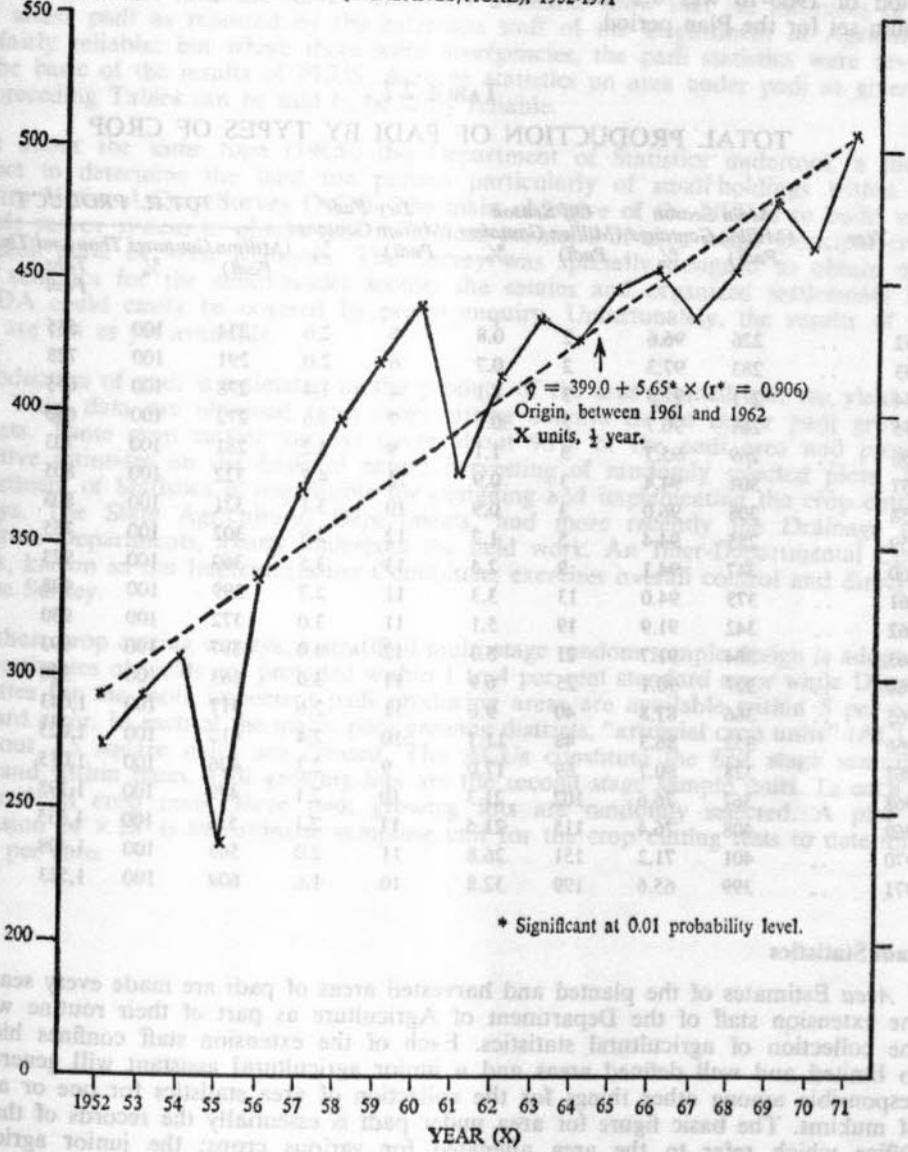
States	(a) WET PADI					Weighted Average 1962-1970
	1962	1964	1966	1968	1970	
Johore	295	243	414	260	229	298
Kedah	444	367	527	531	519	492
Kelantan	324	347	189	163	341	271
Malacca	386	362	364	324	346	369
Negri Sembilan	436	377	437	399	389	414
Pahang	243	219	289	300	228	253
Penang and P.W.	402	442	432	550	508	470
Perak	367	386	350	413	419	387
Perlis	443	417	523	560	534	507
Selangor	548	548	536	565	533	534
Trengganu	252	291	178	238	292	249
WEST MALAYSIA	392	372	408	415	427	404
	(b) OFF-SEASON PADI					
Johore	193	67	385	375	380	366
Kedah	451	354	492	416	452	439
Kelantan	474	386	359	436	416	417
Malacca	357	190	396	378	411	395
Negri Sembilan	—	205	524	352	434	435
Pahang	300	—	337	340	317	333
Penang and P.W.	436	458	455	488	531	470
Perak	267	277	336	428	451	418
Perlis	425	420	477	351	422	421
Selangor	359	495	510	575	607	550
Trengganu	274	335	396	448	345	368
WEST MALAYSIA	413	428	456	455	464	454
	(c) DRY PADI					
WEST MALAYSIA	194	213	190	189	205	198

Fig. 1
TREND OF MAIN SEASON PADI YIELDS WEST MALAYSIA
(GANTANGS/ACRE), 1952-1971



Yield (g) (g)
Yield (gantangs/acre)

Fig. 2
TREND OF OFF-SEASON PADI YIELDS WEST MALAYSIA
(GANTANGS/ACRE), 1952-1971



* Significant at 0.01 probability level.

Taking all three types of padi lands, the annual rate of increase of padi production over the period 1952 to 1970 has been 5.4 per cent or 32,000 tons of padi per annum. The total planted acreage has shown an annual average increase of 2.2 per cent or 18,200 acres. The annual average increase in yields per acre was 1.7 per cent or 6.4 gantangs of padi.

The total production of padi (and rice) for the main season, off-season and dry padi crops is shown in Table 2.7. The table shows that the contribution to the total production from the off-season crop has shown a steady increase and in 1970 about 27 per cent of the total padi production was obtained from the off-season crop. It might also be noted that the rate of increase of total rice production during the First Malaysia Plan period of 1966-70 was 8.2 per cent and this exceeds the target of 7.6 per cent per annum set for the Plan period.

TABLE 2.7
TOTAL PRODUCTION OF PADI BY TYPES OF CROP

Year	Main Season		Off-Season		Dry Padi		TOTAL PRODUCT			
	(Million Gantangs Padi)	%	(Million Gantangs Padi)	%	(Million Gantangs Padi)	%	(Million Gantangs Padi)	Thousand Tons Padi	Thousand Tons Rice	
1952	226	96.6	2	0.8	6	2.6	234	100	585	381
1953	283	97.3	2	0.7	6	2.0	291	100	728	473
1954	271	97.5	3	1.1	4	1.4	278	100	695	452
1955	263	96.7	2	0.7	7	2.6	272	100	680	443
1956	269	95.7	3	1.1	9	3.2	281	100	703	457
1957	304	94.4	3	0.9	15	4.7	322	100	805	524
1958	308	96.0	3	0.9	10	3.1	321	100	803	522
1959	285	94.4	5	1.7	12	3.9	302	100	755	491
1960	347	94.1	9	2.4	13	3.5	369	100	923	600
1961	375	94.0	13	3.3	11	2.7	399	100	998	649
1962	342	91.9	19	5.1	11	3.0	372	100	930	605
1963	364	91.7	21	5.3	12	3.0	397	100	993	646
1964	327	90.1	25	6.9	11	3.0	363	100	908	590
1965	366	87.8	40	9.6	11	2.6	417	100	1,043	678
1966	352	86.3	48	11.3	10	2.4	410	100	1,025	667
1967	328	80.7	69	17.0	9	2.3	406	100	1,015	659
1968	367	76.6	102	21.3	10	2.1	479	100	1,198	780
1969	408	76.4	115	21.5	11	2.1	534	100	1,335	867
1970	401	71.2	151	26.8	11	2.0	563	100	1,408	915
1971	399	65.6	199	32.8	10	1.6	609	100	1,523	990

Padi Statistics

Area Estimates of the planted and harvested areas of padi are made every season by the extension staff of the Department of Agriculture as part of their routine work in the collection of agricultural statistics. Each of the extension staff confines his work to limited and well defined areas and a junior agricultural assistant will generally be responsible among other things for the collection of area statistics for one or a group of mukims. The basic figure for area under padi is essentially the records of the Land Office which refer to the area alienated for various crops; the junior agricultural assistants make annual adjustments to the basic figure according to what they observe (eye observation) as areas that have gone out of production or brought into cultivation during that particular season. The extension staff often work closely with the staff of the Irrigation Department, the Penghulu and the Land Offices, to obtain more accurate information on the areas under padi and other crops. The acreage statistics reported refer to the *gross* area under padi. By gross area is meant the area under padi including the area occupied by bunds, irrigation and drainage canals and the area taken up by

the farm-house. The statistical returns by the extension staff are summarised at the District and State levels and finally, at the Federal Level the Ministry of Agriculture and Fisheries checks the information for internal consistency before publication.

In recent years two important projects have been initiated to improve the basic statistics of land utilisation or areas under the principal crops. In 1966, a land use survey (or PLUS: Present Land Use Survey) was undertaken by the Division of Agriculture with assistance from the Canadian Government. This land-use survey based on aerial photography aims at giving an accurate picture of existing land utilisation, both cartographically and statistically, so that a complete account of all significant forms of land-use are given and displayed for every mukim, district and state. The results of this land use survey which are available show that the estimates of the area under padi as reported by the extension staff of the Department of Agriculture are fairly reliable; but where there were divergencies, the padi statistics were revised on the basis of the results of PLUS. Acreage statistics on area under padi as given in the preceding Tables can be said to be fairly reliable.

At about the same time (1965), the Department of Statistics undertook a major project to determine the land use pattern particularly of small holdings within the country National Crop Survey (NCS). The main objective of the NCS is to build up a sample survey system to obtain reliable annual estimates of area under principal crops for each State of West Malaysia. The Survey was specially designed to obtain such area statistics for the small-holder sector; the estates and organized settlements like FELDA could easily be covered by postal enquiry. Unfortunately, the results of the NCS are not as yet available.

Production of padi is estimated as the product of the area planted and the yield per acre. Yield data are obtained from crop cutting surveys in the major padi growing districts. These crop cutting surveys cover about 90% of the padi area and provide objective estimates on the basis of actual harvesting of randomly selected plots. The Department of Statistics is responsible for designing and implementing the crop cutting surveys. The State Agricultural Departments, and more recently the Drainage and Irrigation Departments, jointly undertake the field work. An Inter-Departmental Committee, known as the Implementation Committee, exercises overall control and direction for the Survey.

In these crop cutting surveys, a stratified multi-stage random sample design is adopted. State estimates of yields are provided within 1 to 4 per cent standard error while District estimates for the more important padi producing areas are available within 5 per cent standard error. In each of the major padi growing districts, "artificial crop units" (ACUs) of about 2.5 square miles are created. The ACUs constitute the first stage sampling units and within them, padi growing lots are the second stage sample units. In each of the artificial crop units, three padi growing lots are randomly selected. A plot of dimension 24' x 18' is the ultimate sampling unit for the crop cutting tests to determine yields per acre.

CHAPTER 3

THE PADI FARMER

Number of Padi Farmers

There are more farmers cultivating padi than any other crop in West Malaysia. This is a reflection of the fact that padi production is carried out on a small scale and to many farmers padi cultivation is mainly undertaken to meet the needs of the farm family for rice, the staple food. Padi is cultivated entirely in small farms, the average area of such farms generally ranges from 2 to 5 acres.

Table 3.1 shows that more than one-half (55 per cent) of the smallholdings in West Malaysia cultivate some padi. It is estimated that there are about 537,000 smallholdings¹ in West Malaysia and of these about 296,000 grow padi in their farms. However, only 140,000 (or 47 per cent of the padi farms) are "specialised padi farms" in the sense that padi is the main crop utilising three-quarters (75 per cent) or more of the farm area. Thus, many farmers combine the cultivation of padi with other crops particularly rubber and fruits, and to many of these farmers padi farming is of a subsistence nature to supply the farm family with their rice requirements.

The distribution of padi farmers in the various States is also shown in Table 3.1. In Perlis and Kedah, 86 and 87 per cent respectively of the smallholdings cultivate some padi. "Specialised padi holdings" constitute more than one-half of the total farms in the two States of Perlis and Kedah and this shows the importance of padi cultivation in these States. Padi cultivation is least significant in Johore where only 2 per cent of the total farms can be classified as padi farms. In Negeri Sembilan, where mixed farming predominates, it is seen that 66 per cent of smallholders cultivate some padi but in only 12 per cent of the total farms is the padi crop the predominant land-use within the farm. This shows that in a large number of smallholdings in Negri Sembilan, mixed farming is common; padi is one of the crops and is cultivated jointly with other crops.

TABLE 3.1

ESTIMATED NO. OF TOTAL SMALLHOLDINGS AND PADI FARMERS, WEST MALAYSIA, 1970

State	Total Smallholdings		Wet Padi Farms		Specialised (2) Wet Padi Farms	
	No.	%	No.	%	No.	%
Johore	69,000	100	4,000	6	1,400	2
Kedah	93,000	100	81,000	87	46,300	50
Kelantan	80,000	100	56,000	70	21,600	27
Malacca	20,000	100	12,000	60	3,200	16
Negeri Sembilan	29,000	100	19,000	66	3,500	12
Pahang	34,000	100	20,000	59	4,100	12
Penang and P. W.	24,000	100	16,000	67	11,800	49
Perak	98,000	100	44,000	45	22,500	23
Perlis	14,000	100	12,000	86	8,900	64
Selangor	44,000	100	13,000	30	9,700	22
Trengganu	32,000	100	19,000	59	7,000	22
TOTAL	537,000	100	296,000	55	140,000	26

¹ Smallholdings are farms having at least one-quarter of an acre but less than 100 acres. The minimum area of such smallholdings is taken as one-quarter of an acre. Farms of 100 acres and more are referred to as Estates. The basis of these figures on the number of smallholdings and padi farmers, is the Census of Agriculture of 1960, updated by information obtained by more recent Surveys undertaken by the Ministry of Agriculture and Fisheries.

² Specialised Wet Padi farms are those farms in which padi is the main crop utilising three-quarters (75 per cent) or more of the farm area.

Table adapted from Information of Census of Agriculture 1960.

Race

Padi farmers are predominantly Malays; it is estimated that about 97 per cent of them are Malays. There are a small number of Chinese, Thais, and Indians also growing the crop. Thai farmers are mainly to be found in the border States of Kelantan, Kedah and Perlis where they have settled in small communities within the padi growing areas. There are two relatively large padi areas of about 5,000 acres each which have been set aside for Chinese farmers; they are at Sekinchan in Selangor and Changkat Jong in Lower Perak. In Malacca, there is a scattering of Chinese padi farmers in the Central District near Malacca town. A small area in Tanjong Karang in Selangor, has been reserved for Indians (Sungei Burong area).

Educational Status

The standard of literacy in the rural areas is low particularly for the older generation. Only a small percentage of padi farmers have completed their primary education which is about 5 to 6 years of schooling. About 40 per cent of the farmers are illiterate, that is, they are not able to read or write. Only about 7 to 10 per cent of the farmers have made use of adult education classes which were organised to reduce the rate of illiteracy.

Farm surveys have been carried out in some States and information on the educational status of farmers was collected. Table 3.2 shows that in Province Wellesley, Selangor and Malacca, there is a higher rate of literacy among padi farmers.

TABLE 3.2
EDUCATIONAL STATUS OF PADI FARMERS

<i>Educational Status</i>	<i>Krian</i>	<i>Kelantan Province (Kemubu)</i>	<i>Province Wellesley</i>	<i>Muda River</i>	<i>Malacca</i>	<i>Lower Perak</i>	<i>Selangor</i>
Illiterate	12	63	11	43	26	43	24
Below Primary Level ..	73	26	53	—	31	33	69
Completed Primary Level	14	10	35	57	41	24	6
Completed Secondary Level	1	1	1	—	2	—	1
TOTAL ..	100	100	100	100	100	100	100

It might also be relevant to point out that the educational standard of farmers is an important factor in determining the level of farm development. Where agriculture is traditional, farmers tend to follow customary practices and do not search for new skills and new knowledge which will make agriculture more profitable. Only those who have received a fair amount of education will be able to read and follow instructions given in agricultural leaflets, be competent to operate mechanical equipment, use farm credit effectively or obtain new knowledge on farming. There is a strong relationship between the level of education and farm productivity, although there may be examples in various countries of illiterate farmers who are able to increase agricultural productivity rapidly.

While about 40 per cent of the farmers are illiterate, the educational status of their children is in a more favourable position. In Kelantan, for example, where 63 per cent of the farmers were found to be illiterate, a Survey in 1968 showed that 68 per cent of the children (of farmers) were attending school; 72 per cent of the children in the age group of 6 to 11 years and 62 per cent of the 12 to 15 years age group were in schools. The question arises as to whether the literate children will take over the farms or will they leave the rural environment and move to urban areas. When farmers were questioned as to what they would like their children to work as, nearly all of them stated that a secure Government job was what was best for them and hardly any padi farmer wished his son to follow his footsteps.

Primary education in the country is free (but not compulsory) and primary schools are well distributed in both the rural and urban areas. Secondary schools are only to be found in the large villages and towns. However, parents have to meet the costs of books, school clothing, meals, transport to secondary schools, examination fees etc. and

this results in a smaller percentage attending secondary schools, particularly girls. The drop-out rate in rural schools is much higher than in the urban schools and this is mainly due to the poverty of the primary producers. The two main reasons for a smaller percentage of children attending secondary schools are:

- (i) farmers, because of their low incomes, require their children to help them in their farm work or go out and earn to supplement their family income;
- (ii) it costs more to send children to secondary schools when compared to primary schools; secondary schools are located only in the larger centres and transport to school costs money; fees for the higher examinations may amount to about \$75 which represents a month's earnings of the farm family.

Government is making a study of the "drop out" problem particularly from the secondary rural schools and after that measures will be taken to minimise the "wastage".

Age and Experience of Padi Farmers

The age of padi farmers average 40 to 45 years; thus farmers have had long experience (exceeding 15 years) in padi farming. A Survey undertaken in the double-cropping areas of Kelantan revealed that 73 per cent of them had been padi farmers throughout their life; 90 per cent of the farmers stated that their parents' occupation (and that of their wives' parents) was also padi planting. These circumstances might suggest that with long experience and tradition, padi farmers should be efficient, but unfortunately this is generally not true.

Importance of Padi Cultivation as a Source of Livelihood

Only to a little more than one-half of the padi farmers is the cultivation of padi their main source of income. Padi farms in West Malaysia are small and incomes from them are low particularly in those areas where only a single crop of padi is harvested each year. Thus, many padi farmers work outside their own farms to supplement their padi incomes. The results of the Census of Agriculture of 1960 indicate that only 58 per cent of the padi farmers reported that they were mainly dependent on padi farming for their living; for the remaining 42 per cent, the main source of income was from work outside their farm, particularly in non-farm occupations. The importance of padi cultivation in providing income to the farm family varies in the different States and this is shown in Table 3.3.

Thus, the bulk of the padi farmers in Perlis, Selangor, Kedah and Province Wellesley depend on padi farming for their livelihood; however in Malacca, Negri Sembilan and Pahang, where yields per acre are low and farms are small, the padi farm households have to depend more on off-farm employment.

TABLE 3.3

PERCENTAGE PADI FARM HOUSEHOLDS GETTING THEIR LIVING MAINLY FROM THEIR PADI FARMS

WEST MALAYSIA	58 per cent
Johore	10
Kedah	70
Kelantan	47
Malacca	19
Negri Sembilan	32
Pahang	39
Penang and Province Wellesley	62
Perak	37
Perlis	90
Selangor	82
Trengganu	53

Source: Census of Agriculture 1960.

The Census of Agriculture 1960 also indicated that more than one-half of the padi farmers (57 per cent), supplement their incomes by working outside their own farms such as on other farms or estates, or in non-farm jobs. As demand for labour in padi cultivation is seasonal, farmers have the time to take on additional work but in large padi areas as in the Kedah plain and Tanjong Karang in Selangor, the opportunities for such off-farm employment may be limited because estates are not found close to the farm houses. A survey of padi farmers in Kelantan revealed that from the padi areas there is a seasonal migration of farmers to Kedah and Perlis to help in harvesting padi there. About 30 per cent of the padi farmers from the Kelantan plain had in the past worked as padi harvesters in Kedah and Perlis. These farmers migrate in late December and January when the harvesting season in the West Coast is at its peak and return in February to harvest their own crop. The net income they are able to bring home after each trip averaged \$72. But the picture may change in the near future, when the bulk of the Kelantan plain will be double cropped and with increasing areas under tobacco cultivation, the Kelantan farmer may not be able to go across to Kedah.

With the introduction of double cropping, padi farmers will have less time to work outside their own farms and they will depend more on padi farming as their main source of livelihood. There are advantages and disadvantages in, depending only on a single enterprise: one advantage is that the farmer will focuss his attention on a single crop and this will lead to greater efficiency in padi farming.

Health of Farm Family

A Survey of the double cropping padi areas of Kelantan revealed that no less than 47 per cent of the farmers stated that they had some serious sickness during the year; these farmers lost on the average 59 working days that year. If we assume that there are 300 work-days per year, this would mean that farmers who reported being sick lost almost 20 per cent of their working time. If we further assume that on the average a farmer earned \$2 per day, then the loss per year will be \$118; if the farmer was indisposed during the peak periods of farm operations, his loss in income would have been even more substantial. From observations in the rural areas, it may be concluded that the most common ailments are malaria and malnutrition. Although anti-malaria measures are carried out in the rural as well as urban areas, nevertheless malaria still persists. Malnutrition is mainly caused by ignorance of the basic human nutritional needs. In West Malaysia sufficient food is taken to prevent hunger but not in adequate or balanced amounts for normal growth and maintenance of health. Those who suffer most severely from malnutrition are the children who need good food for growth.

Net Income of Padi Farmers

Padi farm households have two major sources of income, namely income derived directly from their farms and incomes received from off-farm employment. The bulk of the net farm income is derived from the padi enterprise but padi farmers sometimes cultivate other crops such as coconut, rubber, fruits, tobacco, etc. In many areas mixed farming is very common and many padi farmers depend for their cash incomes on other crops particularly rubber. Where mixed farming is undertaken, particularly the cultivation of rubber, the family labour is more fully utilised throughout the year. Table 3.4 shows that in double cropping areas such as in Province Wellesley, padi cultivation provides 68 per cent of the net family income; the net income from padi amounted to almost \$900 per annum. The Table also shows that net incomes from padi cultivation in the single cropping areas in the East Coast such as Kemubu and Besut are low and average about \$300 per annum. To generalise, it may be said that the padi enterprise provides a little less than one-half the total net incomes in single crop areas but in the double cropping areas padi accounts for almost 70 per cent of the total net income.

Off-farm income is obtained from a variety of different sources, the most common being work for a wage or contract basis in other farms, handicrafts such as the making of attap, or small-scale business and trading. While padi incomes are only received once or twice per year, incomes from off-farm employment are received in small amounts spread over a large number of occasions.

Net income may be defined as Net Family Labour Income, or sometimes referred to Labour Earnings, and represents the returns to the resources of labour and capital of the farm family. Net incomes of padi farmers are low. The low incomes from padi plantings is reflected by the fact that while 20 per cent of the working population is engaged in padi planting, its contribution to the gross domestic product is around 5 per cent. The incomes of padi farmers range from \$1,000 to \$1,500 per annum and this is for a farm family of five persons. This gives for padi farmers an annual income of \$300 per head while that for the population as a whole is almost \$1,000 per head.

TABLE 3.4

AVERAGE ANNUAL NET INCOME FROM FARM AND OTHER SOURCES

Area	Total Average annual Net Income		Net Farm Income		Off-Farm Income		Net (1) Padi Income	
	\$	%	\$	%	\$	%	\$	%
(1)	(2)		(3)		(4)		(5)	
Province Wellesley (1968)	1,314	100	1,011	77	303	23	896	68
Kemubu (1968)	647	100	361	56	286	44	271	42
Sungei Manek (1970) ..	1,149	100	703	61	446	39	594	52
Changkat Jong (1970) ..	1,501	100	1,170	78	332	22	673	45
Besut (1970)	1,081	100	542	50	539	50	318	29
Tanjong Karang (1966) ..	1,640	100	1,174	72	466	28	1,004	61
Krian (1971)	1,111	100	750	68	361	32	691	62

¹ Net Padi Income forms part of Net Farm Income of Column (3).

Employment and Under-Employment

In a Survey undertaken in Besut in Trengganu where about one-third of the farmers double-crop and where mixed farming (padi, rubber and dusun) is the general pattern, it was found that out of a total possible of 840 work-days in a year (300 work-days a year times 2.8 family members working), the farmer and his family spent 220 days working on padi and rubber, 35 days on other farm crops, and 150 work-days on off-farm employment. This total of 405 work-days was less than half of the total work days available; unfortunately, there was little employment opportunities or jobs available and thus the relatively high rate of under-employment.

In a more detailed Survey undertaken by Purcal in 1963, unpublished Ph. D. Thesis, "The Rice Economy of Four Villages in Province Wellesley", in two of the double-cropping villages it was found that under-employment among men in the villages was around 33 per cent for the whole year, although it varied considerably during the various months. During July and January the men were almost fully employed; in fact they were employed for almost 95% of their time available. They could be considered as fully employed if time devoted to supervision of hired workers is taken into account. Between July and January the men were under-employed between 23 and 44 per cent of their time. Purcal also found that in the villages that he investigated, under-employment was higher during the off-season crop period than during the main season crop period. During the main season period, the under-employment among men averaged 32%, whereas during the off-season the average was 14% higher. The reason for greater unemployment during the off-season was the shortage of off-farm employment opportunities during this period as there was keen competition from neighbouring single and double-cropping areas for the limited number of jobs.

Purcal also records that with farmers cultivating different areas of padi land, there is considerable range in labour utilization with holdings in the different size groups. Men cultivating the smaller holdings seemed to have made the best use of off-farm employment opportunities even though the rate of returns was rather low.

In a survey carried out in 1967 by the Ministry of Agriculture in a padi area just outside Malacca town, "Collective Padi Cultivation in Bachang, Malacca", it was found that the level of under-employment was around 35%. This survey revealed that for a six months period, out of the total working days available per farm family of 418 days, the farm family was occupied for 273 days, the details are as follows: 76 days or 18 per cent was utilised on the padi enterprise, 27 days on other farm enterprises, 5 days on off-farm agricultural work and 165 days on off-farm non-agricultural work.

Family Labour, Hired Labour and Under-Employment

Table 7.1 shows that in the double-cropping areas much of the work in the padi enterprise is undertaken by hired workers but in the single crop areas family labour is responsible for most of the padi farming operations. Thus, it is seen from the Table that in Province Wellesley the farmer and his family only complete 60% of the work in padi cultivation whilst in Sungei Manik and in the Kemubu area about 85% of the work is undertaken by family labour. In the Bachang areas of Malacca where some double-cropping was undertaken, the operator did about 36 per cent of the farm work and the family workers about 28 per cent, leaving only 36 per cent to be carried out by hired workers.

It is often asked why padi farmers employ so much hired labour when they themselves and their family workers are under-employed for much of the time. In answer to this question the following points must be considered:

- (a) some types of work such as transplanting and harvesting must be completed as soon as possible and the family workers alone cannot finish the job in time. Hired labour is therefore employed to help.
- (b) Hired labour is employed mainly for transplanting and harvesting and the cost of such services is relatively cheap;
- (c) the under-employment situation is serious only where farmers and their family confine themselves to padi cultivation. Should all other work of the family workers both in and outside of the farm be considered, the level of under-employment is not so serious.

Expenditure Pattern of Padi Farm Households

Expenditure of padi farm households consists of all cash expenses and the value of farm produce consumed or used as payments by the farmers in the course of the year. Such expenditure can be divided into two, namely farm and non-farm expenses. Non farm expenses can again be divided into two, household expenses and other expenses (ceremonial expenses, religious tax etc.).

Purcal in his study of two double-cropping villages in Province Wellesley, 1963, reported the following:

- (a) farm expenses in both cash and kind averaged \$644 per household and this amounted to 42% of the gross value of padi produced;
- (b) the average total household expenditure was \$1,278 per annum and 70% of this amount was spent on food which totalled \$897. The next important item was clothing and footwear. Expenditure on clothes was incurred mainly after harvest;
- (c) among the food items, rice is the most important category, accounting for a third of the total food expenditure;
- (d) the average value of farm produce retained per household was \$331 (i.e. about one-third of the total value of food expenditure);
- (e) Among "Other Expenses", zakat the religious tax, formed the major item; the cash value for zakat amounted to \$138 per household: zakat is a religious tax paid by all Muslim padi cultivators who produce more than 400 gantangs of

padi per annum and the tax is one-tenth of the total padi production. "Fitrah" is also a religious tax paid in cash and in rice and its cash value was about \$6.50. Marriage and funeral expenses averaged \$42 per household for the year. Thus "Other expenses" per household amounted to \$186.50 being:

Ceremonial and other expenses in cash ...	\$ 42.00
Zakat and fitrah	144.50
	<hr/>
	\$186.50

TABLE 3.5

AVERAGE ANNUAL EXPENDITURE (BOTH CASH AND KIND) PER HOUSEHOLD IN DOUBLE-CROPPING AREA, PROVINCE WELLESLEY, 1963

<i>Cash Expenditure</i>	\$	%
Household Expenses	946.80	44.9
Cultivation Expenses	505.70	24.0
Other Expenses	42.00	2.0
	<hr/>	<hr/>
Total cash expenses	1,494.50	70.9
	<hr/>	<hr/>
<i>Expenditure in Kind</i>	\$	%
Retained farm produce	330.70	15.7
Cultivation expenses	138.30	6.6
Other expenses	144.50	6.8
	<hr/>	<hr/>
Total expenditure in Kind	613.50	29.1
	<hr/>	<hr/>
Total expenditure	2,108.00	100.0

TABLE 3.6

AVERAGE ANNUAL HOUSEHOLD EXPENDITURE IN DOUBLE-CROPPING AREA, IN PROVINCE WELLESLEY, 1963

Items	\$	%
1. Food	896.80	70.2
2. Clothing and Footwear	52.50	4.1
3. Housing: rent and repairs	46.75	3.7
4. Household Equipment	45.10	3.5
5. Fuel and Power	15.15	1.2
6. Tobacco and Sireh	30.75	2.4
7. Transport expenses	35.90	2.8
8. School books and pocket money for children	33.30	2.6
9. Gifts in cash	38.90	3.1
10. Sundry items	82.35	6.4
	<hr/>	<hr/>
	1,277.50	100.0

TABLE 3.7

**AVERAGE ANNUAL TOTAL FOOD EXPENDITURE OF HOUSEHOLDS IN
DOUBLE-CROPPING AREA, PROVINCE WELLESLEY, 1963**

Items	\$	%
1. Rice	291.00	32.4
2. Other starch foods	40.90	4.6
3. Meat and poultry	49.10	5.5
4. Fish (fresh)	157.35	17.5
5. Fish (dried)	17.60	2.0
6. Eggs	30.60	3.4
7. Coconuts, oils and fats	39.55	4.4
8. Fruits	39.75	4.4
9. Vegetables and Condiments	62.85	7.0
10. Sugar	72.60	8.1
11. Coffee and tea	34.60	3.9
12. Other foods	40.50	4.5
13. Meals out	20.40	2.3
	<hr/> 896.80	<hr/> 100.0

TABLE 3.8

**AVERAGE ANNUAL TOTAL VALUE OF RETAINED PRODUCE
PER HOUSEHOLD, PROVINCE WELLESLEY, 1963**

Farm Produce	\$	%
1. Padi	278.00	84.1
2. Eggs	27.75	8.4
3. Meat and Poultry	7.90	2.4
4. Fish and Shell fish	4.35	1.2
5. Bananas	3.55	1.1
6. Coconuts	6.95	2.1
7. Others	2.20	0.7
	<hr/> 330.70	<hr/> 100.0

FARM CHARACTERISTICS

Padi Farm Size

In West Malaysia padi is cultivated in small farms averaging 2 to 5 acres. It has been pointed out earlier that there are approximately a total of 296,000 farmers, cultivating an area of 930,000 acres of padi lands. The average padi farm area for the whole country thus becomes 3.1 acres. The average area differs from State to State but all padi farms are small (Table 4.1). Farms in Kedah and Perlis are slightly larger being a little over 4 acres but in Negri Sembilan the average padi area cultivated is only 1.1 acres. Table 4.1 also shows that one-third of the farms (33% of the total) are below 2 acres while only 22% exceed 5 acres. Thus, almost one-half (45%) of the padi farms of West Malaysia fall within the size range of 2 to 5 acres. Some of the more serious problems in padi cultivation, such as the low levels of income and under-employment, arise from the fact that farms are small.

When padi lands were originally allocated in irrigated areas, the farmers were given a padi lot of a fixed size. Thus, in the Tanjong Karang area of Selangor, the padi lands were alienated in lots averaging 3 acres while in Sungei Manik Irrigation Scheme the size of lots alienated increased from 3 acres in Stage I to 5 acres in Stages III and IV. In the Krian irrigated area the size of lots for most lands were between 4 and 6 acres. However, lots as originally allocated do not represent the present average size of the padi area operated by farmers. This is because some lots have been divided thus reducing the padi farm size while on the other hand, several farmers operate two or more padi lots.

TABLE 4.1
SIZE DISTRIBUTION OF PADI FARMS

State	Average Padi Area: Acres	Percentage Farms in Various Size Groups (in Acres)							
		Below 1	1-1.99	2-2.99	3-3.99	4-4.99	5-7.49	7.5-9.99	10 and above
Johore	1.5	5	60	27	3	3	2	0	0
Kedah	4.0	8	19	19	12	10	20	6	6
Kelantan	2.3	8	26	32	16	10	7	1	0
Malacca	2.1	21	32	24	7	6	7	2	1
Negri Sembilan	1.1	38	36	19	4	3	0	0	0
Pahang	1.7	16	38	26	11	5	3	1	0
Penang and P. W... ..	2.5	9	31	23	13	11	11	2	0
Perak	2.6	14	26	19	12	9	15	4	1
Perlis	4.1	3	11	19	16	13	25	8	5
Selangor	3.6	3	14	5	40	13	18	5	2
Trengganu	2.3	14	23	29	11	10	10	3	0
WEST MALAYSIA	3.1	10	23	21	14	10	15	4	3

Land-Use

Very few padi farmers grow padi to the exclusion of other crops. Padi farmers generally cultivate other crops in addition to padi. Mixed farming is very common in padi growing areas. It was pointed out earlier that 47% of the padi farms are "specialised padi farms", in the sense that padi is the main crop within the farm utilizing three-quarters or more of the farm area. The results of the Agriculture Census of 1960 indicate that in these specialised padi farms, 89% of the farm area is devoted to padi and 11 per cent to other crops; it is common for padi farmers to have some kampong land or orchards

where food and cash crops are cultivated. The three main crops are rubber, rice and fruit. For example, in the Tanjong Karang padi area of Selangor, the padi lands are flanked by coconut areas. In fact, in the newly opened up padi areas such as Tanjong Karang and Sungei Manik, farmers were given two lots: a padi lot and another lot for the growing of dryland crops. In Tanjong Karang, each padi farmer was given a three acre lot of padi land and one acre kampong plot for him to build his house and have some coconut and fruit trees to meet his daily requirements. A Survey of Padi Farmers in Selangor showed that 81 per cent of the cultivated area was under padi and 16 per cent was under coconuts.

There are areas in the bottom of river valleys particularly in the States of Negri Sembilan, Pahang and Malacca, where padi is cultivated almost entirely for subsistence while the farmer depends on his rubber for his cash income. For many of these farmers, less than 50% of the farm area is used for the growing of padi. A Survey of Padi Farmers in Malacca undertaken in 1967 showed that on the average the area utilised for the cultivation of padi constituted only 46% of the total farm area whilst in the Northern and Southern Districts (of Malacca), the padi area formed only one-third of the total farm area; in these two Districts more than 40% of the farm land was under rubber which provided the cash income.

Intensity of Land Use

At present two-thirds of the padi lands in West Malaysia grow only a single crop of rice per annum and for more than half of the year the land is idle with no crop growing on it. Where suitable irrigation facilities have been provided for the double cropping of padi, the land is used more intensively and two rice crops are harvested each year. There is some cultivation of off-season padi in all States but the extent of double cropping varies from State to State; by the end of the Second Malaysia Plan period of 1975, two-thirds of all padi lands in West Malaysia will be provided with irrigation facilities for the growing of two padi crops per year. The availability of sufficient water during the dry season is the main limiting factor to the double cropping of padi.

In areas where irrigation facilities are not provided for the growing of two padi crops, there are small pockets of padi lands which are used for growing crops other than padi during the off-season. Tobacco cultivation is well organised on the Kelantan plain by one of the larger local tobacco manufacturers and a total of 9,600 acres were planted in 1971 by approximately 40,000 farmers; the industry has also given employment to a large number of people at the various tobacco processing centres in the State. In the single-cropping Changkat Jong irrigation area of Perak, where the farmers are Chinese, about 20 per cent of the padi lands are utilised in the off-season for the growing of tobacco (620 acres) and various types of vegetables (250 acres). In tobacco cultivation, the time taken from initial sowing of the seeds to the final harvesting is approximately 5 months and therefore fits in well as a second crop after the main padi harvest. In Kelantan, padi farmers received about the same net income from tobacco as from their padi crop, each being around \$250 per annum. But these farmers only utilised about one-tenth of their padi lands for tobacco cultivation as it is generally the practice of the Malayan Tobacco Company which organises tobacco cultivation to limit farmers with a minimum of surplus labour to 1,000 plants, or one seventh of an acre per season.

It has been the official policy that padi farmers in single cropping areas should be encouraged and assisted to utilise their lands more fully as this will enable them to increase their incomes which are amongst the lowest in the country. Maize has been recommended as a suitable crop mainly because of the large imports of grains into the country to meet the requirements of the animal-feed industry. However, it cannot be said that maize cultivation has been successful except for the recent Farmers' Association project at Kuala Brang in Trengganu. At Kuala Brang, about 1,500 acres of maize of the Metro variety was planted in 1970 as an off-season crop. Yields ranged between 1,500 to 2,000 pounds per acre giving a gross income which is somewhat below that of a second padi crop. From this it is seen that yields have to be higher before the growing of maize as a second crop will be readily adopted by farmers. A high priority is being given to research on feed-grain crops such as maize and sorghum so that these crops can be grown in rotation with padi.

Fragmentation

Although farms are small, nevertheless many farmers have fragmented holdings and cultivate two or more pieces of padi lands. Information on the number of parcels per farm was obtained in the Census of Agriculture of 1960. In that Census, farmers were classified by the number of separate non-contiguous "parcels" or "pieces" of land in each farm, in order to reveal the extent of fragmentation. A "parcel" was defined as land entirely surrounded by land of other farmers or by land not forming part of any farm e.g., forest, river, etc., and may consist of a whole grant of land, only part of a grant or several grants. The results of the Census show that for padi farmers, 56 per cent of them operated a single parcel, 25 per cent worked on two parcels, 11 per cent on three parcels, 4 per cent on four parcels and the remaining 4 per cent worked on 5 to 9 parcels.

A detailed study was undertaken in 1954 by Wilson on the structure and development of land ownership in the Mukim of Tanjong Piandang in Krian (Malayan Agricultural Journal, 1954). He points out that the original size of each padi lot in the mukim of Tanjong Piandang was just over seven acres and in 1954 it averaged only $2\frac{1}{2}$ acres per individual owner. But in 1954 the number of owners had risen sharply by 159 per cent and there were an average of 238 owners or co-owners for every 100 lots; but originally most of the land titles were taken by one person as sole owner and only six out of every 100 lots were taken out by co-owners, and as no lot was shared by more than two co-owners, there were on average, 106 land owners or co-owners for every 100 lots. "Co-ownership" exists when a lot is owned by more than one person, each individual co-owner possessing an "undivided share" in the land; they are legally co-owners of the land, all acting jointly in transactions which affect that lot and all entitled to a share of the produce of the land. But in practice, they agree to separate internal boundaries. The study also reveals that co-ownership now prevails in Tanjong Piandang, for only 48% of the padi lots had a single owner while the remaining 52% had co-owners. Wilson sums up the situation very clearly as he states, "Fragmentation arises in certain basic conditions of increasing population density, high land values, lack of alternative local employment, and immobility of labour and capital, so that land is virtually the sole income yielding investment. In this environment, fragmentation is due to laws of succession which authorise or compel division among the co-heirs, who are able to register their proprietary rights. Land subdivision is aggravated when beneficiaries attempt to share equally the various lots, varying in soil, in nearness to water canals for drainage and irrigation, in distance to the road for domestic access and padi transport and in value of secondary income from coconuts and fish ponds."

Land Tenure

It is estimated that 60 per cent of the padi lands in West Malaysia are operated by the owners themselves while the remaining 40 per cent is rented out to tenant farmers in some form or other such as fixed rent in cash, fixed rent in padi, crop-sharing or lease of the padi lands. While the padi lands are broadly divided into two categories of owned-land and rented-land, the farmers operating these lands can be classified into three groups according to the tenure status of the padi lands they operate. The three groups are owner-farmers, tenant-farmers and owner-tenant farmers and they may be defined as follows:

Owner farmers	...	they own all the land they operate;
Tenant farmers	...	they rent all the land they operate;
Owner tenants	...	who own a part of their padi area and rent in the remaining area.

The tenure situation of padi farmers varies from State to State. An attempt is made in Table 4.2 to indicate the percentage of padi farmers in each of the three tenancy status; this information is based on the results of the various Padi Farm Surveys undertaken by the Ministry of Agriculture over the last 5 years and the Census of Agriculture of 1960. It is seen that almost one-half of the farmers are owned-farmers while tenant-farmers constitute 27%. Farmers who own part of their padi lands and rent the balance form 25% of the total padi farmers. Thus tenancy in padi farms is a serious problem

and may prove to be a disincentive against double-cropping. Because of the ineffectiveness of the 1955 Act, a revised Padi Cultivators (Control of Rent and Security of Tenure) Act was passed in 1967.

TABLE 4.2

WEST MALAYSIA: NUMBER OF PADI FARMERS CLASSIFIED BY TENURE STATUS

State	Total Padi Farms	% Padi Farmers by Tenure Status		
		Full Owners	Part Owners Part Tenants	Tenants
Johore	4,000	70	20	10
Kedah	81,000	45	20	35
Kelantan	56,000	25	55	20
Malacca	12,000	52	18	30
Negeri Sembilan	19,000	87	7	6
Pahang	20,000	70	14	16
Penang and P. W.	16,000	44	17	39
Perak	44,000	50	13	37
Perlis	12,000	45	24	31
Selangor	13,000	60	25	15
Trengganu	19,000	55	23	22
TOTAL	296,000	48	25	27

Padi Cultivators Control of Rent and Security of Tenure Ordinance 1955

In the post-war years of 1945 the tenancy situation in the padi areas particularly in Kedah was becoming very acute and the Government introduced legislation in 1955, Padi Cultivators (Control of Rent and Security of Tenure) Ordinance 1955, to protect tenant farmers. This Ordinance stipulates the maximum rents payable: under the crop sharing system, the maximum rental fixed is one-third of the crop; under the fixed rent system, the rent to be charged is based on the class of land as determined for the imposition of water rates in irrigated areas. The maximum fixed rents were as follows:

- 140 gantangs for class I land
- 115 gantangs for class II land
- 70 gantangs for class III land

The Ordinance further stipulates that the duration of the tenancy agreement should be for one year but the tenant farmer has the option to renew the agreement at its expiration.

The Ordinance can be said to have been completely ineffective except in Kedah where special efforts were made to enforce the Ordinance. The main reason for the ineffectiveness was the lack of an enforcement machinery. After a lapse of nearly 10 years a study was made of the reasons as to why the 1955 Ordinance was not successful; in the light of the findings the revised Padi Cultivators (Control of Rent and Security of Tenure) Act was passed in 1967.

Padi Cultivators (Control of Rent and Security of Tenure) Acts 1967

The Act which was passed by Parliament in 1967 stipulates among other conditions the following:

- (a) Tenancy agreements are to be in writing in prescribed forms and are to be registered by the land-lords with the Registrar within 14 days of the date of execution. The agreement is binding on all persons including purchasers of the padi land, successors, etc.

- (b) the agreement shall not be for a period of less than 3 consecutive years and the tenant will be entitled to a renewal of his tenancy agreement by filling a notice with the Registrar.
- (c) the rent for the land will be set out in the agreement and expressed in padi. The maximum rent will be as follows:

Classification of Land	Rent in Gantangs per Acre
Class I	140
Class II	115
Class III	70

- (d) for padi lands which have been declared as double cropping areas, a further 30% will be added to the maximum rent;
- (e) the rent may be paid in cash after the crop has been harvested but this must be with the mutual agreement between the landlord and the tenant; the cash payment is to be calculated on the price of padi at the place of harvest;
- (f) in the event of a general failure of the padi crop due to natural disaster, the Menteri Besar, or Chief Minister, can define the affected area and set the percentage reduction in rent;
- (g) the land-lord shall pay the quit-rent, rates, charges, etc. for the padi land. The tenant cannot sublet or lease any part of the land in the Agreement. The tenant must practice good husbandry and shall bear all costs of such cultivation.

According to the Act, one or more Registrars will be appointed by the State Authority for registering tenancy agreements. Enforcement of the Act will be undertaken by enforcement officers appointed by the Minister of Agriculture. The enforcement officers will be responsible for the prosecution of offenders under the Act. The hearing of disputes arising out of tenancy agreements is to be carried out by Committees set up by the State Authority. Padi land may be repossessed by the landlord if he wanted to cultivate his own land and one year's notice must be given to the tenant.

Under the Constitution, all matters relating to land are prerogatives of the State Government; therefore the Act will have to be adopted by the States before they can be enforced. Till now, a small number of tenancy agreements have been registered only in Kedah and Perlis.

CHAPTER 5

CULTIVATION PRACTICES

Planting Schedules

The various operations in padi cultivation must be completed in accordance with a time schedule and failure to do so will result in a reduction in yields. In the areas served by major irrigation schemes, the time schedule for the various padi cultivation operations is spelt out by the Government in a notification issued by the District Collector of Land Revenue. This schedule is drawn up after consultations between the representatives of farmers and various Government departments, particularly the Divisions of Agriculture and Drainage and Irrigation. A typical padi farming schedule for an irrigated area (Tanjong Karang area) reads as follows:

MAIN SEASON CROP

1. Sowing of nursery and clearing of fields	15-9-69
2. Flooding of fields with water	25-9-69
3. Transplanting	10-10-69 to 24-10-69
4. Drainage of water from fields	15-1-70

OFF SEASON CROP

1. Sowing of nursery and clearing of fields	15-3-70
2. Flooding of fields with water	23-3-70
3. Transplanting	10-4-70 to 20-4-70
4. Drainage of water from fields	10-7-70

The dates for planting and harvesting vary from north to south of the country. Generally the work commences a little earlier in the north and then spreads southwards. Thus harvesting in Perlis will commence in mid-December whilst in Selangor much of the harvesting takes place in February. This makes it possible for owners of small farms as well as farm workers to find additional employment of transplanting and harvesting in neighbouring areas.

Each of the major irrigation areas has its own gazetted padi farming schedule but unfortunately for various reasons farmers do not always abide to the gazetted dates. Very often harvesting of the main crop for many farmers within the Tanjong Karang Scheme takes place in April or May instead of February and because of the non-uniformity of the planting and harvesting dates. Due to such irregularities one planting season may have to be sacrificed by a large number of farmers once every four or five years so that all of them will be able to plant padi at the same time again. This is one of the problems that has to be overcome when there is a drastic change in their way of life when farmers have to follow a tight schedule to grow two crops instead of the traditional single crop.

Cultivation Practices

Government extension efforts are concentrated on double-cropping areas, and further because of the better returns received by farmers in these areas, cultivation practices are much better than in the single cropped areas. The main padi cultivation practices may be listed as follows:

- (a) Land preparation (ploughing and harrowing the fields; repair and clearing of bunds and drains);
- (b) Nursery preparation;
- (c) Transplanting;
- (d) Fertilization and manuring;
- (e) Harvesting.

Methods for Land Preparation

The method of preparation of padi lands is undergoing a rapid change particularly in the double-cropping areas where tractors are replacing the traditional methods of cultivation.

There are three methods for preparing the padi lands. These are (a) cultivation with a "tajak" which is the local scythe (b) use of animal power (buffalo or cattle) or (c) tractor cultivation. Many farmers combine two different methods, or even all three methods when preparing their land. For example, farmers will hire a tractor for the first ploughing and use their own buffaloes for the second ploughing, harrowing etc.

Before the actual work of ploughing begins, the water channels and bunds are cleaned up and repaired so that water can be retained within each plot. The responsibility for the construction and maintenance of the internal water channels and bunds rests with the farmer. Land preparation takes place in standing water.

Use of the Tajak

When the soil is soft (marine soils) and does not permit the use of the tractor or buffalo-drawn plough, the preparation of the land is then undertaken by the "tajak" (e.g. Tanjong Karang and the lower parts of Krian). These soft soils are not suitable to be ploughed either mechanically or with animal power. Cultivation by the tajak is relatively superficial for there is little tillage but the work is very arduous and time consuming. The soil is cut very lightly mainly to slash the weeds which are then either ploughed into the ground, or removed to the bunds. Normally, with weeds that decay rapidly, they are then allowed to rot in the fields and incorporated into the soil. Weeds which cannot be easily destroyed are raked and piled on the bunds; however fresh weeds soon establish themselves in the padi fields as the roots have not been removed. Transplanting takes place without any further land preparation; as the ground is still relatively hard, seedlings have to be planted with the help of a small-tool called the "Kuku Kambing", or "hoof of the goat", a name given because of the shape of this small hand-tool.

The time taken to prepare the padi fields by the use of the tajak is approximately the same as that of an animal-drawn plough, ranging from 7 to 10 man-days per acre. Double-cropping with rice is not recommended for these marine soil areas because the soil will be under water for the greater part of the year and would never dry up sufficiently to give good aeration. An integrated system of main season rice alternating with other crops in the off-season grown without irrigation has been recommended for these areas.

Ploughing with Animal Power

Buffaloes, and oxen to a lesser extent, are used as draft animals in most padi lands. Where animals are used to prepare the fields, the heavy weed growth has first to be slashed or burned before ploughing commences. Generally the ploughs used are the single-furrow type made of wood with the exception of the coulter which is made of iron. The lightness of the wooden plough is an advantage when working in small plots. Ploughing commences after the land has been softened by rain or irrigation water. The plough is followed by the rake-type harrow which helps to break the clods, and at the same time levels the ground. The ploughs are generally drawn by a single buffalo or two heads of oxen. The fields are ploughed and harrowed at intervals and the final harrowing usually takes place when the land is flooded. Although it requires 7 to 10 man-days to prepare an acre of land, in actual practice this work may extend over a period of two months for the weeds must be given sufficient time to decay before the second ploughing takes place. Furthermore, work with buffaloes is confined only to the mornings, or less frequently to the late evenings when the day is cool. Buffaloes are worked for only a few hours each day. This gives enough time for the animal to graze and thus saves the farmer the hard work of cutting and carrying fodder for the work animals.

Mechanical Cultivation

Mechanical cultivation of padi lands by the use of the tractor has been introduced into the country only recently. With the adoption of double-cropping, farmers are faced with the problem of harvesting the first crop and planting the second crop all within a period of six to eight weeks. This calls for a new approach in field preparation and has led to the use of four wheel tractors as well as pedestrian two-wheel tractors. To obtain optimum yields it is also necessary to abide to the recommended cultivation schedules, for late plantings result in lower yields. Tractor cultivation predominates in double-cropping areas; the 4-wheel tractors are more economical in operation but cannot be used in the softer padi grounds like Tanjong Karang and northern parts of Krian and Southern Province Wellesley.

In the double cropping areas of North-West Malaya, that is, Province Wellesley and the Muda Irrigation Area, it is estimated that about 70 per cent of the farmers at present make use of hired tractor service to plough their lands. Competition among tractor contractors has lowered the cost of ploughing to around \$12 to \$15 per acre (for a single ploughing). The tractor contractors provide both the labour and the machines. With the availability of credit from Bank Pertanian and the greater cash income from double-cropping, tractor ploughing is becoming popular. A large tractor can plough 8 acres per day while the pedestrian tractor can complete about 4 acres. It is sometimes said that mechanization results in increased unemployment problems but this will not be true to the "rice-bowl" areas where farm work must be completed within specific dates; on the other hand mechanization creates new jobs in the rural areas for tractor operators, mechanics etc. The establishment of Farm Mechanization Training Centres provides opportunities for the training of rural youth and upgrade their skills and earning capacity.

TABLE 5.1

COMPARATIVE COST ANALYSIS FOR 4-WHEEL AND 2-WHEEL TRACTORS IN LAND PREPARATION IN THE MUDA IRRIGATION SCHEME⁽¹⁾

	2-Wheel Tractor	60 b.h.p. Class Tractor + 60" Tiller	70 b.h.p. Class Tractor + 70" Tiller
1. Average Initial Cost (Useful Life)	\$3,100 (6 years)	\$15,580 (10 years)	\$16,400 (10 years)
2. ANNUAL FIXED COST:			
(a) Depreciation (straight line)	\$517	\$1,558	\$1,640
(b) Tax and Insurance	—	\$200	\$200
Total	\$517	\$1,758	\$1,840
3. Annual Production	84 acres	479 acres	655 acres
4. Average Fixed Cost (A)	\$6.15	\$3.67	\$2.81
5. Average Variable Cost:			
(a) Fuel	\$1.68	\$1.33	\$1.33
(b) Oil and Grease	\$0.25	\$0.46	\$0.46
(c) Repairs and Parts	\$3.00	\$2.78	\$2.04
Total (B)	\$4.93	\$4.57	\$3.83
Total Cost Per Acre (A) + (B)	\$11.08	\$8.24	\$6.64

NOTE:

Labour cost has been excluded because of the difficulty of determining a comparable wage rate where labour productivity varies so greatly according to the type of tractor. The difference between cultivation price and cost per acre may however be regarded jointly as the return to labour management.

⁽¹⁾From Muda Agricultural Development Authority publication "The Contribution of Economic Research to the rice mechanisation process in West Malaysia with special reference to the Muda Irrigation Scheme (by S. Jegatheesan).

Preparation of the Nursery

Three types of nurseries are associated with wet padi cultivation and these are:

- (a) wet nursery;
- (b) floating nursery;
- (c) dry nursery.

Wet Nursery

This is the type of nursery that is recommended by the Division of Agriculture and used by a large number of farmers. The nursery may be located in the padi field itself or in a convenient place near the farm house for better attention. The usual width of the nursery is around 5 feet and can be of any length. The nursery bed is very carefully prepared and is generally fenced in to keep away ducks, chickens and buffaloes. The water is drained away before the seeds are sown. Meanwhile selected padi seeds are soaked in water for a day and then covered with a moist gunny sack for about 48 hours by which time the padi seeds are ready to germinate. The seeds are broadcast evenly over the nursery. Fertilizers are applied after the seedlings are established. The Departmental recommendations for nursery fertilizers and seeds are: 8 lbs of ammophos and three gantangs of seeds for every acre to be cultivated. However, most farmers use more than their recommended quantity of seeds for they wish to ensure that there will be no shortage of seedlings for transplanting. Nursery preparation is usually completed with family labour.

Floating Nursery or "Semaian Rakit"

It is a peculiar type of nursery and found in areas where the water level in the fields is difficult to control; this type of nursery can withstand deep water. In this nursery, cut grass piled to about 6 inches in thickness, forms the floating base. The grass base is then covered with banana leaves on to which a little mud is spread out. Seeds are then sown on to this mud surface and covered with straw. The nursery floats with the water level and this is the main advantage of this type of nursery. But there are several disadvantages in the use of the floating nursery, such as the larger amount of labour and seeds that are required and the longer time period before the seedlings are ready for transplanting; hence, this type of nursery is not recommended by the Division of Agriculture but its use still prevails as farmers are slow in changing their traditional methods.

Another peculiarity of the floating nursery is the use of secondary or transfer nurseries. When the seedlings in the nursery are about a foot in height, they are removed in clumps of 100 to 150 plants to a second or "transfer" nursery where they remain for about a week. Very often, they are transferred again to a third nursery in smaller clumps of about 30 plants. The seedlings are finally transplanted into the fields after having been in the multiple nurseries for a period of 30 to 40 days.

Dry Nursery

Where the padi is grown in non-irrigated areas as in Kelantan, the nursery is prepared on dry land very often near the house of the farmer so that he can attend to it easily. The nursery plot is ploughed and harrowed several times before the seeds are broadcast thickly and evenly over the nursery. The farmer will have to water the nursery every day. The seedlings remain in the nursery for about 40 days after which they are ready for transplanting into the fields. However, if the monsoons are late and the preparation of the fields are delayed, then the seedlings are retained for a longer period.

Transplanting

The seedlings after a period of 25 to 40 days in the nursery are pulled out, the roots are rinsed in water and the top few inches of leaves are cut off to give the plant rigidity. The seedlings are tied into bundles of convenient size for handling.

Transplanting is very often undertaken by women whereas land preparation is essentially a man's job. Transplanting is characterised by planting three seedlings per point about 12 to 15 inches apart at random in the field. Such random planting makes mechanical weeding impossible and this is one shortcoming of the Malaysian method of transplanting compared with the Japanese.

There are two methods of transplanting the padi seedlings, firstly, by the use of the "kuku kambing" which literally means the "hoof of the goat", and the other method is by using the bare hands. As mentioned elsewhere, where the land has not been ploughed but prepared superficially by the "tajak", it is difficult to plant the seedlings with the bare hands and therefore the "kuku kambing" has to be used. The "kuku kambing" is a simple tool with two prongs at the end. The lower part of the seedling stem is placed between the prongs and pushed into the ground. Transplanting with the bare hand is faster than when the "kuku kambing" is used. Transplanting is labour-intensive and it takes about 6 to 10 man-days to complete an acre. As transplanting has to be completed within a short interval, all available labour is used including communal, hired and family labour. The larger labour requirements for transplanting is often the limiting factor in the size of the farm operated by the farm family.

Use of Fertilizers, Pesticides

In double cropping areas nearly all farmers use fertilizers in padi cultivation, but as a rule, the amount used is much less than the recommended quantity. Only a small proportion of farmers use pesticides or weedicides; the use of poison to control rats is about the most common practice undertaken by farmers. Until 1971, fertilizers were supplied to farmers at subsidized prices (subsidy during the First Malaysia Plan being 30% of the market price). But this fertilizer subsidy has now been withdrawn except to padi farmers in non-irrigated areas; the reason for continuing the subsidy scheme in non-irrigated areas is that these farmers have not benefited by the large investments in irrigation.

The Department of Agriculture has specific fertilizer recommendations for the different soil types of the country; a typical fertilizer recommendation and its costs per acre may be represented thus:

	Approximate Market Price
(a) nursery fertilizer (ammophos 8 lbs for 3 to 4 gantangs of seed) ...	\$ 2.25
(b) basal dressing (2 bags of 85 lbs each)	13.92
(c) urea (1 bag of 55 lbs)	10.00
	\$26.17

The cost of fertilizers during the First Malaysia Plan at 30 per cent subsidy amounted to \$18.34 per acre as against \$26.17 at market prices. In the various Padi Surveys undertaken by the Ministry of Agriculture, it was revealed that farmers on the average spend only about \$10 per acre on fertilizers; this means that they used on the average only about one-half of the recommended quantity. A main reason for the small amount spent is a lack of cash to purchase the fertilizers.

But with input credit being provided by Bank Pertanian for a "package of recommended inputs", the situation will rapidly change. The labour for the application of fertilizers and weedicides is provided by the farmer and his family.

Harvesting

Due to shortage of cash, farmers are keen to sell their padi at the earliest possible occasion which may be the very same day the padi is harvested. Harvesting has to be undertaken rapidly as the padi in the entire field ripens almost simultaneously. Hired and communal labour are usually needed to supplement the family labour in harvesting. Harvesting is almost exclusively done manually. The sickle is generally used, for the mechanisation has not yet been proved to be a success. Before the actual harvest, farmer selects and gathers the best padi for seeds by the use of a sharp hand blade, the "tuai". The main crop is cut by the sickle and tied into small bundles. "Shields" are placed on three sides of the threshing tub to prevent the scattering of grains. Threshing is hard work as much force has to be used while beating the sheaves of padi on the "ladder" placed inside the threshing tub, which is a wooden box. Threshing is generally undertaken by men. As harvesting proceeds, the threshing tub is dragged along the field.

CHAPTER 6

MARKETING OF PADI

Farm Retention and Marketable Surplus

It is estimated that a little over one-half of the padi produced in West Malaysia is marketed by the farmers themselves. (Table 6.1) Thus, out of a total production of 1.5 million tons of padi (in 1970), about 0.8 million tons was marketed by the farmers and this is the equivalent of 520,000 tons of rice. A little less than one-half of the crop, or 0.7 million tons of padi, was retained by the farmers for domestic consumption, seeds, payment of zakat, rent, and wages in kind for harvesting and other services such as the hire of buffaloes, etc. Much of this padi is consumed in the rural areas but a part used for the payment of zakat, wages and rent is ultimately sold, though not by the farmers themselves.

The proportion of the crop retained within the village varies in different parts of the country. In the "rice bowl" double cropping areas, about 60% of the production is sold by the farmers themselves. In Province Wellesley, where double cropping of padi has been established for a fairly long time, practically every farmer has a surplus for sale. Almost 60 per cent of the production is marketed and the average quantity sold amounted to 65 piculs of padi per farm in 1968. In areas of lower productivity and smaller farms, where only a single crop is cultivated, as in the Kemubu area of Kelantan, no more than 6 per cent of the harvest is marketed; only 15 per cent of the farmers reported selling padi in 1968 and they on the average sold 9 piculs. The situation in other single cropping areas such as Trengganu, parts of Perak, Malacca, Negri Sembilan, etc., is similar to that of Kemubu and padi cultivation in these areas is mainly to meet the requirements of the farm family of its staple food. However, padi cultivation is not of a subsistence nature in all single cropping areas; in the Changkat Jong padi area of Perak where farms are larger (average padi area being 7.7 acres), 95% of the Chinese farmers have a surplus for sale and the average amount sold in 1970 was reported as 54 piculs.

TABLE 6.1
DISPOSAL OF PADI BY FARMERS

Locality	Average Annual Production Per Farm: Gantangs Padi	DISPOSAL OF TOTAL PRODUCTION IN PERCENTAGE						
		Rent	Wages	Zakat	Farm and Home Use	Sales	Other	Total
Muda Irrigation Area (1966)	1,849	7	2	8	32	51	—	100
Kemubu, Kelantan (1968)	476	17	1	6	69	6	1	100
Malacca (1968)	491	12	9	8	57	14	—	100
Selangor (1967)	1,658	1	8	9	22	60	—	100
Sungei Manik (1970)	1,671	2	9	9	30	49	1	100
Changkat Jong (1970)	1,965	—	—	—	35	65	—	100
Province Wellesley (1967)	2,735	4	3	9	27	57	—	100
Besut (1971)	1,007	22	1	7	53	8	9	100
Krian (1971)	2,294	9	13	10	21	46	1	100

Season for Marketing

The marketing season for padi depends on the time of the harvest and this varies to some extent in the different States. There are two padi crops per year, the main or first crop, harvested at the first few months of the year and the off-season or second crop which is available in the second half of the year. It has been pointed out earlier that

only a third of the padi areas were in 1970 producing two crops; the greater part of the padi lands produce only a single crop of padi. The main or first crop accounts for about 70% of the total production. The general practice of farmers is to market their padi immediately after the threshing of the crop and the marketing season stretches from January to April for the main season crop and late July to September for the off-season crop. Farmers sell their crop immediately after harvest because of their need for money. Furthermore, storage facilities at the farm level are not available. It is estimated that they retain on average 10-20 per cent of their crop for later sales. The proportion retained is higher in the East Coast where padi is sold whenever cash is required to meet the needs of the farm family.

Defects of Traditional Padi Marketing System

The drawbacks of the padi marketing system in West Malaysia is largely the result of the small-scale production units and the agricultural credit pattern in the country. The marketing of padi which has evolved over the years had not adapted itself to the rapid increases in production that are taking place in the rural sector. The marketing system was not adequate and failed to provide the necessary stimulus for increased production. The traditional padi dealers who purchased padi and linked the farmers to the millers operated on a small scale and were inefficient; these dealers were very often shop-keepers who also provided loans in cash and kind to farmers on condition that the padi was sold to them. The provision of irrigation facilities, fertilizers, high yielding seeds, will only be fruitful if the farmer has the necessary incentive to increase his production. In this respect, efficient marketing is an important aspect of the problem for increased production. In addition, milling and transportation facilities have been inadequate to cope with the increased production arising out of double-cropping in the larger padi areas.

Padi planters received poor prices for their crop and this was due to one, or a combination of the following factors:

- (i) widespread indebtedness particularly to shopkeepers who also served as padi buyers;
- (ii) lack of organised credit facilities;
- (iii) absence of competition at the primary buying level;
- (iv) malpractices such as excessive deductions from the official price;
- (v) lack of recognised standards and grades for padi;
- (vi) lack of uniformity in weights and measures and use of defective measuring scales;
- (vii) lack of farm roads and poor communications in rural areas.

The typical padi farmer has a relatively poor bargaining position when compared to the padi buyer particularly where he is indebted to the latter. The problems and difficulties in padi marketing are clearly stated in the Federal Agricultural Marketing Authority's Annual Report for 1965-1966: "Padi marketing is beset by diverse marketing defects, many of which take the form of widespread malpractices by traders during their purchases of padi. The most common defect stems from excessive deductions traders make from the Government guaranteed minimum price. It is common knowledge that heavy deductions are made for moisture content based on a subjective examination of the grain. Apart from excessive deductions, the manipulation of weighing scales is another malpractice employed by traders. Here, the local "daching" is commonly employed and its reading may be interfered with to the advantage of the buyer. These, combined with the purchase of padi by volume rather than by weight whenever it is more profitable to do so, provide the buyer with more padi than he pays for.

But not every malpractice in padi marketing should be attributed to traders; it is also a frequent complaint that padi offered by farmers is excessively damp and well above the 18% moisture level stipulated for rejecting padi. In cases such as these, trading is done at very low prices based on the premise that rejected padi may be bought at whatever price it is worth. There are also complaints that padi is offered for sale with a minimum of winnowing and cleaning and farmers are again the victims of further price deductions.

Many of the difficulties of padi marketing fall outside the area of blame of both traders and producers, and here, the fault may probably be the lack of meaningful grades and standards for both padi and rice. Because of this omission, superior grades of padi are sold at prices paid for inferior grades. The absence of grade differentials also means that farmers are not provided with incentives for growing superior quality grain."

It was against such a background of an inefficient marketing system that the Federal Agricultural Marketing Authority (FAMA) was established in 1965 to overcome these drawbacks.

FAMA and the Marketing System

The Padi marketing system has undergone a very rapid change with the establishment of the Federal Agricultural Marketing Authority and the setting up of a separate body in March 1967, the Padi and Rice Marketing Board, to manage and control Padi Marketing Schemes.⁽¹⁾ FAMA has concentrated its efforts since its establishment in 1965 in bringing about marketing improvements for padi. The main objective of Government intervention in padi marketing is to improve the incomes of producers and also provide encouragement for increased production of better quality padi.

FAMA has established under Section 6 of the FAMA Act a separate body called the Padi and Rice Marketing Board to manage and control padi marketing schemes. At present there are 11 padi schemes in West Malaysia and they fall into two broad classes—Regulatory Schemes and Trading Schemes. A regulatory scheme involves the licensing of all padi buyers and enforcing the conditions of their licences. A trading scheme on the other hand, apart from the licensing of padi buyers, also includes the buying and selling of padi and milling and selling of rice. Of the 11 padi marketing schemes in West Malaysia, three are trading schemes while the remaining eight are regulatory schemes.

<i>Trading Schemes</i>							Padi Area Served
1.	Tanjong Karang	...	...	...	...	...	46,000 acres
2.	Perlis	...	...	...	...	...	66,000 ..
3.	Kedah	...	...	...	...	...	289,000 ..
<i>Regulatory Schemes</i>							
4.	Krian (including Mukims 9 and 10 of Province Wellesley)	...	...	...	...	...	64,000 ..
5.	Penang and Province Wellesley (excluding Mukims 9 and 10)	...	...	...	...	...	36,000 ..
6.	Kelantan	...	...	...	...	...	172,000 ..
7.	Perak (excluding Krian)	...	...	...	...	...	65,000 ..
8.	Selangor (excluding Tanjong Karang)	...	...	...	...	...	4,000 ..
9.	Malacca	...	...	...	...	...	32,000 ..
10.	Pahang	...	...	...	...	...	50,000 ..
11.	Trengganu	...	...	...	...	...	70,000 ..

The main objectives of implementing padi marketing schemes are to ensure that:

- farmers have a ready market for their padi and that they are paid promptly;
- stable and fair prices are paid to farmers;
- marketing practices like weighing and grading are conducted in a satisfactory manner.

(1) The National Padi and Rice Authority has taken over the functions of the Padi and Rice Marketing Board as from January 1972.

These objectives are implemented directly in the Trading Schemes and indirectly through the licensing of the padi dealers in areas where Regulatory Schemes have been introduced. Licences are issued subject to the licencees abiding to certain conditions. Some of the conditions include:

- (a) a licensee must buy padi at a price not less than the guaranteed minimum price fixed by Government. Information on the price that will be paid to farmers and the deductions that will be made must be prominently displayed on a board at the buying centre;
- (b) all purchases shall be made by weight and not by volume;
- (c) all purchases shall be paid in cash immediately upon completion of the purchase.

The regulatory aspects of the scheme are enforced by marketing inspectors whose functions also include marketing extension services. The marketing inspectors supervise regularly the activities of the licencees. Marketing extension is provided through talks with groups of farmers who are made aware of the terms and conditions under which padi buying licences are issued.

All the padi marketing schemes have been initiated by FAMA. Before a marketing scheme is implemented, certain preparatory work has to be completed and these may be grouped into three stages—identification, discussion and implementation. In the *identification stage*, the marketing problems are analysed. A report is prepared with the necessary recommendations and submitted to the Authority for consideration.

In the next stage of discussion, the Authority appraises the Report and makes the necessary modifications. If the recommendations are accepted, a draft of the scheme legislation is drawn up. The draft outlining the details of the scheme with a proviso for any person to object to it is then gazetted. After considering all the objections, necessary amendments are made. The scheme is then gazetted and this is followed by implementation by a Marketing Board.

The general pattern of the Padi Marketing Schemes as implemented by the Padi and Rice Marketing Board is relatively simple. Padi farmers sell their crop to dealers licenced by the Board; these dealers may be independent operators, mill agents, co-operative societies or farmers' associations. These licensed dealers then sell the padi to rice mills. There is also a small amount of direct sales by farmers to rice mills. But in addition to these licensed dealers, there are also illegal padi buyers who buy directly from farmers and sell to the mills or to licensed buyers.

There are small variations from the general pattern of padi marketing as described in the previous paragraph, particularly in respect of the intermediaries for the purchase and sale of padi. These variations are due to the existence of different patterns of marketing in the respective areas and the belief that effective improvements are best accomplished through adaptations of existing organisations and methods. In the Tanjong Karang padi area of Selangor and to a great extent in Kelantan, the monopoly of padi buying is in the hands of the co-operative societies and therefore mill agents and independent operators are excluded from buying padi. In Perlis, all three types of primary level buyers operate (that is, mill agents, independent dealers and co-operative societies); but collection of money for the sale of padi to the mills in the State, can only be made through the Co-operative Banking Union; thus the primary level buyers in Perlis may be considered as agents of the Banking Union. In Kedah, prior to the intervention of the Padi and Rice Marketing Board, only commercial millers were issued with padi purchasing licences. All the padi dealers were acting as agents for these millers and on the recommendation of the millers, the dealers were issued authorization cards by the Kedah State Government. After the implementation of the Kedah Padi and Rice Marketing Scheme, padi purchasing licences are now held by a wider group of commercial millers, co-operative societies and a number of former agents of the commercial mills.

As for working capital to purchase padi, mill agents can depend on their mill owners. Co-operative societies obtain part of their funds through Bank Kerjasama. Independent dealers have to depend on their own resources but very often rice mills furnish some working capital to co-operative societies and independent dealers who regularly supply them with padi. The Padi and Rice Marketing Board also provides cash advances to its agents.

The Guaranteed Minimum Price

Two Government programmes which are very relevant to the marketing of padi and rice in the country are the guaranteed minimum price for padi (GMP) and the strategic rice stockpile.

The guaranteed minimum price for padi was first introduced into West Malaysia in 1949. The main objectives of the GMP are:

- (i) to provide farmers with greater incentives for the production of padi;
- (ii) to increase the incomes of padi planters and assure them of a ready market for their padi;

In theory, the GMP is fixed at a level such that the price paid for padi will reflect the free market price of rice in the world and domestic markets. It is necessary to link the GMP with the free market price of rice, for otherwise, if the GMP is too high in relation to market prices, Government will be faced with large offers of local rice. The level of the GMP for padi has been at \$16 per picul for the last decade; the highest level was \$17 per picul during 1952 to 1954 and the lowest recorded was \$12 for the 1954 crop. The GMP is for good dry padi delivered at the mill door; good dry padi is defined as padi fully matured and having not more than 13% moisture content, free of dirt, empty grains, husk, straw or other foreign matter. The GMP is not implemented directly for only a very small number of farmers deliver their padi at the mill door of Government rice mills. However, the support price is implemented indirectly as the Supplies Division of the Ministry of Commerce and Industry undertakes to buy milled rice from millers at a price based on the GMP, provided millers certify that such rice had been milled from padi purchased at the ruling GMP.

In the GMP, there is provision that, should the moisture content of padi exceed 13%, the deductions from the gross weight will be as follows:

13-15% moisture:	2 katties per picul
15-17% moisture:	4 katties per picul
17-18% moisture:	7 katties per picul

Padi of over 18% moisture will not normally be purchased under the GMP but such wet padi is sold after negotiations between buyers and sellers. With double cropping becoming more widespread, increasing quantities of padi are harvested in wet weather and the moisture content will exceed 18 per cent. For the Muda Irrigation Scheme, specific schedules for deductions above 18 per cent have been drawn up so that wet padi offered for sale has also a market. Artificial drying facilities have to be provided on a large scale to meet the needs of the farmer on double cropping area. The Padi and Rice Marketing Board is undertaking the construction of such dryers particularly in the Muda irrigation area where the target is to establish 15 drying complexes in three phases. The first phase in which 5 drying complexes are being built is almost ready.

The GMP is reviewed in June each year and prices for padi are determined for the second crop of that year and the following year's main crop. With the introduction of recommended varieties of padi, a lower price is now offered for the non-recommended varieties for the second crop; but there is still only a single price for the first crop.

Although there is a guaranteed minimum price for padi, the actual prices received by farmers vary a great deal for a variety of reasons particularly due to their inability to produce "clean dry padi". It is estimated that the average price received by farmers is \$14 per picul. The Commodity Bulletin of FAMA in its July 1971 issue states that the net prices ex-mill in July 1971 were as follows:

Tanjong Karang	\$15.08
Lower Perak	\$15.55
Kelantan	\$14.25

This is to be compared with the GMP price of \$16 per picul.

In order to operate the GMP, Government exercises control over the imports of rice. Importers have to obtain a licence to import rice and such licences are granted on condition that the importer agrees to purchase from the Government stockpile a certain

given ratio of local rice. This ratio is regulated in accordance with the quantity of rice the Ministry of Commerce and Industry wishes to release from the stockpile. As the Government selling price of domestic rice is generally higher than the market price, importers cover their losses by increasing the selling price of their imported rice.

Government Rice Stockpile

The Government through the Ministry of Commerce and Industry operates a rice stockpile which is maintained in various parts of the country. The main objectives of this stockpile are:

- (i) to provide a reserve stock of rice to meet an emergency;
- (ii) to implement the guaranteed minimum price for padi by undertaking to buy rice from millers at a price based on the GMP provided that the millers certify that their padi was bought from farmers at the GMP or its equivalent.

Rice for the stockpile is obtained by the Ministry of Commerce and Industry (which is responsible for the Government rice stockpile; this function is now taken over by the National Padi and Rice Authority) by local purchases from millers and, if necessary, by imports. The rice in the stock pile is continually rotated, the old rice being sold to importers and is replaced by newly milled rice. The Government also operates four rice mills producing rice for the stockpile.

Responsibility for Marketing of Padi and Rice

The marketing of padi and rice is very complex and the responsibilities are divided between several Government Departments:

- Padi and Rice Marketing Board mainly controls the marketing of padi at the farm level;
- Commerce and Industry regulates the imports of rice, operates the Rice Stockpile, fixes the GMP for padi, is responsible for weights and measures and the licensing of wholesalers of rice;
- Food Technology Division provides advice on the milling of rice;
- Standards Institution of Malaysia draws up standards and specifications in respect of padi and rice;
- State Governments exercise control over the licensing of rice mills in their respective States.

There is duplication of functions and responsibilities particularly between the Ministry of Commerce and Industry and the Padi and Rice Marketing Board of FAMA; and there are too many Agencies responsible for various aspects of the padi and rice industry. To ensure rationalisation and co-ordination, the Government established on 1st July, 1971 the National Padi and Rice Authority (Lembaga Padi dan Beras Negara) under the portfolio of the Prime Minister.

National Padi and Rice Authority

This integrated Authority will co-ordinate the various aspects of production, milling and marketing of padi and rice and also be responsible for the development and implementation of overall national policies for the padi and rice industries. Thus, this new Board takes over the powers and functions in so far as padi and rice are concerned of the Supplies Division of the Ministry of Commerce and Industry and the Padi and Rice Marketing Board. The Authority will also have under its responsibility the Government's rice stockpile.

The responsibilities of the new Padi and Rice Authority will be:

- ensure a fair and stable padi price for farmers and an adequate supply of rice at a fair price to consumers;
- maintain sufficient supplies of rice to meet all emergencies;
- make recommendations to Government on policies designed to promote the development of the padi and rice industry and where approved by the Government, to co-ordinate and assist in the implementation of the policies.

The Board was created so as to act as one of the instruments through which the Government will achieve the twin objectives of the New Economic Policy—eradication of poverty and the restructuring of Society. These twin objectives have a direct bearing on the agricultural sector in general and the padi and rice industry in particular, since it is in the padi growing industry that poverty is widespread. The Board also has the following long term objectives:

- to designate the country's rice bowls and concentrate their work in these rice bowls so as to increase the productivity of farmers, upgrade the quality, and reduce the costs of production of both padi and rice;
- encourage padi farmers outside the designated rice bowls to plant crops other than rice (including maize, sorghum, tobacco, etc.) during the off-season and have supplementary enterprises such as cattle rearing and poultry farming;
- encourage surplus farmers either in the rice bowl or non-rice bowl areas to out-migrate to industrial centres or to participate in land development programmes; the Board will also formulate and implement programmes for the remaining farmers in either rice bowl or non-rice bowl areas to enable them to own economic holdings.

With the fulfilment of these long term objectives and the changes that it will bring about within the padi growing industry, it is hoped that the national income objective of \$300 per month for each padi farm family will be achieved.

There are many difficulties in determining the average cost of cultivation of padi for West Malaysia and one of the main problems arises from the fact that there is considerable variation in cost from area to area depending very much on the cultivation practices adopted by farmers, the nature of the soil, rental system, use of family labour, etc. Therefore, it is almost impossible to generalise particularly as there have been no comprehensive survey of costs of cultivation to cover the entire padi growing areas of West Malaysia; it is strongly recommended that sample surveys be undertaken on a systematic annual basis to determine costs of cultivation. Since there is considerable annual fluctuations in yields, costs of cultivation studies should be undertaken on a sustained annual basis for it is not safe to generalise on the data for one or two years.

The Ministry of Agriculture has over the last few years carried out several socio-economic surveys of the padi growing areas including the collection of information on costs of cultivation. Many of the facts given here are drawn from these surveys. The reader must be warned that there are limitations to the accuracy of the data for these areas obtained from interviews and much depends on the honesty of the farmer and the ability of the enumerators to draw out the required information from him. Furthermore, the data refer to a particular year and therefore does not take into account the variations in costed returns which take place over a number of years.

The output of padi per acre varies greatly from State to State and even within individual farmers within a locality in States like Kedah and Perlis where yields per crop exceed 300 gantang per acre while in the East Coast States of Pahang, Terengganu and Kelantan, the yields are not more than one-half that of Kedah and Perlis. Because of such variations, it might be useful to classify padi lands according to their productivity rates and calculate separately the cost of cultivation for each of the classes of padi land.

There is no official classification of padi lands in the country except for statistical purposes by the Director and Irrigation Division. This classification for statistical purposes is based on yields. The prime purpose of subdividing the padi lands into classes is for the collection of statistics on padi lands having similar yields are changed higher water table, the Director and Irrigation Division classifies padi lands as follows:

- Class I land ... with a yield of over 400 gantang of padi per acre
- Class II land ... with a yield of 250-400 gantang of padi per acre
- Class III land ... with a yield of less than 250 gantang of padi per acre

COSTS AND RETURNS FROM PADI CULTIVATION

A. COST OF CULTIVATION

Introduction

Data on costs of cultivation are important for at least two reasons:

- (a) for agricultural extension and farm management work: the breakdown of the various items of costs gives a detailed picture of the functioning of the padi production process. Such information is useful for improving the efficiency of the farms and steps can be taken to reduce costs of production. The Government and farmers are interested in determining the quantities of the variable inputs which would give them a certain amount of product at the minimum cost. Such cost data can be used for extension and advisory services as they demonstrate the superiority of any new method or practice;
- (b) for macro-analysis: cost studies also form the basis for the determination of the guaranteed minimum price for padi, size of the optimum padi farm, relative efficiency of tenant and owner operated farms, fixing credit limits of borrowers etc.

There are many difficulties in determining the average cost of cultivation of padi for West Malaysia and one of the main problems arises from the fact that there is considerable variation in costs from area to area depending very much on the cultivation practices adopted by farmers, the nature of the soil, rental system, use of family labour, etc. Therefore, it is almost impossible to generalise particularly as there have been no comprehensive survey of costs of cultivation to cover the entire padi growing areas of West Malaysia; it is strongly recommended that sample surveys be undertaken on a systematic annual basis to determine costs of cultivation. Since there is considerable annual fluctuations in yields, costs of cultivation studies should be undertaken on a sustained annual basis for it is not safe to generalise on the data for one or two years.

The Ministry of Agriculture has over the last few years carried out general socio-economic surveys in specific padi growing areas including the collection of information on costs of cultivation. Many of the facts given here are drawn from these surveys. The reader must be warned that there are limitations to the accuracy of the data for these were obtained from a single interview and much depends on the memory of the farmer and the ability of the enumerator to draw out the required information from him. Furthermore, the data refers to a particular year and therefore does not take into account the variations in costs and returns which take place over a number of years.

The output of padi per acre varies greatly from State to State and even with individual farmers within a locality. In States like Kedah and Perlis, average yields per crop exceed 500 gantangs per acre whilst in the East Coast States of Pahang, Trengganu and Kelantan, the yields are not more than one-half that of Kedah and Perlis. Because of such variations, it might be useful to classify padi lands according to their productivity classes and calculate separately the cost of cultivation for each of the classes of padi land.

There is no official classification of padi lands in the country except for *gazetted* irrigation areas by the Drainage and Irrigation Division. This classification for *gazetted* irrigation areas is based on yields. The prime purpose of sub-dividing the padi lands into classes is for the collection of irrigation rates; padi lands having greater yields are charged higher water rates. The Drainage and Irrigation Division classifies padi lands as follows:

Class I land	...	with a yield of over 400 gantangs of padi (per season) per acre;
Class II land	...	with a yield of 250-400 gantangs of padi per acre;
Class III land	...	with a yield of less than 250 gantangs of padi per acre.

These classifications were made a long time ago when yields were low. Therefore, they are not really suitable for present day conditions where average yields have increased considerably. For the purpose of this exercise, higher yields per acre will be assumed and they will be:

- High productivity ... yield of over 500 gantangs padi per acre.
- Average productivity ... 350-500 gantangs.
- Low productivity ... less than 350 gantangs.

Data on cost of cultivation will be shown for each of the three classes of padi lands; the information on cost has been collected through surveys of selected areas. The padi areas selected are as follows:

- High productivity land ... Province Wellesley.
- Average productivity land ... Sungei Manik, Perak.
- Low productivity land ... Kelantan.

Component Items of Cost of Cultivation

The main items of expenditure in padi cultivation may be grouped into 7 classes which are:

- (a) labour costs
- (b) seeds and seedlings
- (c) fertilizers
- (d) rent of buffaloes, equipment
- (e) land tax
- (f) rent of padi lands
- (g) interest on capital investment.

Labour inputs and Labour costs

Labour costs account for 60 to 80 per cent of total production costs and is thus the principal cost in padi cultivation.

Both family and hired labour are used in padi cultivation. Much of the labour used consists of family labour, the farmer himself performing the greater part of the work. The value of family labour including that of the farmers can be imputed at \$2 to \$3 per day (of 8 working hours); the actual cost of exchange labour or "gotong royong" is based on the cost of food, tobacco, etc., served to workers. Hired labour is generally engaged on piece rates and in this computation the labour is charged the actual amount paid. In most instances hired labour works side by side with family labour in such operations as harvesting, threshing, field preparation, etc.

The labour inputs and labour costs per acre for the three types of padi land are given in Table 7.1.

It is seen from Table 7.1 that labour costs which include hired labour together with the imputed value of family labour and gotong royong labour, vary from about \$80 to \$120 per acre per season. In the poorer areas the greater part of the farm work (80 to 90 per cent) is undertaken by family labour but in Province Wellesley (high productivity padi land), the farm family does only 40 per cent of the farm work. The dependence of padi cultivation on family labour has at least one important economic consequence: the amount of family labour available, rather than the labour requirements of the farm, is the deciding factor in determining the labour actually used. Under Malaysian conditions, more labour is being used in padi cultivation than is actually required because of the surplus of family labour that is available in the padi growing areas.

TABLE 7.1
LABOUR INPUTS AND LABOUR COSTS PER ACRE (PER CROP) IN
PADI CULTIVATION IN VARIOUS AREAS

Farm Operation	High productivity land: Province Wellesley				Average productivity land: Sungei Manik				Low productivity land: Kemubu							
	Man-Days of Work				Man-Days of Work				Man-Days of Work							
	Total	Farmer and Family	Hired Workers	Gotong Royong	Total	Farmer and Family	Hired Workers	Gotong Royong	Total	Farmer and Family	Hired Workers	Gotong Royong	Total	Farmer and Family	Hired Workers	Gotong Royong
Nursery Work ..	1.4	1.1	0.2	*	4.2	1.5	1.5	*	3.9	1.7	0.1	0.1	3.5	1.5	0.1	0.1
Field Preparation ..	6.6	4.7	1.8	*	32.2	9.1	8.6	0.4	29.1	10.8	0.4	*	23.7	10.4	0.4	*
Transplanting ..	6.1	0.5	4.7	0.9	17.1	6.1	5.3	0.8	16.3	13.7	10.8	2.3	26.1	10.8	2.3	0.6
Fertilizer Application ..	1.0	0.8	0.1	*	2.5	0.3	0.3	—	0.8	0.4	—	—	0.8	0.4	—	*
Weeding ..	3.3	2.7	0.6	*	8.2	1.8	1.8	—	4.5	0.8	0.1	—	1.6	0.7	0.1	—
Harvesting ..	14.5	3.0	11.0	0.4	49.4	8.2	5.8	2.4	25.7	10.7	8.7	2.0	21.1	8.7	2.0	*
Transporting ..	0.9	0.5	0.4	*	4.9	0.4	0.3	0.1	1.7	1.4	1.2	0.2	2.8	1.2	0.2	—
TOTAL ..	33.8	13.5	18.6	1.7	118.5	27.4	23.6	3.7	81.9	39.5	33.7	5.1	79.6	33.7	5.1	0.7

* Less than 0.1

It is also seen that labour inputs to cultivate an acre of padi land vary from 27 to 40 man-days; the inputs being very roughly divided between the three practices of field preparation, transplanting and harvesting. As for field preparation, the use of tractors is becoming more popular and this will reduce the time requirements for this operation. A certain amount of mechanization is being initiated for harvesting and threshing operations. However, transplanting has to be undertaken manually, and therefore, this farm operation will limit the size of padi area that can be cultivated by an individual padi farmer.

As mentioned earlier the labour inputs in padi cultivation are undertaken by family labour and hired labour, the proportion between the two varying with different areas; this is shown in Table 7.2.

Another problem in computing costs of cultivation is in deciding the items that should be included under "costs". While certain costs such as hired labour, seeds, fertilizers, rent, land tax have to be included, there are differences of opinion whether items such as the imputed value of family labour, zakat, and interest on capital invested (mainly the value of the padi land itself) should be brought into the calculation. The last mentioned, interest on capital invested, is a particularly large item of cost for "owner farmers" and relatively small for "tenant farmers". It follows that costs of cultivation for owner farmers will be quite different from tenant farmers. Thus, it would be useful to indicate costs of production for owner-farmers and tenant-farmers separately and this is shown in Table 7.3. The most striking feature of the Table is the great variation in costs of cultivation per acre.

TABLE 7.2
FAMILY AND HIRED LABOUR INPUTS PER ACRE PER SEASON
IN PADI CULTIVATION

Type of Labour	High Productivity Lands: Province Wellesley		Average Productivity Lands: Sungei Manik		Low Productivity Lands: Kelantan	
	Man- days	\$	Man- days	\$	Man- days	\$
	Family Labour	13.5	36.1	23.6	58.2	33.7	67.4
Hired Labour	20.3	82.4	3.8	23.7	5.8	12.2
TOTAL	33.8	118.5	27.4	81.9	39.5	79.6

In Table 7.3, cost of cultivation have been calculated separately for owner-farmers and tenant-farmers and three concepts of costs have been included viz.

- Cost A ... which is confined only to paid out costs in cash and kind;
- Cost B ... which is Cost A plus imputed value of family labour;
- Cost C ... which is Cost B plus interest on capital invested on the farm.

Table 7.3 shows the actual amount of money spent on fertilizers and insecticides by farmers ranges from around \$6 in Kelantan and Sungei Manik to \$22 in Province Wellesley. Farmers use much less than the recommended amount for various reasons; many of them do not use insecticides unless there is an actual outbreak of some disease on their crop. Table 7.3 also shows that there is considerable variation in costs between different padi growing areas in the country. Apart from the amount of fertilizers used, other reasons for variation in costs are due to differences in labour inputs, cultivation practices, etc.

TABLE 7.3

COST OF PADI CULTIVATION PER ACRE PER SEASON IN DOLLARS

Items	High Productivity Lands:		Average Productivity Lands:		Low Productivity Land:	
	Province Wellesley		Sungei Manik		Kelantan	
	Owner farmers	Tenant farmers	Owner farmers	Tenant farmers	Owner farmers	Tenant farmers
Hired labour	77.57	89.63	26.24	25.45	21.13	10.54
Seeds and Seedlings .. .	3.14	3.00	3.03	2.57	4.65	5.02
Fertilizers, insecticides .. .	21.15	19.55	8.39	5.89	8.15	6.37
Equipment, buffalo hiring..	.48	2.00	0.24	0.66	.50	7.93
Land and Irrigation rates..	4.72	—	3.61	—	3.34	—
Rent on Padi Land .. .	—	61.56 (2)	—	42.98 (2)	—	61.48 (2)
Cost A:						
Sub-Total of Paid Out Costs .. .	107.06	175.74	41.51	77.55	37.77	91.34
Imputed value of family labour .. .	37.51	38.28	61.63	38.18	68.94	67.39
Cost B:						
Sub-Total of Paid out Costs plus imputed value of family labour .. .	144.57	214.02	103.14	115.73	106.71	158.73
Interest at 6% on capital Investment .. .	83.81 (1)	8.91 (1)	43.99 (1)	6.23 (1)	119.80	23.70
Cost C:						
All Costs .. .	228.38	222.93	146.13	121.96	226.51	182.43

(1) At 6% per annum for half year only (one season) for Province Wellesley and Sungei Manik where two crops per year are grown.

(2) Rent for one season only.

The concept of Cost C is the most comprehensive and includes all costs both paid out and imputed as well as fixed and variable costs. In the long run all farms must receive sufficient income to meet the various items included in Cost C.

TABLE 7.4

SUMMARY: COST OF PADI CULTIVATION PER ACRE PER SEASON IN DOLLARS

Type of Cost	OWNER-FARMERS			TENANT-FARMERS		
	Province Wellesley	Sungei Manik	Kelantan	Province Wellesley	Sungei Manik	Kelantan
Cost A—						
Paid-out Costs .. .	107	42	38	176	78	91
Cost B—						
Cost A + imputed value of family labour .. .	145	103	107	214	116	159
Cost C—						
Cost B + interest at 6% in capital investment .. .	228	146	227	223	122	182

Cost A comprises only the paid out costs in cash and kind by the farmer and excludes the two items "imputed value of family labour" and "interest on capital investment". Cost A represents the minimum costs and will be useful in calculating the "net returns" to the farmer for his work and management and interest on his capital invested in the farm. This "net return" is obtained by subtracting Cost A from the gross returns obtained by the sale of all the padi produced. It is seen from

Table 7.4 that for Owner-Farmers, Cost A, or the paid out costs, ranges from \$38 in Kelantan to \$107 in Province Wellesley whilst for Tenant-Farmers the range is from \$78 to \$176 for Sungei Manik and Province Wellesley respectively.

Cost C, on the other hand, which includes all costs, is relatively high (\$227) in Kelantan for Owner-Farmers when compared to P. Wellesley (\$228). This is because the interest on the fixed capital investment such as land, farm house etc. in Province Wellesley is spread over the growing of two padi crops as against a single crop in Kelantan.

To sum up on costs, it is seen that the paid-out costs including both cash and kind (Cost A), may be as low as \$38 for owner farmers in Kelantan, or as high as \$176 for tenant farmers in Province Wellesley (an average figure may be taken as \$90). On the other hand, if costs are defined to be comprehensive and include both paid-out and imputed amounts, the cost will then range from \$122 to \$228 per acre (an average figure may be taken as \$200).

Costs of Production per picul of Padi

The costs of producing per picul of padi can be obtained by dividing the cost of cultivation per acre by its yield (Table 7.5). As the farmer in the long run has to meet all costs, both fixed and variable, and both paid-out and imputed, therefore it is best to use the concept of Cost C which is most comprehensive rather than Cost A or B.

The yields per acre for the three areas are very variable, the average padi yields for the three areas may be taken as follows:

Province Wellesley 564 gantangs or 24.0 piculs valued at \$360

Sungei Manik 387 gantangs or 16.5 piculs valued at \$248

Kelantan 271 gantangs or 11.5 piculs valued at \$173

TABLE 7.5
COST OF PRODUCTION PER PICUL OF PADI

Item	OWNER FARMERS			TENANT FARMERS		
	Province Wellesley	Sungei Manik	Kelantan	Province Wellesley	Sungei Manik	Kelantan
Total Cost per Acre: dollars ..	228	146	227	223	122	182
Padi Yield per Acre in Piculs ..	24	16.5	11.5	24	16.5	11.5
Cost per Picul Padi: dollars ...	9.50	8.85	19.74	9.30	7.39	15.82

Net Returns Per Acre Planted

Table 7.6 shows the net returns from the planting of an acre of padi land. The net returns are obtained by subtracting the costs per acre (Cost C) from the value of the padi produced. These returns range from \$137 per acre planted for tenant farmers in Province Wellesley to a financial loss for those farmers in Kelantan. A question may be asked as to why padi farming continues in Kelantan in spite of the fact that farmers are making a loss. The answer is that in computing the net returns per acre, Cost C has been used and this is deducted from the value of the gross yield; if Cost A were used, then the net returns will be much more favourable and this is shown in Table 7.7. The net returns as shown in Table 7.7 represent the returns to the farmer for his work, his management and interest on his capital invested in the farm, these net returns may be as high as \$253 per acre for owner farmers in Province Wellesley or as little as \$83 for tenant farmers in Kelantan.

Using Cost A it is seen from Table 7.7 that the net returns per acre planted averages around \$200 and this is what the farm family receive for their effort in padi cultivation and interest on their capital invested. Thus, a farmer operating 3 acres of padi land and cultivating two crops per year will have an annual net income of around \$1,200.

TABLE 7.6

NET RETURNS IN DOLLARS PER ACRE PLANTED
(Using Cost C)

Items	OWNER FARMERS			TENANT FARMERS		
	Province Wellesley	Sungei Manik	Kelantan	Province Wellesley	Sungei Manik	Kelantan
Value of Padi Produced at \$15 per picul	360	248	173	360	248	173
Cost per Acre	228	146	227	223	122	182
Net returns	132	102	-54	137	126	-9

TABLE 7.7

NET RETURNS IN DOLLARS PER ACRE PLANTED
(Using Cost A)

Item	OWNER FARMERS			TENANT FARMERS		
	Province Wellesley	Sungei Manik	Kelantan	Province Wellesley	Sungei Manik	Kelantan
Value of Padi Produced ..	360	248	173	360	248	173
Cost of Production per Acre (Cost A)	107	42	38	176	78	91
Net Returns ..	253	206	135	184	170	83

TABLE 7.5

COST OF PRODUCTION PER PICUL OF PADI

Province	OWNER FARMERS			TENANT FARMERS		
	Province Wellesley	Sungei Manik	Kelantan	Province Wellesley	Sungei Manik	Kelantan
Total Cost per Acre, dollars	228	146	227	223	122	182
Padi, cost per Acre in Picul	15	16.5	11.5	15	16.5	11.5
Cost per Picul Padi, dollars	15.2	8.8	19.6	14.8	7.4	15.8

Table 7.5 shows the net returns from the planting of an acre of padi land. The net returns are obtained by subtracting the cost per acre (Cost C) from the value of the padi produced. These figures range from \$137 per acre planted for tenant farmers in Province Wellesley to a financial loss for those farmers in Kelantan. A question may be asked as to why padi farming continues in Kelantan in spite of the fact that farmers are making a loss. The answer is that in comparing the net returns per acre, Cost C has been used and this is deducted from the value of the gross yield; if Cost A were used then the net returns will be much more favourable and this is shown in Table 7.7. The net returns as shown in Table 7.7 represent the returns to the farmer for his work, his management and interest on his capital invested in the land, these net returns may be as high as \$253 per acre for owner farmers in Province Wellesley or as little as \$83 for tenant farmers in Kelantan. Thus in fact the land and the labour are not being used to their full potential. Table 7.6 indicates net returns on rice planted on a 200-acre farm in Province Wellesley and this is what the farm family receive for their own rice cultivation and interest on their capital invested. Thus a farmer operating a 200-acre padi land and cultivating two crops per year will have an annual net income of around \$1,000.

CHAPTER 8

RICE IMPORTS

West Malaysia has always been a net importer of rice. Malaysian agriculture places more emphasis on the production of export crops particularly rubber and oil palm. It was only in the last decade that steps have been taken to increase rice production.

Control of Imports

Imports of rice take place so as to bridge the gap between overall demand and local production. The imports into West Malaysia are regulated quantitatively and this control is exercised by the Trade Division of the Ministry of Commerce and Industry and more recently by the National Padi and Rice Authority. The regulations governing these imports are spelt in the Custom's Ordinance of 1967. Quantitative restrictions of imports of rice are necessary for several reasons: in order to ensure a ready market for the steadily expanding local rice production; to facilitate the implementation of the guaranteed minimum price for padi; and for the maintenance of the Government rice stockpile. Restricting the level of imports of rice to achieve these, can only be successful if the import regulating authority can forecast accurately various variables such as the quantity of rice that will be available through local production, stocks held within the country, and the needs of rice for local consumption. But it is not an easy task to have full knowledge of all these variables and fix the import quota so that the supply of and demand for rice can be brought to near equilibrium.

Rotating Rice in the Government Stockpile

In order to effect purchases of rice from the Government stockpile, control is imposed on the imports of rice through the licensing and registration of importers. Every importer, before he is given a licence to import rice, enters into a contract with Government to purchase a proportionate quantity of rice from Government stocks. Importers of rice are given monthly quotas which are based on their past performance and their imports cannot exceed this quota. In 1969 there were 166 registered rice importers in West Malaysia.

Rice import licences are issued on a State or regional basis. The main advantage of this procedure is that transport costs of rice are reduced and this will be beneficial to consumers; furthermore, it also ensures that imports are handled by a large number of traders and competition among them will result in lower prices of rice. The imported rice is brought into the country through the three main ports of Penang, Port Swettenham and Malacca, and also by road from Singapore. The imports in 1970 through the various channels were as follows:

Port	Tons	%
Penang	44,313	16
Port Swettenham	82,270	31
Malacca	117,150	44
Road from Singapore	20,767	8
Others (Port Dickson, Telok Anson, Muar, Batu Pahat, Kuantan, Kota Bharu, Kuala Trengganu) ...	1,983	1
	<hr/> 267,483	<hr/> 100

It is mandatory that all importers buy rice from the Stockpile on a ratio fixed to the quantity of rice they import. Variation in this ratio provides a mechanism for the Government to control imports. For example, in times of rice shortage, the ratio of imports to purchase of stockpile rice, could be raised from 2:1 to 5:1 as happened in the second half of 1967. Conversely, in time of relative abundance of local rice, the ratio can be reduced from 2:1 to 1:1, or imports may be temporarily suspended.

The actual proportion of imports to Government rice has varied from time to time; over the last five years, this ratio has been as follows:

Date	Ratio of Imports	Ratio of Government Rice from Stockpile
1-2-66 to 30-6-66	1	1
1-7-66 to 31-1-67	2	3
1-2-67 to 30-4-67	2	1
1-5-67 to 30-11-67	5	1
1-12-67 to 30-4-68	7	1
1-5-68 to 31-7-68	5	1
1-8-68 to 31-10-68	3	1
1-11-68 to 3-12-68	2	1
4-12-68 to 31-1-69	1	1
1-2-69 to 31-3-69	1½	1
1-4-69 to 30-9-69	2	1
1-10-69 to 31-1-70	3	1
1-2-70 to 30-4-70	2	1
1-5-70 to 30-10-70	1	1
1-11-70 to 31-12-70	CLOSED (For two months)	
2-1-71	1	1½

Quantity Imported (Table 8.1)

As mentioned earlier, imports of rice take place to bridge the gap between local production and overall demand. In the past, West Malaysia has been heavily dependent on rice imports. Net rice imports over the last few years has fluctuated from 200,000 to 400,000 tons and approximately \$100 million is spent annually on imports of rice; but before the end of the Second Malaysia Plan period of 1975, imports into West Malaysia should dwindle to insignificant amounts, Table 8.1 shows the position of gross imports, exports and net imports in terms of quantity and value for the period 1960 to 1970. It is seen that there is a small export trade in rice (of less than 10,000 tons per year) but this is comparatively insignificant. The exports are generally to Singapore and Sarawak.

TABLE 8.1
GROSS IMPORTS, EXPORTS AND NET EXPORTS OF RICE
INTO WEST MALAYSIA

Year	Gross Imports		Exports (Re-exports)		Net Imports	
	Quantity Thousand Tons	Value \$'000	Quantity Thousand Tons	Value \$'000	Quantity Thousand Tons	Value \$'000
1960	368	133,492	9	4,252	357	127,237
1961	336	129,500	20	8,714	316	120,786
1962	310	132,357	22	9,722	288	122,635
1963	399	164,752	10	4,283	389	160,469
1964	409	156,845	7	3,105	402	153,704
1965	293	112,638	36	15,330	257	97,308
1966	239	104,910	32	14,002	208	90,907
1967	296	157,637	10	4,453	286	153,184
1968	240	136,208	2	1,178	238	135,030
1969	227	100,053	6	3,371	220	96,682
1970	267	95,493	5	2,964	262	92,529

TABLE 8.2
IMPORTS OF RICE BY TYPE INTO WEST MALAYSIA, 1965-70

Rice	1965		1966		1967		1968		1969		1970	
	Ton	Value \$'000	Ton	Value $'000	Ton	Value $'000	Ton	Value $'000	Ton	Value $'000	Ton	Value $'000
Rice milled excl. parboiled	175,977	72,355	151,264	67,990	157,074	88,983	108,488	66,648	105,345	52,799	153,096	58,139
Rice milled parboiled	55,756	20,481	41,758	17,945	52,612	27,258	51,386	28,332	45,069	20,346	47,612	18,119
Rice broken excl. for animal food	43,614	13,088	28,726	10,218	66,150	31,714	65,751	33,476	59,716	19,381	53,319	14,713
Pulot rice other than in the husk on undermilled (glutinous)	12,259	5,297	16,324	8,423	19,818	9,582	14,817	7,718	16,390	7,500	13,139	4,363
Other rice under milled	5,672	1,417	1,339	334	261	99	49	34	7	3	317	156
TOTAL	293,278	112,638	239,411	104,910	295,915	157,637	240,491	136,208	226,577	100,053	267,483	96,490
Average Cost per ton		\$384		\$438		\$533		\$566		\$442		\$357

TABLE 8.3
IMPORTS OF RICE BY COUNTRY, 1960-70

Year	Total Rice Imports (Tons)	Burma		Thailand		China		Singapore		Vietnam		Cambodia		Others	
		Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%
1960	373,659	34,418	9	267,083	72	26,083	7	1,135	0	13,311	4	26,884	7	3,922	1
1962	310,264	60,502	19	197,386	64	21,619	7	5,789	2	10,925	3	5,370	2	8,673	3
1964	408,749	30,040	7	268,160	66	86,644	21	239	0	1,178	0	22,194	6	294	0
1966	239,411	13,500	6	139,034	58	65,271	27	18,934	8	76	0	1,243	0	1,429	1
1968	240,491	6,656	3	169,448	70	43,191	18	2,824	1	—	—	206	0	18,166	8
1970	267,493	43,860	16	107,169	40	95,128	36	11	0	1,043	1	576	0	19,606	7

Type of Rice Imported (Table 8.2)

The rice imported into West Malaysia is for trade statistics purposes grouped under six headings. These are:

- whole-milled rice
- parboiled rice
- broken milled rice
- glutinous rice
- undermilled rice
- rice in husk or padi (not imported any more).

About 60 per cent of all imports consist of the first category of whole-milled rice while par-boiled rice accounts for 15 to 20 per cent. A single rice importer may import all five types of rice because he has to supply a number of wholesalers who may be dealing with different types of rice. The quantities of the various types of rice imported during 1965 to 1970 is given in Table 8.2. It is seen that though there is downward trend in imports, there are fluctuations in the quantity imported each year and it is difficult to explain such fluctuations in imports.

Source of Imports (Table 8.3)

West Malaysia obtains its rice from some 15 different countries. The greater part comes from Thailand, Burma and China which account for more than 90 per cent of all imports (Table 8.3). Though the traditional exporting countries continue to maintain their share, imports of rice from China are steadily increasing in recent years. In 1970, 36 per cent of the total imports were from China, and as for milled whole rice, 58 per cent of the imports were from that country. Table 8.4 also shows the import prices of rice from the various countries; it is seen that milled rice, which constitutes the bulk of the imports, was obtained in 1970 more cheaply from North Vietnam and China when compared to Thailand but there may be differences in quality and local preferences have traditionally been for high quality Thai rice. Furthermore, there may be close links between the local importers and the owners of rice mills in Thailand and therefore imports from that country continue inspite of higher prices.

TABLE 8.4

AVERAGE PRICE IN DOLLARS PER TON OF IMPORTED RICE FROM VARIOUS COUNTRIES, 1964-1970

Countries	Year	1964	1965	1966	1967	1968	1969	1970
Burma	..	416	358	377	531	560	363	307
Thailand	..	393	401	463	517	559	454	392
Cambodia	..	333	253	252	568	576	557	486
China	..	357	342	403	550	588	442	342
Vietnam	..	366	—	449	525	—	384	324
Singapore	..	444	448	431	463	519	540	491
Pakistan	..	686	506	497	507	598	628	659
U.S.A.	..	513	504	511	625	658	667	680
Australia	..	—	552	375	365	436	275	—
Republic of India	..	—	464	450	482	417	—	—
Others	..	—	—	—	547	589	319	489
Average Price of Imported Rice	..	384	384	438	553	566	411	357

World Price for Rice

Larger exportable world surpluses over the last few years and a fall in import demand for rice has resulted in a fall in rice prices of around 30 per cent between 1968 and 1970. This is shown in Table 8.4 which gives the average imported prices of rice for the last few years. These rice prices (CIF West Malaysia) may be summarised as follows:

Year			Price per Ton of Rice \$
1965	...	...	384
1966	...	...	438
1967	...	...	553
1968	...	...	566
1969	...	...	441
1970	...	...	357
1971	(first half)		306

Locally produced rice, milled from padi purchased at a GMP of \$16, will result in a wholesale or stockpile purchase price of \$27.50 per picul, or around \$462 per ton. Thus, the cost of production and milling of local rice is relatively high, for imported rice can be purchased at less than \$400 per ton. West Malaysia is a relatively high cost producer of rice. Exports of rice to East Malaysia or any other country can only be possible with subsidies of around \$100 per ton if the GMP remains at \$16 per picul of padi.

Smuggling of Rice

In Thailand, the Government controls the rice trade and fixes the ex-mill prices, purchasing rates, the granting of export quotas and also imposes a variable export tax on rice. One of the objectives of the partial Government monopoly on rice is to ensure sufficient quantity of rice for domestic consumption and that the local price of rice is stabilised at a reasonable level. Hence rice is relatively cheap in Thailand and this is to be compared with the higher Malaysian prices of rice resulting mainly from the price—support programme for padi. It is reported in the *Rice Bulletin* of March 1970 that floor prices paid by Thai authorities to farmers for padi in the 1970 season are the equivalent of \$9.20 per picul and this is to be compared to our guaranteed price of \$16 per picul of padi. Such price differentials for rice between two neighbouring countries tends to encourage smuggling from Thailand along both the east and west coast; along the east coast, much of the boundary between the two countries consists of a shallow river and smuggling there is particularly difficult to control. Apart from the big-time smugglers, there are a large number of small-scale smugglers who operate "like ants" removing rice in small quantities through jungle paths to be accumulated on the Malaysian side of the border. In the speech by the Hon'ble Prime Minister on the launching of the National Padi and Rice Authority, he said, "As for the smuggling of padi and rice to this country, I consider this as a disease that will weaken all our efforts to improve the income and standard of living of our padi farmers, and it must therefore be eradicated The Authority is given full powers to deal with smuggling of padi and rice to Malaysia." Malaysia is concerned about rice smuggling because it can upset the local rice market and depress the price of home grown rice. If this happens the income of farmers will also be depressed and all efforts to improve the lot of the farmers will be futile. It must also be noted that in the last few months when the National Padi and Rice Authority has taken "control" of imports, police action has been initiated against the rice smugglers.

The Director of Enforcement of the National Padi and Rice Authority (NPRA) is quoted as stating (*Straits Times*, March 31, 1972), that smuggling has been cut down by about 95 percent. The *Straits Times* adds that when the anti-smuggling operations started seven months ago, NPRA used to seize 1,000 bags of smuggled rice daily but now their haul seldom exceeds 50 bags a week. In the Perlis border youths are employed to ferry bags of rice on bicycles. For each bag of rice taken a mile or two the youth is

paid one dollar and one hundred for them to make 10 to 15 trips per day. The Straits Times headlines of that day reads as follows, "Day and Night Road Blocks Pay off: Rice Smuggling Gangs Smashed as Government "Exiles" Seven Kingpins".

TABLE 8.5

PRODUCTION, NET IMPORTS AND CONSUMPTION OF RICE IN WEST MALAYSIA, 1967-1971

Particulars	Unit	1967	1968	1969	1970	1971
Local Production of Rice	Ton	659,110	780,000	866,840	914,550	989,530
Net Imports of Rice ..	"	285,939	238,465	220,286	262,343	142,637
Total Apparent Consumption (a)	"	945,049	1,018,465	1,087,126	1,176,893	1,132,167
Percentage of Production to Total Apparent Consumption	%	70	77	80	78	87
Population (b)	Millions	8.217	8.439	8.667	8.901	9.141
Apparent Consumption Per Head (c)	Lbs	258	270	281	296	277

- (a) Due to lack of information, no account can be taken of stocks in arriving at apparent consumption.
- (b) Estimated mid-year population as at 30th June.
- (c) Based on estimated population given above.

There is little doubt that irrigation is one of the most important factors that have contributed to increased rice production. The growing rice season has been extended because of the availability of suitable irrigation facilities and this is the biggest role of irrigation. Apart from enabling a second crop to be grown, irrigation also increases yields of the main season crop. The irrigation water provides the natural rainfall to provide for the crop water requirement, particularly in periods when it is not needed. As farmers learn how to use irrigation water more efficiently, yields will be on the increase. Farmers' benefits cannot be derived from water unless an improved vehicle-facilities system etc. only when there is a suitable irrigation system providing a reliable water supply. This means that food self-sufficiency can be achieved.

The first large irrigation scheme constructed in Malaysia was the Klang Irrigation Scheme, which was opened in 1926. The cost being 2.5 million U.S. dollars, the Government was unable to deal with irrigation projects for another year. An irrigation branch of the Public Works Department was formed with the object of handling rice cultivation, but no important irrigation schemes were constructed after 1910 until the formation of the Drainage and Irrigation Department in 1947. During the trade depression of 1930 when the price of rubber was at a very low level, a Committee was appointed to consider what steps should be taken by Government to encourage the cultivation of rubber. One of the main recommendations in the Committee's report was that an Irrigation and Drainage Department should be established to deal with the problem of land development and water control. This recommendation led to the formation of that department in 1947. The Drainage and Irrigation Department was transferred to the Ministry of Agriculture and the Irrigation Department was established on 17 January 1962. From 1951 to the end of 1954, the provision of irrigation facilities to padi areas was actively implemented and the following major irrigation schemes were constructed: Sungai Manik (25,000 acres), Panchang Baharu (12,300 acres), Klang

CHAPTER 9

IRRIGATION

Need for Irrigation

Annual rainfall in West Malaysia is high averaging about 100 inches but it is seasonal and its distribution is not conducive for the creation of an optimum moisture condition for plant growth. Thus, even during the monsoons, from which a large portion of the annual rainfall is derived, dry spells of several weeks duration may separate the wet spells, and crops which suffer at one time from excessive rain may be suffering from drought only several weeks later. The need for irrigation so as to produce a better crop of padi was recognised long ago. Even centuries ago, farmers already contrived ways and means such as the construction of brushwood dams to ensure a more reliable water supply. To-day, there are still traditional brushwood dams constructed by the farmers in some of the padi growing areas of the country. As brushwood dams are rather rudimentary structures and easily damaged by floods the supply of water from such structures is unreliable. The yields from these areas are low because of the poor water diversion system, and also because of the minimum use by farmers of inputs such as fertilizers, pesticides and improved seeds. As a result of massive governmental effort to improve rice production in recent years many of the existing padi areas are now served by irrigation facilities constructed by the Drainage and Irrigation Department (D.I.D.).

The term "irrigation" will in this Chapter be used in a very restricted sense to mean the artificial application of water to padi through the provision of facilities by Government to aid padi production; irrigation through traditional means will be excluded and these will not be considered as proper irrigation facilities.

There is little doubt that irrigation is one of the most important factors that have contributed to increased rice production. The growing of a second rice crop is possible because of the availability of suitable irrigation facilities and this is the biggest role of irrigation works. Apart from enabling a second crop to be grown, irrigation also increases yields of the main season crop, for irrigation water supplements natural rainfall to provide for the crop water requirement particularly in periods when it is most needed. As farmers learn how to use irrigation water more effectively, padi yields will be on the increase. Maximum benefits can be derived from the use of improved varieties, fertilizers, pesticides, etc. only when there is an efficient irrigation system providing a reliable water supply.

Establishment of Drainage and Irrigation Department

The first large irrigation scheme constructed in Malaysia was the Krian Irrigation Scheme officially opened in 1906 (the cost being \$1.6 million). Up to 1913, no special Government organization existed to deal with irrigation problems, but in that year, an Irrigation Branch of the Public Works Department was formed with the object of assisting rice cultivation. But no important irrigation schemes were constructed after 1910 until the formation of the Drainage and Irrigation Department in 1932.

During the trade depression of 1930 when the price of rubber was at a very low level, a Committee was appointed to consider what steps should be taken by Government to encourage rice cultivation in Malaya. One of the main recommendations of the Committee was that an Irrigation and Drainage Department should be established to deal with problems of land development and water control with particular reference to the utilisation of these natural resources for increasing the production of rice. This recommendation was promptly accepted and the Drainage and Irrigation Department was established on 1st January, 1932.

From 1932 to the outbreak of the War in 1941, the provision of irrigation facilities to padi areas was actively implemented and the following major irrigation schemes were constructed: Sungei Manik (25,000 acres), Panchang Bedena (15,300 acres), Krian

Extension (10,000 acres increasing the irrigable area from 50,000 to 60,000 acres); and a larger number of other schemes. In the 10 years of the Department's existence up to the outbreak of the Second World War in 1941, the activities resulted in:

- (a) the development of 53,000 acres of new padi land;
- (b) the provision of improved irrigation and drainage facilities to 120,000 acres of existing padi land;
- (c) the preparation of projects covering 120,000 acres of existing land and the development of 46,000 acres of new land.

Immediately after the War in 1946, considerable effort was made to increase local production of rice. The increasing importance and emphasis given to rice cultivation by Government is partly reflected by the increasing size of the development funds allocated to the Drainage and Irrigation Department in the various Five Year Plans:

First Malaya Plan	...	...	...	1955-1960	allocation \$38 million
Second Malaya Plan	...	...	...	1961-1965	allocation \$109 million
First Malaysia Plan	...	...	...	1966-1970	allocation \$319 million
Second Malaysia Plan	...	...	...	1971-1975	allocation \$205 million

About two-thirds of these allocations are for irrigation projects which are for expanding irrigation and drainage facilities for rice production, and much of the expenditure has been utilised for further improvement of existing padi areas where production can be increased more rapidly than by opening up new lands. At the same time, however, due regard has also been given to the development of new padi areas. According to the D.I.D. statistics, about one-third of the total of 604,000 acres provided with irrigation facilities up to 1969 may be classified as additional padi areas made available as the result of the irrigation projects. Among the newly opened up padi areas are the Tanjong Karang Irrigation Scheme in Selangor (50,000 acres), and the Trans-Perak Scheme in Perak.

Irrigated and Non-Irrigated Padi Lands, 1970 (Table 9.1)

Out of a total padi area of 943,000 acres at the end of 1970, about 620,000 acres, or 66% of the total padi lands, were served by irrigation facilities provided by the D.I.D. All these areas have an assured water supply for the main or wet season crop. These irrigated areas can be divided into two categories:

- (i) Areas where water supply is sufficient to grow two crops per year; at the end of 1970, a little less than one half of the irrigated areas (286,000 acres) had irrigation facilities for both the main and off-seasons;
- (ii) Areas where water supply is inadequate to grow padi in the dry season; these areas can only produce a single crop per year. The area under this category approximated 334,000 acres as at the end of 1970.

Thus, the remaining 323,000 acres of padi lands had no proper irrigation facilities. They were rain-fed and where conditions permitted, also served by a not-so-reliable supply from traditional farmer constructed water-retention and diversion systems.

Irrigation Under the Second Malaysia Plan

As a matter of Government policy it has been decided that there will be no further investments on irrigation development for *new* padi lands in future. The priorities in the provision of irrigation facilities for the Second Malaysia Plan are as follows:

- (i) Continuation of programmes initiated during the First Malaysia Plan into the Second Malaysia Plan;
- (ii) Provision of irrigation facilities to non-irrigated padi areas where the farmer depends on padi for his living;
- (iii) Improvement and consolidation of irrigation facilities in irrigated areas where such facilities are inadequate, including the provision of double-cropping facilities where feasible.

TABLE 9.1
PADI AREAS IRRIGATED AND NON-IRRIGATED, 1969

IRRIGATED (1) PADI LAND

States	Padi Area Planted	Total		Standard Irrigation Schemes (2)	Controlled Drainage Schemes (3)	Sub-standard or Scheme Under Construction (4)	Area where Irrigation facilities provided for double cropping
		'000 Acres	'000 Acres	%	'000 Acres	'000 Acres	'000 Acres
Johore	11	11	100	8	1	2	3
Kedah	291	163	56	—	4	159	4
Kelantan	171	44	26	44	—	—	7
Malacca	31	22	71	22	—	—	3
Negri Sembilan	32	23	72	23	—	—	5
Pahang	54	40	74	14	24	22	3
Penang and P. W.	40	40	100	40	—	—	32
Perak	121	117	97	116	1	—	67
Perlis	66	64	97	21	—	43	8
Selangor	53	53	100	53	—	—	46
Trengganu	73	27	37	20	7	*	8
WEST MALAYSIA ..	943	604	64	361	37	206	186

* Less than 1,000 acres.

(1) Irrigation Schemes are classified into two broad groups viz.

(2) "Standard Irrigation Schemes" are those schemes which have the necessary facilities to divert all available sources of water into padi fields via irrigation canals and remove any excess water through drains. In cases where there is an adequate supply of water throughout the year, double cropping may be practised and these areas are listed in the last column as double cropping areas. In other cases, water is available for the main crop only and as such only a single crop of padi is cultivated.

(3) "Controlled Drainage Schemes" In these schemes, there is no convenient source of irrigation water and cultivation is therefore dependent on the conservation of direct rainfall by means of drainage control gates which prevent the loss of water from the area. In these areas only a single crop of padi is cultivated.

(4) "A Sub-standard Schemes", there is no proper lay-out of the irrigation scheme. They are usually found in small padi growing areas where the Drainage and Irrigation Department assists farmers by building a few control structures to divert the water into their padi fields.

In effect, under the Second Malaysia Plan, there will be various categories of benefited irrigation areas and these are shown in Table 9.2:

TABLE 9.2
IRRIGATIONAL IMPROVEMENTS TO PADI LANDS
DURING SECOND MALAYSIA PLAN

Additional Irrigated Lands

1. New lands provided with irrigation facilities for a single crop of padi only	2,818	acres
2. New land provided with irrigation facilities for two crops of padi	17,472	"
3. Existing rain-fed padi areas provided with irrigation facilities for a single crop of padi only	12,645	"
4. Existing rain-fed padi lands provided with irrigation facilities for two crops of padi	131,736	"
Sub-total	164,671	acres

Improvement in Existing Irrigation Facilities

5. Existing single crop irrigated areas provided with irrigation facilities for two crops of padi ...	160,498	
6. Existing double cropping areas to be improved	45,611	
Total	206,109	"
Total	370,780	acres

A sum of about \$126 million has been allocated for irrigation works for the Second Malaysia Plan. By the end of the S.M.P. period an additional 165,000 acres will have been provided with irrigation facilities and this will increase the total irrigated area in West Malaysia from 620,000 acres as at the end of 1970 to around 785,000 acres at the end of 1975, when the total area under padi is expected to be around 1 million acres. By then, over 78% of the padi lands of West Malaysia will have been provided with irrigation facilities. Although the total irrigated area will have increased by 165,000 acres only by the end of the S.M.P. period, the total benefited area will be around 371,000 acres as much of the D. and I. Division's work during this Plan period will be to improve existing irrigation facilities in irrigated areas. In this connection, it is relevant to note that in many of the older irrigation schemes, efficient water control to the extent that water can be supplied or drained off at any time irrespective of weather conditions is generally not available.

As noted above, by the end of the Second Malaysia Plan period, there will still be around 215,000 acres of padi lands which will not be provided with irrigation facilities. Many of these areas will remain rain-fed, while others will be served by brushwood dams of rudimentary irrigation works. A little over 400,000 acres consisting of irrigated and non-irrigated padi lands will remain as a single cropped padi area in 1975. A special effort is being made by the Ministry of Agriculture and Fisheries to assist the farmers of these areas to improve their incomes possibly by the cultivation of other crops like maize, sorghum, tobacco, etc., in addition to one single padi crop during the year.

On-Farm Development

If full benefits are to be derived from irrigation facilities provided by Government, considerable on-farm investments and supporting services are required. This fact has been fully recognised and in the more recently constructed irrigation projects, apart from investment on engineering works, funds are also allocated for the construction of farm roads, rice milling facilities, and the provision of agricultural extension programmes, farmer's training work, credit, tractor services, and perhaps the most important of all, the distribution of water to the individual fields. In this last connection it is significant to note that the Drainage and Irrigation Division is progressively increasing its scope of work to the point of organising the distribution of water to the fields of individual farmers. It is therefore apparent that in order that the time lag between the completion of irrigation works and the effective utilisation of irrigation water is reduced to a minimum, and that early economic return from heavy investment on irrigation works can be realised, engineering construction and agriculture development should proceed hand in hand. This is the concept of developing the area as a whole. There is a co-ordinating officer in the major irrigation projects and his duty is to ensure that engineering and agricultural aspects of the project proceed according to schedule, so that there is speedy utilisation of the irrigation facilities for optimum padi production through the use of high yielding seeds, fertilizers pesticides, and modern cultural practices in conjunction with proper water management.

Water Rates

The imposition of water rates is governed by the Irrigation Areas Ordinance, 1953, which provides for the imposition of rates on lands within gazetted irrigation areas. The Ordinance does not specify the rates that should be levied nor does it lay down maximum or minimum charges. However, it makes provision for the imposition of different rates on various classes of land within the gazetted areas and also allows for a reduction in the rates if there should be inadequate water supply.

There is no uniformity in the irrigation rates charged by the different States in West Malaysia. Some States such as Kelantan and Penang have increased their rates since 1963. In 1968 maximum rate charged in Kelantan was \$10 per acre, while Penang imposed a rate of \$9 per acre on Class A lands that were double-cropped. Generally, the rates charged are as follows:

Class A Padi Land ...	\$6 per acre. Class A is land capable of yielding 400 gantangs or more of padi per acre.
Class B Padi Land ...	\$4 per acre. Class B is land capable of yielding crops between 250 to 400 gantangs of padi per acre.
Class C Padi Land ...	\$2 per acre. Class C is land yielding less than 250 gantangs of padi per acre.

The above rates apply to padi lands where irrigation water is provided for only a single crop of padi; where water is provided for two crops, higher rates are being imposed in a few States.

Water Rates, Capital and Maintenance Costs

The capital expenditure and maintenance costs vary a great deal not only from State to State but also from project to project. Taking all the projects hitherto completed, the overall capital cost for irrigation schemes averages \$210 per acre and annual maintenance cost amounts to \$10.90 per acre. Thus, if interest on capital (at 6 per cent) and maintenance costs are to be met, the average water rates should be around \$23 per acre but the actual amount farmers are charged hardly amounts to \$10 per acre. However, present day capital costs are much higher. The capital costs per acre of irrigated padi land for the projects of Muda and Kemubu amount to \$874 and \$1,530 respectively. The maintenance costs for the two schemes are estimated to be \$17 and \$21 respectively. Thus, if water rates should cover only the maintenance costs, then farmers will have to pay around \$20 per acre per annum. There are difficulties in increasing water rates or even in imposing them in areas where no rates existed before.

Double Cropping and Irrigation

It has been mentioned earlier that the growing of two padi crops per year is only possible when there are adequate irrigation facilities. But, the provision of adequate irrigation water during the dry season is not always possible because of adverse physical conditions. Many of the West Malaysian rivers are short with relatively small catchment areas and therefore, the flow of water in these rivers follow the rainfall pattern. During the dry months, the flows are generally low. With only few exceptions, irrigation schemes are run-off-the-river schemes with no storage facilities. To have a perennial irrigation system, it will therefore be necessary to construct expensive storage dams, or resort to pumping water from the lower reaches of major rivers. Fortunately, the several storage and pumping schemes that have been completed or are nearing completion in West Malaysia will have provided the water for the bulk of the 600,000 acres of padi lands that will be doubled cropped during the S.M.P. period.

Apart from the provision of an adequate supply of water, there are other problems which have to be resolved before double cropping becomes an established practice among padi farmers. Among these are:

- (a) The problem of maintaining a uniform planting and harvesting schedule. With double cropping, the interval between the harvesting of the first crop and transplanting for the next crop will be around 6 weeks. A large number of farm operations such as harvesting, threshing, drying, nursery and field preparation and transplanting have to be completed within this time interval. Tractor ploughing has to be introduced. Farmers who have been accustomed to growing a single crop per year are generally unable to readjust themselves to carry out these farm operations simultaneously. As a result an efficient system of water distribution cannot be easily implemented. A great deal of extension work is necessary and farmers must organise themselves;
- (b) harvesting of the off-season crop will coincide with the rainy season and therefore the drying of padi becomes a problem. If the padi is not dried immediately after harvest, it starts germinating and loses weight. The farmer will get a poor price for his padi and this will inevitably result in dissatisfaction. To overcome this problem, Government has established a number of drying complexes in the Muda Irrigation Area. Furthermore, transporting the padi during the wet season is a difficult task. In the Muda and Kemubu Irrigation Schemes expensive all weather farm-roads are being constructed to facilitate the transport of farm produce. In the Muda area the National Padi and Rice Authority has a trading scheme under which it buys wet padi from the farmers and dries the padi. The dried padi is then sold to the private sector or milled by the Authority's own mills and then sent to the Government rice stockpile or disposed in the open market. N.P.R.A. aims at providing 50 percent of the drying facilities leaving the balance to the private sector. On this basis Government is building 16 drying complexes, each with a capacity of 10,000 tons per season. By the end of March 1972, seven of these complexes are already in operation while four more are under construction and will be operational later in the year.

CHAPTER 10

RICE RESEARCH*

Introduction

West Malaysia is basically an agricultural country and the agricultural pattern is typified by export oriented monoculture in both estates and small-holdings on the one hand, and the predominance of peasant agriculture engaged almost entirely on food production on the other. While the country earns foreign exchange through agricultural exports, the level of food production is relatively low and large amounts have to be imported. In the light of fluctuating and declining prices of major export commodities like rubber and oil palm, it is evident that the programme of agricultural diversification needs to be intensified. Statistics available indicate that in 1969 no less than 23% of the total imports were in the form of food and feed items at an approximate cost of \$640 million. Of these imports, the largest single item is rice which accounts for nearly \$100 million.

Apart from the savings in imports, rice cultivation is important as it provides employment for about one-fifth of the working population. Improving the living standards of the rice growing sector has been a very important objective of the Government. It is therefore logical that the improvement of the rice crop has been given the highest priority in the research efforts within the agricultural programme.

Since Independence a strong programme of rice research is in operation. In this programme, the following areas of rice research are being undertaken.

The Improvement of Varieties

The availability of genetically improved varieties to the farmers constitutes one of the surest way to increase rice yields. Breeding and selection of improved varieties established after the Second World War has helped to raise the yields per unit area appreciably in Malaysia. As a result of the ravages of the Second World War, most of the improved varieties developed before this time were lost and the work of rice improvement had to be restarted from scratch after the War. The first pure strain resulting from padi selection became available to the farmers by 1950. Subsequent releases were made from time to time as new pure strains became available. However, it was only after Independence in 1957 that as a result of concentrated efforts in rice research that a bigger number of new varieties were made available. By 1962 there was at least one recommended variety for each region in West Malaysia. The impact of such improved varieties is reflected in the increased average yields obtained after Independence. The yields were raised from 358 gantangs per acre in 1957 to 453 gantangs per acre in 1967.

A major milestone in rice research was the release of the first rice hybrids in Malaysia in 1964. The first hybrid released was Malinja and this was followed in 1965 by Mahsuri. The release of these two varieties was a major step towards increased rice production. These two varieties which are of short maturation and also possess good grain quality, have contributed to a large measure to the successful expansion of double-cropping. Hitherto the acreage under double-cropping had been comparatively small because a suitable variety with good grain quality had not been identified. In the past the variety Pebifun was used but because of its poor rice quality, farmers did not readily plant it and there was little progress in the double-cropping acreage. However, with the release of Malinja and Mahsuri, and the provision of adequate irrigation facilities, the area under double-cropping increased tremendously. In 1957, double-cropping was undertaken in 7,300 acres with a yield of 369 gantangs per acre. In 1966 the acreage planted was 104,000 acres and the yield had increased to 456 gantangs per acre. By 1971 the area double-cropped has risen to 394,000 acres.

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Another step in rice research in this country during the past ten years was the maintenance of close cooperation with the International Rice Research Institute. As a result of such close cooperation, the rice variety IR8 bred at IRRI was found to be adaptable to this country and was released as Ria in 1966. Although this variety has relatively poor rice quality, nevertheless, it has great significance in that it demonstrates that high yields are possible with the use of the correct plant type.

All these three varieties, Mahsuri, Malinja and Ria have their own defects and because of these drawbacks, rice breeders have intensified their efforts in the production of a better variety for double-cropping. Such efforts bore fruit on 5th September, 1968 when the variety Bahagia was released. This new variety was selected out of the cross Peta × Tangkai Rotan, the original cross of which was made in the International Rice Research Institute. The release of padi Bahagia eliminates some of the problems encountered in the cultivation of the three previous varieties for double-cropping. It is of excellent grain quality and is relatively resistant to blast and penyakit merah disease. It can be planted in deeper waters since it is taller than Ria. The planting distance is normally that practised by the farmers. It gives a good yield of about 5,000 lbs (900 gantangs) per acre at moderate fertiliser application of about 60 to 90 lbs. of nitrogen per acre together with the appropriate application of phosphate and potash. In other words, changes in the present farming techniques need not be as drastic as that required by Ria; Bahagia is very acceptable by farmers since less inputs are required.

The release of Bahagia was made at an opportune time when the Muda Irrigation Project was nearing completion; by 1970 when the first phase of the Project was ready for double cropping, this variety was available to the farmers for large scale cultivation. During the 1970 off-season planting of some 90,000 acres in the Muda Project, Bahagia was the main variety planted.

Padi Nutrition

Hand in hand with rice breeding and selection programme, other areas of rice research need to be carried out if the new varieties are to give their high yields. No one area of research can be neglected. Therefore the rice improvement programme takes also into consideration the aspect of the nutrition of the crop. Agronomic investigations carried out during the last ten years on the rice crop has resulted in various findings which can find its application in the successful growing of a rice crop. It is now possible to recommend to the rice farmers fertiliser applications in respect not only to the variety used but also to the type of soil conditions under which a rice crop is grown. As a result of such research in the rice crop, recommendations are available to the farmers as to the quantity and the type of fertiliser to be used in order to achieve high yields.

Rice Protection Research

Agricultural crops are normally afflicted with a host of pests and diseases. Unless such pests and diseases are controlled successfully, the yield of the crop is considerably reduced. Rice cultivation is no exception. In this respect rice research carried out in this country during the last ten years has enabled the major pests such as stemborers and leafhoppers to be controlled successfully. New varieties recommended to the farmers now have resistance to the major pests and diseases. However new strains of such diseases are always encountered from time to time and it is necessary that efforts in research should not be relaxed so that disease resistant varieties are always available to farmers.

Cultural Practices

The introduction of resistant varieties require new technology. In order that a successful crop be grown, the various requirements as to planting distances, depth of planting, weed control and so forth needs to be studied. Present day cultivation of the rice crop is a highly skilled operation; farmers have benefitted by the introduction of such new technology.

The complex of technological changes such as the use of correct fertilisers, the use of good seed and the correct methods of planting the rice crop would not be of much use to the farmers unless they are made available as a package. It is therefore necessary that the farmer should be made aware of the latest findings from research in order that he may be able to reap the necessary benefits from the research that has been carried out. This is being undertaken by the extension services.

Rice Research in the Future

As problems are being solved through research, new problems are also created. With the completion of the Muda and the Kemubu irrigation projects, it is not too far in the distant future that Malaysia will have all the rice that she desires. It is also envisaged that with continued rice research, better yields will be obtained. Malaysia should not strive for self-sufficiency just for the sake of being self-sufficient, but should strive towards an objective whereby the farmers are assured of an equitable standard of living. The research in the future should be such that it will have to take into consideration the creation of an agricultural pattern in the rice areas whereby other crops can be grown in rotation with rice so that the farmers' income can be increased. Towards this end, the rice research now carried out also embodies a programme of rotational cropping in the rice areas.

In order that such a pattern of cultivation can be evolved, it is necessary to carry out intensive research into the problems of soil-water-crop interactions. This branch of research, commonly known as irrigation agronomy, would have to take into account the water requirements for different irrigation methods under different cropping systems and different soil types, fertiliser practices and climatic conditions.

Another problem which is envisaged in the intensification of rice cultivation in the Muda and Kemubu irrigation schemes, is the shortage of labour for the various operations. In order that double-cropping in such areas can be effectively undertaken, there is need for mechanisation in rice cultivation. Intensification of agricultural engineering is therefore imperative particularly in respect to planting, harvesting, and drying. The pattern of the future may well see a shift from the traditional method of labour intensive transplanting towards direct seeding, chemical weed control and harvesting by machines. Work along these lines will be intensified.

In the final analysis, the future work of rice improvement in this country would have to cover a bigger area than hitherto. It will have to take into account not only the production of better varieties which are responsive to fertilisers, pest and disease resistant, better grain quality, amenable to mechanical harvesting, but also a whole range of problems which are connected with the efficient production of the crop, not as a traditional but as a profit motivated enterprise.

CREDIT TO PADI FARMERS

Indebtedness Among Padi Farmers

In the various sample investigations that were undertaken by the Ministry of Agriculture in the padi areas as well as in other smallholders sectors of West Malaysia it was shown that non-institutional credit from private sector agencies is of considerable importance. According to these investigations many padi farmers do not have enough money to operate their farms in an efficient manner. About 85% of the padi farmers in Selangor and Malacca reported being in debt and most of the loans taken were for consumption purposes to finance their living expenses. Institutional credit provided mainly by Rural Co-operative Societies and Farmers' Associations contribute only a negligible part of the credit requirements. Lack of capital is perhaps the most serious limiting factor in the development of smallholder agriculture in West Malaysia.

There is little doubt that agricultural credit when properly organised can make an important contribution in raising the income of the rural people. The provision of credit must be undertaken with other measures and Dr H. Belshaw in his book, *Agricultural Credit in Economically Undeveloped Countries* (FAO Agricultural Studies No. 46) has stated this clearly, "Agricultural Credit should not be considered in isolation but as part of an integrated process of economic development and social betterment applied in such a way that rural populations share in the results. Efficient systems of agricultural credit are necessary if agriculture is to make its contribution to national improvement. But credit will run to waste, or its contribution will be limited unless it is supported within the rural sector by other measures, as well as by the growth of the other sectors of the economy".

The most important of the private sector agencies giving credit are the provision shops providing mainly items of food, and they account for a large part of the loans that are made to the rural population. Many of these provision shops are multi-purpose in function, for they combine the supply of credit with the purchase of rural produce, such as padi, copra, rubber, pineapples, etc. A typical village shopkeeper will serve about 50 farm households and the great advantage he has is that he is on the spot at harvest time to make his collection and he is fully aware of the credit worthiness of all his customers. These provision shops when providing credit do not specifically charge a rate of interest on their loans but it is well known that farmers who sell their produce to them receive a lower price and that the real rates of interest are in fact very high and may amount to 60 per cent per annum. In the padi areas in the north-west of Malaya a system of credit known as "padi-kuncha" used to be widespread. Under this system, seasonal loans are taken by farmers for a short duration, generally from the beginning of the planting season up to harvest time. The loan is repaid at harvest in padi in units of the "kuncha" a measure used in the North-West Coast and is the equivalent of 160 gantangs. The loans under the padi kuncha system are usually given in the form of consumption goods by shopkeepers who also act as buyers of padi. The charging of high rates of interest by the shopkeepers and purchasers of rural produce may be justified when one takes into account the risk of default in repayment and also the cost of making numerous small loans over a period of time.

However, in areas where double cropping of padi has become an established practice, such as in Province Wellesley, where farm incomes are higher, shopkeepers and padi buyers are more willing to finance farmers, and the hidden charges are lower and may be no more than 30 per cent per annum. This is indicative of the fact that as padi farming becomes commercialised, there is an improvement of the terms under which private credit is made available.

Co-operative Credit

The co-operative thrift and credit movement has two sections, the rural section and the urban section. The co-operative movement was introduced into West Malaysia in 1922 and therefore has been in operation for half a century. It had been Government

policy to encourage and support the establishment of rural co-operative societies. The rural co-operative credit societies (RCCS) with unlimited liability was originally intended to serve as the agricultural credit system of the country and was given all possible encouragement by Government.

The co-operative structure for the provision of agricultural credit consists of three tiers; at the base are the rural credit societies and multi-purpose co-operatives; banking unions organised on a regional or state basis constitute the middle tier and Bank Kerjasama (or Co-operative Bank) forms the Apex. The object of the Banking Union is to facilitate the operation of the affiliated societies in banking and credit business. More recently, with the re-organization of the co-operative movement, three out of the 21 banking unions have been turned into branches of Bank Kerjasama and several of the rural co-operatives are now direct members of Bank Kerjasama.

The Government through the Department of Co-operative Development has taken the initiative in the establishment of the network of rural co-operatives particularly in the padi growing areas. Most of these RCCS were formed during the period 1950 to 1955 as a result of Government's policy to finance agricultural credit through co-operative societies. The nature of unlimited liability of the RCCS requires that the area of operation and membership be small. The under-lying reason for this is that there will be thorough knowledge among the members to ensure trust and confidence in dealing with credit and that honorary service will be available to run these societies. These societies undertake a single activity, that is, credit, though the by-laws provide that, with the permission of the Registrar, the society may arrange for the sale of members' produce and for the supply of members' requirements for agricultural implements and consumer goods. The limit of membership was increased from 50 to 100 but being small many of these societies have not been able to satisfy the criteria for viability. At the end of 1970 there were about 1,050 rural thrift and credit societies in West Malaysia with a membership of 48,000 and share capital and deposits amounted to nearly \$6 million. At the same time rural co-operative societies had loans outstanding to the extent of \$6 million indicating that the recovery of loans is not very satisfactory.

TABLE 11.1

RURAL THRIFT AND CREDIT SOCIETIES:
LOANS TO MEMBERS (\$ Million)

Year	Amount of Loans Granted during Year	Amount of outstanding loans to members at end of year
1964	1.9	7.6
1965	2.1	7.2
1966	2.3	8.0
1967	2.4	8.3
1968	2.8	7.2
1969	2.1	6.2

The present policy of the Co-operative Department is one of consolidation rather than expansion. In the last few years there has been a vigorous attempt to re-organise the rural co-operative movement. The co-operative societies which are not doing well are being liquidated and the existing number of societies (963) is much smaller than what they were five years ago (in 1966 there were 1,640 rural co-operative credit societies). The present policy of the Co-operative Division is to have multi-purpose societies which cover a larger area and have a bigger membership so that they can employ full-time paid staff. But, at present, most societies cannot afford to employ such fulltime staff. In 1972, there are 480 multi-purpose co-operative societies which undertake the three functions of credit, marketing and the supply of consumer goods. The three functions are integrated: members are required to market their produce through the society, credit given and consumer goods supplied will be deducted from the proceeds of the marketed produce.

The Co-operative Bank (or Bank Kerjasama Malaysia Berhad)

Bank Kerjasama was registered as "The Rural Co-operative Apex Bank of Malaya, Ltd." in September 1954 with a membership of 11 Banking Unions. There were many setbacks until recently when the Bank was re-organised (in 1969) and direct membership to the Bank was encouraged and since then has been expanding its activities. The Bank acts as a channelling agent for funds made available by Government for disbursement as loans to farmers through the Banking Unions and co-operative societies. The Bank has also its own funds out of which it grants loans direct to members. Its own funds consisting of share capital, deposits, reserves etc., total about \$13 million and this compares favourably with the amount of Government loans which the Bank now uses. The Government loan amounts to about \$10 million and has been granted for the following purpose:

TABLE 11.2
GOVERNMENT FUNDS FOR BANK KERJASAMA

Purpose	\$ (million)
Padi Kuncha Subvention (seasonal loan to padi farmers).	2.9
Padi marketing	5.5
Fertilizer supply (for padi)	0.7
Replacement of small rice mills	0.6
Rubber marketing	0.1
	<hr/> 9.8

The Bank has opened eight branches in various parts of Malaysia and there are plans for another four more branches to be started within the next two years.

Farmers' Associations have only recently been formed. Farmers' Associations are smallholders' organizations which aim to improve the productivity and incomes of their members through group action. These Associations provide in an integrated manner credit and other farm inputs and also undertake marketing. A Farmers' Association consists of several small agricultural units. Each Association covers an area of 5,000-10,000 acres of crop land and will have about 300 to 400 members initially and this will increase to about 2,000 when it becomes fully operational. The Association has a General Manager and five sections namely Administrative, Economics, Credit, Extension and Accounting. To start with, the personnel to run the Farmers' Association is provided by Government and the field staff of the Department of Agriculture act as the general manager and also the head of the five sections.

Farmers' Associations provide supervised credit with their own funds and also from loans provided by Bank Pertanian. A supervised farm credit system enables farmers to obtain the necessary resources and technical knowledge to develop a sound farming system.

It is proposed to have 220 Farmers' Associations in West Malaysia by the end of the Second Malaysia Plan.

Over Lapping Functions of Farmers' Association and Rural Co-operatives

It is clear that there is considerable overlap of functions between the Rural Co-operative Credit Societies and the Farmers' Associations and this is serious because of the shortage of Government personnel as well as leadership in the rural areas. It is also known that in certain areas a large number of farmers have dual membership and this leads to the possibility of farmers getting loans for the same purpose from both organizations. When both these institutions were under the Ministry of Agriculture and

Co-operatives the ministerial directive in March 1968 aimed at avoiding duplication of functions, announced broad guidelines delineating the areas of responsibilities of these two organizations, namely that Farmers' Associations will be responsible for:

- (a) agricultural production credit;
- (b) supply of inputs and services;
- (c) primary marketing;

other functions, such as the supply of consumer goods and processing, will be undertaken by the Co-operatives.

In 1970 this directive was slightly modified: where Farmers' Associations have not as yet been formed, the rural co-operatives should also be allowed to undertake these three functions of production credit, supply of inputs and primary marketing. The proposals were that:

- (i) in areas where Farmers' Association have been established, the Rural Co-operative Societies will be permitted to undertake the three functions mentioned earlier but the co-operatives will rely entirely on their own resources and will not obtain Government financial support for these activities;
- (ii) in areas where Farmers' Associations do not exist, the co-operative societies will be permitted to undertake the three functions and may avail themselves of credit facilities provided by Government in one form or another.
- (iii) in the distribution of fertilizers and other farm inputs at subsidized prices, members of the co-operative societies should be given equal treatment as members of Farmers' Association.
- (iv) As for padi marketing, the main objective is to ensure that farmers are provided with an efficient marketing mechanism at the farm level and therefore the ministerial policy which stipulated that the rural co-operatives should not undertake primary marketing has not been strictly enforced; co-operatives have been given licences to purchase and sell padi so as to ensure improved marketing conditions at the farm level.

Double-Cropping and the need for Credit

It is now clear that with the introduction of double-cropping and the use of high yielding varieties, the incomes of padi farmers can be more than doubled provided they use the necessary production inputs as recommended by the Division of Agriculture. Credit must be made available to these farmers to acquire the inputs. Padi farmers have low incomes and little or no savings and they have to rely on credit to finance their living expenses and also the operational expenditure of the farms.

The World Bank which financed part of the costs of the Muda and Kemubu Projects stressed in the loan agreement the need for the provision of production credit for the farmers in the Muda area. The Bank further provided technical expertise (consultants) to draw up a production credit scheme. Consequently, Bank Pertanian, or the Agricultural Bank, was established to provide loans for the development of agriculture and is operating the credit scheme.

Bank Pertanian was established in 1969 and its main functions are:

- (i) to co-ordinate and supervise credit for all agricultural purposes;
- (ii) to provide both short-term and long-term loans for all aspects of agriculture and animal husbandry;
- (iii) to mobilise savings in the agricultural sector.

On its establishment Bank Pertanian received from the Government a sum of \$10 million as paid up capital contribution while its total authorised capital is \$50 million to be wholly subscribed by Government. The organization of the Bank consists of three Divisions namely Programme Development, Credit Operation, Administration and Finance. The Bank has given top priority to the provision of credit to padi farmers particularly for the Muda and Kemubu irrigation areas so that double-cropping will be successful and the large investments in the provision of irrigation facilities fully justified.

The credit scheme in operation currently in the padi areas is that recommended by the Consultants sent by the World Bank. This scheme is based on the provision of credit by Bank Pertanian; the issue and collection of credit is through various local credit centres such as Farmers' Associations, rural co-operatives, padi dealers, rice mills etc. Apart from financing the local credit centres, Bank Pertanian provides these centres with the necessary leadership and technical guidance in the formulation and implementation of the credit projects. The advantage of Bank Pertanian dealing with local credit centres (and not having direct dealings with farmers) is that these local centres are close to the farms and are in a better position to know which farmers are credit-worthy. Their proximity to farms enables them to be more effective in the disbursement of credit (in coupon form) and the supervision and collection of loans.

Credit in the forms of coupons are issued to the farmers with specific dates of validity corresponding to the recommended phasing of farm operations. Other features of the credit scheme that is being operated by Bank Pertanian are :

- (i) the rate of interest paid by farmers is 8% for secured loans and 12% for unsecured loans; of this interest, 4% goes to Bank Pertanian while the balance is retained by the local credit centre;
- (ii) Farmers' Associations, Co-operatives and private dealers who are engaged in the stocking of fertilizer and the purchase of padi, are appointed local credit centres;
- (iii) loans are due for repayment at the end of the crop season but specific dates for repayment are not indicated.

Pilot Credit Project in Muda

A pilot credit scheme involving 1,900 acres and 431 farmers was launched in early 1970. Two Farmers' Associations and 5 Co-operatives were appointed as local credit centres. These credit centres are responsible for processing applications for credit and also for the repayment of loans to the Bank. Credit is given for inputs of tractor service, fertilizers and insecticides. The credit authorised is in the form of "coupons". Tractor services and inputs such as fertilizers and pesticides are then obtained by surrendering the coupons to contractors or stockists of farm inputs.

The credit granted for the Pilot Project was \$88,000 but only \$58,000, or 66% were actually made use of by loanees and this is shown below :

	Percentage Use
Tractor service	49
Nursery Fertilizer	59
Nursery Insecticide	55
Basal Mixture	81
Insecticides	49
Urea	89
Total ...	66

The reasons for the non-utilization of the coupons by the farmers include :

- (a) the delay in the supply of inputs by suppliers to stockists;
- (b) undercutting: fertilizers and tractors services were available at lower prices and also on credit from sources other than those authorised under the scheme;
- (c) lack of understanding on the part of the farmers on the use of coupons; and
- (d) the failure on the part of the farmers to appreciate and adopt sound cultural practices.

The repayment of the loans was satisfactory, and only 26 out of the 431 loanees in the pilot project did not repay in full (among them two farmers did not make any payments at all). This pilot scheme may be said to be a success and the experiences of the pilot project encouraged the Bank to expand its activities to other important padi growing areas including Kemubu, Besut and Tanjong Karang.

TABLE 11.3

BANK PERTANIAN CREDIT FOR PADI CULTIVATION, DECEMBER 1971

Area	No. of Local Credit Centres	No. of Borrowers	Area Covered: Acres	Credit Authorised: S'000
Muda	145	9,116	47,448	3,011
Kemubu	29	3,155	8,040	549
Besut	5	599	2,541	195
Tanjong Karang	26	1,771	7,947	646
TOTAL	205	14,641	65,976	4,401

Thus, it is seen that a good start has been made to provide organised credit to padi farmers. Bank Pertanian has to be cautious and is more concerned with the viability of credit schemes rather than to an expansion of coverage; it is the Bank's policy that only viable farms should be financed. Loans given to padi farmers have risen rapidly from \$725,000 in 1970 to \$4.4 million in 1971 and for 1972 the figure is expected to be \$6 million. In 1971 the scheme covered farmers of the Muda area only but last year the coverage was extended to Kemubu, Tanjong Karang and Besut areas. The extension of the scheme raised the number of borrowers from 2,700 in 1970 to 14,600 in 1971. For 1972, the number of borrowers is estimated to be 18,000 padi farmers.

RICE MILLING

General Review of Rice Milling Industry

In recent years there has been considerable activity in the rice milling industry of West Malaysia. Manual processing using the pestle and mortar can hardly be seen any more. Improved milling units have sprung up at a rapid rate replacing the outmoded huller plants. Government itself, through the National Padi and Rice Authority, have an active role in modernising the industry so as to provide the necessary milling facilities for the rapidly increasing output of padi. Under the Second Malaysia Plan, \$30 million has been set aside for building artificial dryers and integrated milling complexes (dryer and mill together).

There has been a spontaneous increase in the number of rice milling units in the country and some of the reasons for this are:

- (a) increased activities by co-operative societies in rice milling;
- (b) economic advantages enjoyed by small service mills. Many small mills both licenced and unlicenced are being set up close to the padi growing areas. These mills can be operated by the rural people as no advanced technology is necessary;
- (c) establishment of both small and medium mills particularly in the new double-cropping areas of Kedah, Kelantan and Trengganu in anticipation of the additional padi that will be produced when the new irrigation projects enable two crops to be cultivated;
- (d) gradual replacement of planters' type mills with technically improved milling units. Owing to the better quality rice that can be produced, padi farm families have shown preference to Japanese and Thai type units in milling their home consumption padi. To facilitate the replacement of outdated mills, loans are provided to co-operative societies to change-over to the better type of mills.

Need for Improvement in Milling

The rice milling industry of West Malaysia is processing about 1.5 million tons of padi per annum valued at \$370 million, and thus becomes the most important food industry in the country. While great efforts have been made to increase rice production, these have not been accompanied by parallel attempts improve rice processing. Such a situation has arisen because of lack of technical personnel to investigate the adequacy of existing milling facilities and make appropriate recommendations. However, with the establishment of the Food Technology Research and Development Centre, the necessary expertise has been made available. A Survey of the Rice Processing Industry was undertaken in 1968 by the staff of the Centre under Mr U Thet Zin, Rice Processing Expert. The Survey Reports, two in number, point out the defects of the existing rice milling systems and also indicate how improvements can be introduced to achieve

- higher milling recovery of rice;
- better quality of milled products;
- lower processing costs.

With increasing padi production to a level of near self-sufficiency and the greater commercialization of padi cultivation in the country, the rice milling industry has to adapt itself to the rapidly changing conditions. The Government through the Padi and Rice Marketing Board (now the National Padi and Rice Authority) is establishing a number of large mills in the "rice bowl" areas of the country so that quality rice can be efficiently produced; new mills have been established at Sungei Besar in Selangor, and in the Kemubu area in Kelantan; the Co-operatives have also established a large rice mill within the Kemubu area. As stated earlier, the Government has provided \$30 million for the Second Malaysia Plan for the construction of integrated padi milling and drying complexes.

Types of Milling Systems

U Thet Zin's Report point out that there is a wide range of rice processing equipment used in the country. With about 2,000 small mills and 100 large mills, the rice milling units can be grouped into 4 milling systems, namely:

- classical
- Thai
- Japanese
- Planters' Type.

The *Classical Type* of milling plants are normally equipped with individual machines for cleaning, hulling, separating, whitening and grading. The intake capacity of the most popular size commercial mill is 3 to 4 tons padi per hour. But the Government mills are larger, for example the Government Rice Mill at Anak Bukit and the Co-operative Milling Union Rice Mill in Kuala Selangor have capacities for 8 and 10 tons padi respectively.

The *Thai Type mills* or "Kilang Siam" perform approximately the function as the Classical Type mills mentioned in the previous paragraph, the only difference is that it is small and compact. The milling capacity ranges from less than half to one ton padi intake per hour. These mills are to be found in Kelantan, Perlis and Northern Kedah and are capable of producing marketable quality rice.

The *Japanese Type mills* are mainly of "Kyowa" manufacture. The capacity of the most popular size is about half a ton padi per hour. These mills operate for home consumption as well as undertake commercial milling. This Japanese type mill is gradually replacing the old Planters' mills.

The *Planters' Type mill* consists of a huller which effects husking and rough whitening in one run. These mills are used for milling of home consumption padi only. The milling capacity ranges from 1 to 8 piculs per hour and most of these mills are to be found in the less important rice producing States of Pahang, Trengganu, Negri Sembilan, Malacca and Johore.

Milling Licences

Milling Licences are issued by State Governments and the licensing authorities in most States have favoured the co-operatives in the granting of licences. In Kelantan, until recently, apart from a single privately owned mill, all the licenced rice mills were owned and operated by co-operative societies but 90% of the milling units consist of unlicenced mills many of which are capable of producing quality rice for the market. In spite of this, mushrooming of rice mills, through the licensing system the Government has partially succeeded in checking a too rapid growth of rice milling plants. Before operating a mill, the owner is also required to obtain a certificate of fitness from the Machinery Department and a certificate of health from the Health Department. These certificates are required mainly to ensure the safety of the workers in handling the machines and also to safeguard the health of the people residing in the neighbouring areas of the mill. U Thet Zin points out the shortcomings of the licensing system and also makes several recommendations:

- (i) a number of rice milling plants which are currently operating without milling licences particularly in Kelantan were issued with fitness certificates by the Machinery Department. It is recommended that in order to keep a check on illegal mills, fitness certificates should only be issued to licenced mills. In the meantime, fitness certificates issued previously to unlicenced mills should not be revalidated.
- (ii) he has also recommended that the licensing system should not only be used to limit the number of mills but should also be used to impose regulatory controls on the type of plant and its capacity in respect of the milling quality and recovery of rice. The renewal of licences should be conditional on the mills being able to provide an efficient milling service;

- (iii) the State Governments should also supervise and control the service mills which are used by farmers for milling their domestic requirements of rice. The usual practice is for these mills to take over all the rice bran as part of the milling charge; but such a practice leads to overmilling. As about one-third of the total padi production of West Malaysia is retained by farmers for their consumption and are milled in these service mills, it is necessary to have some regulations on home milling charges.

U Thet Zin recommends that the licensing system which is the prerogative of the State Governments be more fully utilised to bring about major improvements within the rice milling industry. The licensing mechanism should be used to improve regulatory controls of the type of plants to be installed, the capacity of the mills, and the quality of rice that will be produced.

Other Recommendations of U Thet Zin Report

- (i) The use of dubious weighing machines by padi buyers and millers is an abiding problem. The State Governments have their respective weights and Measures Inspectorate staff which certify annually all weights and measures that are commercially used. U Thet Zin has recommended that the Weights and Measures Inspectorate make more frequent surprise checks on rice mills. He further recommends that Marketing Officers of the National Padi and Rice Authority as well as Co-operative Officers be also empowered to check the accuracy of the weights and measures used in these rice mills;
- (ii) the Government and Quasi-Government rice mills must set the example for other mills to follow and introduce some of the recommended measures such as the conveying system for moving padi within the mills, use of artificial rice driers, quality control, laboratory facilities for grading padi, and the par-boiling of rice;
- (iii) the Government mills at Anak Bukit and Arau have not been fully utilised for the past several years and this is not justifiable in view of their ideal location, good equipment and the fact that the milled rice can always be sold to the Government Stockpile.
- (iv) As the Government buys rice from the larger mills of the country, it is in a strong position to advise and direct those mills to have proper damp-proof floors in place of husk dunnage. Husk dunnage is a good breeding ground for insects;
- (v) Government should also advise the millers to introduce miniature milling machines for the determination of grades for the padi they purchase;
- (vi) the Food Technology Centre and the Entomology Division should conduct studies to find out the causes leading to the deterioration of long stored rice in Government Stockpile godowns;
- (vii) Government testing for important locally manufactured components of rice mills would be a useful guide to both the manufacturers and the millers. A competent testing agency in collaboration with the Food Technology Centre should undertake this work.

Milling Yield

Milling yield is the main indicator of the quality of padi milled and of the efficiency of the milling machinery. By milling yield is meant the amount of rice and rice products produced from the milling of a given quantity of padi. Many factors affect milling yields and therefore the conversion factor will depend on

- (a) the variety and condition of padi at the pre-milling stage;
- (b) milling degree;
- (c) composition of rice that will be ultimately obtained.

Japanese type plants belong to Category C. A common feature of the Japanese type plants as far as milling quality is concerned is the presence of bran on the polished grains. To overcome this disadvantage, some of these Japanese units use "polishing drums" to brush the bran meal or rice dust; where these are equipped, then such mills fall into Category B.

The Planter type of milling plant is in Category "D". In Kelantan, about 38% of the total milling capacity consists of Planter type mills while in Kedah, Perlis and Province Wellesley, about 20% of the total production of padi are milled in such hullers. In these mills, hulling and whitening of rice is undertaken in a single operation and the large proportion of broken grains that result are a serious loss to the padi farmers. Furthermore, owing to the inefficient separation system, a good amount of whole grain rice and small broken rice are carried away with the husks.

Milling Costs

In an *ad hoc* survey by two FAO experts (A.A.C. Huysmans and C.V. Unamboowe) of the rice milling industry of West Malaysia in 1966, the representatives of Kedah/Perlis, Penang/Province Wellesley and Krian Rice Mills Associations stated that their average milling costs per picul padi was \$0.88, \$1.05 and \$0.98 respectively. Another FAO study in 1963 estimates the milling costs to vary from \$1.11 to \$1.15 per picul of padi. U Thet Zin estimates that for a well run modern mill with a capacity of 3½ tons padi per hour, the milling cost per picul of padi should be around \$0.60. Thus it is clear that milling costs vary considerably; what is even more important is to recognise the fact that different persons include different items in computing the cost of milling.

Service Charges in Small Mills

Milling costs vary even to a greater degree in the small service mills. In Kedah, U Thet Zin reports that the lowest milling charge is 40 cents per picul and the highest is \$1.19. The actual milling cost in the mills is more than double the cost in the medium and large mills of the classical type. The average milling charge is estimated at \$1 per picul of padi milled, but all by-products of milling are usually retained by the millers. There are some mills that do not charge any milling fee and the revenue they receive is from the by-products surrendered by the padi owners. This system of payment in kind by surrendering the entire by-product to the miller seriously affects the quality and quantity of rice returned to the padi owner. The mill operator will overmill in order to obtain the maximum quantity of by-products. The overmilling of rice will damage the grains as well as reduce the nutritive value of the rice. In Kelantan, the prevalent practice is more acceptable, for practically all mills undertake milling on fixed milling outturn. In some mills in Kelantan the extraction rate fixed is as high as 70% of the padi milled.

CHAPTER 13

SUMMARY

Area under Padi

With one million acres under the crop, padi comes next in importance to rubber in the land-use pattern of the country. About 20 percent of the economically active population is in the padi growing sector. Padi cultivation is exclusively confined to small-holdings averaging three to five acres. In the last decade, there has hardly been any increase in the total physical area of land under the crop and the main reason for this is that water supply and suitable flat lands are limiting factors. There are no plans to open up any large new padi areas in West Malaysia but more of the existing padi lands will be cultivated with two crops. In 1970, about one-third of the padi lands were growing two crops per year but by the end of the Second Malaysia Plan period of 1975, about two-thirds of the area will be harvesting two crops annually. A main objective of West Malaysian rice policy is to increase the incomes of padi farmers through more intensive cultivation particularly by the growing of two padi crops per year.

The importance of padi cultivation varies in the different States; in Perlis, 75 percent of the cultivated land is under padi while in Kelantan and Kedah the corresponding percentages are 35 and 36 percent respectively. But in Johore, only 1 percent of the cultivated land is under the crop.

Number of Padi Farmers

It is estimated that there are about 540,000 smallholdings in West Malaysia and of this nearly 300,000 grow padi in their farms. Many farmers combine the cultivation of padi with other crops particularly rubber and fruits. "Specialised padi farms", in the sense that padi is the main crop utilising three-quarters or more of the farm area, are estimated to be 140,000, or about 47 percent of the total farms cultivating padi.

Padi farmers are predominantly Malays and it is estimated that 97 percent of them are Malays. About 40 percent of the padi farmers are illiterate, that is, they are not able to read or write. However, the educational status of their children is in a more favourable position; in Kelantan where 63 percent of the children is in a more favourable position; in Kelantan where 63 percent of the children of 6 to 11 years were attending school. Survey showed that 72 percent of the children of 6 to 11 years were attending school. The farmers have had long experience in padi farming, for in the double-cropping areas of Kelantan, 73 percent of them had been padi farmers throughout their life and the picture is similar in the other States.

Importance of Padi Farming

Only 58 percent of the padi farmers are dependent on padi farming for their living; for the remaining 42 percent, the main source of income is from work outside their padi enterprise. However, there is great variation between the States; in Perlis, 90 percent of the padi farm households get their living mainly from their padi enterprise and in Selangor the figure is 82 percent. In Johore and Malacca it is 10 and 19 percent respectively. It must also be pointed out that out of 540,000 smallholdings in West Malaysia, nearly 300,000 grow padi in their farms. About one-half of the padi farmers have no surplus padi for sale but with the provision of irrigation facilities for double-cropping, there is a decrease in the number of subsistence farmers and more farmers are now selling a part of their padi production.

Padi Farm Size

The average padi area for the whole country is approximately 3.1 acres. This average differs from State to State but all padi farms are small. About one-half of the padi farms of West Malaysia fall within the size range of 2 to 5 acres. Some of the more serious problems in padi cultivation such as the low levels of income and under-employment, arise from the fact that farms are small. Padi farmers sometimes cultivate other crops such as rubber, fruits and coconuts in addition to padi. Mixed farming is very common in padi growing areas.

Yields

The average yield from the main season crop is a little more than 400 gantangs, or one ton padi per acre; the yields of the second crop are higher by a further 300 pounds or 55 gantangs padi. Padi yields have shown a modest increase over the last twenty years; the average rate of increase of the main season yield is 1.6 percent or 6.2 gantangs per annum and this is to be compared with the off-season increase of 2.9 percent or 11.3 gantangs. Yields per acre differ from State to State; they are higher in Selangor, Kedah, Perlis and Province Wellesley and average 1.25 tons of padi per acre. In Trengganu and Pahang, yields are particularly poor and are no more than half a ton per year.

Production

The total rice production in 1971 was nearly one million tons (990,000 tons) and about one-third of this was obtained from the second padi crops. The rate of increase of rice production during the First Malaysia Plan period of 1966-70 was 8.2 percent and this exceeded the target figure of 7.6 percent. Increases in rice production have been brought about by larger areas being double-cropped as well as increasing yields per unit area.

Fragmentation

Although farms are small, nevertheless many farmers have fragmented holdings and cultivate two or more pieces of land. The 1960 Census of Agriculture indicated that 56 percent of them operate a single parcel, 25 percent worked on two parcels, 11 percent on three parcels, 4 percent on four parcels and the remaining 4 percent worked on 5 to 9 parcels.

Land Tenure

It is estimated that 60 percent of the padi lands are operated by the owners themselves while the remaining 40 percent is rented out to tenant farmers in one form or other, such as fixed rents in cash, fixed rent in padi, crop-sharing, or lease of the padi lands. About one-half of the farmers are owner-farmers; tenant-farmers constitute about 25 percent while farmers who own part of their padi lands and rent the balance form the remaining one-quarter of the total padi farmers.

Cultivation Practices

The various operations in padi cultivation must be completed in accordance with a time schedule and failure to do so will result in a reduction in yields. In padi growing Districts, this time schedule is spelt out by the Government in a gazette notification issued by the District Collector of Land Revenue. Unfortunately, for various reasons, farmers do not always abide by the gazetted dates. This is one of the problems that has to be overcome when there is a drastic change in their way of life when farmers have to follow a tight schedule to grow two crops instead of the traditional single crop.

The method of preparation of padi lands is under-going a rapid change particularly in the double-cropping areas where tractors are replacing the traditional methods. There are three methods for preparing the padi lands. They are (a) cultivation with a "tajak" which is the local scythe (b) use of animal power (buffalo or cattle) or (c) tractor cultivation. Many farmers combine two different methods, or even all three methods when preparing their land. In the double-cropping areas, it is estimated that about 70 percent of the farmers make use of hired tractor services to plough their lands. Competition among tractor contractors in some padi growing belts has lowered the cost of ploughing to around \$12 to \$15 per acre (for a single ploughing).

In the double-cropping areas nearly all farmers use fertilizers but the amount used is much less than the recommended quantity. Only a small percentage of farmers use pesticides or weedicides; the use of poison to control rats is about the most common use of pesticides by farmers.

Marketing

It is estimated that about 60 percent of the padi produced is marketed but the proportion retained within the village varies in different parts of the country. In the double-cropping areas nearly every farmer has a surplus for sale but in traditional single cropping villages only about 15 percent of the farmers sell padi. The usual practice is for farmers to sell their crop immediately after harvest because of the need for money and the lack of storage facilities.

The problems and difficulties in padi marketing are :

- (a) malpractices by traders during their purchases of padi such as excessive deductions from the guaranteed minimum price, manipulation of weighing scales, purchase of padi by volume rather than by weight;
- (b) padi offered for sale by farmers is excessively damp and well above the 18 percent moisture level stipulated for rejecting padi and in such cases trading is done at very low prices. Farmers do a minimum of winnowing and cleaning and are again the victims of further price deductions;
- (c) the lack of meaningful grades and standards for both padi and rice and the absence of price differentials for the various grades also means that farmers are not provided with incentives for growing superior quality grain.

Cost of Cultivation

There are many difficulties in determining the average cost of cultivation of padi: one of the main problems arises from the fact that there is considerable variation in costs from area to area depending very much on the cultivation practices adopted by farmers, the nature of the soil, rental system, use of family labour, etc.

Labour costs account for 60 to 80 percent of total production costs and is thus the principal cost in padi cultivation. Both family and hired labour are used and much of the labour consists of family labour, the farmer himself performing the greater part of the work. The labour inputs to cultivate an acre of padi land vary from 27 to 40 man-days; the inputs being very roughly divided between the three main practices of field preparation, transplanting and harvesting. The paid-out costs in both cash and kind (but excluding the value of family labour) is around \$90 per acre: but it may be as low as \$38 for owner-farmers in Kelantan or as high as \$176 for tenant-farmers in Province Wellesley. But if costs are defined to be comprehensive and include both paid-out costs as well as imputed amounts for family labour and also interest on capital invested, costs of cultivation will be around \$200 per acre.

If we consider only the paid-out costs, the net returns per acre planted averages around \$200 and this is what the farm family receive for their efforts in padi cultivation and interest on their capital invested. Thus a farmer operating 3 acres of padi land and cultivating two crops per year will have an annual net income of around \$1,200 from his padi enterprise.

Incomes

The average net household income is around \$110 per month and this is derived from both the farm and off-farm employment. The padi enterprise provides a little less than one-half the total net income in single crop areas, but in the double-cropping areas padi accounts for almost 70 percent of the total net income. The low incomes from padi is reflected by the fact that while 20 percent of the working population is engaged in padi planting, its contribution to the gross domestic product is around 5 percent.

One reason for the low incomes is the extent of under-employment that exists in the rural areas. Under-employment among men even in the double-cropping areas is around 33 percent for the whole year, although it varies considerably during the various months.

Irrigation

There is little doubt that irrigation is one of the most important factors that has contributed to increased rice production. The growing of a second crop can only be possible because of the availability of suitable irrigation facilities.

Out of a total padi area of 943,000 acres at the end of 1970, about 620,000 acres, or 66 percent of the total padi lands, were served by irrigation facilities provided by the Drainage and Irrigation Department. These irrigation areas can be divided into two categories :

- (i) areas where water supply is sufficient to grow two crops per year; at the end of 1970, a little less than one-half of the irrigated areas (286,000 acres) had irrigation facilities for both the main and second crop.
- (ii) areas where water supply is inadequate to grow padi in the dry season; these areas can only produce a single crop per year. The area under this category approximated 334,000 acres at the end of 1970.

As a matter of Government policy, it has been decided that there will be no further investments on irrigation for new padi lands. The priorities in the provision of irrigation facilities for the Second Malaysia Plan are as follows :

- (i) continuation of programmes initiated during the First Malaysia Plan;
- (ii) provision of facilities to non-irrigated padi areas where the farmer depends on padi for his living;
- (iii) improvement and consolidation in irrigated areas where such facilities are inadequate, including the provision of double-cropping facilities where feasible.

By the end of the Second Malaysia Plan period, an additional 165,000 acres will have been provided with irrigation facilities and this will increase the total irrigated area in West Malaysia from 620,000 acres at the end of 1970 to around 785,000 acres as at the end of 1975. The Drainage and Irrigation Division's programme for the Plan period will also include the improvement of existing facilities in irrigated areas for in many of the older schemes, efficient water control is generally not available.

At the end of the Second Malaysia Plan period there will be around 215,000 acres of padi lands which will not be provided with irrigation facilities. A little over 400,000 acres consisting of both irrigated and non-irrigated padi lands will still remain as single cropped padi areas in 1975.

Rice Imports

West Malaysia has always been a net importer of rice. These imports are regulated quantitatively by Government for several reasons: in order to ensure a ready market for the steadily expanding local rice production; to facilitate the implementation of the guaranteed minimum price, and for the maintenance of the Government rice stockpile. Net imports of rice have dwindled rapidly in the last decade from 357,000 tons in 1960 to 143,000 tons in 1971. About 60 percent of all imports consist of whole-milled rice while par-boiled rice accounts for 15 to 20 percent. West Malaysia obtains its rice from some 15 different countries but the greater part comes from Thailand, Burma and China which account for more than 90 percent of all imports. Imports from China are steadily increasing and in 1970, 36 percent of the total was from China; as for milled whole rice, 58 percent of the imports were from that country.

Rice Research

The availability to the farmer of genetically improved varieties is the surest way to increase rice yields. A major milestone in rice research was the release of the first rice hybrids in 1964. The first release was Malinja and this was followed in 1965 by Mahsuri. As a result of close co-operation with the International Rice Research Institute, the variety IR 8 bred at IRRI was found to be adaptable and was released as Ria in 1966. In 1968, a new variety was made available to farmers and this is padi Bahagia, which when compared to the earlier three varieties, has better grain quality, relatively resistant to blast and can be planted in deeper waters since the plant is taller. Agronomic investigations carried out during the last ten years makes it now possible to recommend to the rice farmers fertilizer applications in respect not only to the variety used but also to the type of soil conditions under which the rice crop is grown.

Credit

About three-quarters of the padi farmers are in debt and most of the loans taken are for consumption purposes. Institutional credit provided mainly by Rural Co-operative Credit Societies (RCCS) and Farmers' Associations contribute a negligible part of the credit requirements. The most important of the private sector agencies giving credit are the grocery shops providing mainly items of food, and they account for a large part of the loans that are made to the rural population. Many of these provision shops are multi-purpose in function, for they combine the supply of credit with the purchase of rural produce.

The RCCS with unlimited liability were originally intended to serve as the agricultural credit system of the country and given all possible encouragement by Government. Most of them were formed during the period 1950 to 1955 as a result of Government's policy to finance agricultural credit through co-operative societies. At the end of 1970, there were about 1,050 rural thrift and credit societies in West Malaysia with a membership of 48,000. The present policy of the Co-operative Division is to have multi-purpose societies (undertaking the three functions of credit, marketing, and supply of consumer goods) which cover a larger physical area and have a bigger membership so that they can employ full-time paid staff.

Farmers' Associations have only recently been formed. These Associations provide in an integrated manner credit and other farm inputs and also arrange for the marketing of padi. Farmers' Associations undertake supervised credit with their own funds and also from loans provided by Bank Pertanian. The target is to have a total of 220 Farmers' Associations in West Malaysia by the end of the Second Malaysia Plan and all the important padi growing areas will be covered by these Associations.

Bank Pertanian was established in 1969. Its main functions are to co-ordinate and supervise credit for all agricultural purposes and to provide both short-term and long-term loans for all aspects of agriculture and animal husbandry. Loans given by Bank Pertanian to padi farmers have risen rapidly from \$725,000 in 1970 to \$4.4 million in 1971 and for 1972 the figure is expected to be \$6 million to serve 18,000 padi farmers. Padi farmers in Muda, Kemubu, Tanjong Karang and Besut have been provided with credit from Bank Pertanian.

Rice Milling

The rice milling industry is processing about 1.5 million tons of padi per annum valued at \$370 million and thus becomes the most important food industry in the country. There are about 2,000 small and about 100 large rice mills in West Malaysia. U Thet Zin, a FAO expert attached to the Food Technology Divisions, undertook a national survey of the Rice Milling Industry in 1968 and reported that there were no mills capable of producing superior quality rice comparable to high grade imported rice. He recommended that the existing licensing system for rice mills should not only be used to limit the number of mills but should also impose regulatory controls to improve the rice milling industry; that is, permission granted for the renewal of licences should be used to develop an efficient milling service. He also noted that one-quarter of the total production of padi was being milled in the simple Planters' type of milling units and the large proportion of broken grains that result are a serious loss to the padi farmers. The usual practice is for these mills to take over all the rice bran as part of the milling charge. He recommended that State Governments should supervise and control these service mills and have some regulations on home milling charges. Other recommendations made are:

- (i) a number of rice milling units which are currently operating without milling licences particularly in Kelantan were issued with fitness certificates by the Machinery Department. In order to keep a check on illegal mills, fitness certificates should only be issued to licensed mills. In the meantime, fitness certificates issued previously to unlicensed mills should not be revalidated;

- (ii) the Government and Quasi-Government rice mills must set the example for other mills to follow and introduce some of the recommended measures such as the conveying system for moving padi within the mills, use of artificial rice driers, quality control, laboratory facilities for grading padi and the parboiling of rice.

Rice Policy

Government policy on padi and rice is an integral part of the overall national policy. Padi farming has special significance when implementing the national economic and social policy for several reasons: firstly, padi farming is important as 300,000 families cultivate the crop and secondly, traditionally, padi farmers have very low incomes. Another important fact is that nearly all padi farmers are Malays.

In the past, rice policy in West Malaysia had three general objectives, namely:

- (i) to support and increase farm incomes;
- (ii) to promote rice production to the level of self-sufficiency;
- (iii) ensure consumers of quality rice at reasonable prices and at minimum cost to the Government.

These three objectives have been reasonably achieved and this is reflected by the fact that in the last decade, local rice production has increased from 50 to almost 90 percent of domestic needs and the country is now not far from self-sufficiency in her rice requirements. Furthermore, the economic position of padi farmers has improved considerably.

More recently, there has been a thorough review of several aspects of the past rice policy. While the basic objectives remain unchanged—to support farm incomes, promote rice production and assure consumers of regular rice supplies—there have been important changes in priorities mainly because the aims of the earlier programmes to reach self-sufficiency are almost being achieved. The main emphasis in the revised rice policy is now shifted from increasing production to one of enhancing the incomes of the padi farmers.

The rice policy issues that were recently reviewed included the following:

Production targets

- (a) the production target is amended to meeting about 80 to 90 percent of the country's requirements. This change in rice policy from self-sufficiency to 90 percent of requirements stems from the fact that the country is, and will remain for sometime, a relatively high cost producer of rice. Emphasis is now shifted from that of self-sufficiency to enhancing the incomes and welfare of padi farmers through programmes to increase the yields per acre and reduce the costs of production. Rice production will in future be concentrated in selected "rice bowls". Farmers living outside the designated rice bowl areas will be discouraged from growing the crop but steps will be taken to safeguard their welfare and also assure them of higher incomes.

Policy on Investment in Irrigation

- (b) No new padi lands will be opened up through Government investment in irrigation facilities. Future investment in irrigation facilities will take into consideration the possibilities of growing other crops such as maize and sorghum in rotation with padi.

Price Support

- (c) An important reason why the price support (or guaranteed minimum price for padi) offered to Malaysian farmers is high when compared to the neighbouring countries, is that there is need to raise the incomes of padi farmers and also encourage the cultivation of food for this is part of the Malaysian agricultural

diversification programme. Incomes of padi planters are generally low and therefore it has been agreed as a matter of policy, that the guaranteed minimum price for padi be continued under the Second Malaysia Plan but the level of the support price will be subject to annual review.

Marketing Improvements

- (d) In the padi industry, the guaranteed minimum price, or GMP, is implemented indirectly; Government undertakes to buy rice from millers provided that the millers certify that such rice has been milled from padi purchased at the ruling GMP. There is little evidence that farmers get the maximum benefits from the support price. But the situation changes and farmers get better prices where the National Padi and Rice Authority has introduced Trading Schemes as in Tanjong Karang, Kedah and Perlis and the Board's purchasing agents buy padi at the farm level. To ensure maximum and fair prices to farmers, Government has recommended that Trading Schemes be extended to other areas.

Co-ordination

- (e) In the past the responsibilities for marketing, milling and control of imports, was divided between several Government Departments but now a single Authority controls the whole spectrum of operations. This integrated body is the National Padi and Rice Authority.

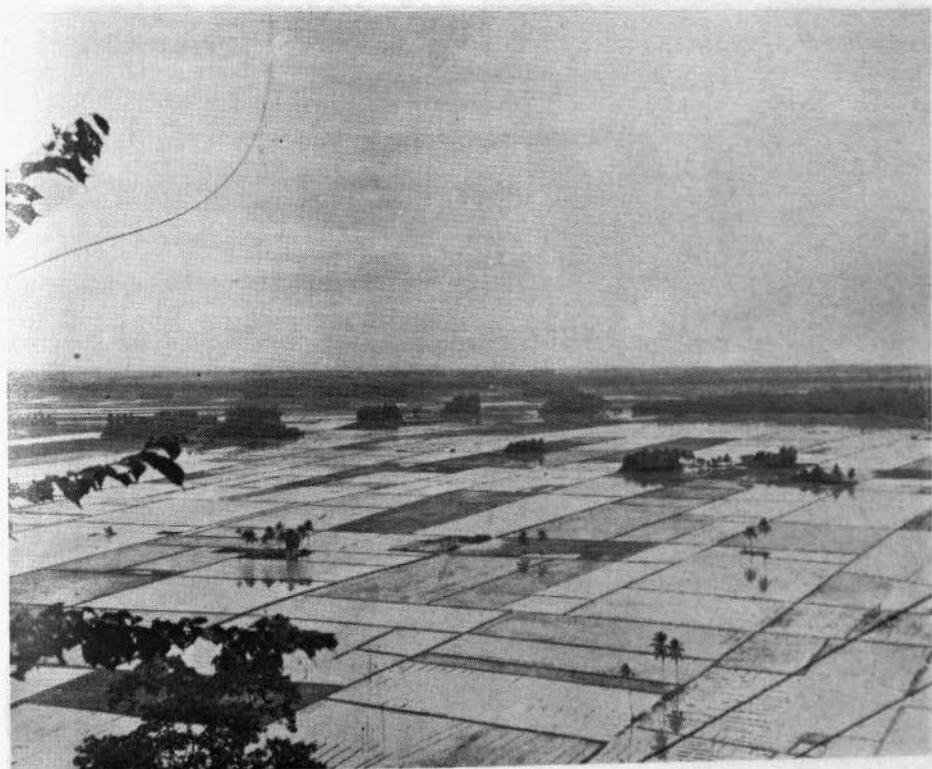


Plate 1
View of Padi Field.



Plate 2
Ploughing with Buffalo.



Plate 3
Mechanised Ploughing.



Plate 4
A Pedestrian Tractor in Use.

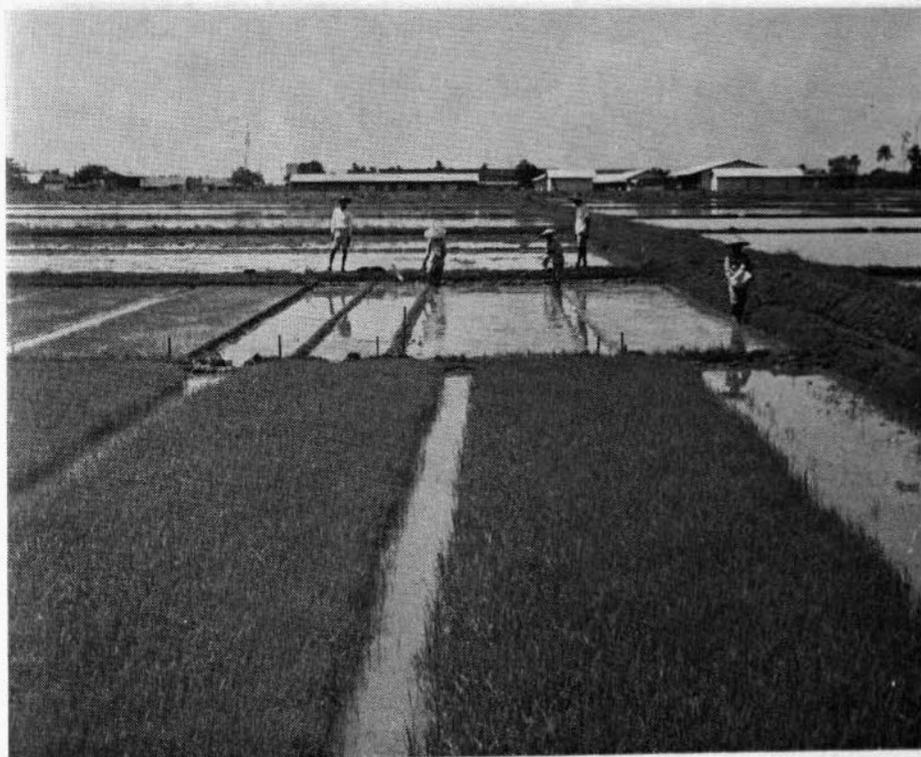


Plate 5
A Padi Nursery in Kedah.



Plate 6
Fertilizing Field before Transplanting.



Plate 7
Transplanting Seedlings



Plate 8
Transplanting Seedlings Using Kuku Kambing.



Plate 9
Spraying Weedicides.



Plate 10
Harvesting Padi.



Plate 11
Experimenting with a Combine Harvester.



Plate 12
Threshing Padi.



Plate 13
Winnowing Padi



Plate 14
Winnowing Padi. A Hand Operated Fan in Used to Improve Sieving.



Plate 15
Dry Padi in the Sun.



Plate 16
Lesong Kaki for Husking Padi.



Plate 17
Pounding Padi.



Plate 18
Padi Drying Complex.



Plate 19
A Government Rice Mill.



Plate 20
A Farmer Collecting Grass for his Cattle.



Plate 21
Padi Planter Fishing in One of the Irrigation Canals.



Plate 22
Farmers' Association Meeting in Progress.



Plate 23
Farmers Undergoing Course at Farm Mechanization Training Centre.

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