



UNIVERSITI PUTRA MALAYSIA

**A COMPARATIVE STUDY OF THE EFFECTIVENESS
OF PRICE SUPPORT AND FERTILIZER SUBSIDY
PROGRAMMES FOR SELF-SUFFICIENCY IN RICE
PRODUCTION IN PENINSULAR MALAYSIA**

Ismail bin Sulong

FEP 1984 1

A COMPARATIVE STUDY OF THE EFFECTIVENESS
OF PRICE SUPPORT AND FERTILIZER SUBSIDY
PROGRAMMES FOR SELF-SUFFICIENCY IN RICE
PRODUCTION IN PENINSULAR MALAYSIA

Ismail bin Sulong

A thesis submitted in partial fulfilment
of the requirements for the degree of
Master of Science in Resource Economics
in the Universiti Pertanian Malaysia.

July 1984



ACKNOWLEDGEMENTS

I wish to formally express my greatest appreciation and gratitude to my supervisor, Dr. Mohd. Ghazali Mohayidin, for the inspiration, guidance, help and constructive criticisms in making this dissertation possible.

I also wish to express my thanks to officers of Lembaga Padi dan Beras Negara especially Tuan Haji Salim Abdul Hamid and Encik Zahari Abdul Hamid for their cooperation in furnishing the data.

I am also greatly indebted to Encik Hadzman Abd. Rehman and Encik Yusuf Basir from National Farmers Association (NAFAS) for their cooperation in supplying me essential information for the study.

My appreciation to my wife Faridah Abdullah for her efforts in reading through the draft of the dissertation and coming out with constructive remarks and suggestions that have thrown much light on the language used in the dissertation.

My special appreciation also to my wife, and my sons Fazlil Aslan and Fazdil Imran for their understanding, patience and sacrifice throughout the study program.

Last but not least my special thanks to Nazaam Suhaili Ramli who helps considerably in the typing of the draft and the final manuscript.



TABLE OF CONTENTS

	Page
 CHAPTER I	
INTRODUCTION	
1.1 The Status of Rice Production	1
1.2 The Problem	8
1.3 Objectives of the study	12
1.4 Scope and limitations of the study . . .	13
 CHAPTER II	
RICE PRODUCTION POLICY, LITERATURE REVIEW AND A REVIEW ON SELECTED MODELS	
2.1 Rice Production Policy	15
2.1.1 Infrastructure investment.	17
2.1.2 Control of input and output prices	19
2.1.3 Institutional development and research	24
2.2 Literature review	27
2.3 A review of selected models	34
 CHAPTER III	
METHODOLOGY	
3.1 Research framework	43
3.2 Sources and collection of data	43
3.3 The model	
3.3.1 Model of the study	44
3.3.2 The variables	58
3.3.3 Rice supply and production functions	65

	Page
CHAPTER IV	
RESULTS OF THE STUDY	
4.1 The data used	71
4.2 Results and discussion	75
CHAPTER V	
CONCLUSIONS AND POLICY IMPLICATIONS	
5.1 Summary	86
5.2 Conclusions	88
5.3 Policy Implications	89
BIBLIOGRAPHY	94
APPENDICES	
Appendix 1 Padi fertilizer distribution under government subsidy scheme for the years 1951-1966	98
Appendix II Definitions of key words used	101
Appendix III Variables estimation	102
Appendix IV Calculation of costs and benefits	109



LIST OF TABLES

TABLES	Page
1.1 The distribution of padi farms by size	3
1.2 Rice production and level of self- sufficiency in Peninsular Malaysia . . .	5
1.3 Compound annual growth rates of output, areas cultivated, and padi yield by types of padi, Peninsular Malaysia, 1950/51 to 1960/61 and 1962/63 to 1976/77 . . .	
2.1 Development expenditure for drainage and irrigation	18
2.2 Guaranteed minimum padi prices	21
2.3 Rates of fertilizer subsidy	23
2.4 Allocations and expenditure on new fertilizer scheme	25
4.1 Estimation of variables	72
4.2 Computed elasticities of output supply and factor demand	74
4.3 Production elasticity of fertilizer . . .	76
4.4 The cost, and losses of government revenue, distribution of income, and foreign exchange savings	77
4.5 Total social benefits and net social benefits	80
4.6 Benefit cost ratio	82



LIST OF FIGURES

FIGURES	Page
2.1 The determination of an economically optimum level of fertilizer use for a given fertilizer response function	36
2.2 The cost of subsidies: the case of fixed production coefficient	39
3.1 A model of price support and fertilizer subsidy for rice	48
3.2 A model of fertilizer demand in relation to subsidy	57



An abstract of the thesis presented to the Senate of Universiti
Pertanian Malaysia in partial fulfilment of the requirement for
the Degree of Master of Science.

A COMPARATIVE STUDY OF THE EFFECTIVENESS
OF PRICE SUPPORT AND FERTILIZER SUBSIDY
PROGRAMMES FOR SELF-SUFFICIENCY IN RICE
PRODUCTION IN PENINSULAR MALAYSIA.

by

Ismail bin Sulong

July 1984

Supervisor : Dr. Mohd. Ghazali bin Mohayidin

Faculty : Resource Economics and Agribusiness

Rice production is of both economic and political
importance to the Malaysian government. Despite the
implementation of various programmes the country is still
unable to be self-sufficient in rice production.

Among the policy programmes implemented and aimed
at achieving self-sufficiency in rice production and
simultaneously increasing the farmers' incomes, are two short
term policy programmes namely price support and fertilizer
subsidy schemes. Both schemes have incurred heavy expenses
on the part of the government, but more so, the self-sufficiency

level in rice output could not be achieved while the incidence of poverty among padi farmers still remains amongst the highest in the country's various occupational sectors.

The purpose of this study is to determine the effectiveness of each of the two policy programmes in their contribution towards achieving self-sufficiency in rice production and increasing the farmers' income. Previous research have shown that both price support and fertilizer subsidy schemes could increase crop output and consequently increased the farmers' income. A finding of a comparative study on price support and fertilizer subsidy policy programmes to achieve self-sufficiency in rice production in the Philippines showed that the fertilizer subsidy scheme is more cost effective and contributes a higher income for the farmers than that of the price support scheme.

The present study adapts the model used by Barker and Hayami in the Philippines study. Secondary data and information from previous studies are used to evaluate the costs and benefits of the two policy programmes in the study.

The results show that the price support scheme was more cost effective and contributed more income to the padi farmers than the fertilizer subsidy scheme. In order to induce the farmers to increase rice output to achieve self-sufficiency, the price of padi should be increased by approximately 43 per cent from the present guaranteed minimum price. The fertilizer subsidy

may probably be a more effective policy programme in future
if more fertilizer - responsive padi varieties are found.

CHAPTER I

INTRODUCTION

1.1 THE STATUS OF RICE PRODUCTION

Agriculture has an important role to play in the economic and social development of Peninsular Malaysia. Approximately 34 percent of the working population is engaged in the agricultural sector in 1982. Agriculture also accounts for about 22 per cent of the gross domestic product and provides about 40 per cent to the country's foreign exchange (Fourth Malaysia Plan, 1981-85). However, like most of the developing countries, agricultural incomes are relatively low when compared to income in the non-agricultural sector.

According to the Fourth Malaysia Plan, rice farming accounts for about 151,000 households or approximately 16 per cent of the households in agriculture. There are approximately 300,000 padi

farmers in Peninsular Malaysia operating some 764,160 hectares of padi land (Economic Report, 1983). A study by Selvadurai (1972) showed that the average size of padi farms in West Malaysia is about 1.25 hectares or 3.1 acres (TABLE 1.1). About 54 per cent of these farmers operate on an area of less than 1.21 hectares (3 acres) and 78 per cent of them operate on an area of less than 2 hectares (5 acres). Despite the government's effort to eradicate poverty (in line with the new Economic Policy), the incidence of poverty among the padi farmers is still high, that is about 55 per cent. This percentage indicates that the incidence of poverty in padi farming is one of the highest among all the occupational sector in Peninsular Malaysia (Fourth Malaysia Plan, 1981-85).

Rice is the staple food of the population. More than 20 per cent of food consumed is rice. For the rural population rice constitutes as much as 35 per cent of their diet (Household Expenditure Survey, 1973). However, Peninsular Malaysia has never been self-sufficient in rice production. Since the colonial era, the country has relied rather heavily on the imports of rice particularly from Thailand, Burma, Pakistan and the People's Republic of China, although the government has tried to become completely self-sufficient in rice after independence in 1957.

TABLE 1.1: THE DISTRIBUTION OF PADI FARMS
BY SIZE

STATE	Average rice area (acres) ¹	Per cent farms in various size groups (acres)							
		Below	1- 1.99	2- 2.99	3- 3.99	4- 4.99	5- 7.49	7- 9.99	10 and above
Johor	1.5	5	60	27	3	3	2	0	0
Kedah	4.0	8	19	19	12	10	20	6	6
Kelantan	2.3	8	26	32	16	10	7	1	0
Malacca	2.1	21	32	24	7	6	7	2	1
Negeri Sembilan	1.1	38	36	19	4	3	0	0	0
Pahang	1.7	16	36	26	11	5	3	1	0
Penang	2.5	19	31	23	13	11	11	2	0
Perak	2.6	14	26	19	12	9	15	4	1
Perlis	4.1	3	11	19	16	13	25	8	5
Selangor	3.6	3	14	5	40	13	18	5	2
Trengganu	2.3	14	23	29	11	10	10	3	0
West Malaysia	3.1	10	23	21	14	10	15	4	3

Source: Selvadurai, S., Padi Farming in West Malaysia, Ministry of Agriculture and Fisheries, Malaysia, Kuala Lumpur, 1972, p. . 26.

1. 1 acre = 0.40469 hectare

Despite evidence that the country's rice production has increased by approximately 1.5 times in 1982 when compared to that in 1957, the level of self-sufficiency achieved in 1982 is still inadequate, for it is only 82 per cent of the total domestic rice requirement (TABLE 1.2). The highest level of self-sufficiency in rice achieved was in 1980 when production was at 98 per cent of the self-sufficiency level. During the First Malaysia Plan (1965-70) production increased steadily from 60 to 78 per cent level of self-sufficiency. By the end of the Second Malaysia Plan (1971-75), the country was 95 per cent self-sufficient in rice. The increase in rice production after 1967 was the result of increased irrigation facilities which not only made double cropping possible but also the introduction of high yielding varieties. During the Third Malaysia Plan (1976-80) rice production began to decline, dropping to 74 per cent self-sufficient in 1978. Although production picked up towards the end of the Third Malaysia Plan (when the rice output was at 98 per cent), the momentum was not sustained, for at the beginning of the Fourth Malaysia Plan (1981-85) rice production was on the decline again.

Peninsular Malaysia is capable of achieving self-sufficiency in rice production as can be seen in



TABLE 1.2: RICE PRODUCTION AND LEVEL OF SELF-SUFFICIENCY IN
PENINSULAR MALAYSIA

Year	Hectares			Rice production (tonnes)				Level of self-sufficiency (Per cent)
	Main season wet padi	Off season wet padi	Dry padi	Main season wet padi	Off season wet padi	Dry padi	Total	
1956	275,303	3,393	16,754	348,796	4,506	11,431	364,736	56
1957	280,777	2,677	18,644	436,626	3,871	19,235	423,287	56
1958	287,977	2,938	19,691	208,625	4,613	12,884	426,121	61
1959	291,895	4,276	18,191	359,882	7,070	14,987	381,940	60
1960	295,363	8,173	19,547	462,163	14,337	16,550	492,940	58
1961	299,609	14,352	16,870	502,787	21,379	14,418	538,584	63
1962	297,111	18,827	19,021	465,597	30,402	14,815	510,814	68
1963	302,546	19,874	17,988	499,027	33,582	15,119	547,729	68
1964	311,425	23,642	18,600	435,297	40,400	15,993	491,690	63
1965	308,843	36,337	17,479	525,487	66,320	14,327	606,134	60
1966	308,819	42,270	18,268	513,811	77,986	14,317	606,114	72
1967	355,686	63,512	20,842	485,675	112,370	12,904	610,950	70
1968	366,888	90,918	20,740	607,760	168,754	16,044	792,558	77
1969	382,825	96,793	23,140	677,832	189,330	17,528	874,689	80
1970	379,603	131,901	21,683	661,948	249,148	18,168	929,274	78

..... CONTINUED TABLE 1.2

Year	Hectares			Rice production (tonnes)				Level of self-sufficiency (Per cent)
	Main season wet padi	Off season wet padi	Dry padi	Main season wet padi	Off season wet padi	Dry padi	Total	
1971	372,654	159,350	20,036	659,611	329,348	16,501	1,005,461	87
1972	361,251	197,428	13,614	607,496	398,614	11,614	10,180,620	91
1973	369,328	212,228	9,923	673,156	441,414	8,921	1,123,492	88
1974	371,129	257,100	9,110	709,847	464,754	7,996	1,182,598	85
1975	372,480	213,400	9,710	666,140	441,360	8,690	1,116,190	95
1976	347,880	222,480	10,010	628,640	499,180	7,750	1,135,570	91
1977	345,260	212,500	9,480	588,290	465,480	6,200	1,059,940	87
1978	335,340	103,200	7,310	595,100	198,130	5,510	798,740	74
1979	331,500	223,280	7,440	672,920	489,960	7,240	1,170,120	92
1980	319,390	204,300	6,430	666,160	470,500	5,560	1,145,220	98
1981	316,150	198,930	8,030	671,400	458,950	7,060	1,137,420	90
1982	274,670	212,190	6,230	558,870	444,310	4,520	1,037,700	82

Source: Federation of Malaysia (1956-1982 issues) Ministry of Agriculture and Fisheries, Padi Statistics, West Malaysia, Kuala Lumpur.

1980. The overriding concern is the basic strength of the country's economy and its comparative advantage derived from the production of tradable primary commodities such as rubber, palm oil, and tin; in addition to the policy of increasing the incomes and the welfare of the padi farmers. But, by being overdependent on rice imports to meet per capita requirements, the country would particularly be vulnerable to deficits during uncertain periods of world shortages. At such times, the government would be confronted with difficult decisions in the face of rising import prices and the high cost of intervention in the form of consumer subsidies.

As shown in TABLE 1.2, there are three main types of padi grown in Peninsular Malaysia; namely (i) main season padi, (ii) off-season wet padi and (iii) dry padi. The off-season wet padi is cultivated in flooded fields around March/April and harvested between July/August, while the main season wet padi is planted in October/November and harvested in February/March of the following year. Dry padi refers to padi grown in fields which need no water to be stored.

According to Donald Taylor, until 1965, the main season wet padi was the only significant source of rice production in the country. The mid-1970's saw an



output increase of off-season wet padi which accounted for about 45 per cent of the national total. The yields of the main and off-season wet padi were between 2.6 to 3.0 tonnes per hectare and 3.2 to 3.5 tonnes per hectare respectively.

Total padi output grew at an annual rate of 4.0 percent during the 1950's, and at 5.2 per cent from 1962/63 to 1976/77 (TABLE 1.3). Although the yield increase accounted for 60 per cent of the total padi output prior to 1961/62, such an increase accounts for only 35 per cent of the output increase after 1961/62. This shows a drop in yield as a source of output growth in padi production.

As for dry padi, its contribution is only about three per cent of the total padi production in 1970. After that period its contribution was even less than one per cent of the output. The yields of dry padi showed an increase until the 1960's. Since then they have remained rather stagnant.

1.2 THE PROBLEM

One of the government's policies in rice production, as discussed in section 2.1 is to achieve



TABLE 1.3: COMPOUND ANNUAL GROWTH RATES IN TOTAL PADI OUTPUT, THE PADI AREA CULTIVATED, PADI YIELD, BY TYPE OF PADI, PENINSULAR MALAYSIA, 1950/51 TO 1960-61 AND 1962/63 TO 1976-1977.

	1950/51 to 1960/61	1962/63 to 1976/77
	%	%
All types of padi		
Total output	4.0	5.2
Area cultivated	1.5	3.3
Yield	2.4	1.8
Off-season wet padi		
Total output	17.7	22.1
Area	9.4	20.0
Yield	7.6	1.8
Main-season wet padi		
Total output	3.7	1.0
Area cultivated	1.3	0.1
Yield	2.4	1.0
Main-season dry padi		
Total output	10.6	-8.1
Area cultivated	3.7	-7.8
Yield	6.6	-0.3

Source: Donald Taylor, The economics of Malaysian padi production and irrigation, p. 36.

self-sufficiency and to increase the farmers' income simultaneously. The government could, as in the past import additional rice for domestic requirements. However, dependence on imported rice might create some problems particularly when there is a shortage in the world rice production such as experienced in 1972/73. Under such a situation, dependence on world supply of rice could result in a national crisis both politically and economically. The government aims to control the domestic price of rice and has developed a programme to ensure this. The control of rice price is administered by a mechanism composed of a number of devices, the most important of which are the rice buffer stock, import quota, variable 'tariff' and compulsory sales by millers (Brown, 1973). If the world price of rice is lower than the domestic price as it normally is, the government could earn a profit by restricting import and selling the rice at above the purchase price. In doing so, the government could protect the padi farmers at the expense of the consumers. However, if the world price of rice higher than the targeted domestic price, the imports required by the government so as to maintain the domestic price (which the government wishes to maintain) would be greater than what it would take under free trade. Selling below the purchase price would then benefit the consumers at the expense of the government and the rice producers.

Besides the objective of maintaining a fair domestic price for the consumers, the government is also directing its policy towards increasing the farmers' income and reducing the danger of over dependence on foreign rice supply in order to supplement the domestic consumption. Considering that rice is also a "political crop", the government is putting more emphasis on increasing the incomes of padi farmers.¹ Together with other means of increasing rice production such as increasing irrigation facilities, the government is also implementing two short term policies: price support and fertilizer subsidy programmes.

The two policy programmes have incurred a considerable cost to the government. For instance in 1981 alone the fertilizer subsidy scheme cost the government M\$115 millions while that of price support scheme cost M\$175 millions. Besides the social costs which may burden the society, it is not certain whether both programme has significantly benefitted the padi farmers especially in terms of increasing their

¹ Goldman (1976) remarks that rice emerged as a political crop not only because of its strategic importance in consumption but also because its production is almost exclusively identified with the Malay community.

incomes. The high incidence of poverty which still exist among the padi farmers may indicate the ineffectiveness of the two policy programmes in increasing the farmers' incomes. Probably, instead of carrying out the two policy programmes, it may be sufficient to implement an alternative programme that may reduce the government's cost. Such programme may be more cost effective in increasing the farmers' income.

1.3 OBJECTIVES OF THE STUDY

The objectives of this study are to determine the relative effectiveness of the (i) price support and (ii) fertilizer subsidy schemes in augmenting the farmers' income in the context of the national rice policy to achieve self-sufficiency in rice production.

The more specific objectives are:

- (1) To determine the direct and indirect costs to the government in the implementation of the price support and fertilizer subsidy programmes.
- (2) To determine the impact of the programmes on the farmers' income.