UNIVERSITI PUTRA MALAYSIA

PRICING EFFICIENCY OF THE VEGETABLE MARKET IN MALAYSIA

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by

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Thesis Submitted in Partial Fulfilment of the
Requirements for the Degree of Master of Science
in the Faculty of Economics and Management
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To my children;

Fadhilah
Mohamad Fairuz
Fatin Nadiah
Fatin Hanisah

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abstract of thesis presented to the Senate of Universiti Pertanian Malaysia in partial fulfilment of the requirements for the degree of Master of Science.

PRICING EFFICIENCY OF THE VEGETABLE MARKET IN MALAYSIA

by

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April, 1994

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Faculty : Economics and Management

Pricing inefficiency has been blamed as one of the causes for the decline in domestic vegetable production. Structural differences, system of consignment and close price discovery mechanism increase the market power of intermediaries, especially the wholesalers. Hence, changes in the wholesale price are not transmitted to farm level in a similar manner when it increases and decreases. Farm price is more responsive to decreases rather than increases in the wholesale price. Any rise in production cost which does not commensurate with prices received by farmers attract them to switch to more profitable crops or industries which then affects vegetable production.

This study provides empirical evidence to prove that asymmetric price transmission occurs in the vegetable market. Such evidence provides proof to the government that wholesalers use their market power to employ pricing strategies which result in complete and rigid pass-through of cost increases but slower and less complete transmission of cost savings to the farmers. This problem requires effective measures in the effort to enhance the development of the vegetable

industry in the country. The univariate residual cross-correlation approach by Haugh (1972, 1976) and Pierce (1977) and Granger's test of causality were used to ascertain relationships between market levels in price formation. Improved Wolffram's asymmetry procedure with a distributed lag model was adopted and estimated for a subset of fresh vegetables. Time series data on prices consisting of 204 weekly observations were utilized for the purpose. Each series represents the average of five main market centres in the country.

The results obtained show that the wholesale market tends to be a major node for pricing. Both retail and farm prices generally lag wholesale price changes. For the eleven most popular vegetables studied, the evidence clearly indicates that price changes are not transmitted throughout the vertical system. Retail prices tend to adjust quickly to increases in wholesale prices. In contrast, farm prices tend to reflect more fully decreases in wholesale price relative to increases. Thus fluctuations in wholesale prices are not beneficial to both parties.

Improvements in the marketing system geared toward a more competitive market and open pricing mechanism, supported by improvements in production technology are essential to sustain production of vegetables. Any government development programmes such as setting up auction market ,should be critically planned and implemented with the co-operation of all related agencies. The programmes should also be geared towards effective monitoring, collecting and dissemination of market information among market participants.

Abstrak tesis yang dikemukakan kepada Senat Universiti Pertanian Malaysia sebagai memenuhi sebahagian daripada syarat untuk Ijazah Master Sains.

KECEKAPAN HARGA SAYUR-SAYURAN DI PASARAN SAYUR-SAYURAN MALAYSIA

Oleh

SHARIFAH BINTI HASHIM

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Ketidakcekapan letak harga dikatakan sebagai salah satu punca kejatuhan pengeluaran sayur-sayuran tempatan. Perbezaan struktur pasaran, sistem 'consignment' dan proses letak harga yang tertutup telah memperkukuhkan kuasa pasaran perantara-perantara terutama pemborong. Akibatnya, kesan ke atas harga ladang didapati berlainan semasa kejatuhan dan kenaikan harga borong. Harga ladang didapati bertindakbalas lebih cepat terhadap kejatuhan dari kenaikan harga borong. Peningkatan kos pengeluaran yang tidak setimpal dengan harga yang diterima oleh petani telah berjaya mengalihkan perhatian mereka kepada tanaman atau industri yang lebih menguntungkan. Tindakan ini telah menjejaskan pengeluaran.

Kajian ini diharap dapat memberi bukti empirikal mengenai kewujudan transmisi harga yang tidak simetri dalam pasaran sayur-sayuran. Fakta ini membuktikan bahawa pemborong telah menggunakan kuasa pasaran dalam strategi letak harga yang menyebabkan kesan peningkatan kos ditanggong segera dan

sepenuhnya oleh petani manakala sebaliknya berlaku jika terdapat pengurangan kos. Masalah ini perlukan perhatian serius dalam usaha mempercepatkan pembangunan industri ini. Kaedah 'univariate residual cross-correlation' yang diperkenalkan oleh Haugh (1972 dan 1976) dan Pierce (1977) serta ujian sebab-musabab Grangers telah digunakan dalam mendapatkan perkaitan di antara peringkat pasaran dalam pembentukan harga. Kaedah tidak simetri Wolffram yang telah diubahsuai dengan model 'distributed lag' telah digunakan dan dianggarkan bagi sayur-sayuran terpilih. Data siri masa harga bagi 204 minggu mewakili lima pasaran utama di dalam negara telah digunakan.

Keputusan menunjukkan harga borong merupakan penggerak kepada harga ladang dan runcit. Bukti-bukti jelas menunjukkan bahawa kesan perubahan harga tidak tersebar sepenuhnya kesemua peringkat pasaran. Harga runcit didapati lebih cepat berubah mengikut kenaikan harga borong. Sebaliknya kesan kejatuhan harga borong lebih cepat diikuti oleh harga ladang. Oleh itu turun naik harga borong yang keterlaluan tidak memberi faedah kepada kedua-dua pihak, pengguna dan pengeluar.

Pembaharuan sistem pemasaran kearah pengwujudan pasaran yang lebih kompetitif dan mekanisma letak harga yang lebih terbuka, disokong dengan pembaharuan teknologi pengeluaran adalah perlu dalam usaha meningkatkan pengeluaran sayur-sayuran. Program pembangunan perlu dirancang dengan teliti dan dilaksanakan dengan kerjasama erat kesemua pihak berkaitan. Ia juga perlu disusun agar penyeliaan, pengumpulan dan penyebaran maklumat pasaran dapat dilaksanakan dengan berkesan.

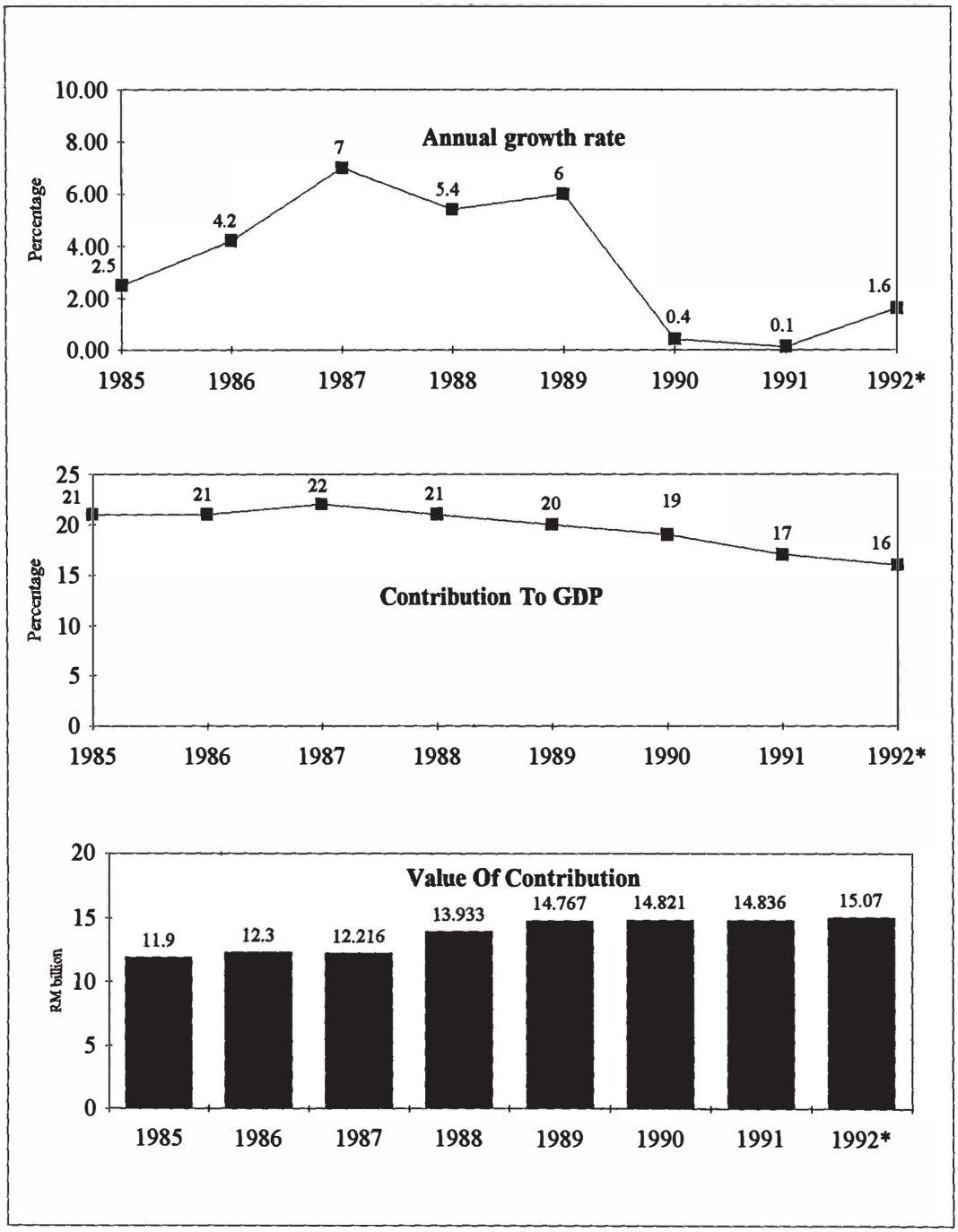
CHAPTER I

INTRODUCTION

Malaysian Agriculture

The agriculture sector remains an important contributor to the national economy. The sector has contributed significantly to the expansion of the Gross Domestic Product (GDP), employment and foreign exchange earnings as well rural development, particularly towards poverty eradication and preservation of the ecological system and environment. In a rapidly diversifying and industrialising economy, its contribution to the GDP, however, fell from 22% in 1987 to 17.3% in 1991 and dropped further to 16% in 1992 (Figure 1). However, in absolute terms, its contribution increased from RM 13.9 billion in 1988 to RM 14.8 billion in 1991 and is expected to increase by 1.6% to RM 15.1 billion in 1992. Thereby remaining as the second most important sector after manufacturing since 1988.

The rapid expansion of the manufacturing sector and a slow down in agricultural production have reduced employment in the agriculture sector from 31.3% (1,759.6 thousand) of the national employment in 1985 to 27.8% (1,837.6 thousand) in 1990. However, it is still expected to be a prime leader in the employment of labour until the end of 1995 with 1,821.9 thousand employment as projected by the Economic Planning Unit in the Sixth Malaysian Plan (Table 1).



Key * : Estimate

Source : Economic report 1990/1991, 1991/1992

Sixth Malaysia Plan 1991 - 1995, Economic Planning Unit, 1991

Figure 1

Agriculture Sector Growth And Contribution To The Gross Domestic Product (GDP) 1985 - 1992

Table 1

Employment by Sector 1985 - 1995

Sector	1985 ('000)	1985 (%)	1990 ('000)	1990 (%)	1995 ('000)	1995 (%)
Agriculture & Forestry	1,759.6	31.3	1,837.6	27.8	1,821.9	23.5
Mining & Quarrying	44.4	0.8	39.1	0.6	40.7	0.5
Manufacturing	855.4	15.2	1,290.2	19.5	1,699.1	21.9
Construction	429.4	7.6	426.9	6.4	547.5	7.1
Non-Government Services[1]	1,716.3	30.5	2,177.0	32.9	2,770.9	35.7
Government Services	819.5	14.6	850.2	12.8	872.2	11.3
Employment	5,624.6	100.0	6,621.0	100.0	7,752.3	100.0

Notes:

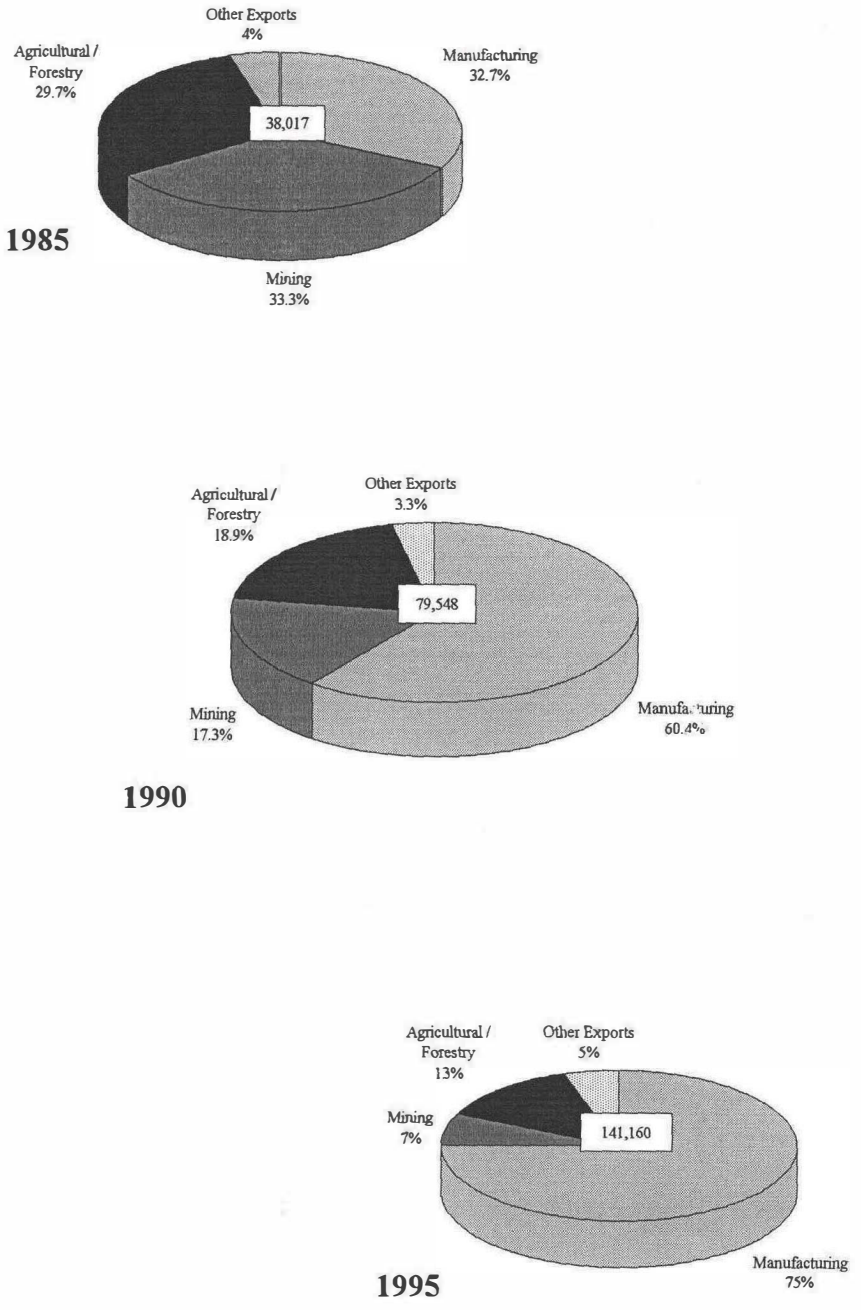
1 Includes electricity, gas and water; transport, storage and communications; wholesale and retail trade, hotels and restaurants, finance, real estate and business services and other services.

Source: Sixth Malaysian Plan (1991 - 1995), Economic Planning Unit, 1991

The contribution of the agricultural sector to export earnings also declined from 29.7% in 1985 to 18.9% in 1990 and is expected to fall to 13.0% at the end of 1995 despite marginal increases of its value from RM 11,281 million to RM 15,099 million in 1990 and RM 18,370 million at the end of 1995. However, it is still the second most important contributor after the manufacturing sector, which contributes more than 60% of the nation's foreign exchange earnings (Figure 2).

Marginal growth in the agricultural sector came from cocoa, palm oil, timber, fisheries and livestock (Sixth Malaysian Plan, 1991). However, production of paddy , coconut , rubber and vegetables declined for the period 1985 - 1995 (Table 2). Production of rubber, paddy and coconut declined by 16%, 9%, and 15% respectively in 1990 compared to 1986. Vegetables were the only commodity which showed continuous declines in production for the period between 1986 and 1990 with a reduction of 6% while the other three commodities indicated some fluctuation in production within that same period.

Growth in production was mainly constrained by the scarcity of suitable land, shortage of labour, increasing cost of production and price received by farmers. In the light of these, the strategy to increase production will thus focus more on a commercial approach that emphasises efficient utilization of resources, wider application of research and development and labour saving devices as well as broader extension services and an efficient marketing system. This programmes under each strategy should be integrated to ensure a reliable and sufficient supply of agricultural inputs to the manufacturing, services and agro-based industries which are increasing in importance. It also enables a sustainable development and improvement in income for those remaining in the agricultural sector.



Notes : Figures are percentage of total exports

Source : Sixth Malaysia Plan 1991 - 1995, Economic Planning Unit, 1991

Figure 2

Exports by Sectors 1985 - 1995
(RM Million)

Table 2

Production of Agricultural Commodities, 1985-1990
(`000 Tonnes)

Item	1985	1986	1987	1988	1989	1990
Rubber	1,470	1,539	1,579	1,662	1,422	1,291
Crude Palm Oil	4,133	4,544	4,533	5,030	6,055	6,095
Palm Kernel	1,212	1,336	1,311	1,413	1,794	1,845
Sawlogs *	30,956	29,869	36,149	37,728	39,709	41,000
Sawn Timber *	5,550	5,424	6,222	6,684	8,322	8,900
Cocoa	108	132	191	225	250	262
Padi	1,953	1,745	1,697	1,786	1,640	1,590
Pepper	19	15	14	19	27	29
Pineapple	153	144	150	164	168	173
Tobacco	9	14	11	7	13	10
Fruits **	852	887	1,046	1,078	1,118	1,165
Vegetables **a	212	275	267	264	260	258
Coconut ***	1,826	1,374	1,590	1,579	1,568	1,557
Fisheries						
Marine	575	562	859	826	822	830
Aquaculture	51	51	45	46	68	75
Livestock						
Beef	17	16	16	18	18	18
Mutton	1	1	1	1	1	1
Poultry	251	279	310	335	344	368
Eggs ***	3,395	3,618	3,819	4,255	4,394	4,718
Pork	164	162	181	192	202	211
Milk «»	24	27	28	29	31	34

Notes:

* Measured in thousand cubic metres

** Refers to Peninsular Malaysia

*** Measured in million units

«» Measured in million litres

**a Figures are based on Federal Agricultural Marketing Authority (FAMA) survey report. However figures for the year preceeding 1990 are adjusted according to percentage decline as reported in Sixth Malaysian Plan (1991 - 1995); Economic Planning Unit, due to factors such as incomplete coverage of the study.

Source: Sixth Malaysian Plan 1991-1995, Economic Planning Unit, 1991

: Annual Reports on Vegetable Production, Federal Agricultural Marketing Authority (FAMA), 1990

The Vegetable Industry in Malaysia

The vegetable industry contributed RM 70.3 million to foreign exchange earning in 1989, an increase of 44% from year 1988. A slight decline in export of vegetables, however, occurred in 1990 (Table 3). Export of vegetables was only RM 66.5 million in 1990 and declined further to RM 35.6 million in 1991. Increasing domestic demand and restricted import demand due to concern over pesticide residual are among the important factors for the drop in exports. Even though Malaysian vegetable exports declined, demand from Singapore, the country's largest importer, is expected to increase as depicted in her trend of imports. Singapore has always been the major market for Malaysian fresh vegetables accounting for about 70% of the value of exports. Since there is a ready market for vegetables in Singapore, Malaysia can increase its exports by utilising the established business link between the two countries provided that Malaysian farmers can supply an adequate quantity and varieties at reasonable prices and quality that are competitive enough compared to other producing countries such as Indonesia and Thailand. Hence, this could increase the contribution of the vegetable industry to the country's foreign exchange earnings.

The country is also a net importer of vegetables to meet increasing local demand. Imports of fresh, chilled and frozen vegetables in 1990 and 1991 were RM 245 million and RM 281 million, respectively (Table 4). The main imports were onions, garlic, potatoes, cabbages, carrots, chillies, ginger, celery and tomatoes. The increasing trend of imports which constitute around 27% - 29% of the total vegetable requirement in the country is alarming, especially when exports and production are declining.

Table 3

Exports of Vegetable Into Selected Countries
1989 - 1991

Country	1988		1989		1990		1991	
	Tonnes `000'	RM `000'	Tonnes `000'	RM `000'	Tonnes `000'	RM `000'	Tonnes `000'	RM `000'
Singapore	99.72	38,160.50	121.82	48,277.90	124.96	52,935.10	51.99	24,965.60
Brunei	0.19	379.10	1.48	2,156.20	1.43	2,602.80	0.36	919.60
Indonesia	3.78	4,061.80	19.19	12,218.80	10.81	7,528.30	15.55	6,691.30
Thailand	0.86	1,094.40	1.57	1,405.50	1.03	1,260.60	1.31	1,115.50
Others	2.44	5,079.20	3.27	6,198.40	1.01	2,177.30	5.57	1,948.60
Total	106.99	48,775.00	147.33	70,256.80	139.24	66,504.10	74.78	35,640.60

Source : Department of Statistics Malaysia.

Table 4

Imports of Fresh, Chilled or Frozen Vegetables 1988 - 1991

	1988		1989		1990		1991	
Commodity	MT	Value (RM)	MT	Value (RM)	MT	Value (RM)	MT	Value (RM)
Potatoes fresh Chilled	33,079.34	9,029,509	25,743.38	7,934,140	13,445.80	4,131,173	2,619.52	971,504.00
Other Potatoes, Fresh or Chilled	26,550.38	12,160,676	37,388.48	14,097,351	48,737.79	20,045,430	58,619.14	23,314,833
Pea Nut	1,793.22	1,919,254	2,174.94	2,595,435	4,262.74	4,569,852	3,763.37	4,167,077
Chick Peas	3,180.36	2,781,644	2,815.74	3,259,374	3,130.56	4,553,875	3,723.97	4,863,592
Beans	5,086.03	3,826,022	7,978.81	5,417,279	5,538.13	4,549,647	5,877.13	4,285,989
Tomato Fresh Chilled	4,814.18	2,319,647	4,285.24	2,161,095	5,086.38	2,695,521	3,717.19	2,163,363
Onions & Shallots	109,520.84	84,293,367	135,395.40	95,605,422	125,670.61	93,946,162	129,383.25	105,643,739
Garlic	37,004.46	48,057,046	34,189.88	43,431,968	32,715.70	45,474,861	38,827.06	60,606,248
Leeks	3,341.46	3,372,893	2,703.13	2,588,390	2,101.08	1,869,440	1,764.45	1,639,967
Cauliflower & Broccoli	6,377.08	12,846,621	6,673.09	14,102,471	6,633.06	15,280,979	6,330.80	16,304,777
English Cabbage	20,538.47	8,842,809	18,018.98	7,528,399	28,835.12	10,017,012	29,403.00	12,255,420
Other Cabbages	4,307.41	2,586,261	3,468.25	2,162,539	2,118.78	1,503,535	1,150.52	1,085,177
Carrot & Yam bean	10,800.01	13,668,942	12,190.55	14,520,290	12,881.70	16,810,611	13,522.70	21,380,112
Salad Beefroot	1,666.66	1,340,471	1,715.84	1,666,407	1,987.23	2,081,043	2,871.10	2,856,384
Celery O/T Celeriac	1,425.06	1,983,453	1,338.65	2,145,720	1,545.70	2,467,425	1,297.30	2,154,816
Fresh Chillies	5,377.21	2,914,921	4,863.86	2,530,850	5,706.47	3,187,289	6,540.46	3,483,443
Ginger not preserved	6,206.00	3,309,315	5,906.99	3,848,000	6,689.39	4,156,277	4,715.64	3,822,563
Kale	1,103.10	1,184,709	1,068.70	1,160,223	1,405.42	1,306,652	1,150.67	1,204,247
Other Fresh Vegetables	3,547.71	3,603,078	3,312.83	3,074	4,207.74	3,841,562	3,120.27	2,649,056
Other Chilled or Frozen Vegetables	1,759.38	2,245,355	2,155.32	2,272,022	2,175.85	2,317,175	6,733.66	2,657,203
Total	287,478.36	222,285,993	313,388.06	229,270,453	314,875.25	245,451,907	325,131.20	281,216,143

Source : Department of Statistics , Malaysia

There were about 10,200 hectares of land devoted to vegetable cultivation in 1991 out which 76% were in states of Johore, Perak, Pahang and Selangor with the statewise distribution having a total hectarage of 2803, 1803, 1673 and 1522 respectively (FAMA 1992a). About 13,000 farmers were involved in vegetable production, where 61% of them were in Pahang, Perak, Johore and Selangor (Table 5).

Although the hectarage and the number of farmers involved in this industry are considered small compared to other commodities such as rubber and paddy, vegetable cultivation is recognised as a potential crop for diversification and is encouraged in most developing countries (Moon Chi Wok, 1986). Cultivation of vegetables is more profitable than that of cereal crops on small scale farm-land. In Malaysia, a farmer who cultivates one hectare of land can earn a gross income of about RM 1,000 per year from non irrigated rice cultivation and RM 3,000 per year if the land is irrigated. But he can earn RM 8,000 per year if he plants vegetables as a monocrop (Moon Chi Wook, 1986). It is also estimated that commercial vegetable producers of 20 hectares can earn an annual gross income of RM 680,378 or RM 34,000 per hectare (Ministry of Agriculture, 1986). Since the cultivation of vegetables is far more remunerative than rice, it could become a potential source of profitable income. Furthermore, vegetable cultivation is more flexible in terms of utilization of resources and is easily marketed for cash returns.

Vegetables are also an important source of vitamins and minerals which are important contributors to good health. Greater health awareness among local consumers together with an increasing standard of living, has increased consumption of vegetables in the country. Revised consumption figures released by FAMA in 1992 show that annual percapita consumption of 53 type of vegetables

Table 5

Hectarage of Vegetable Farms and Number of Farmers in Peninsular Malaysia, 1991

State	Hectarage	Number of Farmers	Average Farm size
Johore	2,803.31	1,688	1.66
Kedah/Perlis	699.87	817	0.86
Kelantan	472.88	1,610	0.29
Malacca	465.48	650	0.72
Negeri Sembilan	151.95	179	0.85
Pahang	1,673.05	2,568	0.65
Penang	210.85	441	0.48
Perak	1,802.51	2,433	0.74
Selangor/Fed.	1,521.71	1,172	1.30
Terengganu	445.24	1,364	0.33
Total	10,246.85	12,922	0.79

Source: Federal Agricultural Marketing Authority (FAMA), 1992

had increased from 38 kg in 1982 to 45 kg in 1985 and 53 kg in 1988, but decreased to 50 kg in 1991 (Table 6). As a group, vegetables and fruits percapita consumption increased from 63 kg in 1982 to 81 kg in 1991. These figures are still below the world average percapita consumption for fruits and vegetables which was 87 kg . Malaysia's percapita consumption is also very low when compared to the consumption levels of Japan, Taiwan and South Korea which was 94 kg and of Western Europe and North America which was 145 kg - 188 kg as indicated in Figure 3 (Moon Chi Wook, 1986). However with recent positive attitude towards health food, it is expected that domestic consumption will increase at least to the level of Japan or Taiwan in the near future which indicates a good scope for domestic market expansion.

Although the importance of the vegetable industry to the Malaysian economy is not as significant as rubber, oil palm and cocoa, its contribution cannot be denied especially as a source of healthy and cheap food to fulfil increasing domestic demand. The importance of this industry is reflected in the National Agricultural Policy (NAP) where the policy for this commodity has been spelt out in line with other industrial crops. The new NAP (1992 - 2010) states that;

"Vegetable production will be expanded substantially to meet the increasing local demand and for export. Production will also be diversified to include indigenous varieties such as 'ulam' whose cultivation will be encouraged on a commercial scale. In view of the decline in areas for vegetable gardening in urban and semi-urban areas, specific areas including highlands will be identified and zoned as vegetable growing areas. Environmental constraints and shortages of land in the highland will necessitate its most optimal and rationalized usage for vegetable cultivation. Quality and standards including sanitary requirements will be emphasized. New cost effective methods for the production of high valued vegetables, both temperate and lowland, will be pursued".