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Sector Report
Malaysia
Review of the Rice Industry

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Country Department II
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CURRENCY EQUIVALENTS

Currency Unit = Ringgit M$

Average 1987	March 1988
US$1 = 2.40	US$1 = 2.40
M$1 = 0.42	M$1 = 0.42

FISCAL YEAR

Government of Malaysia: January 1 - December 31

WEIGHTS AND MEASURES

Metric System

GLOSSARY OF ABBREVIATIONS

BPM	-	Bank Pertanian Malaysia (Agricultural Bank)
DID	-	Department of Irrigation and Drainage
DOS	-	Department of Statistics
FAMA	-	Federal Agricultural Marketing Authority
FELCRA	-	Federal Land Development Authority
GMP	-	Guaranteed Minimum Price
IADP	-	Integrated Agricultural Marketing Authority
ISIS	-	Institute of Strategic and International Studies
KADA	-	Kemubu Area Development Authority
LPN	-	National Padi and Rice Authority
MADA	-	Muda Area Development Authority
MARDI	-	Malaysian Agricultural Research and Development Institute
NAP	-	New Agricultural Policy
NEP	-	New Economic Policy
RISDA	-	Rubber Industry Smallholders Development Authority
UPM	-	Agricultural University of Malaysia

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REVIEW OF THE RICE INDUSTRY

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REVIEW OF THE RICE INDUSTRY

Foreword

This review developed from concern expressed by the Government of Malaysia and the World Bank over the failure of the padi and rice sector to respond to generous subsidies and public investment in irrigation schemes. Despite rising padi yields and farm incomes, production has steadily declined over a decade as many padi fields have been left unplanted and standards of farm management have fallen noticeably. Additional incentives addressed to specific symptoms have not produced the desired results. While Malaysia's small and protected rice sector is more akin to that of Japan and South Korea than to that of its close neighbors, it is unique in its resistance to intervention programs commonly used to induce a supply response--and which have worked so well in Indonesia, the Philippines, Burma, and India.

Discussions between the World Bank and Malaysia's Economic Planning Unit on future irrigation projects led to agreement on the need for a review of the subsector prior to further investment. A steering committee, jointly chaired by the Bank and the Economic Planning Unit, was formed and included representatives of involved agencies. The Agricultural University of Malaysia and the Institute of Strategic and International Studies were engaged to carry out a major study. The study teams interviewed farmers, millers, merchants, and agency personnel in addition to researching existing material. Special attention was paid to the eastern states of Sabah and Sarawak.

The Bank sector study, although based largely on the reports of the study teams, also incorporates international experience with market intervention. For this reason, the perspective and recommendations of the Bank report may not always coincide with those of the studies. There is, however, common agreement in the analysis and on the need for more, rather than less, market liberalization for both factors and products.

This report is based on findings of a joint World Bank/Government of Malaysia study group and was prepared by W. Cuddihy, World Bank, on the basis of reports by Tan Siew Hoey, V. Kanapathy, and Ismail Haron (Institute of Strategic and International Studies), Mohd. Ghazali Mohayidin, Chew Tek Ann, and Roslan Ghaffar (Universiti Pertanian Malaysia), G. Ryland (Con.), and from Bank reports.

Summary and Conclusions

1. Introduction. Malaysia's padi and rice sector badly lags behind the rest of the economy in income generation, output growth, and efficiency gains. Natural resource endowments and the development of service institutions give tree crops a distinct advantage over food crops which is not easily changed by compensatory government programs.

2. Over the past three decades the government has consistently provided the rice industry with assistance designed to increase output, improve efficiency, and support incomes. The number of programs has increased regularly. Among these are subsidies on fertilizer, pesticide, credit, and irrigation on the input side, and a subsidized guaranteed minimum price and a price bonus for padi on the output side.

3. Because of supply problems, a National Padi and Rice Authority (LPN) was constituted to regulate markets, eventually moving into milling in 1974. LPN is now the largest miller and itself receives substantial assistance. Consumer markets are, in theory, closely regulated.

4. Nominal protection of the industry is unusually high in comparison with that in the rest of the economy. Nominal protection rates rose to 100% in the late 1980s as import prices fell steadily below domestic prices that have remained largely unchanged for 15 years. Effective protection rates rose to 300% as further input subsidies were given.

5. The industry today is characterized by increasing market disorder. Government intervention has been unable to prevent this development, and a growing body of evidence suggests that the approach being used itself may be contributing to the disorder. Malaysia, always a high-cost rice producer compared with Burma, Thailand, and Indonesia, can ill-afford this extra handicap on its rice industry's competitiveness with imports.

6. The impact of policy on output, efficiency, and incomes has been mixed, but two periods can be discerned. Between 1965 and 1975 intervention concentrated on providing physical factors of production and promoting technological change. During the decade production expanded 3.5% annually as a result of the spread of the familiar high-yielding variety (HYV) technology and increased irrigation facilities. During the next decade, policy concentrated on support to prices and markets. Production fell by an average 0.2% per year, about 100,000 hectares (ha) of padi land were left unplanted annually, and government transfers rose rapidly. Many unintended effects have added to industry costs, requiring further subsidies. The industry in its present form is neither viable nor sustainable. Production and productivity are falling, milling performance is below international norms, budget costs are rising, consumers pay a high price for a mixed quality product, poorest padi farmers are least helped by the subsidies and irregularities are common.

7. Policy Problem. The view taken in this report is that two major forces are at work, often in opposite directions. First, the decline in interest in padi farming is due to fast growth in higher status employment,

better income opportunities, superior social facilities, and other attractions in urban areas or in other parts of agriculture, such as the oil palm sector. Padi subsidies have not been enough to restore income competitiveness.

8. The second force at work is extreme market rigidity, particularly in land markets. A commonly observed phenomenon is that farmers leave padi land unplanted or in low-input production rather than diversify, sell or lease. Programs to change this have not have the desired effect and it may be that other policy measures have had unintended negative effects in this regard. For example legislation reserves much of the padi land for Bumiputras, land title covenants bar padi land being used for other crops, and padi land rents have been unchanged since the inception of the Padi Cultivators Act (1967). While the legislation is no longer rigidly enforced these measures relate to a labor-abundent padi land-short situation of several decades ago that is quite different from the current production environment.

9. Price protection measures given to increase farmer incomes may have contributed most to land market rigidity. Protection measures are eventually captured in land values regardless of whether the land is farmed. Subsidies have made padi land a valuable asset despite the low economic value of its output and have perpetuated the problem of small farm size and fragmentation that accompanies inheritance practices. Small farm size is the major structural problem of the industry. The incentive structure discourages farm size growth, a bias that seems less appropriate for Malaysia's conditions than for India's or Indonesia's.

10. Structural change is occurring nevertheless through increasing use of machinery services and the rise of part-time farming. It is surprising that this poverty-stricken sector has been able to amortize the extraordinarily large numbers of tractors and large combine harvesters that have arrived in the Muda area in a very short period. Clearly, much of the subsidy is captured in returns to machinery operators.

11. Regardless of the usual relative productivity arguments of small versus larger farm size, small farm size is a key constraint on padi policy success because it limits total income a farmer can receive from his land. Even with very high productivity the income of small farms is not satisfactory relative to that from nonfarm work. This is particularly marked during periods of rapid growth in the nonfarm sector. Technology change has also greatly increased the minimum size of a viable padi farm. Muda farm surveys show that between 1974 and 1986, labor use on the "average" double-cropped farm fell from 240 days annually to 80 as a result of mechanization, and to 44 days where, in addition, direct seeding had replaced transplanting. When total farm income cannot be increased by enlarging farm size and when other, more remunerative work is available for the slack period of almost 200 working days a year, padi growing becomes a secondary job and cultivation standards necessarily fall. Where no other work is available poverty is the result or the farmer abandons padi farming for work elsewhere but retains the valuable land asset. For older farmers, padi growing is increasingly approaching a form of semi-retirement.

12. The major policy problem for the milling and distribution sector is

the unintended growth in LPN's share of the market. The private sector has greater milling capacity and lower operating cost and produces superior-quality rice. LPN, however, has little leeway in rejecting unsatisfactory padi, is more lenient in deducting for moisture and contaminants, and offers easier access to the price bonus. In addition, the system of controls has proven difficult to administer and LPN has had to devote increasing resources to preventing leakages. LPN must pay more to padi growers for the rice in padi than it can charge consumers for the same amount of rice with its embodied cost of processing and provision for wastage. The net result has been that LPN survives from day to day only because of government subsidies approaching M$200 million per year. Much of what is wrong with the present system is summarized by the following figures: in 1986 LPN's cost of imported rice at the wholesale distribution point was M$652 a ton which it sold at M$925 per ton. Domestic supplies cost M$1,090 per ton and were sold at M$668 per ton, being of lower average quality. Since LPN loses on local rice and profits from imports, attempts to improve its efficiency run counter to its attempts to encourage local production.

13. The cost of this policy is borne by the consumer. The consumer is taxed M$273 a ton on the imported rice, or 41%, to pay for the income support to padi growers, fraud in the bonus scheme, inefficiency in milling (because of losses and drying costs associated with wet padi). The shortfall in revenue from the consumer tax is met by Treasury grants, which are ultimately paid for by the consumer through general taxation.

14. The total budget cost of padi subsidies in 1986 was estimated at M$491.6 million for 840,000 tons of rice: M$176.4 million for input subsidies and M$315.2 million for output subsidies. The cost to the Treasury, then, was M$585 in subsidies per ton of rice worth M$652 at economic prices and M$989 at domestic prices. The M$585 per ton is one measure of the excess cost of rice production in Malaysia and reflects its noncompetitiveness with imports.

15. On the benefit side are the gains to the two groups that clearly benefit from this policy: producers and speculators. The average padi farmer growing 1.5 ha of padi receives M$377 per month with protection, which is barely equal to the poverty income. While three times the amount the farmer would receive without protection, it is still insufficient to retain labor, management skills and investment when other opportunities arise. Also gaining from this policy are smugglers, padi bonus traders, absentee padi landholders (because of the rising value of the land), large header-harvester owners, and employees of the complex administration system. Closer analysis shows that the farmers whom the system is intended to help, the smaller growers with no other income, are not reached, while the larger growers and and those with other jobs, for whom padi growing is secondary, probably do not need the income support. The losers are the urban poor, whose real purchasing power is cut, and the rural poor without a surplus of padi, who must buy at inflated prices. These are rubber smallholders, rubber tappers, laborers, and the smallest padi growers with large families.

16. There has been no production response over the last decade despite the costly subsidies, and the nation is further from food self-sufficiency than at the inception of intensive market intervention. The analysis

presented in this report indicates that a major policy change is warranted. Recent changes in production policy subsequent to the National Agricultural Policy paper were an important first step, but more fundamental reform is recommended. Presently policy supports production increases only in eight granary (large-scale irrigation) areas. Subsidies continue to be given to all Padi producers, with few exceptions, on the basis of income transfers from consumers and taxpayers. However, the analysis supports the common observation that these income transfers are not neutral in their effect on production, production, productivity, milling and consumption. The use of many different subsidy instruments also imposes unnecessarily high cost per ringgit transferred to the target group. About M$500 million per year is spent on the various programs to support the incomes of about 200,000 farmers not all of whom are poor. If all went to poor growers, poverty in the padi sector would no longer exist. Its continued existence is due to high administration costs, wastage and absence of any targetting. It is recommended that a simpler, more direct system of income support be examined.

17. For example, the experience with tertiary irrigation development illustrates the difficulty of trying to increase production unless the fundamental structures of land management and market intervention are changed. Investment in tertiary structures increased production in the KADA pilot scheme whereas under the MUDA II Project, repeated surveys indicate that there was little yield and water-use difference between land with and land without tertiary development. The novel approach in KADA was to consolidate 656 individual lots of land belonging to 492 owners into one block of 107 ha with central management, land reform and consolidated infrastructure. A maximum of 30 workers are used at peak times while the others work elsewhere. Gross yields over five seasons are approaching 6 tons of padi per ha. While in MUDA, they remain at about 4.5 tons per ha. In MUDA, land was not consolidated and management operations were left unchanged.

18. The KADA experience shows there are definite production gains to be made from economies of scale through land reform and centralized management. However, the cost is proving to be too high to replicate though there are opportunities for cost reduction. For the shareholders, the trial succeeded because they receive not only an increased income from extra production, but also free investment as well as the usual subsidies on inputs and padi. At present, the venture is uneconomic and means have to be found to either reduce costs, inclusive of the cost of subsidies, or to change the cropping pattern. In addition, shareholders are unwilling to sell their entitlements because of capital gains and subsidies. The gains to individuals from these income transfers are greater than the gains from increased production at economic prices. This suggests that long run success would require reduction in number of shareholders, changes in land use legislation and reduction in economic costs. At yields of 6 tons per ha, it is unrealistic to expect further yield gains to pay for the excess cost.

19. Hopefully, this review is consistent with other support for an integrated program of adjustment in the padi and rice sector. While there are many constraints on the ability to adjust, a long term goal of an economically viable industry providing good quality rice to consumers at a competitive price and decent incomes to a sustainable number of farmers who grow padi by

choice seems reasonable. For the immediate future it is recommended that the complex intervention system be simplified with close examination of the success of each subsidy program and a better system of targetting income support be introduced. For the longer run, an adjustment program of orderly departure along the lines of the KADA pilot scheme is recommended together with a withdrawal of LPN from milling.

20. However, to support reform of the sector changes are recommended in the institutional arrangements for policy analysis and planning. Consistent with the Fifth Malaysia Plan, establishment of an agricultural policy analysis group is strongly recommended. Policy implementation monitoring is quite different from program expenditure monitoring, and Malaysia generally suffers from inadequate agricultural policy analysis, particularly with respect to econometric quality and macroeconomic relationships. Planning needs to base growth rates on specifically identified real sources of growth. The current production planning methodology works back from consumption needs, import estimates and other variables to derive the needed production growth rate. The forecast of a 5% growth rate for rice used by the Ministry of Agriculture in its granary proposal simply has no historical or cause-related basis.

Recommendations

21. Recommendations must address the question of the future of the Malaysian economy as a whole and the part to be played by the rice sector over the next ten to twenty years. If the projection is for long run macro-economic growth with padi farming providing decent incomes and productivity increase then the number of people dependent on padi will have to be reduced. At unsubsidized long-run average prices, the value-added (net income) of the approximately 1.2 million tons of the rice produced is M$360 million. Divided equally among the existing 200,000 families in padi growing this provides M$1,800 per family per year or M$150 per month, equivalent to about one-half of the poverty level. To provide competitive incomes of about M$500 per month, without subsidies, would require a reduction to some 60,000 families. At the same time macro-economic growth will bid jobs away from padi growing. Under this scenario, the recommendation is that Government support address structural change. This would consist of helping potentially viable farmers leave without loss of income through job provision or a direct income support program. Income policy and production policy would be separated. There are successful precedents for an adjustment program of this nature.

22. If, on the other hand, the policy choice is to keep the padi sector the same size in terms of number of growers then this implies increasing long-run nonviability. As padi incomes continue to decline relative to those in the rest of a rapidly developing economy, the budget cost of income support rises and with it dissatisfaction in being left behind. Under this scenario, the recommendation is that Government support address the design of a least-cost income maintenance program through measures that do not distort production, productivity and consumption.

23. The existing set of programs has arisen historically to address situations that may or may not still be relevant. For example, the free

fertilizer was given to introduce the benefits of fertilizer to farmers and is continued to support incomes. Replacement of the fertilizer subsidy by a direct income top-up would provide the same income support without the waste and illegal retrading associated with the fertilizer scheme.

24. This report recommends a two stage approach being a combination of the two scenarios given above. For the short-run, the existing programs should be examined for their effectiveness with respect to income support goals and changes made. For the long-run, an adjustment program is proposed to reduce the number of families dependent on padi growing and to provide the conditions necessary for the development of a viable industry.

25. Detailed recommendations are as follows.

(a) Rice Price - decontrol except for one basic grade. Relate controlled price to moving average import price so as to increasingly expose domestic prices to market forces.

(b) Rice Importation - continue to be made only by LPN during the adjustment period. Effect will be to dampen price movements during domestic price liberalization process.

(c) Market Controls - end restrictions on rice movements. Effect will be to increase competition on quality and price.

(d) Padi Price Subsidy - continue but restrict only to those strictly eligible and initiate census to identify resident padi growers and their suitability to participate in a land consolidation program or to be assisted in leaving the industry either through changed land use or through incentives to retire. Effect will be to reduce Treasury cost and number of people claiming subsidies.

(e) Guaranteed Minimum Price - derive from moving average import price of rice rather than from cost-plus method which enshrines inefficiency. Effect will be to restore competitiveness of domestic milling.

(f) Padi Procurement - introduce drying charges for wet padi. This will give farmers the option of drying padi or selling it wet. Effect will be to reduce burden on LPN driers with associated spoilage and to increase farmer awareness of padi quality.

(g) Milling - end subsidies on LPN operations. In locations where the private sector is able and willing to offer adequate milling services in accordance with LPN-determined standards, LPN should withdraw from direct purchasing and milling. End the subcontracting of milling of LPN padi by private millers. LPN should purchase up to its capacity for drying and milling only. Effect will be to decrease LPN operations, and reduce budget costs.

(h) Fertilizer Subsidies - end fertilizer subsidies. Farmers are aware of the usefulness of fertilizer. Income support should be given only on the padi subsidy or through a direct welfare payment. Effect will be to end wastage and questionable practices in fertilizer distribution as well as to reduce budget cost.

26. Long-Run (3-5 years)

(i) Padi Price Subsidy - replace with direct welfare payments to "at risk" farmers previously identified. Effect will be to reduce budget cost and eliminate abuses while protecting incomes of the genuine poor.

(j) LPN Operations - restrict to maintaining the emergency stockpile. LPN to withdraw from milling except for regulation functions. LPN to license or contract with the private sector to import rice. Genuine farmers' milling cooperatives should be encouraged but not to the point of becoming a burden on Government.

(k) Padi Cultivators' Act - the Act is outdated and generally by-passed. A revised regulation consistent with modern conditions should be enacted.

(l) Land-Use Regulation - legislation restricting land to padi growing should be changed. Where land-use changes are already permitted upon payment of a fee, the fee could be considered as a one-time subsidy for reducing the recurring subsidies associated with padi. The effect would be to encourage diversification.

(m) Rice Industry Adjustment Program - an industry-wide adjustment program would be implemented by Government. This would include credit and technical assistance to private sector millers and growers' cooperatives to take up LPN's reduced market share or to buy facilities under divestiture. A major focus would be land consolidation and would involve assistance to potentially viable farmers to buy out nonresident multiple owners or to purchase padi land from those with little viability prospects. The program would include a pension scheme for older growers wishing to retire or for those with other claims on basis of need.

27. Complementary measures. An adjustment program would need complementary measures. For consolidated padi blocks the previous canal networks following small-lot configurations would need to be changed and would probably warrant tertiary development with emphasis on land levelling. For marginal padi lands moving to other crops, drainage would be required.

28. Research and Extension. Such a program would require intensive research and extension support. Padi research efforts would need to focus on producing HYV's with maturity of 110-120 days, with the necessary disease and pest resistance. The varieties would need to give high yields from direct sowing which poses special problems of establishment, water management and weed control.

Conclusion

29. While the program outlined above would be expensive, disruptive and time consuming, the alternative of the present situation is no better. A comprehensive reform of the industry would lead to a satisfactory resolution whereas inaction is likely to lead to increased pressure for further subsidies. Both situations lead to a smaller padi and rice sector. This is desirable from a long-run perspective if Malaysians have attractive job opportunities outside the subsector and has been recognized in the granary policy. Only in the case of a forecast of general economic depression over the long-run would it be desirable to subsidize nonviable padi growers to remain. Such an approach in a rapidly developing economy ensures increased impoverishment of padi growers unless consumers and Government are willing to compensate those left. Malaysia is well on the way to becoming a newly Industrialized Economy. It is worth remembering that in mid-1988 South Korea pays US$1,183 per ton of padi at the farm level, Taiwan pays US$660 per ton and Japan pays US$1,810 per ton as a result of the same policy Malaysia follows. The padi price comparator derived from the import price of rice is US$160 per ton equivalent. Structural change is both a cause and a result of economic growth. A managed program of structural adjustment is recommended as socially desirable, economically justified and technically feasible.

I. INTRODUCTION

A. Overview

1.1 On superficial inspection, the padi growing regions of Malaysia seem a testament to the success of farm policy. Generally, healthy rice crops are well served by a properly maintained irrigation system. Transport and milling facilities are modern, and growers are guaranteed a high price by a benevolent administration. Yet discussions with farmers, millers, and administrators reveal widespread dissatisfaction. Farmers complain of low returns to their labor, millers complain of inadequate margins and of poor quality padi that cannot be turned into good quality rice, while government regrets the rising program cost and unfulfilled production targets. Each year the simmering discontent boils over at harvest time and receives wide press coverage that does little to help. It is not surprising that Malaysia's rice industry and associated policies are a sensitive topic deserving comprehensive treatment.

1.2 Padi farming in Malaysia is a predominantly Malay (Bumiputra) activity and hence characterized by an unusual degree of welfare intervention. Regulations govern who may own padi land and what crops may be grown on it. Regulations also govern the milling and distribution of rice. Less direct but effective mechanisms govern the price of fertilizer, pesticides, and other inputs. The underlying theme is clearly one of benevolent assistance to farmers--protection from displacement from traditional lands, protection from merchants and millers, and protection from declining incomes relative to those of the rest of the population. All these mechanisms for protecting the industry clearly follow the intent of the New Economic Policy (NEP).

1.3 Under static economic conditions, the implementation of these regulations over almost twenty years might have had the desired effect on production and incomes. But Malaysia's economy during most of this period has been dynamic, with rapid growth and structural change. Agriculture has shared in this process with the exception of the padi and rice sector, where growth in output has been negative for a decade and structural change has been slow.

1.4 Government has explicitly acknowledged that its rice policy is not working. For example, the guiding principle for sectoral policy announced in the 1984 National Agricultural Policy through the year 2000 [1/] was commercial viability except for rice. For rice the policy goal was self-sufficiency, set at 90% of total requirements, at fair prices and with minimum cost to the Treasury. Production targets were set at a 5% annual increase, to be achieved by expanding irrigated padi areas by 10,000 ha per year. In 1986, the policy was abandoned as production continued to fall. The Fifth Malaysia Plan for 1986-90 envisaged a 2% annual production increase through yield improvement

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1/ Malaysia, "National Agricultural Policy," May 1984.

and no expansion of irrigation,[2] but even this seems unlikely. The Economic Report of the Ministry of Finance for 1987/88 records a 12.3% decline in padi production from 1985 to 1986, and projects further declines of 4.6% for 1987 and 2.6% for 1988.[3]

1.5 Within the milling sector there are also clear signs that all is not well. The low recovery of unbroken rice from the gross out-turn of padi is inconsistent with Malaysia's superior performance in oil palm and rubber processing and with the quality of the rice milling facilities. In fact, Malaysia's rice recovery rate of 58% to 64% is the second lowest of those recorded for the 22 Asian countries listed in the International Rice Research Institute (IRRI) World Rice Statistics. The Treasury underwrites expanding losses for state-owned mills while private mills close or find creative solutions.

1.6 Net Effect. A few simple parameters indicate the magnitude of the net effect of policy implementation and the nature of the policy dilemma. The cost of imported rice in 1986 was M$652 a ton, whereas the financial cost of domestic rice was M$1,090 a ton (Table 1.1). Because of quality differences, the average sale price was M$925 a ton for imported rice and M$668 a ton for domestic rice. Government gained M$273 a ton through its monopoly of imports and lost about M$422 a ton on its subsidy to local suppliers. The net loss to the government in 1986 was M$337 million.

Table 1.1: MALAYSIA, TRANSFERS ON RICE, 1986
(ringgits)

	Imports	Domestic supplies
Cost per ton (ex mill/c.i.f.)	652	1,090
Consumer price per ton	925	668
Net gain/loss per ton	273	-422
Quantity (million tons)	0.4	0.8
Total gain/loss (M$ millions)	109	-337

Source: Computed

1.7 Reducing the burden on the Treasury while maintaining the transfer structure would require contraction of the industry. Shifting the burden to consumers would further penalize the poor, both rural and urban, who constitute 86% of all the poor, whereas shifting the burden to producers (14% of all the poor) runs counter to the original policy premise that producer

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2/ Malaysia, "Fifth Malaysia Plan, 1986-1990," P 64.

3/ Malaysia, Ministry of Finance, "Economic Report, 1987/8," P 51.

welfare must be protected. Each remedial action conflicts with a major part of the policy goal of producing rice at a high level of self-sufficiency, at fair prices for both producers and consumers, and with minimum cost to government--and so the system persists. This dilemma also suggests that the single instrument of rice price control cannot achieve the simultaneous maximization of multiple goals. Income support measures may have to be separated from allocative measures.

1.8 The study on which this report is based provides evidence that much of Malaysia's excess production costs are a result of the controls themselves as well as a reflection of high real resource costs. Thus a reduction of industry costs might achieve more than the current policy, which results simply in the passing of losses between groups. This report evaluates the performance of the padi and rice sector from this point of view, identifying specific areas of excess cost and making recommendations for change.

B. Summary of Policies and Instruments

1.9 Pre-Harvest Intervention. Prior to independence in 1957, rice policy was concerned with production. Disruption of imported supplies had led to recurrent food shortages while the rubber boom drew land and labor out of rice production. Policy instruments used were irrigation investment, legislation to prevent rubber planters from pushing padi farmers off padi lands, and a variable padi floor price.

1.10 After independence the new government, concerned with lagging incomes among padi growers, used the floor price for income support. To the goal of food security was added that of poverty reduction through price-related income transfers and rural development. The intensive rural development strategy was made possible by the arrival of the high-yielding varieties (HYV) of irrigated rice. The government embarked on a major program of irrigation investment for double cropping and subsidization of complementary inputs, credit, and services. Legislation was implemented to protect the rights of tenants (Paddy Cultivators Act of 1967).

1.11 Post-Harvest Intervention. Early policy was concerned with licensing and with market regulation to protect farmers' interests against traders and commercial millers, who also controlled credit and retail sales. Attempts were made to increase farmer involvement in milling through establishment of state-supported cooperative mills. This approach failed because of undercapitalization, antagonism with middlemen and poor management (Fredericks and Wells, 1983). In 1965, the Federal Agricultural Marketing Authority (FAMA) and its monopoly regional marketing boards were established. In 1967, the Paddy and Rice Marketing Board (PRMB) was established to control trading activities while FAMA maintained a strategic stockpile and enforced the GMP program. An FAO study of milling in 1968 drew attention to the poor quality of milling and the inability of millers to respond adequately to the major

expansion in padi output at that time.[4/] The study recommended a more active government role in processing. Acordingly, the government milling agency, the National Paddy and Rice Authority (LPN), was established in 1971 and eventually given regulatory powers over the entire marketing chain and the monopoly over rice imports. LPN control over the emergency stockpile came to be used as a mechanism for price stablization.

1.12 Cost-plus pricing of padi was introduced in 1974 in response to international price escalation. LPN set cost estimates and margins subject to Cabinet approval. The intent of the policy was clearly to protect consumers from further rises in import price.

1.13 The prices and margins set in 1974 have remained virtually unchanged while import prices have halved and milling costs have doubled. In response to pressure from farmers for an increase in the padi price, the government in 1980 introduced a bonus payment of M$165 per ton of clean, dry padi over the procurement price of M$463 per ton. The bonus is a direct transfer to producers from the Treasury and is not included in the cost-plus derivation of consumer prices.

1.14 Intervention in Distribution and Consumption. Prices are controlled for eleven basic items under the Price Control Act, the most important being rice. Rice prices were set by the Cabinet in 1974 at import parity near the peak of the external market and have remained virtually unchanged despite lower world prices. Nonprice controls include grade specifications, control over rice transport, and a requirement for bimonthly accounts of padi and rice sales and purchases from millers and wholesalers. LPN is entrusted with implementing these controls.

1.15 The initial production response was high: output doubled from about 1 million tons of padi in the mid-sixties to 2.1 million tons in 1974, and self-sufficiency rose from 35% to 90%. But three unexpected results occurred. The Government miller (LPN) failed to capture the millers' profits; in fact, milling value added is negative (-30%). Production then steadily fell by 20% from the late seventies to 1986, as about 15% of padi land was left unplanted annually. And, finally, the system was impossible to control. Among the contraventions have been secondary trading in free fertilizer, sale of rights to padi subsidies, mixing of rice quality grades, illegal movement of rice within Malaysia, and smuggling of rice from abroad. But the same policy that has turned "normal" response to price signals into illegal activities on the trading side has failed to elicit a "normal" response on the production side.

1.16 The explanation for the failure to achieve a production response is that padi farming in Malaysia, even with generous subsidies, is no longer competitive with oil palm or cocoa production, or with the use of labor and capital in nonagricultural activities. The multitude of market interventions have thwarted the structural transformation necessary to restore the

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4/ Gibbons, D., et al. (1980), Agricultural Modernization, Poverty and Inequality, Gower Company, Aldershot.

competitiveness of the padi and rice industry in line with the rapid changes in the rest of the economy over the last two decades by keeping more growers in padi than would otherwise remain.

1.17 For example, owners of padi land benefit from the extraordinary level of effective protection regardless of whether the owner is resident, the land is idle, or cultivation practices are substandard. This encourages owners not to sell padi land and locks the industry into a pattern wherein an increasing number of part-time and older farmers withhold padi land from potentially viable growers. The protection has increased not only the value of assets but also land-associated production costs. The subsidies on fertilizer and other operating costs increase part-time padi income for those whose major source of income is elsewhere, but these subsidies are not enough to provide a satisfactory income to full-time padi farmers of potential viability who are unable to increase their farm size. The policy increases the income per hectare but effectively restricts the number of hectares. The result is the coexistence of padi production as a poverty industry and the holding of padi land as a rich asset. Attempts to overcome the poverty problem using the same subsidy and control system will only exacerbate the situation by increasing land costs. The effect will be greater upward pressure on the consumer price of rice, greater incentives for smuggling, and increased costs to the Treasury.

II. GOVERNMENT INTERVENTIONS

A. Padi Production

Farm Characteristics

2.1 Malaysia is a small padi producer by East Asian standards and does not have the typical Asian padi-based economy. Padi contributes only 1% to GDP and 5% to total agricultural value added. Only about 10% of planted area is under padi. Production is concentrated in eight large irrigation schemes, which account for 65% of production. The remainder of production is on small irrigation schemes, rainfed fields, and shifting cultivation areas, where yields are significantly lower than on the large irrigation schemes.

2.2 Full-time padi growers, most of whom are Bumiputras, represent about 7% of rural households. About 75% of padi farmers are poor, and they constitute about 14% of the nation's poor families. Thirty percent of padi growers are tenants.

2.3 The average farmed area is about 1.6 ha and has remained quite stable since 1955, when it was 1.5 ha, despite such major changes as the opening of large irrigation schemes, introduction of the HYV technology, and increased mechanization. Sixty percent of the padi crop is harvested by large combines despite the small average farm size. Farm-size growth has been constrained by cultural attachment to the land, multiple ownership, policy interventions favoring retention of land ownership, and legislation blocking custom operators of large machinery from amassing padi land.

Input interventions

2.4 Both the federal and state governments are involved in input intervention programs, but federal programs are far larger and easier to quantify. The most important input interventions are in the provision of fertilizer, low-cost credit, and irrigation facilities.

2.5 Fertilizer. Fertilizer subsidies began in the early 1950s as an effort to encourage farmers to use fertilizer in padi production. After a brief hiatus in fertilizer subsidization after 1971, it was reintroduced in 1974 to combat spiralling import prices. The fertilizer subsidy remains in effect even though the price of fertilizer has fallen considerably. In the current program, farmers receive a standard quota of 300 kg per hectare of free fertilizer. The upper farm-size limit of 2.4 ha appears to be ignored, with free fertilizer going to almost all padi growers. In addition, the government pays a commission to and reimburses delivery charges of the Area Farmers Associations, which distribute the free fertilizer.

2.6 Farmers are well aware of the benefits of fertilizer and have long been using unsubsidized fertilizer in the production of other crops. Fertilizer application rates for padi, however, have generally matched the subsidized quota amounts rather than being determined by soil and plant requirements. The amount applied has been estimated at only 40% of the recommended application rate (Chan 1980). The cost to the government of the program, according to federal budget figures, was M$98.5 million in 1986.

2.7 Credit. In response to survey findings of interest rate charges of 60% to 80% to padi farmers from informal credit sources, the government established the Agricultural Bank of Malaysia (BPM). Its primary purpose was to finance double cropping of padi and increased purchases of fertilizer, improved seed, and other traded factors. The credit subsidy has been on both interest and principal. In 1986 the interest rate was raised from 0% to 4%. Arrearages have averaged 59% in recent years.

2.8 Because of other subsidies and small farm size, padi farmers make relatively little use of credit except for machinery services. In 1986 only 112,752 ha of planted area of 600,000 ha was financed. The real impact of the subsidy program has been on the BPM rather than on padi growers. Adding uncollected principal to the opportunity cost of the interest rate subsidy yields a total subsidy cost ranging from M$10 per ha to M$24.9 per ha between 1980 and 1985. The persistent level of high arrearages and negative spreads have left the BPM in precarious financial condition.[5/] The bank survives only because of an annual M$30 million grant from the government.

2.9 Irrigation. Malaysia's irrigation intervention occurs through federal funding of state-operated facilities. Capital costs are not recovered, and recovery of operating costs is minimal (about 2%). Water charges range from zero to M$29 per hectare; operation and maintenance costs

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5/ World Bank, 1987. Report on DFI's, Malaysia

range from M$29 to M$243 per hectare. Allocations for irrigation and drainage under the Fifth Plan (1986-90) were M$337 million, down from expenditure of M$1,424 million under the Fourth Plan (1981-85).

2.10 Farmers tend to view the irrigation schemes as belonging to the government and have little incentive to use water efficiently or to maintain the facilities. Numerous irrigation schemes and rehabilitation projects in recent years have failed to increase production even though padi yields have increased. Farmers appear to be unwilling to invest in the labor required to make the schemes successful (field regulation of water flow, land leveling). Cropping intensities have fallen in many schemes, and farmers have shown little interest in off-season planting because more remunerative employment is available. Even in MUDA much of the crop is grown from volunteer seedlings without weed control. Federal allocations for irrigation and drainage were cut by 75% in the Fifth Plan (1986-90), reflecting a realization of the irrigation schemes' limited effect on production while the rest of the system remains constrained. The government no longer supports expansion of padi growing in new irrigation schemes or rainfed areas.

B. Padi Marketing and Processing

Procurement Intervention

2.11 Intervention at the post-harvest stage is the most expensive and difficult to manage component of Malaysia's rice policy--and its most contentious. Market intervention began in 1949 with the guaranteed minimum price scheme. The government purchased rice from private mills for strategic stockpiling at a guaranteed minimum price (GMP) that was supposed to be passed on to growers. The guaranteed minimum price was eventually extended to the entire padi crop.

2.12 LPN, which was originally established as a market regulator, is directly involved in padi purchasing and milling. It also maintains a strategic stockpile and has a monopoly on rice imports. LPN purchases almost half of all marketed padi. Growers receive the guaranteed minimum price of M$496 per ton of clean, dry (14% moisture content equivalent) padi plus a M$165 bonus per ton. The guaranteed minimum price is passed on to consumers, whereas the Treasury bears the cost of the bonus payments. Neither the guaranteed minimum price nor the bonus varies by season or location.

2.13 Procurement interventions have had a major depressing effect on the competitiveness of the Malaysian rice industry. In 1984, LPN paid M$468/ton of padi. AT 60% milling rate the cost of padi per ton of rice produced was M$780 while the rice was worth only M$652 per ton at import parity. In all years but 1980 and 1981, the price of Malaysian rice has been uncompetitive with imports. Malaysian rice will remain uncompetitive unless padi costs are markedly reduced.

2.14 The cost to the Treasury of the padi bonus (about M$200 million a year) represents 70% of the explicit subsidies for all sectors shown in the government's operating expenditures for 1986 and is equivalent to 17% of development expenditures for the entire sector. The double subsidy (guaran-

teed minimum price and bonus) has had no output effect,[6/] in fact, production and food self-sufficiency have declined.

Drying, Milling, and Storage

2.15 Drying. Malaysia's rice is noncompetitive not only in price but also in quality. Quality defects in rice are attributable primarily to improper drying and handling of padi. As a consequence of double cropping and the rapid rise in combine harvesting, large quantities of dry-season padi are harvested after the beginning of the wet season and delivered to drying facilities over a very short period. Installed drying capacity, which would be adequate were harvesting and deliveries spread out over time, is inadequate under existing practices.

2.16 This situation is aggravated by the padi pricing system, which does not encourage farmers and harvesters to spread out padi deliveries. Because millers bear the resource cost of drying, farmers gain nothing from drying their crop or spreading out the harvesting period. In addition, deductions for moisture content above the 14% standard, which are low by international standards, are linear whereas drying costs per unit rise sharply at higher moisture content. Lenient deductions for contaminants and immature grains similarly do nothing to encourage delivery of high quality padi.

2.17 The drying subsidy has adversely affected rice quality and processing costs and has forced LPN to bear a disproportionate share of the losses. Private millers buy the drier padi, and LPN, which by law cannot reject padi, is left with the poorer quality deliveries. In addition, the private sector is able to buy dried padi from LPN at the same cost as undried padi from farmers and has underinvested in drying capacity while LPN facilities are badly strained. LPN's drying costs include not only the resource cost of drying, but also losses due to the deterioration of wet padi waiting to be dried at overstrained facilities. LPN's drying cost of about M$30 a ton is a direct subsidy to growers.

2.18 Milling. LPN mills account for 25% of total milling capacity in Malaysia. Although LPN mills are larger, newer, and better equipped than private mills, LPN recovery rates are only 52-60% compared with 62-64% for private mills. LPN's poorer showing is attributable to the poorer quality of the padi it receives.

2.19 In 1986 LPN purchased 49% of the marketed padi crop and milled 28% of it. Of the rest of LPN's padi, 65% was sold to private millers and 35% was sent to Bumiputra millers on consignment and returned to LPN as rice. Because private millers pay the same for padi bought from LPN, which is already dry and clean, as for padi purchased from growers, the net result is a transfer from LPN to private millers of the drying cost (about M$5 million in 1986) plus the value of the losses avoided through LPN's purchase of the poorer

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6/ ISIS, Rice Industry Study, January 1988, p. 56.

quality padi. The loss to LPN for drying and wastage on the padi sent for consignment milling amounted to another M$2.7 million in 1986.

2.20 The immediate effect of the government's involvement in milling is the concentration of padi sales at LPN mills. The greater the concentration on LPN, the greater the efficiency losses and unintended transfers to millers as excess padi is sold free of drying and spoilage costs. Without the LPN mills, however, the system would collapse because average milling margins are negative. With the price of padi set by the guaranteed minimum price and the price of rice basically unchanged since 1974, millers are caught by rising processing costs for wages and materials. To survive, private millers get larger than average margins by squeezing costs, mixing rice grades, obtaining clean, dry padi from LPN, and purchasing a higher proportion of top-end grain.

2.21 Although the lower processing cost per ton and higher grain recovery rate for private millers, together with the strained capacity of LPN's facilities, suggest that changes in the milling share should be in the direction of the private sector, pricing and procurement practices are producing the opposite effect. LPN mills are being used to transfer income at a high efficiency cost for which LPN is not responsible, while in the private sector, gains from capturing subsidies seem to be higher than those to be realized from performance improvements.

2.22 The cost of LPN's presence in the sector in 1986 was an operating loss of M$96 million, which was funded from government grants and LPN profits on sales of imports. Including bonus payments totaling M$219 million, total outflow from the Treasury in 1986 was M$315 million, which represents the excess cost of production at the output level attributable to the price intervention system.

C. Rice Marketing and Pricing

2.23 Rice Marketing. All aspects of the rice trade are controlled by LPN. LPN sells locally milled rice to some 1,400 private wholesalers for distribution to about 30,000 retailers. LPN also purchases and stores imported rice to meet estimated supply deficits, releasing it through the same mechanism as for domestic rice. LPN issues licenses to wholesalers and retailers, regulates prices and margins, and controls rice transport through the issuance of permits.

2.24 LPN has had a monopoly on rice imports since the crisis in the international grain market in 1974. In that year importers were unwilling to import grain at rising prices for resale at a substantial loss at the controlled price. Although import prices fell sharply in the following years, the prices and margins set in 1974 have not been changed. LPN receives substantial monopoly profits on all imported rice at a cost of substantial distortion of the industry. In 1986 consumers paid M$78 million over the import cost to LPN.

2.25 Rice Pricing. The price of rice, which is nominally based on a cost of production plus fixed margin basis, has remained virtually unchanged since 1974. (The rice "price" is actually a complex system of 156 prices, which

vary by grade and by region; see Annex 3.) The calculation of price begins with the price of padi (which is itself fixed through the guaranteed minimum price), to which processing costs are added and the value of by-products subtracted to arrive at the ex-mill price. To this is added a set milling margin of M$250 per ton, which bears little relationship to reality, since average actual milling margins are negative. Fixed wholesale and retail margins are also added to arrive at the final price of rice.

2.26 Price control has succeeded at stabilizing prices but only at a level considerably higher than would otherwise prevail. During the period 1976-87 consumers gained through price control only in 1980 and 1981. The large difference between domestic and border prices, as well as the difference in quality, has strongly encouraged smuggling, which accounts for an equivalent of about 30-50% of official imports. Attempts to curtail smuggling have had little effect while incurring rising costs and disrupting rail and road transport. Finally, the maintenance of a high and stable consumer price for rice, which is derived directly from the guaranteed minimum price for padi, has enabled the government to maintain a higher and more stable producer price at a lower cost to the Treasury than would be possible with import parity-based prices, but only at a high efficiency cost to the industry.

III. POLICY EVALUATION

A. Effect on Budget Cost

3.1 The goals of the rice policy are to support and maintain reasonable incomes for padi farmers and to ensure adequate supplies of rice at a fair price to consumers and at minimum cost to the government. Although government cost does not capture efficiency and welfare losses, it gives a first approximation of the size of the assistance program in relation to the value of production.

3.2 The total, unrecovered cost to the government of input subsidies (fertilizer, interest rate subsidy and bad debt, irrigation operation and maintenance, and the farm mechanization program) was M$203.2 million in 1982 and M$176.4 in 1986 (Table 3.1). Output subsidies, which include the padi bonus and LPN's loss on local padi operations, totaled M$234.1 million in 1982, rising to M$315 million by 1986. The overall gross estimate of budget cost is M$437.3 million for 1982, rising to M$491.3 million in 1986. On the input side, this total does not include the M$300 million per year spent on new irrigation works during the Fourth Malaysia Plan, nor the subsidies for pesticides, fuel (now discontinued), seeds, and assistance to cooperatives. On the output side, it does not include the profits from sales of imported rice, which partly offset the operating loss on LPN's local padi operations.

Table 3.1: MALAYSIA: ESTIMATED COST OF DIRECT ASSISTANCE TO THE PADI AND RICE INDUSTRY; 1980-87
(millions of ringgits)

Direct assistance	1980	1981	1982	1983	1984	1985	1986	1987
Input Subsidies								
Fertilizer	72.0	114.6	112.6	92.4	62.9	82.2	98.4	80.4
Fertilizer delivery	7.2	7.7	6.7	5.4	10.7	4.9	7.6	N/A
Credit	10.0	12.3	14.9	24.9	22.1	18.5	18.0	N/A
Irrigation O&M	36.0	38.0	42.0	37.0	36.0	39.0	51.0	42.0
Mechanization	5.0	5.0	27.0	20.0	16.0	6.0	1.4	1.7
Subtotal	130.2	177.6	203.2	179.7	147.7	150.6	176.4	N/A
Output Subsidies								
Padi bonus	88.0	177.0	180.0	175.0	164.0	201.0	219.0	205.0
LPN loss on local padi	N/A	N/A	54.1	63.2	31.4	95.0	96.2	N/A
Subtotal	N/A	N/A	234.1	238.2	195.4	296.0	315.2	N/A
Total cost	N/A	N/A	437.3	417.9	343.1	446.0	491.6	N/A

Sources: Fertilizer; UPM Study, Table 3.6.1; FAO; and Federal Budget, 1987.
Credit: Annex Table 2.5
Irrigation: Annex Table 2.6
Mechanization: FOA.
Padi Bonus, LPN losses: ISIS (1988), Table 6.1.

3.3 Malaysia's rice output in 1986 was about 840,000 tons. Under the generous assumptions of no storage losses and production of only grade A1 rice, its value in domestic prices would be about M$740 million. Subsidies in 1986 totaled M$491 million, giving an assistance rate of 66%. If the crop is valued at import prices its value was M$521 million for which the total of input and output subsidies was M$491 million.

3.4 The large budget cost of the program relative to the value of output does not necessarily mean that the policy goal of minimum government cost has not been met. There are, however, a number of disturbing aspects that suggest that this may be the case. First, the expenditure program is out of control because it is open-ended. Losses are underwritten regardless of their cause. For example, with the growing concentration of deliveries to LPN, losses have increased and will continue to do so unless the padi procurement system is changed. Second, despite the incentives, production continues to fall, indicating an increasingly large subsidy burden to taxpayers and an income transfer to a smaller and smaller group of recipients. Third, the program is not well targeted; evidence is ample that not all padi farmers are poor and that fraud and other leakages are common. Finally, program costs are

likely to increase as the rise in import prices for rice cuts into LPN's considerable profits on sales of imported rice, which it uses to offset losses on domestic padi purchases. (Between January 1987 and January 1988, c.i.f. rice prices rose by M$200 a ton.)

B. Effect on Farm Incomes

3.5 Stability. An initial objective of Malaysia's padi and rice policy may have been to stabilize farm income, and between 1975-80 it did that successfully and reasonably efficiently, although at a high cost to consumers. Since 1980, however, it has turned into an income maintenance program.

3.6 Between 1975 and 1980, the average farm gate price of paddy rose from M$492.2 per ton to M$537.9 per ton (guaranteed minimum price plus local variation). In 1986, the farm gate price was M$662.4 per ton (Table 3.2). The coefficient of variance for price (measuring annual change) was 13.19. The coefficient of variance for production for the same period was 55.03. the impact on farm revenue was a coefficient of variance of 50.11 which, presumably, would have been less had padi prices risen during poor seasons. It seems reasonable to conclude that the guaranteed minimum price increases price stability but decreases the stability of farm incomes by preventing price rises in poor seasons.

Table 3.2: MALAYSIA: VARIABILITY OF FARM PRICES AND INCOME, 1975-86

Year	Price (M$/ton)	Padi marketed ('000 ton)	Farm income (M$ million)
1975	492.2	1,716	844.7
1976	519.5	1,746	907.1
1977	512.2	1,630	834.9
1978	504.1	1,229	619.6
1979	512.4	1,799	921.8
1980	537.9	1,761	947.2
1981	669.7	1,749	1,171.3
1982	666.8	1,595	1,063.5
1983	664.9	1,478	982.7
1984	667.9	1,302	869.6
1985	663.4	1,681	1,115.1
1986	662.4	1,445	957.1
Mean	588.8	1,596	936.2
Std. deviation	77.7	658	351.8
Coefficient of Variance	13.19	55.03	50.11

Source: ISIS, Rice Industry Study, 1988, Table 3.4; and Ministry of Agriculture.

3.7 Income Levels. The annual survey data on production costs on the MADA Agricultural Development Authority (MADA) scheme demonstrate the impact of intervention on farm income. The average variable cost per hectare for the 1987 off-season crop was M$511 in market prices, but M$728 in economic prices after adding the value of input subsidies (Table 3.3). At producer prices (guaranteed minimum price plus padi bonus), the yield of 4.6 tons per hectare of padi assumed in the model was worth M$3,040. At a free trade price, the padi would have been worth about M$1,380. The net farm income (gross margin) with intervention was M$2,529, an increase of 287% over the income without intervention (M$652). Of the M$1,877 income support, M$217 came from subsidies on costs and M$1,660 from subsidies on production value.

Table 3.3: MALAYSIA: AVERAGE COST OF PRODUCTION OF PADI - MADA AGRICULTURAL DEVELOPMENT AUTHORITY SCHEME, OFF-SEASON, 1987
(M$ per hectare)

Item	Farm Level Prices	Economic prices
Materials and Services:		
Seeds	28	28
Fertilizer	3	151
Pesticide	6	6
Machinery hire	437	437
Credit	0	20
Water charges	37	85
Subtotal	511	728
Labor (farm-family):	Quantity days	Quantity days
Nursery	1.5	1.5
Land preparation	2.5	2.5
Transplanting	14.0	14.0
Management	6.5	6.5
Harvesting	1.5	1.5
Post-harvest	1.0	1.0
Subtotal	27.0	27.0
Production:		
Yield (tons)	4.6	4.6
Price per ton	661.0	300.0
Value of production	3,040.0	1,380.0
Net Income [gross margin]	2,529.0	652.0

Source: Computed from MADA data.

3.8 For the average MADA farm of 1.6 ha, the monthly gross margin was M$337 with intervention and M$87 without intervention. The program enables a full-time padi farmer of "average" size to reach the minimum income objective of M$325 per month, which meets the government goal of raising padi farmers' income above the poverty line.

3.9 Assuming that the subsidy is divided evenly among poor farmers, the policy is achieving its stated objective from the narrow perspective of the farm income goal. There are many flaws in the approach, however. The subsidy is not distributed evenly, and there is no effective income cut-off point to ensure that only those in the poverty target group receive the subsidy. Also, the policy assumes that padi income is the total household income. Although this may have been true several decades ago, income surveys indicate that this is not always the case today. The completion report (1986) of the Small-Scale Irrigation Schemes Project (Ln 1444-MA) found that a major reason for poor project participation was the relatively small contribution of padi production to farm family income. A survey found that padi income contributed from 4% to 14% of total farm incomes on schemes in Negri Sembilan, Perlis, and Malacca (Table 3.4). Presumably, farmers did not engage in double cropping because it would have reduced the family labor available for other income activities. Clearly, farm-size is no longer a reliable indicator of farm family income.

Table 3.4: MALAYSIA: CONTRIBUTION OF PADI TO TOTAL FARM FAMILY INCOME, (1982)

State	Total	Income Source			
		Farm	Padi	Off-Farm	Unearned/a
Negri Sembilan (M$)	4,266	837	284	2,162	984
% of Total	100	20	7	51	23
Perlis (M$)	3,473	761	501	1,805	406
% of Total	100	22	14	52	12
Malacca (M$)	3,947	496	149	2,310	996
% of Total	100	13	4	59	25

/a Pensions, remittances, and gifts.

Source: Completion Report Small Scale Irrigation Schemes Project, Ministry of Agriculture.

3.10 The correlation between farm size, padi income, and family income is closer in the large-scheme areas, which are characterized by monocropping. The MADA 1982 survey data show non-agricultural income declining with farm size (Table 3.5). Only those in farm-size classes of 1.7 ha and above achieved a total household income above the poverty line of M$325 per month.

This implies that farm income interventions were unsuccessful in reaching 40% of MADA growers. Even the largest farm class (2.6 ha and above, with an average size of 4 ha), for which the bonus constituted the largest percentage of household income, would barely reach the poverty level without it. This indicates that the problem is due not simply to small farm size but also to high production costs at all size levels. The survey also shows that the price subsidy benefits larger growers more, not only because they produce more padi but also because padi revenue forms a larger percentage of their total household income.

Table 3.5: MADA: SOURCES OF HOUSEHOLD INCOME BY SIZE OF FARM, 1982 (M$)

Item	Farm Size Class			
	Less than 0.86 ha	0.86 - 1.70 ha	1.71 - 2.60 ha	Exceeding 2.6 ha
Agricultural Income:				
Gross padi income	1,487	3,451	6,042	10,871
Output subsidy	400	875	1,612	2,728
Average wage income	83	7	8	6
Other agricultural income	201	111	69	51
Gross agricultural income	2,171	4,444	7,731	13,565
Costs of production	811	2,185	3,800	7,133
Net income from agriculture	1,360	2,259	3,931	6,523
Nonagricultural income	777	311	132	17
Total household income	2,137	2,570	4,063	6,540
Price subsidy as percentage of total household income	18.72	34.05	39.68	41.71
Nonagricultural income as percentage of total household income	36.36	12.10	3.25	0.26

Source: MADA Information and Performance Handbook, 1987.

3.11 The view of high production costs at all scales of operation is supported by the experience of the Federal Land Consolidation and Rehabilitation Authority (FELCRA) mechanized padi estate at Trans Perak (Ln 1960-MA). Of the 2,208 ha of padi planted during the first crop in 1987, mostly on land that had supported several crops, a net return of M$410.9 per ha was realized, inclusive of input and output subsidies amounting to M$631 per ha. Without the subsidies, the estate would have experienced a net loss of M$220 per ha. These calculations do not include charges for irrigation, land taxes, or management overhead.

3.12 In summary, it seems that market interventions are not achieving the intended income goal for diversified farmers in small schemes with access to off-farm work or for the 40% of farmers in large schemes whose holdings are too small for viability at any subsidy level. In addition, in the eastern states of Sarawak and Sabah, where the padi and rice industry is much less developed than on the Peninsula and the reach of government policy interventions is much smaller, many growers who are not in the market economy are not being reached (about 85% in Sarawak and 25% in Sabah; see Annex 5). Subsidies are a more important component of household income among larger farmers than among smaller farmers, and low returns to padi are not simply a function of farm size but indicate an economic efficiency problem. It appears from the analysis presented above that the subsidy program is the source of profit in the whole industry across all farm sizes. Thus, the true cost of the subsidy is that it perpetuates a production structure that is basically uneconomic, while its income-support benefits are limited and biased toward larger producers. In this respect it is fortunate that farmers have not expanded output according to Plan expectations.

C. Effect on Production Efficiency

Technical and Allocative Efficiency.

3.13 The fertilizer, pesticide, credit, and water interventions fix not only their price but also influence how much is used. The upper limit on the quantity of fertilizer used on an individual farm depends as much on the quantity supplied by government free of charge and the market for resale as on production response to fertilizer. To the extent that amount used deviates from soil and plant requirements, farmers are off the production frontier. Similarly, the quantity of water supplied to a crop at the tertiary level is influenced by the quantity supplied by government at a fraction of cost and by the opportunity cost of labor used for water control rather than by crop requirements. While farmers may be efficient in allocating resources according to the relative prices facing them, the industry is inefficient at the level of economy.

3.14 Administrative influence over factor proportions is inherently inefficient because proportions are necessarily determined on a regional or district basis while price determination relates to the specific farm conditions. The high opportunity cost of labor and the lack of realistic water pricing would explain much of the small differences in yields between blocks in MADA with tertiary development and those without it.

Management and Risk.

3.15 Because the state assumes the decision-making role on what crop to grow (by law, only padi can be grown on designated land) and with what factor mix and also removes output price uncertainty, padi farmers operate in a system with low farm management input requirements. Increased availability of contracted mechanized services has further enabled farmers to reduce time spent managing and working the farm. This has facilitated the growth of part-time farming, which leads to inefficiency and distorts labor markets by decreasing demand for permanent laborers and increasing demand for specialized

seasonal workers. The clear winners appear to be the machinery owners, who are usually unable to obtain land. The rapid growth of large-scale mechanization in the MADA area, which used to be characterized by poverty and small farm size, can best be explained as the result of machinery owners capturing much of the subsidy payment. Without the cash bonus, the machinery service industry would be severely curtailed because the hiring of mechanized services is the largest cash cost of the farmer.

3.16 The subsidy program also causes distortion in the land market and constrains the development of larger size farms. Because eligibility for subsidies is tied to land ownership, the value of padi land, as well as land associated costs rise. This retards the development of viable farms, because owners of small lots are induced to retain ownership in order to keep their claims on subsidies, even if the land is not planted.

3.17 Finally, the system discourages crop diversification by tying subsidies to padi production and turning the terms of trade heavily in its favor. A padi land owner in MADA, for example, who shifted from padi to another annual crop, would lose subsidies, face legal penalties, and would need to increase risk management.

Economic Efficiency

3.18 Nominal Protection.[7/] Because a country may produce or import a product, a commonly used measure of economic efficiency is the comparison of domestic with import prices to determine nominal protection of domestic production. Since padi is not traded, an import price equivalent (border price) for padi is derived by subtracting LPN milling and transport costs from the import price of rice. In 1986, the nominal protection coefficient for Malaysian padi was 2.07 (Table 3.6), that is, the producer price was about twice the important parity price (Figure 1). Until 1981, padi prices were not significantly distorted, given the inherently large error of estimate. With the introduction of the padi bonus in 1981, domestic padi production began to register a high nominal protection rate. Because of the downturn in world prices of rice in later years, domestic padi production with the guaranteed minimum price but without the bonus still shows significant protection. For domestic prices to equal import prices without any change in protection, long-run import prices would have to rise from US$310 per ton to US$480 per ton, which considerably exceeds even optimistic projections.

3.19 Effective Protection. Since factor prices are also subsidized, a comparison of value added is a better measure of economic efficiency. Using 1985 cost-of-production survey data for the second crop in MADA, the value of traded inputs at domestic prices for a transplanted crop was estimated at M$468 per hectare whereas these inputs were worth M$697 per hectare at import parity (Table 3.7). On a per ton basis, the costs were M$197 and M$293 respectively, giving a value added of M$820 per ton at domestic prices and

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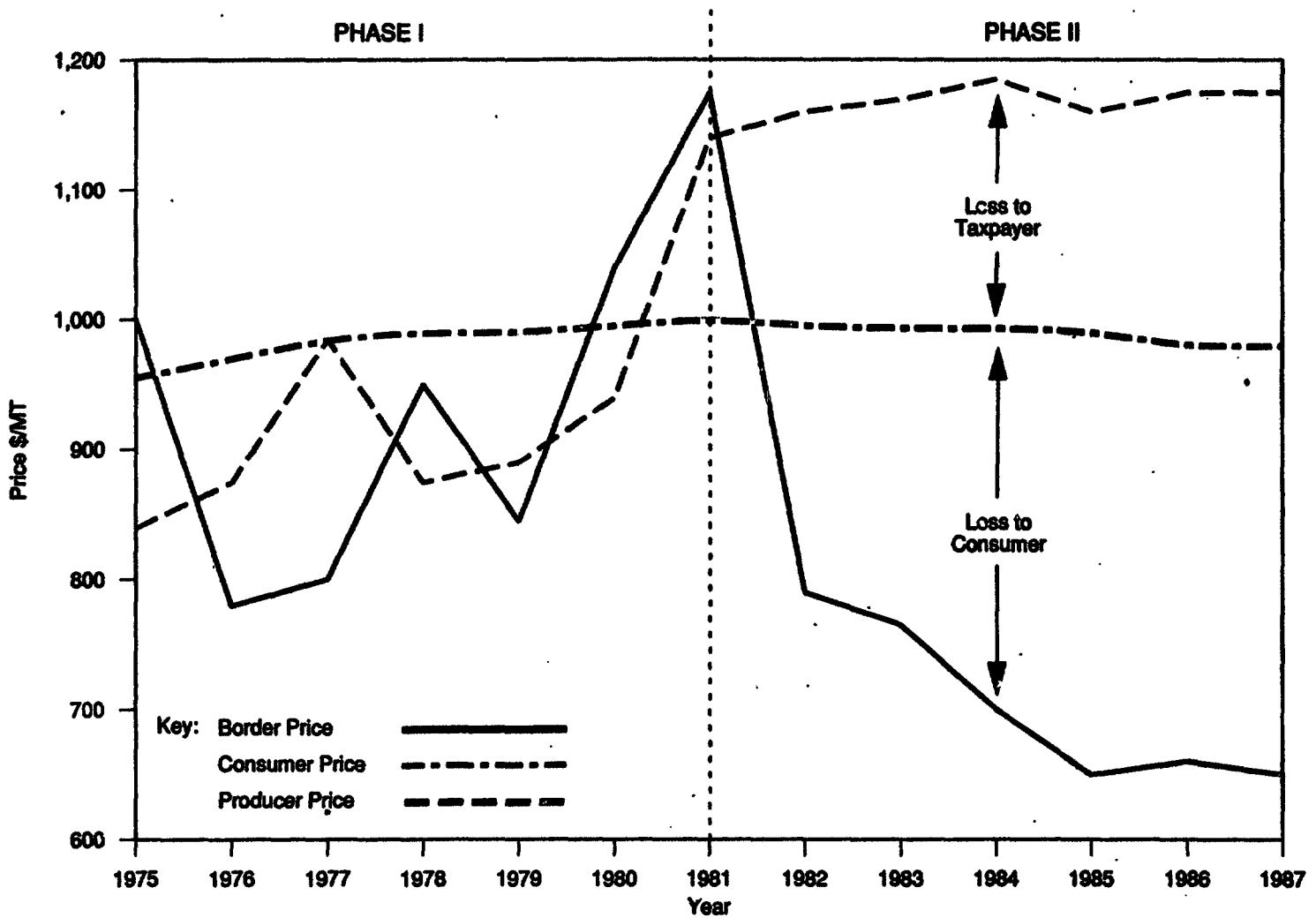
7/ For discussion of methodology see, Pearson, Akrasanee and Nelson, "Comparative Advantage in Rice Production: A Methodological Introduction," FRI Studies, Vol. XV, No. 2, 1976, Stanford University.

Figure 1
MALAYSIA: TRENDS IN BORDER & DOMESTIC RICE PRICES 1975-1987



Source: Computed by ISIS.

caktw42402b

Table 3.6: MALAYSIA: NOMINAL PROTECTION COEFFICIENTS FOR PADI PRODUCTION, 1975-86

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
	($/mt)											
Border price, M$fob	919	683	703	896	771	970	1,143	715	684	615	563	570
Less 10% quality discount	92	68	70	89	77	97	114	71	68	61	56	57
	827	615	633	807	694	873	1,029	644	616	554	507	513
Add shipping etc.	100	100	100	90	90	90	83	83	82	76	76	73
Import price, cif	927	715	733	897	784	963	1,112	727	698	630	583	586
Add value of by-products	70	70	70	70	70	70	70	70	70	70	70	66
Import parity price	997	785	803	967	854	1,033	1,182	797	768	700	653	652
Less processing costs	75	82	88	94	99	105	114	136	144	158	146	161
Border price of rice	922	703	715	873	755	928	1,068	661	624	542	507	491
Border price of padi	599	457	465	567	491	603	694	430	406	352	330	319
Domestic mill door price, padi	492	519	512	504	512	534	670	667	665	668	663	662
Nominal protection coefficient	0.82	1.14	1.10	0.89	1.04	0.89	0.97	1.55	1.64	1.90	2.01	2.07

Note: Figures on shipping costs prior to 1981 are only rough estimates. From discussions with LPN officials such costs could well exceed M$100/mt rice shipped.

The value of by-products are estimates based on milling recovery rates. The numbers for 1985 and 1986 are based on the price obtained for brans and brokens and are derived from discussions with the Kedah/Perlis Rice Millers' Association.

Source: Computed from LPN statistics by Tan, S.H., ISIS, Feb. 1988.

M$214 per ton at import parity. The effective protection coefficient was 3.84; that is, value added at domestic prices was almost four times that at import prices. Even without the bonus, Malaysian rice production has been competitive only in years of unusually high world prices (only two years in the past decade).

3.20 Domestic Resource Cost. Another method of measuring economic efficiency is to determine the domestic resource cost of the traded inputs (land, labor, and capital) used to produce rise. These inputs are valued at their opportunity costs to obtain their economic return in rice production rather than in some alternative use. Valuing labor at market rates, investment in irrigation facilities as the present value of public investment, and land at its net return in oil palm production (for example) gives an estimated domestic resource cost of M$1,717 per hectare and M$721 per ton (Table 3.7) for a transplanted crop. In other words, M$721 of domestic resources were spent to obtain M$214 (value added at input parity) of rice. A convenient way of expressing the relationship is the domestic resource cost coefficient, which relates the cost per unit of value added, in this case 3.37.

Table 3.7: MALAYSIA: COMPARATIVE ADVANTAGE IN RICE PRODUCTION, MADA SEASON II, 1985
(ringgits per hectare)

Traded inputs	Transplanting		Broadcast (wet)	
	Private	Economic	Private	Economic
Seeds	27	27	27	27
Fertilizers	2	162	3	162
Pesticides	12	12	16	16
Machinery services	408	408	414	414
Water rates/irrigation O&M	19	88	19	88
Total	468	697	479	707
Gross yield (tons/ha)	4.311		4.311	
Net yield (tons/ha)	3.664		3.664	
Rice (tons/ha)	2.38		2.38	
Cost per ton	197	293	201	297
Price per ton	1,017	507	1,017	507
Value-added per ton	820	214	816	210
Effective Protection Coefficient	3.84		3.89	
Domestic resource costs				
Labor	628	628	400	400
Investment		426		426
Land /a	663	663	663	663
Total	1,291	1,717	1,063	1,489
Domestic resource cost per ton	542	721	447	626
Domestic resource cost coefficient (DRC)		3.37		2.98
DRC - Assuming 3.31 t on yield		2.43		2.13
DRC - Assuming sunk costs		2.53		2.12
DRC - Assuming zero opportunity cost of land		2.06		1.65
Returns to land per hectare	1,352	(552)	1,394	(334)

/a The calculation of the return from using the land for palm oil rather than padi is based on a price of $188/MT fresh fruit bunch (FFB), a smallholder yield of 20 MT/ha in 1985, and production costs averaging $110/MT as estimated by Tan (1987).

Source: Computed by ISIS from Cost of Production Survey, Mada.

3.21 Although evaluation of domestic resource cost is crude at best in a static model, in this case the domestic resource cost coefficient is so far from the break-even point that sensitivity analysis would not change the conclusion of a clear lack of competitiveness. Only at unlikely yields of 9 tons per hectare does rice become competitive.

3.22 Analyses of the foreign exchange cost and the impact on land value of rice production also indicate a lack of economic efficiency. The value added at economic prices of M$214 per ton of rice is equivalent to US$85.6 at the official exchange rate of about M$2.5, = US$1. Because this foreign exchange was earned (saved) by rice production at a cost of M$721 per ton, the implicit exchange rate is M$8.4 = US$1.0, indicating that foreign exchange is lost in using the domestic resources to produce rice instead of a viable alternative.

3.23 The subsidy program also severely distorts padi land value. The M$214 of value added per ton of rice is equivalent to M$510 per hectare, at a yield of 2.38 tons of rice at 14% loss of padi and 65% milling recovery rates. Deduction of labor and capital costs of M$1,054 per per hectare (Table 3.7) leaves a residual return to land of -M$552 per hectare at the marginal opportunity cost. The return at market prices, however, with all subsidies included, is estimated at M$1,352 per hectare. This suggests a major unintended impact on land markets, land associated costs (rents, purchase prices), land-use, and other land-related aspects.

D. Effect on Production Levels

3.24 Supply Response. One of the most explicit policy goals of the padi and rice intervention program has been import substitution, which has provided the justification for government spending on new irrigation schemes and on production. The 1985 New Agricultural Policy envisaged an expansion of irrigated padi of 10,000 ha each year. The decision in 1986 to halt irrigated padi expansion and to rely on increases in yield in the large-scale schemes to reach production targets was predicated on a 5% annual output growth. Over the long run (since 1960), however, output has grown at an annual average of only 2%, with a rapid peak in the late-sixties and early seventies and a negative growth rate of 1.9% since the peak output of 2.1 million tons of padi in 1979. The most severe decline has been in Sabah, where padi output has fallen by 6% annually since 1979, followed by the Peninsula, with a 1.5% annual decline.

3.25 Sources of Growth. Decomposition of the sources of growth for the Peninsula, where statistics are more robust, shows that the long term production growth of 2% has been due to a steady 1% annual increase in yields in irrigated areas and a 1% increase on planted areas linked to expansion of government-supplied irrigation facilities. Within the planted area, there has been a 13.8% annual expansion of second-crop planting, a 0.8% annual contraction of wet season planting, and a 5.3% contraction of rainfed padi area (Table 3.8). Two distinct growth periods are evident. Between 1960-64 and 1970-74 output grew from an annual average of 947,000 tons of padi to one of 1.597 million tons. The 3.5% annual average growth rate is consistent with the spread of new varieties, new technology, and irrigation infrastructure that occured in Malaysia as elsewhere at that time. Between 1970-74 and 1980-

84, output fell by 0.2% per year, consistent with labor outflow to faster growing sectors and it was during this latter period that subsidies were either introduced or intensified. Between the early and late eighties the downward trend has continued even as subsidy cost has moved upwards.

Table 3.8: MALAYSIA: CROPPED AREA YIELD AND PRODUCTION OF PADI IN THE PENINSULA 1950-1984

Year	Area under cultivation ('000 hectares)				Average yield, (ton/ha)		Production	
	Main Season	Off Season	Dry Paddy	Total	Main Season	Off Season	Dry Paddy	Total ('000 tons)
1950	275.7	3.0	15.3	294.0	2.0	1.5	0.8	573
1960	351.7	8.4	24.6	384.7	2.5	2.7	1.3	923
1961	356.1	14.4	21.4	391.9	2.6	2.3	1.3	980
1962	353.5	18.8	23.5	395.8	2.4	2.5	1.2	950
1963	358.9	19.9	22.5	401.3	2.4	2.7	1.4	963
1964	356.4	23.7	21.2	401.3	2.3	2.6	1.3	923
1965	363.2	36.4	21.7	421.2	2.5	2.8	1.2	1,053
1966	362.9	42.3	21.4	426.6	2.4	2.8	1.2	1,024
1967	356.0	63.6	30.9	440.5	2.3	2.7	1.1	1,013
1968	367.2	98.0	20.8	486.0	2.5	2.8	1.2	1,215
1969	383.1	96.4	23.2	499.7	2.6	3.0	1.1	1,299
1970	379.9	132.0	21.7	533.6	2.6	2.9	1.3	1,382
1971	373.3	159.5	20.1	552.9	[illegible]	3.1	1.2	1,548
1972	361.5	197.6	13.6	572.7	2.5	3.1	1.3	1,546
1973	369.6	212.4	9.9	591.9	2.8	3.1	1.4	1,717
1974	371.4	217.4	9.1	597.7	2.9	3.2	1.3	1,793
1975	372.5	213.4	9.7	595.6	2.7	3.1	1.4	1,668
1976	347.9	222.5	10.0	580.4	2.7	3.4	1.2	1,741
1977	345.3	212.5	9.5	567.3	2.6	3.3	1.0	1,584
1978	335.0	103.2	7.3	405.5	2.1	2.9	1.1	1,095
1979	331.5	223.3	7.4	562.2	3.1	3.3	1.5	1,743
1980	319.4	204.3	6.4	530.1	3.2	3.5	1.3	1,749
1981	316.2	198.9	8.0	523.1	3.2	3.5	1.4	1,748
1982	274.7	212.2	6.2	493.1	3.3	3.2	1.1	1,596
1983	295.2	173.5	4.4	473.4	3.3	3.2	1.3	1,522
1984	241.0	186.1	6.3	433.4	2.7	2.8	1.3	1,177
1985	266.0	194.5	6.3	466.8	3.7	3.5	1.3	1,673
1986	246.1	181.4	6.3	433.8	3.7	3.6	1.3	1,599
Average growth %	-0.8	13.8	-5.3	1.0	1.0	1.0	0.0	2.0

3.26 Price Elasticities. These observations of a poor supply response to the government program are supported by the results of supply-response modeling. Although there seems to be a paucity of satisfactory supply-response studies, existing studies have generally found a price elasticity of only about 0.2. The difficulty of obtaining good estimates is, of course, due to the many non-price controls and to the low between-year variability of prices as the guaranteed minimum price became the average rather than the minimum price. Under these circumstances, price management is more important in determining income than supply. Supply is being determined by the opportunity cost of the farmers' labor and declines with Malaysia's increasing industrial and services growth.

E. Effect on Consumption

3.27 Income and Price Effect. Rice is the basic food of Malaysians. The Household Expenditure Survey of 1980 shows that lower income groups spend a higher proportion of income on rice than do higher income groups (Table 3.9). The lowest income households spent an average of 26.2% of their income on rice, whereas the highest income households spent an average of 11.9%. Thus, at the household level, the pricing policy hurts poor consumers proportionately more than those who are better off. This is particularly important for landless laborers and for rubber tappers, whose wages are linked to rubber prices. Setting the price of a wage good too high puts undue pressure on the competitiveness of industries with a high labor component such as rubber.

Table 3.9: MALAYSIA: PENINSULAR MALAYSIA, MONTHLY HOUSEHOLD EXPENDITURE ON RICE ON THE PENINSULA, 1980
(ringgits)

Expenditure Class	Total Food Expenditure	Expenditure on Rice	
		Amount	% of Expenditure
0-199	60.8	16.0	26.2
200-299	101.85	21.69	21.3
500-599	188.01	28.01	14.9
1000 and above	342.12	40.02	11.7

Source: Household Expenditure Survey, Department of Statistics, 1980.

3.28 Per capita consumption of rice (local production plus official imports) declined from about 113 kg in 1970 to 82 kg in 1985, or to about 90 kg if allowance is made for smuggling. A decline in per capita consumption of rice with increasing real income is consistent with experience elsewhere, as other goods are substituted for rice. While there has been a slight increase in the consumption of wheat (from 31 kg per capita to about 36 kg over the period), the main substitution in consumption has been meat, particularly poultry through greater expenditures on feed grains. Between 1974 and 1984, per

capita rice consumption declined by 31% while per capita real income increased by 93%. During the period, the price of rice was virtually unchanged in nominal terms but fell 39% in real terms. The fall in consumption is explained by income behavior toward an inferior good rather than by price behavior. A negative income elasticity of 0.31% derived from time series data (Mohd Kamil 1984) seems consistent with the findings of the literature of low elasticities of demand for staple foods. Not captured by the price models, however, is the increased demand for higher quality rice as incomes rise. In fact, much of the rice smuggled from Thailand is to satisfy demand for very high quality rice not imported by LPN.

F. Effect on Food Self-Sufficiency

3.29 The pursuit of import substitution in basic foods explains much of Malaysia's willingness to underwrite rice production almost without regard to cost. (This is not a purely Malaysian phenomenon, as evidenced by EEC and Japanese foodgrain policies.) Malaysia's production planning begins with an estimate of total rice requirements based on population projections and per capita rice consumption coefficients. Until recently, a fixed target for self-sufficiency was set, say 80%, from which import requirements, production growth rates, and area to be planted were calculated.

3.30 Because self-sufficiency targets have been set too high, projections of growth rates in domestic output have consistently been unrealistic. Thus the current "rice basin" policy projects a 5% increase in production despite the historical experience of long-term sustainable growth only of 1%-2% per year over the last 20 years and negative growth over the medium term.

3.31 In practice, the fixed targets have been dropped except for long-range planning, and the shortfall is made up by increasing imports. During the recent slump in the import price of rice, this practice has helped finance LPN losses on procurement of local padi. (LPN uses profits gained by buying imports at a low price and selling at a high price to cross-subsidize its operations.) Thus an increase in self-sufficiency would imply a greater burden on the Treasury. With the current upswing in import prices, a call for a return to self-sufficiency targets can be expected, along with pressure to shift even more of the burden to consumers.

3.32 Rice Self-Sufficiency. Peninsular Malaysia is officially estimated to be about 80% self-sufficient in rice, Sarawak about 55%, and Sabah about 25%. Increased rice demand arising from population growth has been partly offset by decreasing per capita consumption, a decline that began after the peak consumption years following the spread of double cropping and has become more noticeable with the fall in production. The degree of self-sufficiency has decreased most noticeably in Sabah, falling from 60% to 25% in ten years.

3.33 A major defect in the use of self-sufficiency targets for policy planning is their unreliability. Consumption is seriously underestimated because smuggled rice is not included, even though it may have accounted for as much

as an additional 23% of official consumption figures for 1985.[8/] On the production side, output is estimated from crop-cutting sampling, with little adjustment for losses, which have been estimated at 18% between pre-harvest yields and mill deliveries for marketed production. The high losses are a direct result of padi procurement and pricing practices. Whereas attempts at production expansion along the same production function have failed, gains in self-sufficiency could be realized from a liberalization of rice pricing and enforcement of a moisture-deduction system for padi.

3.34 Self-Sufficiency in Foodgrains. Total grain production (rice production adjusted for losses and waste) in Malaysia in 1985 was about 1,018 million tons, while rice, corn, and wheat imports totaled 2,145 million tons (Table 3.10). Thus the self-sufficiency level in food grains in 1985 was 32% of total apparent consumption, down from 55% a decade earlier. A turnaround in foodgrain self-sufficiency is unlikely, given Malaysia's inability to grow wheat because of climatic conditions and its non-competitiveness in corn production. Furthermore, as demand for meat continues to increase with incomes and population, derived demand for corn will increase.

Table 3.10: MALAYSIA: SELF-SUFFICIENCY IN TOTAL FOODGRAINS, 1970-87
(tons)

	1970	1974	1980	1985	87 /a	
Net Production						
Rice	877	1,094	1,078	1,012	937	
Maize /b	N.A.	N.A.	10	6	26	
Total production	877	1,094	1,088	1,018	963	
Net Imports						
Rice	363	334	167	426	320	
Maize	171	160	662	1,181	1,257	
Wheat /c	335	412	472	538	615	
Total imports	869	906	1,301	2,145	2,192	
Total grain supply	1,746	2,000	2,389	3,163	3,155	
Self-sufficiency in food grains (%)	50	55	46	32	30	
Self-sufficiency in rice (%)	70	76	86	70	76	

/a Provisional
/b Not reliable because of small scattered, plantings.
/c Includes flour.
Source: ISIS and FAS Grain and Feed Reports.

8/ Tan, S. H., 1988, ISIS Price Industry Study, p. 40.

3.35 Clearly, the unusually high levels of padi protection cannot be justified on food security through self-sufficiency grounds. While self-sufficiency in rice hovers around the 75-85% level, self-sufficiency in total grains has fallen from 55% to 32% and will continue to fall. The padi and rice protection policy, as currently implemented appears to be exacerbating the problem of declining self-sufficiency in food grains by (1) turning relative prices against the domestic production of diversified crops that could be grown on padi lands; (2) fixing the cropping pattern in padi through legal controls, the provision of cheap inputs for padi, the synchronization of irrigation water supply with padi demand schedules; and (3) underwriting the financial losses of the state milling system, thus providing no incentives for stemming high grain losses.

3.36 Since the major part of Malaysia's food now comes from abroad, it would appear that food security would be maximized through a policy based on import management and a reduction in practices that thwart structural change in the domestic food production sector. Malaysia's food import bill is not unsustainbly high, totaling M$2,557.6 million in 1986, representing 7% of total export earnings and 20% of the value of agricultural exports. Rice imports accounted for only 4.5% of total food imports and 0.3% of total export income. Under these circumstances, import substitution becomes a weak argument for the continuation of high levels of protection to a high-cost industry that is a net loser of foreign exchange (on an opportunity-cost-of-resources basis).

IV. RICE INDUSTRY ADJUSTMENT

A. The Case for Reform

4.1 Justification. The policy goals for the padi and rice subsector are well understood: the practice of subsidizing food production and the income of a lagging sector in a rapidly developing economy is a common strategy with a common result.[9/] The protected subsector becomes unsustainable without an ever increasing contribution of public funds. In Malaysia, consumers are penalized twice--in the marketplace and in the allocation of public revenues. The largest share of the income support measures does not reach the poorest padi growers, and food production is declining while both economic and financial costs rise. From the review of sectoral performance, three major key areas for reform emerge (1) market policy, (2) production structure and (3) institutional responsibilities.

4.2 Market Policy. Price and nonprice interventions in markets have affected production, consumption, and incomes. Although the goals include increased output and efficiency in production, the effect has principally been to transfer income to producers at very high cost. The intervention apparatus is complex and partial adjustment of separate instruments is likely to produce unintended effects, as has been the case in the past. A comprehensive, industry-wide approach is required rather than separate production, consumption, market, and income policies. The cost of implementing any adjustment program would be high. In addition, resistance is likely from special interest groups--not only from legitimate producers who will lose through change but also from those profiting from grey market activities made possible by unintended effects of policy implementation.

4.3 The cost of not reforming would also be high. If output expands with the present inefficiencies locked in, the budgetary cost will rise accordingly, particularly in padi procurement and milling, as LPN attracts a larger share of padi production. Expansion of LPN facilities would transfer public expenditure from the operating to the development budget with no net reduction at a time of excess private sector capacity and contraction in output and number of padi growers. Expansion of facilities would increase average cost and further decrease competitiveness.

4.4 If output continues to contract, the budgetary cost would also rise as import prices rise. At the top of the import price cycle, the incentive to smuggle would be low but the rigid domestic pricing regime would impose heavy losses on LPN as it loses its cross-subsidy on domestic purchases. At the bottom of the cycle, the economic disparity between the padi sector and the rest of Malaysia's economy would increase and padi growers' relative incomes would fall unless budgetary outlays increased. Shifting the burden to consumers would increase the cost of wage-intensive industries. Without

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9/ ANDERSON K., and HAYAMI Y., The Political Economy of Agricultural Protection - East Asia in International Perspective. Allen and Unwin (1986)

serious reform, all plausible options result only in a transfer of losses between groups.

4.5 Institutional Responsibilities. The five major institutions responsible for policy implementation are the Economic Planning Unit, the Ministry of Agriculture, LPN, the Agricultural Bank of Malaysia (BPM), and the Farmers' Organizations. Missing from the Government apparatus is an adequate institutional capacity for analyzing policy performance in a rapidly changing economic environment.[10] Ad hoc policy studies are conducted in reaction to crises, but they reflect the institutional biases of the organization responsible for preparing them. The existing analytical apparatus is structured to produce commodity balances using fixed coefficients rather than to prepare critical appraisals of policy implementation performance. The Fifth Malaysia Plan states that policy analysis capacity will eventually be improved (P 318), but an impartial bureau of agricultural economics is needed now. Policy performance needs to be monitored regularly, and instruments need to be modified periodically as circumstances change.

4.6 LPN and BPM. Both LPN and BPM were established to provide important market services and continue to do so. But both institutions are financially unsound. ACIAR's long-term study on milling and DFI's study of BPM clearly show that management performance in LPN and BPM is constrained by unintended policy impacts. As long as LPN is required by law to pay more for padi than its value as rice, no managerial skill can solve its problems. BPM is constrained by interest rate and bad debt policy; as a result, it had a negative spread of 8% on padi loans in 1985.[11]

4.7 The roles of these institutions need to be redefined for the 1990s. Although market failure prompted their establishment, it can be argued that Malaysia's padi and rice markets are still not functioning properly and that LPN has itself become a cause of market failure. In the case of BPM, the policy requiring that it charge less than its resource costs cannot continue without causing severe injury to its institutional performance.

4.8 Structure of Production. The third area for adjustment consideration is the structure of production. To the extent that intervention influences who grows padi and where, considerable structural change is already occurring. More and more padi land is being taken out of production, not only in marginal areas but also in large schemes. Other manifestations are the increase in direct seeding and mechanization, which has been accompanied by falling husbandry standards. These changes appear to be the response of a generally aging class of farmer-owners to the need to reduce their labor and management inputs in the absence of a labor pool of distinctly poorer rural leaseholders without other employment opportunities.

10/ Fifth Malaysia Plan, 1986, pp. 317-318.

11/ World Bank, 1987, Report on DFI's, Annex 5.

4.9 The government has taken three steps to address the problem. The most important has been the decision to terminate infrastructure expansion in rainfed and small irrigation scheme areas because of poor beneficiary response. Another is the idle lands program, which attempts to induce unemployed graduates and others to replant unused padi land, particularly in other crops. The third initiative is in group farming ("estatization"), which allows labor outflow but incurs higher cash costs and overhead costs than individual farming.

4.10 These measures are having little influence, however, because input and product price distortions, as well as cultural attachment to and multiple ownership of padi land, discourage growth in farm size. The programs do nothing to affect the critical problem of escalation of economic cost which must be decreased to compensate for the long-run decline in the real price of rice. Subsidies increase farmers' incomes but also increase economic cost of production. Further subsidies are then needed as one policy goal works against the other.

B. Adjustment Principles

4.11 (i) Simplicity. Malaysia's padi and rice interventions are the result of historical reactions to specific situations. The package has proven to be inflexible over time, leading co a disparity between the policy view of conditions in the industry and the reality of those conditions. The system needs to be simplified by eliminating redundant measures and ensuring that the remaining measures are consistent with actual conditions. For instance, income support does not require subsidies on both factors and products. Trying to apply too many instruments to achieve too many goals imposes too high a cost in managing the system, as LPN's enforcement division has found. Many of the measures, such as the rice transport permits, have no current value and should be dropped in the interest of improving management feasibility. A system that is too complex provides too many opportunities to cheat and becomes too difficult to monitor.

4.12 (ii) Different Instruments for Different Goals. The primary reason for the failure of policy implementation is the use of prices to achieve disparate goals. The provision of free fertilizer is justified on the grounds of encouraging its use as part of a learning process that has long since been completed whereas its removal is blocked on income grounds even though padi price guarantees and subsidies are intended as the primary mechanism for providing income support. Similarly, the lenient padi moisture deduction rate is also used to provide income support, but at great efficiency cost to LPN. Each policy goal should be pursued through a single instrument so that its efficiency may be effectively monitored and evaluated.

4.13 (iii) Targeting. Not all padi farmers are poor and not all rice consumers are rich. The growth of off-farm employment opportunities has severed the relationship between small farm size and poverty. Efforts to direct fertilizer subsidies and padi bonus payments to the poor by tying access to farm size have been ineffective, as is evidenced by the fact that the number of recipients exceeds the number of padi growers. In practice, bonus payments are based on padi deliveries, and while all transfer systems

have problems, it would be difficult to find one with greater leakages than a system based on padi deliveries. Income support should be given only to growers in residence. No support should be given to new entrants to the industry, particularly entrepreneurs wishing to establish commercial padi farms.

4.14 (iv) Cost Reduction. Any change in policy measures should pass the test of impact on aggregate industry cost. Incorporation of the padi bonus into the guaranteed minimum price would fail this test because it would result in a marked increase in the rice price and a surge in smuggling and control costs. The reduction in the Treasury burden should be achieved through better targeting of income support and the elimination of redundant or obsolete subsidies in order to improve efficiency.

4.15 (v) Market Solutions. Market solutions are consistent with Malaysia's market economy. Administrative solutions to industry problems have had a poor record in terms of achievement of the desired impact and have increased the burden on the operating budget. The new initiatives for idle padi land and the mini-estate schemes have already encountered such problems. Measures supporting market-determined solutions such as allowing other crops on designated padi land seem more consistent with current macroeconomic policy.

4.16 (vi) Market Impact. The original policy goal of the government market intervention was to correct for market failures. However, a change is warranted since there is clear evidence that implementation is adversely affecting the market. For example, LPN's establishment as a market competitor was justifiable, but subsequent policy implementation created constraints on its performance that have clearly been responsible for market disarray. Results have been similar for the Farmers Organizations' involvement in fertilizer distribution.

4.17 (vii) Pricing. The implicit assumption underlying the implementation of the price policy is that Malaysia's rice sector can be effectively isolated from world markets by prohibiting imports except by LPN. Under this assumption, prices can be set at any level and quantitites can be adjusted by varying import amounts. This assumption of effective isolation does not hold because the greater the gap between external and internal prices, the greater the effort needed to prop up the domestic industry. While many arguments can be made against the use of border or import parity prices, domestic prices should bear some long-run relationship to the real factor or product resource costs because the rice industry competes with other domestic industries for resources whose returns are, in fact, determined by the market.

C. Specific Recommendations

Planning for Adjustment

4.18 Growth Prospects. The Malaysian economy is expected to rebound between 1988 and 1993. Both the Malaysian Ministry of Finance [12] and the World Bank's 1988 Country Economic Memorandum [13] foresee GDP growth rates of 4% to 5% for the period. Agriculture too is expected to grow, due primarily to the performance of tree crops, but at a lower rate of 2% to 3%. Given an annual average decline in padi and rice output of 1% over the last ten years, and no immediate prospect of a major turnaround in the industry, long-run growth in paddy and rice output can be expected to continue in the range of ±1% annually. There is no evidence to support the Ministry of Agriculture's forecast of a sustained 5% annual growth rate in output given past performance and the fact that growth will be based solely on yield improvement since current policy no longer supports expansion of padi area.

4.19 With a rice sector growth rate markedly lower than that of the rest of the economy, the padi and rice industry will continue to become poorer relative to the rest of the economy, other things remaining unchanged. Unless a specific program is introduced to deal with the problem directly, the burden on government will increase, more land will be left idle, and part-time farming will become more pervasive, as will attendant productivity problems.

4.20 Protection has not worked and clearly contributes to disorder in the industry. Actual conditions in the padi and rice sector must be explicitly recognized and taken into account in the planning process.

4.21 Bureau of Agricultural Economics. The current level of agricultural policy analysis available to Malaysian policy makers is inadequate, given the magnitude of the problems. In addition, the statistical basis is unsatisfactory. The crop cutting survey of the Department of Statistics estimated 1.721 million tons of dry padi produced in 1986. Using a notional milling rate of 0.66, the estimate of rice produced is then derived to give 1.1 million tons of rice. However, mill returns show only 1.290 million tons of padi purchased and 880,000 tons of rice produced. The 421,000 ton of padi difference is due to on-farm consumption, retention for seed, losses and estimation error. Given the high inducements to market padi it is unlikely that the marketed share would be so low and estimation error appears to be the major explanation. The poor results of the supply response modelling for Malaysia are largely due to the use of the crop cutting estimates rather than the use of mill padi purchases supplemented by direct farm surveys to measure the significance of the amount not marketed. Similarly, smuggled rice is not included in rice balance sheets. The quantities involved are quite large and can be estimated indirectly. The advantage of ongoing policy analysis of high

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12/ Ministry of Finance, Economic Report 1987/88.

13/ World Bank (1988), Malaysia: Matching Risks and Rewards in a Mixed Economy.

standard is the feedback to the process of basic data estimation. Consistent with the recommendations of the Fifth Malaysia Plan, it is suggested that a Bureau of Agricultural Economics be established within the Prime Minister's Department and possibly within EPU. Its staff could be small, perhaps six professionals at a PhD or equivalent level who are well experienced in economic policy analysis for agriculture. The unit would need to be independent of the vested interests of any single ministry and exempt from direct involvement in Plan preparation. The mission of the bureau would be the impartial analysis and monitoring of agricultural policy implementation from a macroeconomic perspective. Its first task would be the reformulation of economic policy for the padi and rice sector and the definition of an adjustment program. A second task would be to define a policy for growers outside the granary areas. The current granary policy simply states that infrastructure will not be extended. However, farmers will continue to need research, extension, infrastructure maintenance, and other services. In particular, policy redefinition is needed for East Malaysia, where no granary for support has been identified. A third task would be a critical review of the statistics on production, area, yield, consumption and other basic planning data.

An Adjustment Program

(i) Production Adjustment

4.22 Production has failed to stem industry decline, and the stronger the current surge in nonagricultural growth, the worse will be the future decline. However, as the foregoing analysis has indicated, the noncompetitiveness of the padi and rice industry is as much a function of structural weakness as of a resource unsuitability. There are three major structural problems on the production side: (a) farm sizes are too small to provide incomes competitive with incomes from jobs elsewhere; (b) policy initiatives are working against growth in farm size by creating incentives that induce more claimants over padi income to remain in the system than the system can economically support; and (c) intervention has pushed up industry costs, particularly land costs.

4.23 A production adjustment program is recommended to reduce the number of claimants over padi income and to reduce program costs. Legislation has been enacted prohibiting the sale of padi land of less than one acre to prevent further fragmentation. Additional legislation is required limiting multiple ownership of land below a certain size providing for the witholding of subsidies from such land. Using government funds to buy out claimants seems preferable to using funds to support the incomes of those who are not bona fide farmers. Farm size could be increased by providing assistance to promising young farmers by buying out salaried siblings or pensioning older, part-time growers who are not interested in farm expansion. Successful farm amalgamation schemes have been undertaken in other countries and even in Malaysia, where, for example, the KADA amalgamation trial has been successful but at high cost which can be reduced. At a minimum, any intervention measure that works against growth in farm size and farm income (net of subsidies) should be reexamined and considered for termination. The argument here is not the relative productivity difference between small and larger farms but the relative income handicap of even the most productive small farm.

4.24 The principles of an adjustment program would be (a) full compensation of losers in a closed system that ensures declining compensation costs, and (b) orderly departures from the sector. Despite the current protection program, growers are leaving land idle and underutilizing expensive facilities (for example, tertiary development under MUDA II). A managed departure program would offer greater gains, and the net employment effect is likely to be negligible. Tying income support to an identified group of farmers for example, to farmers over a certain age, would lead to decreasing costs over time as beneficiaries die, whereas support based on bags of padi produced continues regardless of need. Income support would be nontransferable, and new entrants to the industry would be ineligible for assistance.

(ii) Market Adjustment

4.25 The agricultural development principles set out in the Fifth Malaysia Plan are commercialization of the smallholder subsector, rationalization of the extent of government involvement, and an increase in private sector participation. In no way can it be reasonably argued, however, that current market management operates according to these principles. Consistent with these principles would be some reduction in intervention, particularly in the use of price intervention to support income. If price intervention is considered necessary, only one price should be controlled.

(a) Factor Markets

4.26 Fertilizer. The free fertilizer program should be phased out over a three-year period. The Farmers' Organizations should compete with private fertilizer distributors so that growers could select the lowest cost supplier. At the same time, the Malaysian Agricultural Research and Development Institute should intensify its fertilizer trials and fertilizer recommendation program on individual farms.

4.27 Credit. Padi credit is no longer provided interest free but at 4% interest. The next step is to set the interest rate and repayment terms so that they cover BPM's actual expenses net of any cross-subsidization of its other activities. The interest subsidy is of minor importance to farmers, while the low recovery of principal works against the commercialization of both BPM and the farmers.

4.28 Irrigation Charges. The current system offers no incentive for improved water management. The water cost is low or free and does not vary with the quantity used. Development of effective water-user associations has not been very successful under the current system because water-user associations can have little impact if they cannot levy cost penalties for misuse. MADA, for example, has a major problem supplying water to users at the end of the canals. Concrete lining has improved the distribution potential under MUDA II, but water still does not always get through because absentee farmers at the top of the canal leave turnout gates open--without penalty. At the least, volumetric pricing should be introduced in the large-scheme areas at the small irrigation area subblock level of about 20 small farms each. Water supplies should be rotated between small irrigation areas at the head and at the ends of the networks, with metering for each group.

(b) Padi Marketing

4.29 Pricing. The two major aspects of padi marketing for which adjustment should be considered are pricing and state milling. The padi procurement system is the pivot on which the whole industry turns. The procurement system determines industry efficiency and profits and losses. At present, there are no incentives for improving quality, while the moisture-deduction schedule ensures that maximum losses are built into the system all the way downstream.

4.30 The padi pricing schedule should be adjusted to reflect both weight loss in drying and the resource cost of drying. Pricing should be such that it becomes profitable for farmers associations or entrepreneurs to invest in drying facilities and to offer drying services to padi growers prior to mill delivery. Mechanical on-farm drying is not recommended because of higher costs and quality-control problems that are likely to arise with many small operations. Low-cost sun drying is suitable for small quantities.

4.31 Price Levels and Flexibility. Padi prices are too high and inflexible. The guaranteed minimum price for padi has become in effect a fixed price. Although originally calculated on a cost-plus basis that included the full price of fertilizer and other inputs, the guaranteed minimum price was not reduced when extensive government input subsidies reduced farmers' costs. Fixed padi prices have reduced risks and hence farmers' management inputs. At times of poor harvests, fixed prices have also reduced farmers' incomes. In addition, fixed prices have led to an intense, post-harvest concentration of padi deliveries at LPN facilities, forcing over-investment in government facilities, because there is no incentive payment to cover the holding cost of spreading deliveries.

4.32 Although a desirable long-term goal may be to derive padi prices directly from import-parity prices, for the near term it is recommended that some protection of the industry be retained as a sudden large shock would be socially undesirable. At the same time, it is recommended that a change be made from cost-plus padi pricing to pricing based on rice prices less the actual costs of milling, drying, transport, and storage.

4.33 These changes would need to be accompanied by other measures to reduce inefficiencies in these operations and by direct income support measures. Measures to reduce inefficiencies in post-harvest operations would be a price structure reflecting resource costs (e.g., drying) and increased competition through a reduction in LPN's presence.

4.34 Coupon Subsidy. The padi bonus system, which is open to abuse,[14/] should be replaced by a system of direct income payments that are not tied to padi production or deliveries. Various alternatives need to be examined for

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14/ The Auditor-General's Report, Government of Malaysia (1982). The report documented poor supervision, fraud, and collusion between farmers and subsidy agents.

feasibility. Among other options, it is suggested that a system be considered whereby all growers would receive a lump sum payment based on their recent average bonus receipts. No new entrants to the program would be allowed, and the program would eventually shift to one of payments based on need (as measured by a farmer's occupational immobility or other criteria). The move from an open-ended Treasury obligation to a closed one would ensure that the cost would not rise above its present level and would decrease through attrition.

(c) Rice Marketing

4.35 Reform is recommended in four areas: pricing, quality, nonprice regulation, and the role of LPN.

4.36 Prices. It is suggested that consideration be given to the "price-band" method of price control.[15/] The method starts with a moving average c.i.f. import price. Domestic prices are set at a level that exceeds the moving average by the agreed level of protection. Ideally that protection margin is to be reduced over time. Government price support of the local crop is triggered by a fall in domestic prices below a margin, say 10%, of the adjusted import price. This system has worked well in Chile for more than 15 years and ensures that prices move in the same direction as import prices while protecting growers from sharp fluctuations. The protection level is explicit and adjustable and effects only the product price. The current system of protection in the padi and rice industry is a mix of implicit and explicit transfers, with no indicator of overall cost other than rising market disorder and budgetary burden. Only one basic grade of rice should be controlled; prices of higher grades should be determined wholly by the market.

4.37 Quality and Grading. The aggregate quality of the rice available in Malaysian markets is lower than that which could be provided were the same resources used differently. The low quality is due partly to the varieties grown, the grades imported, and the poor quality of the padi entering the mills and partly to the small differentiation of grade margins, which provides little incentive to mill higher quality rice.

4.38 The complex of grades and geographical zones should be abolished. The system creates confusion, provides incentives for cheating, and entails high enforcement costs. Increased price competitiveness should involve grade competitiveness. Grade specifications would be required for the single grade with a controlled price.

(d) Nonprice Controls

4.39 The function of market controls is to remedy a perceived market failure. When the controls themselves become an impediment or increase industry costs, they should be removed. Many of the government licensing and

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15/ For operational details see World Bank, on Agricultural Price Control in Chile, 1988.

reporting requirements in the padi and rice industry no longer serve any useful function. Licensing of the transport of rice in quantities over 100 kg gives a spurious impression of control in a system in which grey market imports are measured in the thousands of tons. Detailed miller accounts add significantly to overhead and serve little real use.

(e) The Role of LPN

4.40 There are two issues involved in a consideration of LPN's role: one is LPN's role as Malaysia's major rice miller; the other is the efficiency of LPN's operations. If the government wishes to continue LPN's milling role, then an explicit market share (for example, 20% or 250,000 tons of rice milled) should be delimited for LPN. Adequate resources would need to be allocated for investment in plant capacity and for operating expenses. At present, LPN's market share is not predetermined and its intake of padi bears no relationship to plant capacity, leading to excessive milling costs and the need to turn over part of its intake to private millers at a loss. This situation greatly increases LPN's operational costs, which have to be met by the Treasury. Even the best management effort by LPN cannot overcome this handicap.

4.41 LPN's problems are not unique but are shared by parastatal millers and marketing boards elsewhere. The general swing toward privatization has been for good reasons. At best, such parastatal entities have been an interim solution. In the Malaysian context, state bodies involved in trading have generally been successful when their activities have been based on tree crop commodities and less than successful when based on food crops, which is consistent with Malaysia's comparative advantage in production. Involvement of a government agency does not guarantee that a marginal activity will become profitable. Rather, the generally higher cost of a state operation, shielded as it is from market tests by budget infusions, ensures perpetuation of the relative unprofitability of the sector by protecting submarginal growers and structures.

4.42 It is recommended that LPN withdraw from milling over a five-year period and that it revert to its previous role of market regulator. For the time being, however, LPN should continue to import and stockpile rice. LPN pricing and release of imported grain would serve as the variable tariff measure used to influence domestic prices. Food security objectives would be met by forward contracts on rice deliveries.

D. Conclusion

4.43 The Malaysian padi and rice sector is in serious difficulty because benevolent intervention has sought to force a distributional solution on a relatively unprofitable industry characterized by structural rigidity in an evolving economy. A managed program of structural change would have a better chance of encouraging productivity increases and farm income growth. The first priority for such a program would be the dismantling of much of the protection that shelters excess costs and encourages market disorders. If left unfettered a smaller padi and rice industry might experience strong and sustained annual growth of as much as 5% as a short-run response to adjustment measures and 2% thereafter from yield increases.

MALAYSIA

REVIEW OF THE RICE INDUSTRY

ANNEX 1: Production

A. Structure of Production

1. Aggregate Output. Malaysia is a small padi producer by East Asian standards, its recent annual average out-turn of 1.5 million tons is dwarfed by Indonesia's 37.5 million tons and Thailand's 19.2 million tons and is a reflection of smaller planted area (Annex 1, Table 1). National average yields of 2.7 tons per ha are intermediate and range from 4.5 tons per ha for irrigated crops in large schemes to 1.5 tons per ha for rainfed hill padi.

Annex 1, Table 1: PADI STATISTICS FOR SELECTED COUNTRIES, 1983-87
(annual average)

Country	Area ('000)	Production (million tons)	Yield (tons/ha)
Indonesia	9,700	37.5	3.9
Thailand	9,700	19.2	1.9
Philippines	3,330	8.3	2.5
Malaysia	660	1.5	2.7

Source: FAO Production Yearbooks

2. Malaysia does not have a typical Asian padi-based economy. Padi contributes only 1% to GDP and 5% to total value-added in agriculture, fisheries and forestry. About 10% of planted area is under padi. In 1986 some 85% of production of about 1 million tons of rice (1.5 million tons of padi) was grown on the peninsula; the eastern states of Sabah and Sarawak accounted for the rest, with yields generally one-half those of the peninsula (Annex 1, Table 2).

3. Production is concentrated in eight large-scale irrigation schemes. One large scheme administered by the Muda Agricultural Development Authority (MADA) accounts for over 40% of production with average yields of 4.5 tons padi per hectare. Another 25% of output comes from the other seven large schemes (granary areas). Outside of the large scheme areas are a wide range of small irrigation schemes, rainfed padi fields, and shifting cultivation areas concentrated in the eastern states and yielding less than 1 ton per hectare.

Annex 1, Table 2: MALAYSIAN RICE PRODUCTION BY REGION, 1980-86
(thousands of tons)

Year	Peninsula	Sabah	Sarawak	Total	Granaries (%)
1980	1,145	59	114	1,318	64
1981	1,137	59	106	1,303	63
1982	1,038	57	119	1,213	62
1983	961	52	105	1,117	61
1984	847	45	118	1,010	56
1985	1,092	46	120	1,258	66
1986	942	43	116	1,101	65
1987	885	46	119	1,050	64

Source: ISIS, 1988, Government Interventions in the Padi and Rice Industry of Malaysia, p. 16.

4. Padi Farm Characteristics. About 116,000 households [16/] are engaged principally in padi farming and another 200,000 grow some padi. The Fifth Plan estimates that full-time growers represent 7% of all rural households. About 73% of all farmers are Bumiputras, but the proportion is higher in padi growing. Some 57% of padi growers are considered poor and account for 14% of the nation's poor families.

5. Farm Size. The average farmed area is about 1.6 ha. Only 2% of padi farms are larger than 3 ha. Survey data indicate that 30% of padi farmers are tenants, with the remainder being owner-operators who frequently rent extra land. Farm size and tenancy status have remained rather stable over time. For example, surveys in the MADA scheme found an average farm size of 1.8 ha in 1955, 1.7 ha in 1965, and 1.6 ha in 1975.[17/] During this time, a major irrigation scheme was opened, HYV technology was introduced, and large tractor mechanization became well established. Growth in farm size has been constrained by cultural attachment to land, policy incentives for retaining ownership, multiple ownership of land, and, particularly, padi land ownership and tenancy laws that block custom operators with large-scale machinery from amassing padi land.

B. Intervention on Inputs

6. Although state governments are also involved in market interventions on inputs, federal programs are far larger and easier to quantify. Among

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16/ "Fifth Malaysia Plan, 1986-90," p. 86. Full time growers were estimated by the 1984 Household Income Survey. Part-time growers were identified from 337,000 registered recipients of free fertilizer for padi in 1986 and 230,000 recipients of the padi price bonus for the same year.

17/ Centre for Policy Research, University of Science, Land Tenure in the MUDA Irrigation Area, Malaysia 1981.

these, intervention is most significant in the provision of fertilizer, credit, and irrigation.

7. Fertilizer. In order to demonstrate the high payoff to farmers from the use of fertilizers, a subsidy scheme was introduced in the early fifties. An amount of free fertilizer was distributed to farmers equal to a percentage of a regional average requirement. Although the temporary subsidy was to cease in 1966, it was continued at 30% of the original level until 1971. A more elaborate scheme was introduced in 1974 to combat spiralling import prices. The program reached a 100% subsidy level in 1979, which remains in place. A standard quota of 300 kilograms per hectare is given free to farmers registered under the program. The upper limit of farm size is 2.4 ha, the number of recipients suggests that in practice almost all padi growers receive the free fertilizer quota.

8. The government-sponsored Area Farmers Association (PPK) distributes the free fertilizer and receives a commission on turnover and reimbursement of delivery charges. The National Association of Farmers Associations (NAFAS) is the monopoly distributor of fertilizer to the PPKs. Urea is supplied to NAFAS from the government-owned Petronas plants. Phosphates and potassium are imported by the Ministry of Finance and the Ministry of Agriculture and supplied to NAFAS. Over the period 1980-86, M$473.2 million was transferred under the fertilizer subsidy program (Annex 1, Table 3) and M$42 million for the subsidy on distribution costs. The number of farmer recipients varied from a high of 416,250 in 1980 to a low of 279,547 in 1985. These values are only partial and probably include only the Ministry of Agriculture component. (NAFAS's records for 1986, for example, show a subsidy of M$80 million and another M$4 million for distribution, whereas the Ministry of Agriculture total shown for the year in Annex 1, Table 3 is only M$54.3 million. Similarly, the federal budget shows M$98.5 million for the fertilizer subsidy for the same year.)

Annex 1, Table 3: MALAYSIA - FERTILIZER SUBSIDY DISBURSED, 1980-86

Year	Number of recipients	Quantity (tons)	Value (M$ millions)	Price/ton (M$)	Value per recipient (M$)
1980	416,250	153,773	81,600	531	196
1981	304,019	140,348	100,654	717	331
1982	285,089	139,706	77,552	555	272
1983	284,721	139,477	65,389	469	230
1984	282,769	110,813	49,583	447	175
1985	279,547	105,776	44,049	416	158
1986	336,804	152,601	54,331	356	161

Source: Ministry of Agriculture.

9. Effect of Fertilizer Subsidy. As expected, the fertilizer application rate has been adjusted to the quota of free fertilizer rather than being determined by the specific soil fertility, plant variety, and other factors. Very little over-quota amounts of fertilizer are purchased for padi, and anectodal evidence indicates that secondary trading and wastage occur. Chan (1980) estimated that the actual amount applied was only 40% of the recommended amount. The intent of the original subsidy program was to encourage fertilizer use, particularly for HYVs. But farmers have long been accustomed to its benefits and use unsubsidized fertilizers in the production of other crops. The reintroduction of the scheme as a defense against high import prices may have been relevant in 1974 when urea cost US$315 a ton f.o.b. but no longer seems relevant at 1987 prices of US$116 a ton, in current prices. In 1985 constant dollars this represents a fall from US$533 a ton to US$89 a ton.

Annex 1, Table 4: FERTILIZER PRICES MID-1988
(US$ at official exchange rate)

	Farm Level Prices/Ton			
Country	UREA	AmS	TSP	KCL
Japan	441	248	546	319
S. Korea	267	132	N/A	115
Taiwan	201	167	N/A	167
Philippines	184	126	313	N/A
Thailand	168	99	313	162
Malaysia (Unsubsid.)	157	119	N/A	123
Indonesia	81	81	81	81
Malaysia (Subsidized)	0	0	0	0

Source: IFDC Bulletin, July, 1988

Malaysia's quota of free fertilizer is the cheapest in the region. As shown in Annex 1, Table 4, the price of unsubsidized fertilizer is also the lowest with the exception of Indonesia'a subsidized supplies. An average of 1 kg. of free fertilizer plus 1 kg. of unsubsidized fertilizer would still give Malaysian padi growers the cheapest fertilizer in the region at US$78/ton equivalent. The padi price/urea fertilizer price ratios are

Japan	4.1
South Korea	4.4
Taiwan	3.2
Malaysia (average)	3.2
Malaysia (full price)	1.6
Thailand	0.95
Philippines	0.91

High ratios imply high financial returns to use of more fertilizer, provided that the crop still responds at the current level of fertilizer application. Maintenance of price ratios above 1.0, past the point where plant yields respond, result only in income transfers to the grower. For Malaysia, it is interesting to note that payment of unsubsidized prices still gives an incentive to expand fertilizer use where there is a plant response and an income transfer where there is not. Why farmers do not apply over quota amounts of favorable padi/fertilizer price ratios is a matter of conjecture and has not been researched. Access to extra fertilizer is not a problem and response trials clearly quantify production response by area. Farmers apparently do not think it is worth the trouble to devote complementary resources such as labor, or there has been a failure in research and extension to convince the grower that more fertilizer is worthwhile.

10. Credit. Prior to 1970, formal credit was not commonly available to padi smallholders. Credit was advanced at high rates of interest for small amounts from traders, relatives, and other sources. A 1968 national padi and rice marketing survey by the Federal Agricultural Marketing Authority found that interest rates of 60% to 80% were common.[18/] Not surprisingly, this depressed demand for fertilizer, improved seeds, and other traded factors. The Agricultural Bank of Malaysia (BPM) was established as a government-owned credit institution in 1969 predominantly to finance double cropping of padi.

11. In 1981, the Government reduced the interest rate on padi loans to 0%; in 1986 the rate was increased to 4%. Credit use is relatively small because the various subsidies markedly reduce the cash needs and because of small farm size. Between 1972 and 1985, 445,619 subloans were made to padi growers for a total amount of M$308 million for short-term production credit. All loans were below M$5,000 (the average was M$691) and most were for machinery services. In recent years arrears have averaged 59% of outstanding padi loans.

12. Effect of Credit Program. The program was an essential part of the total package used to spread double cropping and the associated use of HYV technology. In 1970, padi farmers had access to 40 local credit centers. In 1982, the number had risen to 527 (Annex 1, Table 5). The number of subloans rose from 2,724 to a peak of 45,859. Of interest is the small coverage. In 1986 only 112,752 ha were financed out of a planted area of about 600,000 ha. The number of farmers receiving loans remains at about 45,000 from a padi grower population of between 116,000 and 300,000 (those growing some padi). Clearly, the credit scheme suffers from lack of demand since at zero interest there was no credit rationing among padi growers.

18/ F.A.M.A. National Marketing Survey, Phase 1, 1968, pp. 94-98.

Annex 1, Table 5: MALAYSIA: BPM PADI CREDIT SCHEME, 1970-86

Year	No. of credit centers	No. of loans	No. of farmers	Area (ha)	Disbursement (M$ '000)
1970	40	2,724	2,293	6,914	214
1975	211	39,465	19,961	89,622	15,370
1978	181	25,261	16,354	55,506	11,582
1979	264	29,252	18,729	71,952	10,968
1980	238	15,459	8,882	42,964	5,996
1981	220	21,819	11,843	73,990	13,414
1982	527	36,133	17,059	83,903	24,800
1983	401	39,278	39,279	98,544	32,700
1984	413	31,722	31,722	72,086	25,950
1985	449	41,402	41,402	100,676	32,098
1986	361	45,859	45,850	112,752	37,617

Source: BPM

13. Low demand for formal credit is attributable to the low level of cash outlays among growers and part-time farmers' access to savings from other income sources. For example, in 1979, before the introduction of free fertilizer, 18,729 farmers received BPM padi credit amounting to M$10.9 million for 71,952 ha. In 1980, after the fertilizer became free, only 8,882 farmers received credit amounting to M$5.9 million for 42,009 ha (Table 2.4).

14. The credit subsidy is on both principal and interest. Between 1980 and 1985, the outstanding portfolio on padi loans rose from M$15.4 million to M$36.3 million. The interest income foregone, assuming a 10% opportunity cost of capital, rose from M$1.5 million a year to M$3.6 million. During this period, a little over half the principal due was collected. Adding the interest rate subsidy to the uncollected principal gives a total subsidy varying between M$10 million and M$24.9 million annually (Annex 1, Table 6). The average interest rate subsidy at zero interest for all subloans in 1986, assuming the opportunity cost of capital of 10%, would have been a mere M$29 per hectare or M$54 for an average 2-ha farm family. The real impact of the subsidy program is on BPM. The persistent level of high arrears and negative spreads has left BPM in a precarious financial position, requiring an annual grant from the government of about M$30 million.[19/]

19/ World Bank, 1986, Malaysia, A Study of Development Finance Institutions.

Annex 1, Table 6: MALAYSIA: PADI CREDIT SUBSIDY, 1980-85
(millions of ringgit)

	1980	1981	1982	1983	1984	1985
Outstanding portfolio	15.4	19.6	25.6	33.8	37.6	36.3
Interest foregone	1.5	1.9	2.6	3.3	3.7	3.1
Collection rate (%)	45	47	62	56	51	59
Subsidy on principal	8.5	10.4	12.3	21.6	18.4	14.9
Total	10.0	12.3	14.9	24.9	22.1	18.0

Source: Computed from Annex 6, Tables 5 and 17, World Bank Report on BPM, 1986.

15. Irrigation Facilities. Malaysia's Fourth Plan (1981-85) allocated M$1,451 million for irrigation and drainage. In the Fifth Plan (1986-90), only M$337 million was allocated, or a fall of 75% from the Fourth Plan level. The decreased allocation reflected disenchantment with the power of irrigations schemes to expand production while the rest of the system remains constrained.

16. Malaysia's irrigation intervention is of the "normal" type, with federal funding of state-operated facilities. Operation of the scheme is a central mechanism for both organizing farmers and managing technology change. Capital costs are not recovered and recovery of operational costs is minimal. In 1985 water charges levied range from zero to M$29 per ha per year, whereas operation and maintenance costs ranged from M$35 to $73 per ha on large schemes and M$79 to $243 per ha on large schemes. Total water charges collected average around M$0.8 million per year while total operation and maintenance costs are about M$50 million per year for an actual cost recovery of 2% on O&M and 0% on capital.

17. Estimates of the cost of the irrigation program vary according to the classification of component items. Those given in the federal budget and the Finance Ministry's estimate of expenditure and achievements are presented in Annex 1, Table 7. As shown in the table, the operating cost for the MADA and KADA schemes plus nonspecified general operations is over M$50 million per year. (Not shown are the irrigation expenditure within rural development projects and schemes supported by individual states.) Development costs averaged M$145.6 million per year between 1981 and 1985 (Fourth Plan) and totaled M$189.3 million for 1986 and M$181.1 million for 1987.

Annex 1, Table 7: MALAYSIA: ESTIMATE OF IRRIGATION AND DRAINAGE EXPENDITURE, 1981-87
(millions of ringgits)

	1981-1985	1986	1987
Operating Costs			
Department of Irrigation	n.a.	12.7	13.1
Muda Area Development Authority	n.a.	25.1	21.7
Kemubu Area Development Authority	n.a.	20.8	19.0
Subtotal		58.6	53.8
Development Costs			
Kembu Area Development Authority	35.2	8.2	13.5
Muda Area Development Authority	141.3	53.8	22.0
Negri Sembilan	30.9	17.8	11.6
Rompin-Endau	56.0	46.8	66.3
Seberang-Prai	7.0	11.9	14.9
N.W. Selangor	196.2	19.2	15.6
Trans-Perak	36.6	12.2	8.9
K. S. Manik	219.5	39.4	23.9
Besut	5.2	-	4.4
Subtotal	727.9	189.3	181.1
Total Costs	927.9	247.9	234.9

Source: Government of Malaysia, Anggaran Belanjawan, Program dan Prestasi, 1985; Belanjawan Persekutuan, 1987.

18. Effect of Irrigation Intervention. While public expenditure for irrigation has undoubtedly played an important role in expansion of production, allocation cutback for the Fifth Plan is a clear indication that the government is rethinking the effectiveness of the strategy. Probably the major deficiency of the approach has been its effect on the attitude of farmers. Farmers view the schemes as belonging to the government and have little commitment to water-use efficiency or maintenance of facilities, as exemplified by the difficulties experienced in efforts to develop effective water user associations. This arrangement suits part-time and absentee growers, for whom more involvement in system scheduling and water control at the field level involves a high opportunity cost.

19. Perhaps the most striking examples of the problems faced by the development strategy is decreasing farmer interest, as shown by experience with MUDA II and the Small-Scale Irrigation Project. That part of the Muda

irrigation scheme that benefited from Bank-supported tertiary development under MUDA II (Ln. 1717-MA) shows little or no improvement in performance over that part without tertiary development (Annex 1, Table 8).

Annex 1, Table 8: MALAYSIA: MUDA II PADI YIELDS
(tons per hectare)

Year-Season	With tertiary development	Without tertiary development
1981-1	3.6	3.7
1982-2	3.7	4.1
1982-1	2.9	2.7
1983-1	2.2	2.5
1984-1	3.0	3.2
1985-1	3.6	3.4
1986-1	3.4	3.4
1986-2	4.1	3.9
1987-1	4.1	3.9
Simple average	3.4	3.4

Source: National Crop Cutting Surveys and MADA data. See Project Completion Report, MUDA II Irrigation Project, Annex 3, Table 1, September 1988.

20. In order for the benefits of precise water-control structures to be realized, farmer involvement would have to increase, particularly in field regulation of water flow and improvements of land leveling. However, the investments took place during a time when farmers were cutting back their involvement by moving to direct seeding, leaving turn-out flood gates open without attention, and using mechanical field preparation to reduce spiralling labor costs. In 1974, some 77 days per hectare were required for padi production using bullocks and normal labor. In 1982, this had fallen to 32 days per hectare as tractor cultivation and combine harvesting spread, and to 15 days per hectare when direct seeding was used. By 1986, transplanting required only 35% of the labor required in 1974 (Annex 1, Table 9). During the period, the cost of labor in real terms tripled.

Annex 1, Table 9: MALAYSIA - LABOR USE PER HECTARE, MUDA, 1974-1986
(days)

Field activity	1974	1979	1982	1982 /a	1986
Nursery	4	2	2	0	1
Land preparation	6	4	1	1	3
Transplanting/seeding	19	13	19	4	15
Crop management	8	4	6	6	6
Harvesting	32	20	3	3	1
Post-harvest	8	5	1	1	1
Total	77	48	32	15	27

/a Direct seeding introduced.

Source: MADA.

21. These changes in practices have not been limited to large, high-productivity schemes. They have occurred even on small, isolated schemes, where the opportunity costs to farmers' labor would be expected to be lower. The Bank-supported Small-Scale Irrigation Schemes Project (Ln 1444-MA) was implemented during the late seventies to rehabilitate 60,000 ha in 200 schemes. After six years and an investment of M$180 million it became apparent that farmer interest had waned. Cropping intensities on completed schemes actually fell from 109% in 1976 to 48% in 1983, ranging from 0% in Selangor to 107% in Perlis, out of a possible 200% (Annex 1, Table 10). Little interest was shown in off-season plantings because more remunerative work was available. The expost evaluation calculated a rate of return on the investment of only 3%, and only 111 schemes were built.

Annex 1, Table 10: MALAYSIA: SMALL-SCALE IRRIGATION SCHEMES - AREA, YIELDS AND CROPPING INTENSITY FOR COMPLETED SCHEMES, 1981-83

State	Number of schemes	Area (ha)	Cropping Intensity (%) 1981	1982	1983
Perlis	4	1,278	59	78	107
Perak	3	235	0	9	11
Kedah	23	6,879	40	57	72
Selangor	1	1,000	0	0	0
Negri Sembilan	26	2,776	39	60	68
Malacca	14	1,657	50	30	81
Johor	1	138	29	24	32
Pahang	7	2,559	17	11	9
Trengganu	9	4,322	1	2	2
Kelantan	9	4,489	42	73	69
Sarawak	5	5,863	9	18	24
Sabah	9	4,960	30	38	55
Total	111	36,156	27	38	48

Source: Ministry of Agriculture, Project Completion Report.

22. What went wrong? Paddy yields had increased as expected, farmers used recommended varieties, free fertilizer and cheap water were available, and growers received a price bonus. Field surveys revealed that for Negri Sembilan (13 schemes), Perlis (2 schemes), and Malacca (4 schemes) only 4%-14% of farmer income was derived from paddy growing, with the balance coming from other activities, mostly nonagricultural or oil palm production. Even with the most supportive policy measures, these marginal areas could not be sustained. Not surprisingly, the government has suspended preparation of a MADA III or KADA II scheme and no longer supports expansion of padi growing in new schemes or rainfed areas.

MALAYSIA

REVIEW OF THE RICE INDUSTRY

ANNEX 2: Padi Marketing and Processing

A. The System of Post-Harvest Intervention

1. Policy intervention at the post-harvest stage has proven the most expensive and difficult to manage as its complexity has grown over time. It also is the most contentious aspect of Malaysia's rice policy.

2. Description. A surprising 60% of the padi crop is combine-harvested despite the small size of individually operated areas. The bulk-harvested grain is unloaded into bags for transport to the point of sale. Sale may be directly to an LPN mill, a large private mill, or to a small mill processing only for home consumption. Alternatively, sale may be to village-level purchasing agents (Figure 2). At the point of sale, the padi is graded and price adjustments are made for moisture and quality. At the mill, the padi is dried to about 14% moisture content and milled. The rice is then stored for release to private wholesalers.

3. Post-Harvest Intervention. Market intervention began in 1949 with the introduction of the guaranteed minimum price scheme whereby the government purchased rice from private mills for a strategic stockpile at a guaranteed price which was supposedly passed on to growers. Guaranteed minimum price was eventually extended to the whole padi crop, and a government institution, LPN, now competes directly with the private sector in padi purchase and milling. In addition, LPN maintains the strategic stockpile, is the monopoly importer, and polices regulations governing the whole industry.

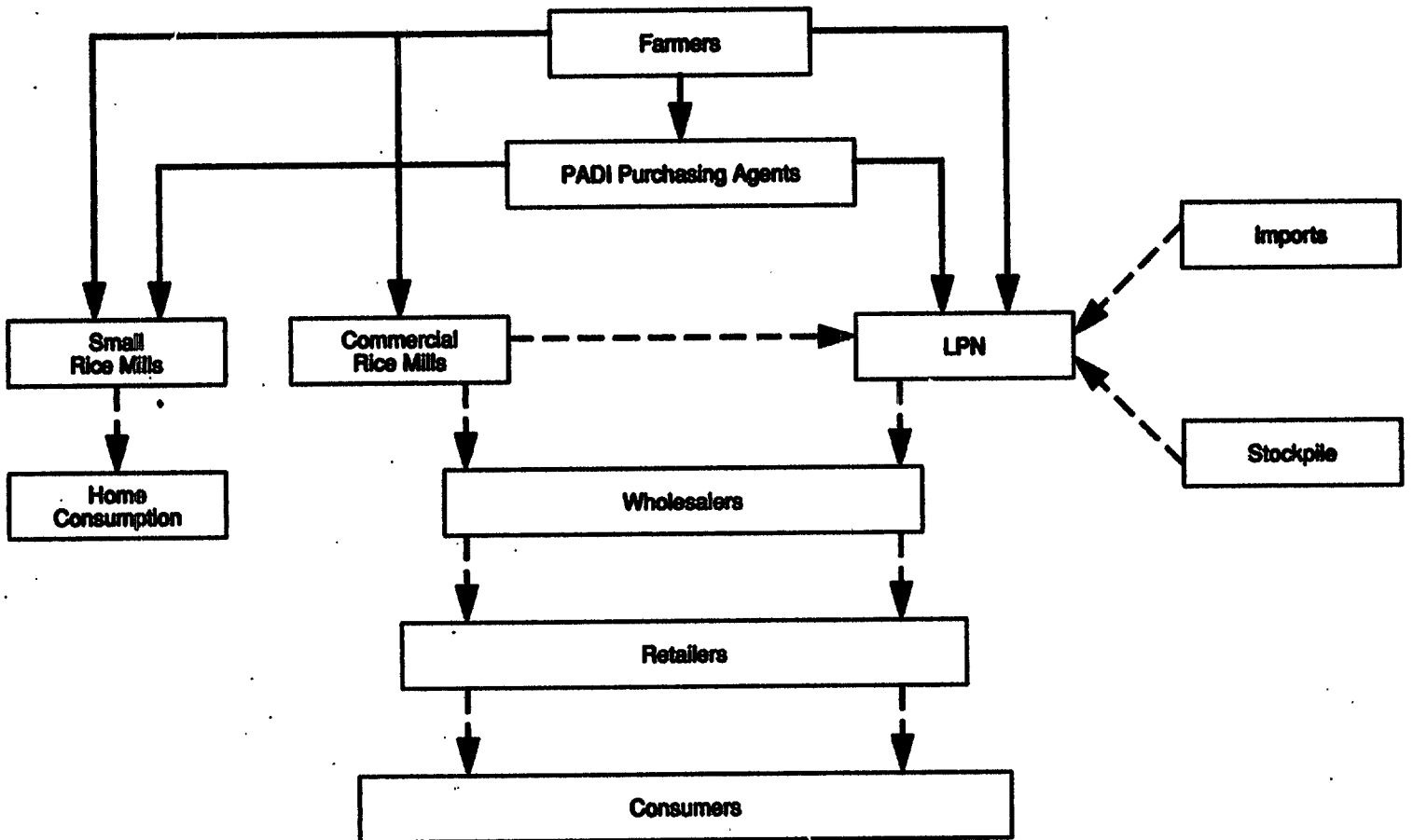
4. Market Shares. Of the 1.7 million tons of padi grown, some 1.3 million tons, or 75-80% is marketed. LPN now purchases almost one-half (49%) of the crop (Annex 2, Table 1), up from 20% in 1975.

Annex 2, Table 1: MALAYSIA: MARKET SHARE OF PADI (Purchases)

	Private Millers		LPN		Total
	Tons	%	Tons	%	Tons
1975	567,676	80	144,076	20	711,752
1979	400,403	65	219,215	35	619,618
1980	504,282	64	317,033	36	871,315
1981	726,883	76	238,205	24	965,088
1982	753,884	70	332,394	30	1,086,278
1983	717,227	69	325,066	31	1,042,293
1984	702,617	71	282,345	29	984,962
1985	654,080	54	560,157	46	1,214,837
1986	661,162	51	630,877	49	1,292,039

Source: IRRI Rice Industry Study, January 1988, p. 136.

Figure 2
PADDY/RICE MARKETING CHANNEL



Source: LPN

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5. The 661,162 tons purchased by the private sector utilizes about 50% of installed drying and milling capacity of 1.3 million tons. The 630,877 tons purchased by LPN exceeds its installed milling capacity of 423,520 tons.[20/] Some of the excess padi is sent to qualified Bumiputra millers for milling on a fee-for-service basis, and the rice is sent back to LPN. Participants do not bear the trading or milling losses, which are on LPN's books. LPN sells the remainder of its excess padi to private millers after drying; private millers are not charged for the drying.

B. Padi Procurement and Pricing

6. At place of sale, growers receive the guaranteed minimum price of M$496 per ton (for clean padi at 14% moisture content equivalent) from the buyer plus a bonus of M$165 per ton of padi from an LPN agent on presentation of a passbook. The guaranteed minimum price cost is passed on to the eventual consumer; the Treasury bears the cost of the bonuses. The guaranteed minimum price and bonuses do not vary by season or location. The guaranteed minimum price for long-grain varieties was set at M$429.9 per ton in 1974 and raised to M$496 in 1979, where it remains. Medium-grain varieties are priced lower but in the same manner. The bonus has not changed since its introduction in 1980. Bonus payments of M$150 or less are made in cash. Amounts over M$300 can only be received from LPN mills upon presentation of the sales receipt. The difference between the guaranteed minimum price and the average mill-door price has declined and has been insignificant during the last decade (Annex 2, Table 2).

20/ Table 6.6 ISIS Report and Table 6.1.

Annex 2, Table 2: MALAYSIA: PADI PRICES
(M$/100 kg)

	Guaranteed minimum price	Average actual	Difference (%)
1971	26.44	24.56	-7.11
1972	26.44	27.67	4.65
1973	26.44	34.46	30.33
1974	42.99	48.96	13.89
1975	46.30	49.22	6.31
1976	46.30	51.95	12.20
1977	46.30	51.22	10.63
1978	46.30	50.41	8.88
1979	49.60	51.24	3.31
1980	49.60	51.24	1.77
1981	49.60	50.51	1.83
1982	49.60	50.13	1.07
1983	49.60	49.94	0.69
1984	49.60	49.79	1.29
1985	49.60	49.79	0.38
1986	49.60	49.69	0.18
1987	49.60	N.A.	N.A.
1988	49.60	N.A.	N.A.

Source: ISIS Rice Industry Study, computed from LPN data.

7. Effect of Padi Procurement Intervention. The most apparent and consequential effect of the padi procurement intervention is on the competitiveness of the Malaysian rice industry. Whether the consumer or the treasury pays for the padi bonus, the cost at the level of the economy for a ton of padi is the same--M$661 (Annex 2, Table 3). At the higher milling rate of 64%, 1.56 tons of padi are required per ton of rice. The cost of the padi alone in a ton of rice averages M$1,031 or US$430. To this must be added drying (US$10) processing (US$58), and other downstream costs, which gives a total of at least US$500 per ton at the mill door. Only in 1981 did import prices approach this level. In all other years rice production was uncompetitive with imports. The industry will remain uncompetitive unless the padi cost is reduced markedly, regardless of any improvements that may be made in processing and drying or of the devices employed to fund the procurement.

Annex 2, Table 3: MALAYSIA: COST OF PADI PER TON OF RICE, 1980-1987
(millions of ringgits and US dollars)

Cost per ton of padi		
GMP	496	
Bonus	165	
	661	
Cost per ton of rice		
Milling rate, %	64	
Tons of padi/ton of rice	1.56	
Cost of padi/ton of rice	1,031	(US$430)

8. Cost to Treasury. Since the bonus payment program began in 1980, M$1,406 million has been paid, and the program now costs the Treasury an average of M$200 million per year. This represents 70% of the cost of the explicit subsidy program for all sectors shown in the federal government's operating expenditures for 1986 and is equivalent to 17% of development expenditures for the agricultural sector for that year.

9. Effect on Other Goals. The double subsidy, guaranteed minimum price plus bonus, is paid on a per ton basis and the total transfer received per grower increases with cutput. Supply response analyses in the literature show no evidence of output effect.[21/] In fact, production and food security have declined. As expected, however, the share of production marketed through the official procurement system has risen rapidly to 80%.

10. All growers benefit regardless of whether they are among the 57% of poor padi farmers. Without the subsidies, all other things remaining equal, more padi families would be poor and other means would be required to reach income goals.

C. Drying, Milling, and Storage

11. Drying. Regardless of any improvements in milling and storage technology, improperly harvested and dried paddy will give a high proportion of broken and discolored rice. Just as setting the padi price too high overwhelms the effect of cost-reduction measures in achieving price competitiveness, poor quality padi nullifies the effect of technology improvements in achieving quality competitiveness. Malaysia's rice is both expensive and of lower average quality than rice from other Asian countries as measured by the higher out-turn of low grades.

12. One of the consequences of the spread of double cropping has been the harvesting of the dry season crop at the start of the rainy season in

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21/ ISIS, Rice Industry Study, January 1988, p. 56.

August/September. The rapid rise in combine harvesting has aggravated the situation, as large quantities of wet grain are delivered in a very short time to drying facilities that cannot process the rain quickly enough to avoid deterioration. Installed drying capacity, which is generally more than adequate, becomes insufficient under these circumstances. Expansion of facilities that are used only during a brief period is an expensive solution. The strain on drying facilities could be reduced if harvesting were scheduled to spread deliveries over a larger period and farmers adhered to the schedule. Unfortunately, the padi pricing system provides incentives to farmers and harvesting contractors to do just the opposite.

13. The weight of water in padi above the 14% standard is subtracted from the total padi weight according to moisture-deduction schedule (Annex 2, Table 4). The resource cost of drying is borne by the miller, so farmers gain nothing by drying their crop or spreading the harvesting period. In addition, the deduction rate is almost linear whereas drying costs per unit rise sharply at higher moisture content, and padi with more than 25% moisture should be rejected outright. A similar situation exists for deductions for admixtures, contaminants, and immature grains which is 1% for each 1% of impurity. Not surprisingly, given the spread of mechanical harvesting, millers report a very high and rising proportion of immature and empty grains.

Annex 2, Table 4: MALAYSIA: DEDUCTION RULE FOR MOISTURE CONTENT OF PADI

Moisture (%)	Deduction (%)
>14	0
14.1 - 15	1
15.1 - 16	2
16.1 - 17	4
17.1 - 18	5
18.1 - 19	6
19.1 - 20	7
20.1 - 21	8
21.1 - 22	9
22.1 - 23	10.5
23.1 - 24	11.5
24.1 - 25	13
Above 25	Negotiable

Source: LPN

14. Effect of Drying Subsidy. The main effects of drying subsidy are on the quality of rice, the processing costs, and the distribution of losses between public and private millers. The deduction schedule has been a sore point with farmers and was reduced under pressure to the present levels, which are unusually low. For example, Malaysia's deduction at 19.5% moisture is 7%, whereas Thailand's is 16.5%, the Philippines' is 12%, and Indonesia's is 9% (Annex 2, Table 5). The net effect of the deduction rate is that private millers buy drier padi, whereas LPN, which by law cannot reject padi, is left

with padi of lower overall quality. In addition, the private sector under-invests in drying capacity while LPN facilities are strained. After harvest, paddy must be dried quickly. For a moisture content of 22% and above, the drying must be done within one or two days. In MADA and KADA, trucks of padi have waited up to four days at LPN facilities because of drying capacity problems, which greatly increases padi deterioration.

Annex 2, Table 5: DEDUCTION RATES FOR MOISTURE CONTENT IN ASEAN COUNTRIES, (1984)
(percentages)

Malaysia		Thailand		Philippines		Indonesia	
Moisture content	Deduction	Moisture content	Deduction	Moisture content	Deduction	Moisture content	Deduction
14.0	0			14.0	0	14	0.0
		14.5	0.0	14.3	2		
14.5	1	14.7	1.5	14.8	3		
15.5	2	15.3	3.0	15.3	4	15	1.87
16.5	4	16.3	6.0	16.5	7	16	3.75
		16.8	7.5				
17.5	5	17.3	9.0	17.5	9	17	5.63
		17.8	10.5				
19.5	7	19.3	16.5	19.5	12	19	9.24
		19.8	18.5				
20.5	8	20.3	20.5	20.5	14	20	10.98
		20.8	22.5				
21.5	9	21.3	24.5	21.5	15	21	12.71
		21.8	30.5				
23.5	11.5	23.3	32.5	23.5	18	23	15.89
		23.86	34.5				
24.5	13	24.3	36.5	24.5	20	24	17.34
		24.8	38.5				
				24.5	21	25	18.79

Source: T.A. Chew and Fatimah Mohd. Arshad, "Comparative Paddy Pricing Systems in ASEAN," Universiti Pertanian Malaysia; unpublished.

15. While the drying cost of about M$30 per ton of padi is a direct transfer to growers, the reduced quality and outright spoilage due to moisture are losses captured by no one. Another hidden cost is the reduction in effective drying capacity and resultant expansion to reduce drying time.

16. Milling. Of the 329 rice mills in Malaysia, LPN owns 27 (8%), which together constitute 25% of total milling capacity; the balance belong to private millers. LPN's market presence varies geographically, from 55% of the milling capacity of Kedah/Perlis mills to 4% in Penang/Seberang Prai. LPN's mills are newer, generally larger, and better equipped than private mills; 23 are in the 5 or more tons per hour size class. Private mills are predominately (146) in the 1 ton per hour class. The total asset value of LPN's 27 mills is M$65.5 million, compared with M$50 million for that of the 305 private mills surveyed. According to LPN surveys, the recovery rate is higher (62-64%) in private mills than in government mills (52-60%). LPN's poor recovery is due to the poorer quality of the padi it is required to accept rather than to poor management.

17. In 1986, LPN purchased 49% of the crop (630,877 tons) and milled 28% (354,741 tons). Of the remaining padi, 166,387 tons were sold to the private sector for milling and 91,153 tons were passed to Bumiputra millers to mill on a fee basis, with the rice being returned to LPN (Annex 2, Table 6).

18. Private millers purchased 661,162 tons from farmers and 166,387 tons from LPN in 1986. Since the padi bought from LPN is already clean and dried, and is priced the same as padi bought from growers, the net result is a transfer from LPN of the drying cost of about M$5 million plus the value of losses avoided from poor quality rice. The LPN loss on consignment milling amounted to another M$2.7 million for drying plus wastage.

Annex 2, Table 6: MALAYSIA: MILLING SHARES, 1985 and 1986
(tons)

	LPN	
	1985	1986
Padi purchased	560,167	630,877
Padi sold unmilled	46,097	166,387
Padi milled by LPN	294,427	354,741
Padi milled for LPN	161,690	91,153
	Private Millers	
	1985	1986
Padi purchased from growers	654,680	661,162
Padi purchased from LPN	46,097	166,387
Padi milled	700,777	827,549

Source: Computed from LPN data.

19. Effect of Milling Intervention. The immediate effect of the procurement and pricing system is to concentrate padi sales at LPN mills. LPN is unable to reject deliveries, is more lenient on deductions, and can disburse cash on the spot for the bonus payment. The limit to the deliveries is the small number of LPN mills rather than their capacity to process the purchased grain or competitiveness. Without the government mills, the system would cease because average milling margins are negative (Annex 2, Table 7). Interviews with private millers in 1987 indicated losses of M$84.8 per ton, for the most commonly produced grade, B2. LPN's direct loss for that year was M$287 per ton exclusive of wastage losses. With the price of paddy set by the guaranteed minimum price and the rice price unchanged since 1974, millers are caught by rising processing costs for labor and materials. LPN's losses are underwritten by the Treasury whereas private millers survive by squeezing costs, mixing rice grades, obtaining clean dry padi from LPN, million on consignment for LPN, and purchasing a higher proportion of the top end of the crop to get greater than average margins. The problem for the government is that the greater the concentration of deliveries to LPN, the greater the efficiency losses and unintended income transfer as excess padi is sold off to private millers free of drying and spoilage costs.

Annex 2, Table 7: MALAYSIA - MILLING RETURNS PER TON OF RICE, 1986
(ringgits per ton)

	Private mills (grade B2)	LPN mills (all grades)
Cost of padi	807.3	827.3
Processing costs	145.5	195.0
Total cost	952.8	1,016.3
Value of by-products	85.9	60.3
Ex-mill rice price	782.1	668.9
Total returns	868.0	729.2
Net return	-84.8	-287.1

Source: ISIS, Rice Industry Study, p. 138 and p. 155.

20. The lower processing cost per ton for private millers, and their higher grain and head rice (whole grain) recovery rate together with the capacity constraints on LPN's facilities suggest that changes in the rice milling share should be in the direction of the private sector; however, the pricing and procurement practices are producing the opposite effects (Annex 2, Table 8). The LPN mills are being used to transfer income at an unusually high efficiency cost for which LPN is not to blame. The current system has the potential of weakening the integrity of growers, millers, and civil servants in the industry. Even now, there are well-documented cases of abuse, and the gains to the capturing of subsidies seem higher than those from performance improvement.

Annex 2, Table 8: MALAYSIA: MILLING PERFORMANCE, 1986

	LPN	Private Mills
Processing costs (M$/ton)	195	146
Grain recovered (%)	59	64
Head rice recovered (%)	72	80

Source: LPN.

21. Treasury Cost. The annual direct cost to the Treasury [22/] of milling involvement and the bonus scheme was M$315 million in 1986 (Annex 2, Table 9), which was funded from profits on imports and government grants. The bonus payment of M$219 million is an income transfer while the operating loss of M$96 million is the cost of LPN's presence in the sector. Since 1980, the government bonus grant has totaled M$1,191 million, while the revolving fund grant to cover LPN's operating loss has totaled M$233 million since 1982. Regardless of the funding mechanism used to cover the loss, the M$315 million outflow in 1986 was the excess cost of production at the output level attributable to the price intervention policy. The bonus becomes a cost because it increases the return to padi land and hence is captured by increasing land values.

Table 3.9: MALAYSIA: NET CASH FLOWS FOR LPN, 1986
(millions of ringgits)

Outflow	
Operating loss	96
Padi bonus payment	219
Subtotal	-315
Inflow	
Profit on imports	78
Government grant for bonus	185
Government grant to revolving fund	34
Subtotal	+297

Source: Compiled from Federal Budget 1987, and LPN Annual Report 1987.

22/ Figures are compiled from the Federal Annual Budget (Belanjawan Persekutuan) and LPN's Annual Reports.

MALAYSIA

REVIEW OF THE RICE INDUSTRY

ANNEX 3: Rice Marketing

A. Distribution

1. Locally milled rice is sold to some 1,400 private wholesalers for distribution to about 30,000 retailers throughout the country. LPN imports to cover supply deficit and stores it for release through the same channels as for domestic supplies. These supplies are supplemented by illegal imports, principally from Thailand.

2. All aspects of the rice trade are controlled by LPN. LPN issues licenses to retailers and wholesalers, regulates prices and margins, and issues permits for transporting rice in quantities over 10 kg. LPN also polices compliance with regulations and prosecutes violations.

B. Imports

3. On the basis of production and consumption estimates and stocks on hand, LPN calculates the deficit to be imported each year. For example, in 1987, production supplied 837,000 tons of rice from 1.6 million tons of paddy and 320,000 tons were imported (Annex 3, Table 1). Prior to the crisis in the international grain trade in 1974, importing was done by the private sector under strict regulation. Quotas were applied and importers were required to maintain a buffer stock to moderate temporary fluctuations in total supply. In addition, the Government maintained a strategic stockpile for use in an emergency food shortage.

4. In 1974 the buffer stock proved unable to stabilize supply at the controlled price. Importers were unwilling to import grain at rising prices for resale at a substantial loss. In that year, LPN became the sole importer and combined the buffer stock and the strategic reserves. The controlled consumer price was successfully defended as the Government absorbed trading and stockholding losses. Although import prices fell steeply soon after that, the prices and margins set in 1974 have remained unchanged. This has resulted in substantial monopoly profits to LPN on imports at a cost of substantial distortion in the whole industry.

Annex 3, Table 1: MALAYSIA: RICE PRODUCTION, IMPORTS, AND CONSUMPTION, 1974-87
(thousands of tons)

Year	Gross padi production	Net rice production /a	Net imports	Changes in stocks	Total apparent consumption
1974	2,112	1,080	334	60	1,354
1975	2,001	1,024	146	5	1,165
1976	2,011	1,029	223	26	1,225
1977	1,925	985	136	47	1,074
1978	1,525	780	409	125	1,062
1979	2,116	1,083	239	(20)	1,342
1980	2,081	1,065	167	(46)	1,278
1981	2,020	1,033	317	(11)	1,361
1982	1,884	964	393	(21)	1,377
1983	1,734	887	358	(59)	1,305
1984	1,572	804	426	34	1,196
1985	1,953	999	426	141	1,284
1986	1,721	880	300	(101)	1,281
1987	1,642	837	320	(75)	1,232

/a Less allowances for on-farm consumptin, field losses, retention for seed, animal feed use, storage, and other losses. The recovery rate of 65% on the balance is equivalent to about 51% on gross padi production. Net rice production is obtained from mill records and gross padi production from crop cutting samples.

Source: ISIS, Rice Industry Study, p. 50; Economic Report, Ministry of Finance.

C. The System of Rice Pricing

5. Rice prices are set on a cost-of-production plus fixed margin basis using standard coefficients and uniform unit costs. Prices vary by grade and by location. Thirteen grades and 6 geographic zones are specified. At the miller level, thirteen prices are set, one for each grade. At the wholesale level, six geographical zones and thirteen grades give seventy eight prices to be set; with a similar number for the retail level, the total number of prices to be maintained is 156. While maintaining this system this would seem to be an onerous administrative chore, the task is simplified by the fact that only minor adjustments have been made over the fourteen years since 1974. The retail prices shown in Annex 3, Table 2 have been unchanged since 1982.

Annex 3, Table 2: MAXIMUM RETAIL PRICE BY GRADE OF RICE /a
(ringgits per kilogram)

Grade Specifications	Grade symbol	Maximum Retail Price per Kg of Rice by Zone (a)	(b)	(c)	(d)	(e)	(f)
Malaysia long-grain super	A1	1.04	1.06	1.07	1.09	1.11	1.11
Malaysia medium-grain premium	A2	0.96	0.98	0.99	1.01	1.03	1.03
Malaysia long-grain 25%	A3	0.88	0.89	0.91	0.93	0.94	0.94
Malaysia long-grain 45%	A4	0.74	0.76	0.78	0.79	0.81	0.79
Malaysia medium-grain premium	B1	0.98	0.99	1.01	1.03	1.04	1.04
Malaysia medium-grain 10%	B2	0.91	0.93	0.94	0.96	0.98	0.96
Malaysia medium-grain 25%	B3	0.83	0.84	0.86	0.88	0.89	0.89
Malaysia medium-grain 45%	B4	0.71	0.73	0.74	0.76	0.78	0.76
Sample grade	S	0.64	0.64	0.66	0.68	0.69	0.68
Malaysia 100% broken special	D1	0.56	0.58	0.6	0.61	0.63	0.63
Malaysia 100% broken ordinary	D2	0.48	0.5	0.51	0.53	0.55	0.53
Malaysia glutinous long grain	E	1.3	1.3	1.3	1.3	1.3	1.3
Malaysia parboiled rice	F	1.16	1.16	1.16	1.16	1.16	1.16

/a Prices have been in effect since 1/1/82.

Source: LPN.

6. The calculus begins with the cost of paddy, which is fixed (the guaranteed minimum price but not the bonus), using a 65% rice recovery rate. Processing costs are then added and the value of by-products are subtracted to give an ex-mill price. A set margin of M$250 per ton is then applied. In 1974 an "average" private sector miller gained a profit of M$100.3 per ton of B2 rice milled. In 1986 the miller suffered a loss of M$84.8 per ton, since the ex-mill price remained M$782.1 per ton and net production costs had risen from M$681.8 per ton to M$866.9 per ton (Annex 3, Table 3). The set margin bears little relationship to reality, and clearly a miller survives by not being average. Many millers have left the industry entirely.

Annex 3, Table 3: PRIVATE SECTOR MILLING MARGINS PER TON OF RICE, 1974 and 1986
(grade B2 in ringgits per tons)

	1974	1986
Cost of padi	692.2	807.3
Processing costs	78.5	145.5
Gross production cost	767.7	952.8
Less value of by-products	85.9	85.9
Net production cost	681.8	866.9
Ex mill price	782.1	782.1
Milling margin	100.3	-84.8

Source: ISIS Rice Industry Study, 1988; LPN; and private millers.

7. To the ex-mill price is added a wholesale and a retail margin. For B2 grade, for example the ex-mill price to the wholesalers (Table 4.3) is M$782 per ton. A fixed margin of M$47 per ton is allowed to cover transport, storage and profit to wholesalers. A fixed margin of M$78 per ton is allowed for the cost of retailing which gives a total retail price of M$0.91 per kg for Zone A in padi surplus areas. For deficit areas, a transport cost is added, giving a retail price of M$0.98 per kg in Johore (Zone E), for example.

The Effect of Rice Price Control

8. Price Level and Stability. Price control has succeeded in stabilizing consumer prices. Administered consumer prices in Malaysia rose from M$960 in 1974 per ton to M$989 in 1987. The coefficient of variance reflecting movements during those years was only 1%. By comparison, the fob price of Thai 5% broken fell from US$542 per ton in 1974 to US$230 per ton in 1987, giving a coefficient of variance during those years of 22%. The rice price control effect on price level is illustrated in Figure 1, which shows that control kept consumer prices stable but at a level considerably higher than would prevail without control. During the period 1976-87, the consumer would have gained through price control only in 1980 and 1981.

9. Smuggling. Smuggling has become a major problem for two reasons: the large difference between domestic and border prices and the difference in quality. There is a large demand in Malaysia for fragrant Thai rice, which is not imported. Nonetheless, it is readily available in major towns in Malaysia at a price almost double its import parity price. While it is difficult to estimate the quantities of all rice grades smuggled, the difference between local production plus official imports and demand based on per capita consumption derived from survey data is about 150,000 tons per year, which is equiva-

lent to 30-50% of official imports. Attempts to stop rice smuggling have incurred rising costs and have interrupted rail and road traffic, but with little effect on availability.

10. Effect on Producers. The rice price is directly derived from the GMP for paddy. The paddy bonus introduced in 1981 was not incorporated into the GMP to avoid a consumer price rise. The maintenance of a high and stable consumer price has enabled a high and stable producer price to be maintained at a lower Treasury cost than with import parity at an efficiency cost.

MALAYSIA

REVIEW OF THE RICE INDUSTRY

ANNEX 4: Sabah and Sarawak

A. Background

1. Special attention is given to the eastern states because their wide physical separation from the Peninsula results in a considerably different set of industry conditions. The padi and rice industry is much less developed in the eastern states, and for historical reasons the degree of intervention has also been much lower. The main characteristic differentiating East Malaysian production is its much higher proportion of upland padi. While Peninsular upland padi constitutes only 1% of total planted area, upland padi constitutes 30% in Sabah and 45% in Sarawak. Upland padi is grown mainly for subsistence and hence is mostly a part-time activity.

2. As a consequence, the use of high-yielding varieties, fertilizers, pesticides, and farm services has been much lower. None of the eight "granary" areas designated to receive continued Federal support is in East Malaysia, where production is widely dispersed among shifting cultivation areas and ponded plots in small valleys. Double cropping is insignificant in the eastern states. The milling industry is similarly underdeveloped. As a result of these characteristics, the standard intervention packages used throughout the peninsula are neither fully applied nor fully enforced in the eastern states.

3. The federal programs are smaller than those of the states, which is the reverse of the case on the Peninsula. As a result, heavy expenditures on capital-intensive irrigation schemes have not been made. Although food security considerations have been high, the expenditures required are beyond the resources of individual states.

B. Sabah

4. Production. Padi production in Sabah has suffered as the rapid development of the state over the past decade enticed growers into more remunerative activities such as logging and estate agriculture. Planted area among about 25,000 farmers from some 50,000 ha in the mid-seventies fell to 32,000 ha in the late eighties (Annex 4, Table 1), a fall of 30%. About two-thirds of planted area is lowland padi, which is grown in the wet season and yields 2.5-3.0 tons per hectare. The remainder is hill padi under shifting cultivation, yielding less than 1.0 ton per hectare. Of the 56,000 ha alienated for wet padi, only 23,000 ha, about 40%, is cultivated.

Annex 4, Table 1: MALAYSIA: COMPARISON OF PADI PRODUCTION IN EASTERN AND PENINSULAR MALAYSIA, 1987

Region	Area (ha)	Yield (tons/ha)	Production (tons)
Peninsula	440,000	3.2	1,397,000
Sabah	32,000	2.2	72,000
Sarawak	154,700	1.3	200,000
Total	626,700	2.7	1,669,000

Source: MOA (preliminary).

5. Production Interventions. Until 1987 the state government maintained a Padi Board to administer an input subsidy scheme at a flat rate of M$506 per hectare, which equaled about 30% of the total cost of production and was sufficient to cover the full cost of seeds, fertilizer, pesticides, and part of the farmers' own labor cost (PICSS scheme). As output fell and costs rose, the input subsidy was abolished, and the state now pays only a ploughing subsidy of M$250 per hectare.

6. The higher labor costs in Sabah and the overall labor deficit, together with the fixed ceiling on rice prices, has rendered padi growing commercially unviable in Sabah. A federally funded rehabilitation program for small-scale irrigation schemes, supported by the World Bank under the Small-Scale Irrigation Schemes Project (Ln 1444-MA) attempted to increase incomes and output through double cropping. On nine rehabilitated schemes completed in 1983, only 2,750 ha were planted (200% would be possible with double cropping) for a 55% cropping intensity. The state-supported Trusan Sapi large-scale mechanized padi farming project achieved only 450 ha of its 9,000 ha target. Losses were estimated at M$198 per ton even at the very high yield (for Sabah) of 3.5 tons per hectare. Other schemes have been tried without success.

7. Post-Harvest Intervention. Post-harvest intervention is necessarily limited since only about 25% of production is marketed. LPN is the sole importer, and price control is exercised in major markets at the Zone C price level. LPN purchases and mills only 2,000 tons of padi at its three mills. The 30 private mills buy the other 10,000 tons marketed. The guaranteed minimum price and the padi bonus are paid. Of the M$219 million total bonus payment in 1976, only M$2 million went to Sabah, reflecting the subsistence nature of its rice industry and the difficulty of reaching income and output objectives through market incentives.

8. Imports. Some 75% of Sabah's rice needs are met through LPN imports of about 100,000 tons of rice annually into Sabah from the Peninsula and from abroad. Under these conditions, attempts at self-sufficiency for the state have been shelved (Annex 4, Table 2).

Annex 4, Table 2: MALAYSIA: PADI PRODUCTION AND RICE IMPORTS IN SABAH, 1982-87
(thousands of tons)

Year	Padi		Rice		
	Production	Marketed	Private mills	LPN mills	Imports
1982	90,000	12,739	7,212	431	90,506
1983	82,000	10,586	5,529	822	104,039
1984	72,000	13,923	7,254	1,100	108,080
1985	72,000	13,111	7,047	820	111,323
1986	81,000	12,275	6,736	629	114,462
1987	79,000	11,098	6,447	612	69,735

Source: Computed.

C. Sarawak

9. Production. Most of Sarawak's annual padi output of about 200,000 tons is rainfed; two-thirds is grown in ponded flats. The remainder is hill padi under shifting cultivation. The low overall average yield of only 1.3 tons per hectare, which is 40% of that of the Peninsula, reflects both the low level of technology and consumer preference for popular local varieties over HYVs.

10. Production in Sarawak seems to be stable rather than clearly declining as in the rest of Malaysia mainly because the development of other opportunities has been less rapid. Nevertheless, irrigation facilities are as underutilized as they are in the rest of Malaysia. The cropping intensity of the five irrigation schemes rehabilitated under the Bank project (Ln 1444-MA) was only 24% in 1983. Of the 8,887 ha of drainage schemes for single-crop padi in 1984, only 3,449 ha was planted. Farm budgets indicate a substantial loss on padi growing if labor is costed.

11. Interventions on Production. The main program is the Assistance to Padi Planters' Scheme (APPS) of the state government. The scheme covers 9,000 ha of the 150,000 ha of padi grown. Under the scheme, purchased inputs are subsidized for three years. The input subsidy over the three-year period totals M$1,000 for new padi land and M$500 for rehabilitated land. The subsidies are insufficient to cover the loss on surplus marketed at official prices, and padi growing has become a marginal activity.

12. Post Harvest Intervention. Only 10-15% of Sarawak's padi is marketed. All drying and milling facilities are in the private sector, and LPN purchases no padi in the state. LPN monitors compliance with regulations and imports about 80,000 tons annually, which implies a self-sufficiency level for the state of about 55%. There are 82 mills in the state with an annual capacity of 53,620 tons, although only half this amount is milled.

MALAYSIA

REVIEW OF THE RICE INDUSTRY

ANNEX 5: ANALYSIS OF PRICE POLICY

1. Two models have been developed to analyze the relationships between administered pricing and the welfare of consumers and producers, and public expenditure. The models are used to explore the impact of options for price policy reform. The first is a price equation model that measures the net change in social welfare associated with a given level of market intervention. The second is a partial equilibrium model for simulating production, consumption, gains, and losses between 1975 and 1986.

A. Analysis of Paddy and Rice Pricing

2. Current pricing relationships in the Malaysian rice sector can be analyzed in terms of the following pricing equation relating retail sales of rice to sales of locally produced rice, imported rice, and rice unaccounted for, and Government transfers to the industry.

(1) $$Pr\ Qr = Prm\ (Qr - Qd - Qa) + Prd\ QD + Pr\ Qa + G,$$

Pr, Prm, Prd = price of rice at retail, import price including wholesale and retail margins, and domestic rice prices;

Qr, Qrm, Qrd, Qa = quantity of rice sold at retail, imported, domestic and sales unaccounted for; and

G = net government revenue to the industry.

This basic model can be used to derive a number of important relationships between the domestic prices of rice and the supply prices of paddy, imports, import prices, and marketing costs.

3. Domestic Pricing Domestic retail prices of rice (Pr) are based on the guaranteed minimum prices of paddy.

(2) $rPr = Pg (1+PM) (1+WM) (1+RM)$

and

$Ps = K (Pg+S)$,

where

r	=	marketable recovery of rice (60%).
PM	=	processors margin (10%).
WM	=	wholesalers margin (5%).
RM	=	retailers margin (10%).
Ps	=	supply price of paddy.
Pg	=	guaranteed minimum price of clean dry paddy ($460/ton).
S	=	subsidy on clean paddy ($165/ton).
K	=	wet/dry conversion factor (88%).

Under the assumptions presented above, the average retail price of rice is given as

$$0.6Pr = 460 (1.2705)$$
$$Pr = \$974/ton$$

The supply price of paddy (Ps) is given by

$$Ps = k (Pg + S)$$
$$= 0.88 (460 + 165)$$
$$= \$550/ton.$$

The supply price of paddy is the average supply price of paddy in wet condition, assuming in this case moisture content and impurities of 12%.

Import Pricing

4. LPN is the sole importer of rice. Under current pricing practices, the retail price of imported rice is set by domestic pricing arrangements. Hence import prices are related to domestic retail prices as follows:

(3) $(Pm + T) = Pr/ [(1 + WM) (1 + RM)]$,

where T is the variable net margin on imports and is given by

(4) $T = Pr/[(1 + WM) (1 + RM)] - Pm.$

If the import price (c.i.f.) of rice is $650/ton and wholesale and retail prices are the same as for domestic production, then:

$$T = 974/1.55-650$$
$$= 193.33/t.$$

This margin is the net revenue obtained by LPN from sales of imported rice.

Government Transfers

5. Government transfers (G) to the industry resulting from these pricing practices are given by

(5) $G = T\,Qrm - KS\,Qrd\,1 - OPL - FS,$

where

1 = conversion factor amount of wet paddy actually received for further processing (0.82);

OPL = annual operating loss incurred by LPN (87m); and

FS = annual costs of fertilizer subsidy (90m)

Equation 5 states that government net revenues to the industry are given by the net revenue from sales of imported rice less subsidies paid to the industry and operating losses incurred by LPN.

If domestic production of paddy is 1.65 million tons and imports are around 300,000 tons then the net government transfer is

G = 193.33 (0.3m.) - [(165) 0.88 (1.65m.) 0.82]
= $ (58m.- 196.45m. - 87m. - 90m.)
= $ 315.45m.

The pricing practices described above can be summarized in terms of the following prices and quantities:

Average retail price of rice	=	$ 974/ton
Average import price of rice (c.i.f.)	=	$ 650/ton
Average supply price of rice	=	$ 550/ton
Guaranteed minimum price of paddy	=	$ 460/ton
Subsidy paid on paddy	=	$ 165/ton
Local production of paddy	=	1.65 million tons
Local production of rice	=	900,000 tons
Imports of rice	=	300,000 tons
Unaccounted for sales of rice	=	150,000 tons
Consumption of rice	=	1.35 million tons
Self-sufficiency ratio	=	66.66%.

The main features of current Malaysian pricing practices of domestic rice and paddy are as follows:

(a) Domestic prices of rice are set by domestic cost conditions through the operation of the guaranteed minimum price for paddy.

(b) Import prices of rice are adjusted to domestic prices by a variable tariff on imports. This means that domestic retail prices are effectively shielded from movements in import prices.

(c) Government sets retail prices in such a way that there will always be a net transfer to the rice industry.

(d) Consumers bear most of costs of the rice industry.

Impact of Alternative Pricing Reforms

6. Border Pricing. Under a border pricing reform, domestic prices are set in terms of import prices only

$$(6) \qquad Pr = Prm\ (1 + WM)\ (1 + RM)$$
$$\text{and} \quad Ps = r\ Prm/\ (1 + PM),$$

so that both retail prices, Pr, and supply prices, Ps, reflect international prices. In terms of indicative prices, the following border prices will prevail:

$$Pr = 650\ (1.155) = \$750.75/\text{ton}$$
$$Ps = .6\ (650)/1.1 = \$354/\text{ton}$$

Under this option, the government can continue to subsidize production, but there will be no offsetting revenue from imports. Consumers will benefit from immediate reductions in the retail prices of rice. At these border prices for paddy, there will be a significant reduction in marketable surplus, and many producers would be "at risk." The extent of producers put at risk under various strategies is discussed further below.

Deficit/Financing

7. Under the deficit/financing option, retail prices are set so that net government transfers to the industry are reduced to the extent that deficits on domestic production are partially offset by surpluses on sales of imported rice. Supply prices of paddy continue to be set at levels determined by the government, but consumers will now benefit from movements in import prices. This benefit is partially offset by increased transfers from consumers to producers rather than from the government. This mechanism is a movement toward effectively quarantining all transfers within the rice industry and reducing government outlays.

This strategy can be analyzed as follows for a situation in which consumers rather than the government bear the full cost of the subsidy on paddy:

$$(7) \qquad T\ Qm = (Pd - Pr)\ Qd$$

where:

$$Qm = Qr - Qd - Qg$$
$$Pr = (Pm + T)\ (1 + WM))\ (1 + RM)$$
$$rPd = Ps\ (1 + PM)$$
$$Ps = k\ (Pg + S),$$

which, on solving for T gives:

$$T = \frac{[\,Pd - Pm\,(1 + WM)\,(1 + RM)\,]}{[(Qm/Qd) + (1 + WM)\,(1 + RM))]}$$

$$= \frac{1008.33 - 650\,(1.155)}{(0.333 + 1.155)}$$

$$= \$173.104.$$

Thus

$$Pr = (650 + 173.04)\ 1.155 = \$950.68.$$

Under this reform, retail prices are reduced by about $25/ton and net government transfers to the rice industry are reduced to about $100 million. A bounty equivalent to about $57.64/ton on domestic rice would be paid from LPN to private millers. Millers would also be paying the subsidy on paddy directly to producers, thereby saving administration costs and imputed millers costs compared with the current regulation whereby which the miller may procure only while the LPN subsidy officer is on site.

The main features of the deficit/financing option are as follows:

(a) Domestic retail prices of rice reflect both international prices and domestic costs.

(b) The government can reduce its direct outlays in the industry.

(c) Consumers will be better off in terms of price than at present and producers will be no worse off than at present. The gainers from lower prices (consumers) compensate producers to the extent that both parties are no worse off.

(d) Consumers can immediately benefit from either reduced prices of imports and/or reduced costs of production.

(e) Bounty payments from the government to private millers can be used to achieve desirable reforms within the industry

Estimates of Net Social Benefits

8. Conventionally, net social benefits stemming from a policy change are analyzed in terms of the change in gross social benefit less incremental costs incurred in adjusting production capacity.

Change in Gross Social Benefit

9. The change in gross social benefit (d GSB) is given as the change in consumer surplus (d CS) plus the change in producer's surplus (d PS):

(8) $d\,GSB = d\,CS + d\,PS$
$d\,CS = CS_1 - CS_o$, and
$d\,PS = PS_1 - PS_o$,

where

CS_1, CS_o = Consumer's surplus after the change (CS_1) and before the change (CS_o).

PS_1, PS_o = Producer's surplus after the change (PS1) and before the change (PS_o).

For a linear demand curve, $Qr = A + B\,Pr$ $(A>0, B<0)$, CS is expressed as

$$CSr = 0.5\,(-A/B - Pr)\,Qr,$$

where

B = Ed Q (avd)/P (avd)
Ed = Retail price elasticity of demand for rice
(avd) = Mean of demand quantities (Q), price (P)

Similarly, PS can be expressed as

PSs = 0.5 (Ps - C/D) Qs; Qs = C+D Ps
C = Es Q (avs)/ P (avs)
(avs) = Mean of supply quantities (Q), price (P).

Assuming Es = 0.1, Ed = -0.3, the change in gross social benefits (d GSB) for each policy environment is given in Table 1. Moving from the present system to a border price determination would result in a gain in gross social benefits of M$53.2 million. A move to the deficit/financing system gives a gain of only M$6.62 million.

Table 1 - CALCULATION OF GROSS SOCIAL BENEFITS OF VARIOUS RICE POLICY OPTIONS

Policy Environment	Ps $/t	Qs m.t.	Pr $/t.	Qr m.t.	d PS $	d CS $	d GSB $
Initial	553	1.65m	974	1.35m.	-	-	-
Border Pricing	354	1.59m	751	1.44m.	-26.9m	80.07m.	53.2m.
Deficit/Financing	553	1.65m	950	1.36m.	-	9.62m.	9.62m.

Source: Model results.

B. Impact of Pricing Interventions: A Partial Equilibrium Analysis

10. The preceding sections set out the various incentive measures to encourage rice production in Malaysia. This section examines the extent to which the various affected groups have gained or suffered as a result of the policy. Conventional measures of welfare gains and losses among producers, consumers, and the government provide a convenient integrative framework for analyzing the impact of pricing interventions. Such partial equilibrium analysis has been applied empirically in a number of countries for different types of commodities. An attempt will be made here to review the work done in this area relating to rice policy analysis in Malaysia.

A Graphical Presentation of Price Interventions in the Rice Sector

11. Since the program's inception, guaranteed minimum prices have been maintained at levels higher than border prices except in years of world scarcity. Figure 1 shows that had border prices P_1 prevailed, Q_1 would have been produced and consumption would have been Q_2, the gap being met by Q_1Q_2 of imports. With the introduction of the guaranteed minimum price, domestic price rises to P_2, resulting in a loss in consumer surplus of P_1P_2DF.

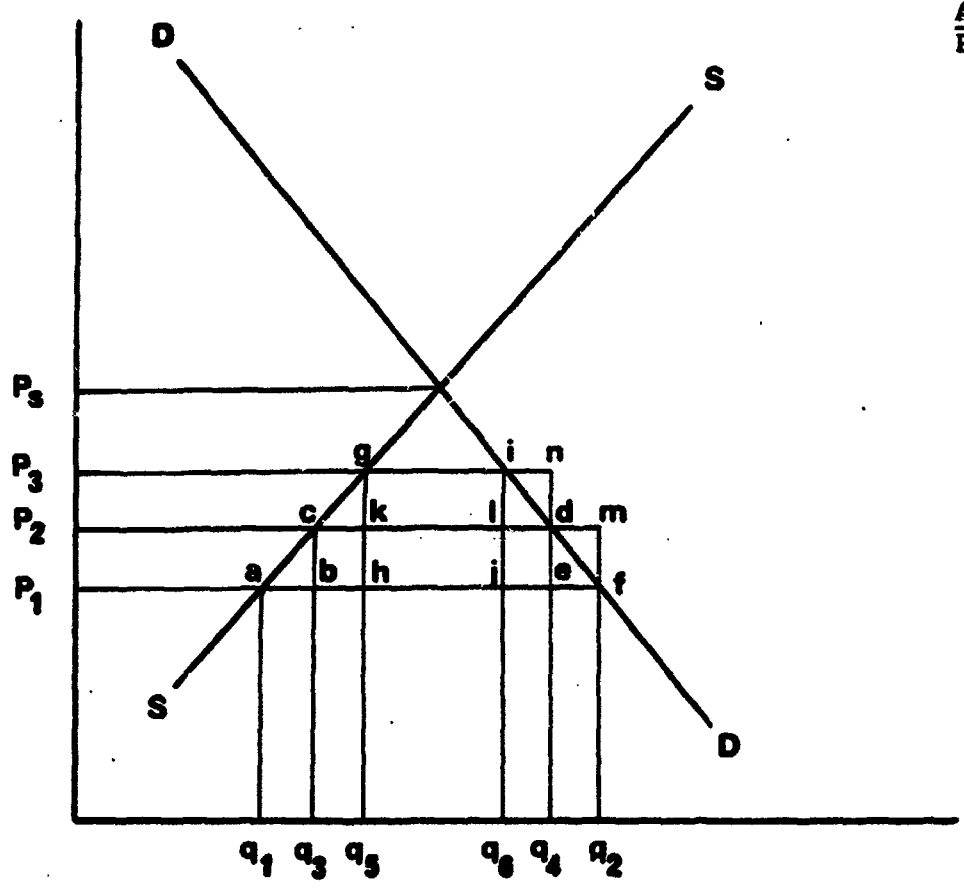

Figure 1: Malaysia: Price Interventions in the Rice Sector

P_s - self-sufficiency price
P_1 - world/border price P_2 - GMP
P_3 - GMP + price subsidy to producers

Effects of Intervention 1: Domestic price support prior to 1980.	
Loss in consumer surplus	Area p_1p_2df
Producer surplus	Area p_1p_2ca
Import revenue	Area bcde
Deadweight loss in consumption	Area def
Production efficiency loss	Area abc
Consumer efficiency loss	Area dmf

Effects of Intervention 2: Adding price subsidy to GMP, 1980	
Loss in consumer surplus	No change
Producer surplus	Increase by Area p_2p_3gc
Import revenue	Area hkde
Deadweight loss in consumption	No change
Production efficiency loss	Area agh - increase by Area bcgh
Consumption efficiency loss	Area din

Quantity produced increases by Q_1Q_3 as producers respond to the price incentive, while consumers cut their consumption to Q_4. The loss in consumer surplus is thus distributed as the gain in producer surplus amounting to P_1P_2CA, the gain in import revenue to the government in its import monopoly depicted by the area BCDE, the production efficiency loss amounting to the area ABC, and the deadweight loss in consumption captured by the area DEF. Production efficiency losses arise from having to compete for resources from other sectors of the economy to produce the extra production Q_1Q_3, which could have come from imports. Deadweight losses in consumption result in the real loss in consumption foregone which could not be distributed elsewhere.

12. In 1980, the government introduced a price subsidy that is given to producers as a form of bounty payment. The subsidy is met out of general revenue and is thus an implicit subsidy on consumption. Had the subsidy been incorporated into the guaranteed minimum price as a self-financing mechanism, consumption would have been curtailed to Q_6. Producers face a new price of P_3 and increase their production by Q_3Q_5, while consumers still face the price of P_2 and consumption is maintained at Q_4. Imports amount to Q_5Q_4 rather than Q_5Q_6. The producer surplus increases by P_2P_3GC to P_1P_3GA. The budgetary cost of the price subsidy is indicated by the area P_2P_3ID, which is offset from the gains from imports amounting to the area HKDE. Producer efficiency losses increase by the amount BCGH. Deadweight losses in consumption remain at DEF. There is, however, a consumption efficiency loss of DMI resulting from consumers inability to capture the full effects of the government transfer. From the diagram it is obvious that consumption would be drastically curtailed were the government to push for full self-sufficiency.

Supply and Demand Response

13. The basic parameters needed for an evaluation of price interventions are the elasticities of supply and demand. On the eve of double-cropping, Aromdee (1969) estimated the area response to be 0.22 using the Nerlovian adjustment model. Prior to the distribution of the full fertilizer subsidy, Barnum and Squire (1976) estimated an output elasticity of 0.61 in the Muda Area Development Authority (MADA area). Beyond the transition period to double-cropping, area response is constrained by the lack of available land for padi cultivation. Fuad's recent estimates (1985) produced an area response of 0.17. In the single-cropped areas, Haughton (1983) found a supply response ranging from 0.15 to 0.24 using the Cobb-Douglas production function. His estimates are based on surveys carried out between 1976 and 1979, prior to the introduction of the price subsidy. Sahathavan's estimates (1974) using time-series data put the value of price elasticities between 0.2 and 0.5. His subsequent work (with Tamin, 1987) produced a supply response of 0.2 based on time series data regressing price against yield. In spite of the intensification of production subsidies, there appears to be no commensurate supply response.

14. What explains the low supply response, given that Malaysia was one of the earliest and fastest adopters of the high yielding variety technologies? Why is it that similar packages of irrigation, seeds, and fertilizers applied elsewhere have been so successful, as for example, in Indonesia, which was transformed from the world's biggest importer of rice into an occasional

net exporter? Malaysia practices a peculiar program of price support. The guaranteed minimum price has from its beginning functioned as a floor price rather than a true support price. It is announced at the beginning of each planting season, and the same basic price has prevailed for years at a stretch. The introduction of double cropping and the distribution of free fertilizer represent a supply shift to the right. The price subsidy should have a similar effect, which is reflected in the greater amount of marketable surplus.

15. The guaranteed minimum price is not the only rigidity facing the farmer. Land is the other. Padi land is fixed in area and cannot be converted to other use. Some of the states, particularly those that are not major rice growers, have given permission for such land to be used for other crops. But the most important factor inhibiting the use of land for padi cultivation is the availability of water. To the extent that water is available, the returns from padi farming must compete with those from other crops and occupations, as is well illustrated in the case of the single-cropped areas.

16. On the consumption side, price elasticities range from -0.2 to -0.5. For the period 1951-66, Armodee's (1969) estimates range from -0.35 to -0.46. Goldman's (1975) estimates for 1956-72 produce a value of -0.4. Sahathavan's (1974) estimates put the elasticities at between -0.2 and -0.4 for the period prior to 1974--before the imposition of rice price control. Fuad's (1985) estimates, which include stock figures, produce a value of -0.5, a rather implausible value considering Malaysia's stature as a relatively affluent society and the fact that consumer prices have been held at rigid levels since 1974. Tamin and Sahathavan's (1987) estimates yield a value of -0.3 by accounting for the influence of the price of the substitute, wheat, on consumption. Demand response can be expected to be low given the traditional concept of inferior goods. Since the imposition of rice price control, per capita income has grown quite rapidly as the economy entered a bouyant phase in the 1970s to the early 1990s. Real prices of rice have thus declined steadily, further boosting the income effects. The consumption of other high-value food items has assumed greater importance, as evidenced by a fall in per capita rice consumption from 80 kg in the 1973 Household Expenditure Survey to 67 kg by the time of the 1980 survey.

17. In practical terms it is difficult to obtain unbiased estimates for the parameters because of the large number of non-price variables. Given the data quality, it is unlikely that any further econometric refinements will result in significant increase in accuracy. Considering the shifts in supply that take place as a result of the provision of irrigation, fertilizer, and the price subsidy, the elasticity of supply probably lies somewhere between 0.15 as estimated by Houghton (1983) and 0.2 as estimated by Tamin and Sahathavan (1987). For the purpose of computing the partial equilibrium effects, the supply elasticity of 0.2 will be used. A demand elasticity of -0.3 appears to be a reasonable estimate.

18. The other important variable is that of the import price of rice. While most studies use the price of Thai broken 5% as the reference price, the grade imported by LPN is Class II Siam 100%, and this price is used as the

reference price. The f.o.b price is adjusted for quality discount, freight, insurance, and the value of by-products. Domestic wholesale prices are used as consumer prices, while farm prices for padi are converted to rice price equivalent by adding processing costs. This brings domestic prices up to the equivalent of the import parity price.

Results of the Partial Equilibrium Analysis

19. The results of the partial equilibrium analysis (Annex 5, Table 1) show the increase in producer gains, particularly after 1980, and mounting consumer losses, a result to be expected with the rapid decline in border prices during this period. Also expected was the fact that consumer efficiency losses have tended to outweigh producer efficiency losses. Deadweight losses accordingly have escalated over the last six years. Government expenditures/revenues have fluctuated rather sharply, as they are the sum of all the various effects. Foreign exchange costs have increased since 1982 with the rapid increase in imports over the last four years. One important implication of the analysis of relative gains/losses is the financial difficulty faced by the government in simultaneously sustaining a high absolute level of domestic production and imports, as indicated by the figures for 1981. In that year, both domestic farm and consumer prices were higher than border prices, and government expenditures were higher than at any time during the decade of intervention.

20. Had domestic prices been lowered by reducing the guaranteed minimum price by 20% in 1986, the deadweight losses would have been reduced by almost 83% (from M$38 million to M$5.7 million), resulting mainly from a large reduction in consumer efficiency losses of more than 77%. There would be a net gain to the government arising from the drastic drop in producer gains to about one-third of the level without the price reduction. Although there would be an increase in foreign exchange costs, consumer losses would be reduced by more than half.

21. The incorporation of the price subsidy into the guaranteed minimum price from 1980 onward would automatically have raised consumer prices, resulting in a higher level of deadweight losses in consumption, as shown in the graphical analysis. Deadweight losses would have almost doubled compared with the present system, in which the subsidy is a deficiency payment for production (Annex 5, Table 2). There would be a net gain to the government, however, because the costs of the producer price support would be fully absorbed by consumers. Government would gain from the effective "tariff" on consumption through its monopoly on rice imports. Producer surplus or welfare gains would remain at the same level depicted in Table 2, while consumer losses would escalate as a result of the 25% increase in prices. Introduction of a price subsidy rather than an upward revision of the guaranteed minimum price is thus justifiable from the consumers' point of view.

22. To evaluate the impact of attaining higher levels of self-sufficiency, the targets set by the Ministry of Agriculture are used. According to the Ministry, the granary areas could in theory produce at least 60% of the nation's requirements by 1990. However, based on the potential yields estimated by Mardi, the granaries can theoretically produce 78% of consumption needs.

MALAYSIA

IMPACT OF PRICE INTERVENTIONS IN RICE PRODUCTION, MALAYSIA 1975-86

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986 at 60% SSL	at 78% SSL	Reduce GMP
Supply elasticity	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Demand elasticity	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Production (000 mt)	1,285	1,297	1,240	982	1,365	1,325	1,302	1,216	1,122	1,017	1,258	1,148	1,303	1,684	1,148
Net imports (000 mt)	146	183	136	409	239	167	317	393	358	426	426	215	869	488	215
Apprent consumption	1,431	1,480	1,376	1,391	1,604	1,492	1,619	1,609	1,480	1,443	1,684	1,363	2,172	2,172	1,363
World price (fob, US$)	383	269	286	388	352	445	497	307	295	263	227	221	300	300	221
Exchange rate	2.4	2.54	2.46	2.32	2.19	2.18	2.3	2.33	2.32	2.34	2.48	2.58	2.45	2.45	2.58
Border price, cif (Pb) M$/mt	997	785	803	967	854	1,033	1,182	797	768	700	653	652	805	805	652
Consumer price (Pc), M$/mt	953	965	983	990	991	993	1,000	994	993	996	996	989	989	989	836
Producer prices (Pf), M$/mt	832	869	876	869	887	932	1,144	1,162	1,167	1,185	1,166	1,181	1,181	1,181	771
Percent price changes, Pb-Pc	4.62	(18.65)	(18.31)	(2.32)	(13.82)	4.03	18.20	(19.82)	(22.66)	(29.72)	(34.44)	(34.07)	(18.60)	(18.60)	(22.01)
Percent price changes, Pb-Pf	19.83	(9.67)	(8.33)	11.28	(3.72)	10.84	3.32	(31.41)	(34.19)	(40.93)	(44.00)	(44.79)	(31.84)	(31.84)	(15.43)
Change in consumption (000 mt)	(19.8)	82.8	75.6	9.7	66.5	(18.0)	(88.4)	95.7	100.6	128.7	174.0	139.3	121.2	121.2	90.0
Change in production (000 mt)	51.0	(25.1)	(20.7)	22.1	(10.2)	28.7	8.6	(76.4)	(76.7)	(83.2)	(110.7)	(102.8)	(83.0)	(107.2)	(35.4)
At Border Prices															
Supply	1,335.97	1,271.93	1,219.33	1,004.15	1,354.84	1,353.72	1,310.65	1,139.61	1,045.28	933.75	1,147.30	1,045.16	1,219	1,575	1,112.56
Demand	1,411.18	1,562.82	1,451.59	1,400.69	1,670.52	1,473.97	1,530.60	1,704.67	1,580.60	1,571.65	1,857.98	1,502.33	2,339	2,339	1,453.00
Imports	75.21	290.89	232.26	396.55	315.68	120.25	219.95	565.06	535.33	637.90	710.67	457.18	1,120	764	340.43
Efficiency loss, production, $m	(4.2)	(1.1)	(0.8)	(1.1)	(0.2)	(1.5)	(0.2)	(13.9)	(15.3)	(20.2)	(28.4)	(27.2)	(15.6)	(20.2)	(2.1)
Efficiency loss, consumption, $m	(0.4)	(7.5)	(6.8)	(0.1)	(4.6)	(0.4)	(8.0)	(9.4)	(11.3)	(19.0)	(29.8)	(23.5)	(11.2)	(11.2)	(8.3)
Deadweight losses, $m	(4.6)	(8.5)	(7.6)	(1.2)	(4.7)	(1.8)	(8.2)	(23.4)	(26.6)	(39.2)	(58.2)	(50.7)	(26.8)	(31.3)	(10.4)
Producer gains/losses, $m	(207.8)	110.0	91.3	(95.2)	45.2	(132.4)	(49.3)	457.8	463.0	513.4	673.7	634.5	505.5	653.3	138.7
Consumer gains/losses, $m	63.4	(258.9)	(240.9)	(31.9)	(215.2)	60.0	302.7	(307.5)	(321.7)	(408.1)	(547.8)	(435.9)	(388.5)	(388.5)	(242.5)
Change in foreign exchange, $m	(31.1)	(45.3)	(44.1)	(30.8)	(48.1)	(11.0)	94.3	(15.4)	(18.3)	(31.8)	(41.3)	(23.8)	(30.8)	(11.3)	(35.4)
Govt revenue/expenditure, $m	180.1	202.8	201.3	159.0	222.8	85.2	(339.4)	(111.5)	(96.3)	(34.3)	(26.4)	(124.2)	(59.5)	(222.3)	149.8

Source: Computed by ISIS.

INCORPORATION OF PRICE SUBSIDY INTO THE GMP

	1981	1982	1983	1984	1985	1986
Supply elasticity	0.2	0.2	0.2	0.2	0.2	0.2
Demand elasticity	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Production (000 mt)	1,302	1,216	1,122	1,017	1,258	1,148
Net imports (000 mt)	317	393	358	426	426	215
Apparent consumption	1,619	1,609	1,480	1,443	1,684	1,363
World Price (fob, US$)	497	307	295	263	227	221
Exchange rate	2.3	2.33	2.32	2.34	2.48	2.58
Border price cif, (Pb) M$/mt	1182	797	768	700	653	652
Consumer price (Pc), M$/mt	1,254	1,248	1,247	1,250	1,250	1,243
Producer prices (Pf), M$/mt	1,144	1,162	1,167	1,185	1,166	1,181
Percent price changes, Pb-Pc	(5.74)	(36.14)	(38.41)	(44.00)	(47.76)	(47.55)
Percent price changes, Pb-Pf	3.32	(31.41)	(34.19)	(40.93)	(44.00)	(44.79)
Change in consumption (000 mt)	27.9	174.4	170.6	190.5	241.3	194.4
Change in production (000 mt)	8.6	(76.4)	(76.7)	(83.2)	(110.7)	(102.8)
At border prices						
Supply	1,310.65	1,139.61	1,045.28	933.75	1,147.30	1,045.16
Demand	1,646.89	1,783.44	1,650.55	1,633.48	1,925.28	1,557.42
Imports	336.24	643.83	605.27	699.72	777.98	512.26
Efficiency loss, production, $m	(0.2)	(13.9)	(15.3)	(20.2)	(28.4)	(27.2)
Efficiency loss, consumption, $m	(1.0)	(39.3)	(40.8)	(52.4)	(72.0)	(57.5)
Deadweight losses, $m	(1.2)	(53.3)	(56.2)	(72.6)	(100.4)	(84.7)
Producer gains/losses, $m	(49.3)	457.8	463.0	513.4	673.7	634.5
Consumer gains/losses, $m	(115.6)	(686.3)	(668.1)	(741.3)	(933.3)	(748.1)
Change in foreign exchange, $m	(43.2)	(78.1)	(72.1)	(75.1)	(85.3)	(59.7)
Govt revenue/expenditure, $m	209.2	360.0	333.3	375.5	445.3	257.9

Source: Computed by ISIS.

23. Assuming that prices remain at the present level of US$300 per ton and no change in the exchange rate by 1990, the results show a distinct disadvantage in moving from 60% to 78% self-sufficiency. Deadweight losses increase by more than 14%, while the government's position switches from a net gain of M$32 million at 60% self-sufficiency to an increased obligation of M$155 million at 78% self-sufficiency. The efficiency of such a move is questionable, considering that it would result in a saving of foreign exchange of less than M$21 million.